

# Critical Conversation into Action: Fostering Students' Mathematical Identities

## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

### TRANSCRIPTION

**Robin J.:** Good afternoon and welcome to the *EquiLearn Virtual Roundtable*. My name is Robin Jackson, Products Coordinator here at the Midwest & Plains Equity Assistance Center and I'll be serving as your Host and Technical Director today. Today's *Virtual Roundtable* is entitled **Critical Conversations into Action: Fostering Students' Mathematical Identities**. In this *Virtual Roundtable* participants will: learn, revisit and discuss productive mathematical beliefs about students' learning; learn and discuss how to foster equitable learning environments that affirm learners' mathematical identities (such as encourage students to see themselves as problem solvers, capable of making valuable contributions to the mathematics and validate students' knowledge, and live experience as learners) and leverage multiple mathematics competencies such as presenting mathematical tasks with multiple entry points; and finally, we will learn how to reflect on how current mathematical environments can be strengthened to further promote equitable learning for all students.

**Robin J.:** Please consider this time an informal space to share your thoughts and insights, leverage learning from other educators and to ask questions. Give me one second. Next slide please. Can you go back to the commitments please, at the beginning? There we go. During today's Roundtable, we will align to the Four Commitments for Courageous Conversations when discussing the topic. First, stay engaged. Second, experience discomfort. Third, speak your truth and lastly, expect and accept non-closure. Next slide please.

**Erin S.:** Hello, my name is Erin Sanborn and I'm a Doctoral Research Assistant here at the Map Center. I will be serving as your Assistant Technical Director

Copyright © 2020 by Great Lakes Equity Center

The contents of this document were developed under a grant from the U.S. Department of Education (Grant S004D110021). However, the content does not necessarily represent the policy of the Department of Education, and endorsement by the Federal Government should not be assumed.

## Critical Conversation into Action: Fostering Students' Mathematical Identities *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

today. *EquiLearn Virtual Roundtables* are intended to be interactive. Participants are asked to interact in real time via our teleconferencing format. Also, to reduce noise we ask that all participants please mute your microphones when you're not speaking. Lastly, the video camera function has been turned on, so if you have a webcam and would like to join us, please feel free to do so by clicking the camera icon at the lower right hand of your screen. Please feel free anytime throughout the presentation, throughout the Virtual Roundtable if you have any questions or comments or technical concerns, please feel free to use the chat message directly if you need anything at all. Again, please don't forget to mute your microphones when you're not speaking. Thank you.

**Robin J.:**

Next slide please. And these are just pictures of Erin and I for your viewing pleasure. Next slide please. Thank you, Erin. Next, I'm pleased to introduce our Roundtable facilitators, Dr. Marilyn Strutchens is an Emily R. & Gerald S. Leischuck Endowed Professor, Mildred Cheshire Fraley Distinguished Professor and Coordinator of Secondary Mathematics Education at Auburn University, Auburn, Alabama. Her research focuses on equity issues, clinical experiences for secondary teacher candidates, teacher change and teacher leadership in mathematics education. She is an editor and author of several mathematics educational publications. In addition, Dr. Strutchens serves as a leader for Clinical Experiences Research Action Cluster of the Mathematics Teacher Education Partnership, an initiative of the Association of Public and Land-Grant Universities.

**Robin J.:**

Dr. Jami Stone is an Associate Professor of Mathematics Education in the College of Education and Behavioral Sciences at Black Hills State University in Spearfish, South Dakota. Her research interests include equity

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

and mathematics education and pre-service students co-planning and co-teaching during their clinical experiences. Prior to earning her Ed.D. in Educational Studies from the University of Nebraska-Lincoln, Jami taught grade 8-12 mathematics in Nebraska for 21 years. Welcome, welcome, welcome. I'll now turn it over to Dr. Stone.

**Jami S.:**

Thank you Robin so just a recap of the anticipated outcomes for this *Virtual Roundtable*. We hope that participants will learn, discuss, and revisit productive mathematical beliefs about students' learning and how to foster equitable learning environments that affirm all learners' mathematical identities and leverage multiple mathematics competencies within them. And you'll have the opportunity to reflect on how current mathematical environments can be strengthened to further promote equitable learning for all students.

**Marilyn S.:**

Good afternoon. It's my pleasure to be with you. And we like to start by just sharing some definitions of equity. Educational equity means that every student has access to the educational resources and rigor they need at the right moment in their education across race, gender, ethnicity, language, disability, sexual orientation, family background, and our family income. In other words, there are no barriers to learning for any students, and each and every student has the opportunity to learn meaningful mathematics. Next slide please. So, Rochelle Gutiérrez states that equity means being unable to predict students' mathematics achievement and participation based solely upon characteristics such as race, class, ethnicity, sex, beliefs, and proficiency in the dominant language. Next slide, please. We would like for you to ponder this question for a moment and then write your response in the chat.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

- Marilyn S.:** Why must educators not predict what students are capable of? So, why is it important for educators not to be able to predict what students can do? So just take a few minutes, or a minute, so we can keep moving to writing your chat.
- Jami S.:** And Erin or Robin, is someone going to read out some of the comments?
- Erin S.:** Sure. Robin, would you like me to, or would you like to?
- Robin J.:** If you could, please.
- Erin S.:** Okay, um. I noticed that, um, is it ... I was going to try and do names, but I don't want to mess up anybody's name on Zoom. But we have, um, "prediction can often be rooted in implicit bias and it can limit students' potential." "Teachers and educators don't know truly what students are capable of." Um, "I like the metaphor: It's like a horoscope. What you predict or say can be seen as reality." Oh ok, um, and just again speaking to, um, individual lens and bias and that will inherently select and sort students into those that can, and those that can't, and their actions will follow in bolster this thinking. So it will it impact what students think they can do.
- Robin J.:** What I also see here is this idea that going into a situation, um, with preconceived ideas about what students can and can't do will, um, cause you to limit them, uh, limit your perception of them and what they're capable of doing, and also may even project onto the students the same type of limitation.
- Marilyn S.:** Thank you all for participating and answering that question. And many of the statements that you made can relate to people's growth or fixed mindsets. And this growth or fixed mindset comes from the work of Carol

Copyright © 2020 by Great Lakes Equity Center

The contents of this document were developed under a grant from the U.S. Department of Education (Grant S004D110021). However, the content does not necessarily represent the policy of the Department of Education, and endorsement by the Federal Government should not be assumed.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

Dweck, and then Jo Boaler and others have built on her work. And they talk about students with the growth mindset believes that intelligence and smartness can be learned. Uh oh, can you go back? Yes. And then students with growth mindsets work and learn more effectively displaying a desire for challenge and resilience in the face of failure. And then students with a fixed mindset believe that you're either smart or you are not. When students with the fixed mindset fail or make a mistake they believe that they are just not smart, and give up.

**Marilyn S.:**

And it's important for us as teachers and administrators to examine what kind of mindsets we have because our mindsets impact what we do with our students, how we interact with them, the kind of tasks that we pose, the kind of policies that we have in place in our schools. Oftentimes, tracking is an, is an, is an um example of people having fixed mindsets because they put students, oftentimes, into dead end courses instead of giving all students the opportunity to reach their full potential. And so, if cultivate...if we want to cultivate growth mindsets in our students, then we have to have growth mindsets about our students. And we have to provide them with opportunities to be able to persevere and to develop growth mindsets of their own. Ok, next slide please. And I'd also like to talk to you...because I mentioned the dangers of fixed mindsets and tracking and things like that.

**Marilyn S.:**

But those aren't the only things that pose problems for our students. Uh, many of you mentioned being able to, like, predict limit students' opportunities and also may cause teachers not to interact with students in favorable ways that could actually help students realize their full potential. So some harmful assumptions from Francis Su are, based on some nonacademic characteristic, I can prejudge a mathematical aptitude.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

Sometimes students are judged not by what they can do academically, but sometimes by, uh, whether or not they sit still and pay attention in class, uh, based on whether or not they come from a high socioeconomic status group or a low social economic group and these are demographic factors rather than academic abilities. And then sometimes people feel like they can base students'...uh, determine their mathematical abilities based on their grades.

#### **Marilyn S.:**

Like say if a student got a B in Algebra 2. Sometimes people might think that student can't go to Calculus, or the next class above Algebra 2, which really limits the student's potential. And a grade doesn't necessarily tell you everything that a student can do. And if a student is making a B in a class, that student is doing well. And then low performing students must be capable...must be incapable or lazy. And we don't want to think about low performing just being about and incapable of lazy. Sometimes students might be bored. Sometimes when students transfer from one school to another, their transcripts aren't examined well, and the information about the student isn't passed on along well enough, and they're placed in lower level classes than they should be and that impacts their performance. And then some so times they're just not motivated by what's happening in the classroom.

#### **Marilyn S.:**

So a lot of times it's not just about who the student is, it might be about what's happening in the classroom. And then mathematical teaching doesn't involve culture. We must think about students' culture in the classroom, especially in our diverse classrooms that we have these days where we have students coming from different countries, where we have students who've experienced different life situations. It's always important

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

that when we provide a problem that has a context, that we ensure that students understand the context so that they can all be on the same page in terms of thinking about how to solve a particular problem. And then-

**Robin J.:** Excuse me. Dr. Strutchens?

**Marilyn S.:** Yes.

**Robin J.:** We have a question for you.

**Marilyn S.:** Ok.

**Robin J.:** Tad Johnston says, “what word do you use to describe deciding what activity is best for a student at a given point in time, or the resources and rigor they need at the right moment in their education, if not making a prediction about what they can do and what they should do at the time?” So if we're not making predictions, then what is the terminology for that?

**Marilyn S.:** So, if you're not making predictions, you're basing what you do on what you actually had an opportunity to learn about a student, what you have based on students' records, in terms of their academic records. You can even do diagnostic tests yourself to find out what students know and can do. You can do interviews with the student, you can...there are a lot of different ways that you can find out what students are ready and capable of doing. And a lot of times, sometimes it helps to just walk into the room and say to your students, "I have students who are capable of reaching high heights." And you can see the smiles on their face because you're walking into the room saying that you believe in them, and that you want them to succeed. And a lot of it is really getting to know your students as individuals, and not based on assumptions that you have about different groups of students.

Copyright © 2020 by Great Lakes Equity Center

The contents of this document were developed under a grant from the U.S. Department of Education (Grant S004D110021). However, the content does not necessarily represent the policy of the Department of Education, and endorsement by the Federal Government should not be assumed.

## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

**Robin J.:** Thank you Dr. Strutchens.

**Marilyn S.:** Are there any other questions about the definition before-

**Robin J.:** No, I don't see any others.

**Marilyn S.** Ok...but really it's just about getting to know who your students are, doing some kind of diagnostic tests. Not necessarily a test, but some kind of way of finding out what students know and are ready to do. So, it's doing some kind of readiness activity even, to find out what they can do. And using multiple entry-level tests. That can help you to find a lot about where students are for a particular topic, and some of the things that they already know, because you can see where their starting point is. And then, um... where was I? Ok. I'm doing a student a favor by telling him or her to leave math. You're never doing a student a favor by telling them to drop out of math. What you're doing is lessening the options that they'll have for future careers, and so on. And then only some people are math people. We don't want students to believe that only some people are math people.

**Marilyn S.:** We want to teach mathematics in a way so that all students believe that they can do math. And then there are low kids and high kids. We don't want to think about students in that way. And that math is not political. That's not true. Mathematics is used in a lot of ways politically like gerrymandering when it comes to voting and so on. And so, we want to really think about mathematics in a lot of different ways, and we want to change mathematics from being a gatekeeper to a door opener for many students. Ok, next slide please.



## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University

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

**Jami S.:**

Thank you Marilyn. And before I go to this slide, I wanted to give a plug, I put it into the group chat, but the book, *How to Differentiate Instruction in Academically Diverse Classrooms*. This is the third edition of Carolyn Tomlinson's differentiation book and this is...ok...we don't do the ... teach to the middle, go up, go down. You teach up. And then it's our responsibility as educators to scaffold the learning for those that are not, um...you know that need more, um, more scaffolding, basically. So rather than doing what it used to be. So, going on to the point of interruption, this quote is from the National Alliance for Partnerships in Equity. And the word I like to use rather than interrupting is to disrupt. Right now we're...all our lives have all been disrupted by the COVID-19 pandemic. However, we are, uh, making adjustments and that same thing can happen to what occurs in our classrooms, and our neighbor's classrooms, our schools, and so on.

**Jami S.:**

We need to, uh, shut down the negative micromessages. so that we do foster students' self-efficacy, and we need to eliminate these cultural stereotypes. We're all people. Next slide please. So, on the micromessages that teachers send to their students and staff member or their colleagues, we need to focus on the micro-affirmations. That's what effective teachers do. They value all students. They have inclusive classrooms, they're encouraging, they're intentional with the work, and they are always positive to help move students forward rather than looking at what they can't do. And going back to our colleagues, there's times, um, when just like Marilyn said about a teacher telling a student that they're not calculus material, thinking that they're doing them a favor and they're not. Um, colleagues that say, "Oh boy, this student, he's a handful." That doesn't do anybody any good.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

**Jami S.:**

That doesn't do the student any good. And it doesn't do the person that received the message any good. It might have been that that person was a handful in your classroom, but don't prejudge how they're going to act in my classroom. So, we have to have that clean slate as Angelica, I believe, put in the chat box. Everything should be a clean slate, so. Next slide please. All right. And so, we all know that these stereotypes exist about people. We have these implicit biases. One, that's a step in the right direction to recognize the implicit bias that we all have, but then to continue to work so that those biases are eradicated. And so, we want to keep those micromessages to be affirming, not, um, derogatory or deficit thinking. And because we do, all students are capable of learning to the amount, um, the degree of learning that's different, but learning isn't a race.

**Jami S.:**

So, we have to remember that, that we're all, um, on the spectrum of learning, so. If you could go to the next slide please. An excellent resource about learning more about the impact of our words on students' mathematics identities can be found in the book, *The Impact of Identity and K-8 Mathematics*. That's where it happens. I am so happy when someone comes up to me and says, "I loved math. It was a challenge for me, but I enjoyed the challenge." Unfortunately, I don't get that message near as often as I hear the other one. It's become socially acceptable to say, "I was never good at math." And this is something...a mindset that needs to be eradicated, going back with Dweck, and thinking about a growth mindset. You might not know it now, but with persistence and perseverance, you can learn. Next slide please.

**Jami S.:**

All right. So, from the text, some of the key ideas about mathematics identities is the fact, how does a person believe about themselves as a

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

mathematics learner? And those perceptions are sometimes worried about how others view us and our ability as a mathematics learner. Also, the belief about the nature of mathematics. Rather than saying, "Oh, this is hard," think of mathematics as a challenge, as a puzzle that needs to be solved, rather than something that can't be done. And engagement is huge. Students that are not, um... that the...if we don't teach up and challenge everyone in scaffold, you're going to have students that are bored and will find something else to do. So mathematical engagement is so important. And then being an active learner. This is so important in a mathematics classroom.

- Jami S.:** And I love when I can go into one of my interns' classrooms where she's with, uh...where he or she is with a clinical educator, and I can just tell by looking at it how the desks are shaped whether or not they believe in students learning from themselves, or whether they are looking at it just as teacher directed...you learn from the teacher. Next slide please.
- Erin S.:** Ok, please....Dr. Stone, we have a question. Could you repeat the name of the book that you mentioned, and I'll put it in the chat?
- Jami S.:** Sure. It's *The Impact of Identity in K-8 Mathematics* by Julia Aguirre and Mayfield Ingram.
- Erin S.:** Thank you.
- Jami S.:** You're welcome.
- Marilyn S.:** And Danny Martin.
- Jami S.:** And Danny Martin. Thank you for that.

Copyright © 2020 by Great Lakes Equity Center

The contents of this document were developed under a grant from the U.S. Department of Education (Grant S004D110021). However, the content does not necessarily represent the policy of the Department of Education, and endorsement by the Federal Government should not be assumed.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

- Marilyn S.:** Okay. So now that we've talked about, um, students' mathematics identity and what it entails. What we would like for you to do is to read the three cases that you have in your Google doc. And two of them are really short, uh, they're about half a page each. And then the other one is a page. So, we're going to give you about five minutes to read the cases, and then answer the questions, um, related to the cases. How would you characterize each student's mathematics identity? What factors are impacting each student's identity? And what can a teacher do to strengthen each student's mathematics identity? So, we'll give you about five minutes to read the cases, and then, um, respond to the questions in the chat.
- Erin S.:** If you need access also the link is in the chat.
- Jami S.:** Oh, thank you. I was just getting ready to put it in there, so.
- Marilyn S.:** Thank you.
- Robin J.:** And, also feel free during these few minutes while you're reading, um, to drop any questions that you have specifically about the topic today, or for Dr. Stutchens or Dr. Stone.
- Robin J.:** Um, Kathy, um, there is a link to the Google drive that was just posted in the chat bar to the case studies.
- Robin J.:** Dr. Stutchens or um, Dr. Stone?
- Jami S.:** Yes.
- Robin J.:** There's a question here. Uh, let me see. Victor Percy says, "I teach in higher ed and my students have a hard time unlearning their negative

## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University

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

beliefs about their mathematical identity. Um, I was wondering if someone could speak to that at some point.”

### **Jami S.:**

I've learned so much from my...my introduction and collaboration with the Midwest & Plains Equity Assistance Center to help me in this area. Um, because that's where I learned about asset-based thinking, and thinking about what a student, er, a person can do, rather than what they can't do. And, um, even in my writing of an email or, my daughter I'm helping her on her paper, we all have those negative connotations that we want to include, but I make her take'm out. It's like you shut it down. And also...and I don't want to say no, we can't talk this way. But, um, going back to what Rochelle Gutiérrez has done with her, um...in her shoes activity, which I don't know if you don't know about it, it's basically about, um, empathy. How would it feel if someone did that to you? And if you can make those new, um, those pre-service teachers recognize how it feels if they were labeled and marginalized, they might have a different feeling, so.

### **Marilyn S.:**

And I also think that it's important to put them in situations where they can see that they are strong mathematics people. like giving them multiple entry-level tasks that they solve and are victorious in solving them. And helping them to see that, um, mathematics is more than just memorizing a bunch of algorithms. Giving them the opportunity to really think through problems and see that they can be successful. I think that helps build a more positive mathematics identity than just, uh, telling them to just stop saying negative things about themselves. I think it's important that they don't say negative things, but I think it's important that they see themselves as doers of mathematics that are put in situations where they can converse

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

with others about mathematical problems, and that they're valued. That their thinking is valued.

**Marilyn S.:** So I think all of that is really important. Having them to speak positive things about themselves, and putting them in situations where they have to struggle through a problem but then actually be victorious in solving it. So, it's kind of like going from, uh, frustration to elation. And so, that helps to build their mathematics identities.

**Jami S.:** All right. Looks like we have some feedback about the case studies.

**Marilyn S.:** Ok, and some people mentioned that Craig's identity, they said that I can do math, like...oh, I forget that these things move as people put them in. Like the challenge, but it's not getting me status in the classroom. So they're getting at that Craig had really strong mathematics abilities, but he was not valued or respected. He wasn't a part of the classroom. And then they said that, um, teachers focusing on instruction and Tom or other students and not really providing Craig with some quality time. And then, um, another said, Caroline has a strong and positive math identity, believing she's strong in math and she also knows other others think she's strong in math. She's engaged and has strong self-efficacy. And the other say Carolina is confident. She feels respected and valued, and so on.

**Marilyn S.:** And then another says, students like those in the vignette have positive math mindsets until they are exposed to situations that tells them they should think differently. It seems as though, as though, this is the case for many. It's just that the times comes at different times and points to different people. And so, I think it's really important that we think about Caroline's situation. She felt respected and valued, but not only was Caroline

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

respected and valued, other members of her class were also. Like her teacher differentiated instruction. She used multiple entry-level tasks, and she provided students opportunities to work in groups. Whereas Craig oftentimes, you know, he was stifled. He couldn't speak and answer questions in class. And so, it's really important that even though gifted students can do mathematics, that they feel valued and that they can contribute to the classroom discussion.

- Marilyn S.:** And then I think people haven't gotten a chance to read about Calvin as much. But Calvin also was really strong in mathematics, but then Calvin was, um, hyperactive in class. And so, when he was getting ready to move to the sixth grade, um, his teacher didn't recommend him for pre-algebra, which he was really capable of doing, but because of his behavior in class and his disability, so to speak, the teacher didn't think, um, that he could handle pre-algebra. And so-
- Robin J.:** Um, Dr. Strutchens?
- Marilyn S.:** Go ahead.
- Robin J.:** Dr. Stutchens, actually I had a question about the vignettes in my email. The person writes, "it seems that the vignettes focused on already high achieving students. Why not bring in students not yet high achieving?"
- Marilyn S.:** Ok, so, we focused on those vignettes because they were available. No, I'm just kidding. That's part of it, but also to show that students can be successful and still not get what they need. Whereas, and especially Calvin as and the author of Calvin's Vignette, Dr. Robert Berry, referred to him as a Black boy. And I think that's really important to think about. Calvin, even

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

though he was successful in mathematics, he was about to be denied access to more higher learning, more advanced mathematics, which he was highly capable of doing. And, um, so, we wanted to show with these vignettes that even though students may have strong mathematics identities, that sometimes they are not able to realize their full capabilities because of tracking, or because of, um, wrong decisions made by teachers and other policies that might be in place.

**Marilyn S.:**

And then also, um, just think about Craig. If he didn't have someone at home, uh, pushing him and encouraging him to continue believing in himself and doing mathematics the way that he does, what do you think would happen to him in the classroom eventually? He would give up. And so, it's not...we're not ignoring the fact that we have students that are not excelling in school, and that they need to be paid some attention to, but we're also showing that all students need, uh, to be treated equitably. And then, uh, and there are a lot of vignettes and there are a lot of situations where students aren't succeeding in mathematics. When you look at the NAPE data, you can see that there are a lot of disparities and a lot of disparities in terms of students' achievement. And so, when we think about the disparities that exist, we have to look beyond the data, beyond the test scores, and think about what's happening in the classrooms.

**Marilyn S.:**

So, if you think about Caroline, um, she was in a strong teacher's classroom that differentiated instruction, and probably the students who weren't gifted were also succeeding in mathematics because the teacher was doing enough to meet the needs of each and every student. But then, um, when you think about Calvin and his situation, it seemed like people didn't want, um, to move him forward in an upper level class because he might distract



## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

others, versus, um, focusing on what he needed as a strong math student. And so, there are a lot of, um, things that we can do to foster each and every students' mathematics success in the classroom. Whether we're talking about students who are already strong, or students who need additional help. And, uh, Dr. Stone mentioned differentiating instruction. Uh, we've been talking about using multiple entry-level tasks.

**Marilyn S.:**

We've been talking about really getting to know our students. We've been talking about using context that students can understand when they're solving problems, so that they don't get caught up in the context and not be able to do the math. We've been talking about valuing students, giving them challenging problems, uh, supporting them to be able to reach the challenge that you give to them. So, even though we're using these vignettes, there are a lot of different things that we can extract from those three vignettes.

**Erin S.:**

We had a comment from, from Victor in the chat who brought up that this, this makes him think of the colonization and assimilation of, of school, and the factory style of the education system, and how often teachers are forcing to enforcing rules or policies or practices, uh, that end up distracting from learning and growth.

**Jami S.:**

I'll address that question. I left the high school classroom in 2003 right when No Child Left Behind was getting geared up. However, the, uh, Elementary and Secondary Education Act was enacted in, what, 1964. However the thing about the factory model, of course, I don't believe in that, I had to read in one of my doctoral classes called *Readings in Rural Education*. We read Charles Dickens, *Hard Times* back from the late 1800s, and it talked about this type of education, and because it was the factory-style with the growth

## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

of the industrial revolution. However, it's our job to disrupt that...that belief. And we're doing it because we have to. Well, if it doesn't produce the results that we want, um, punishing students by making them do less art and music and physical education and more math is not the solution to it.

**Jami S.:** It's by using the resources that Marilyn mentioned earlier with the differentiation, um, rich tasks that have multiple entry points. Um, using the five practices of orchestrating mathematics discussion. It's not about getting to that next; we have to get teachers and principals if necessarily too if their breathing down the back, but that's not how we learn. It's we want to learn for deep understanding, not as the United States has already been labeled, our curriculum a mile wide and an inch deep.

**Marilyn S.:** Ok. And so, um, someone mentioned-

**Erin S.:** I had a question about, "how do we utilize our privilege as math teachers to advocate for the often-ignored subjects like art, music and PE?"

**Jami S:** Integrate.

**Marilyn S.:** I agree.

**Jami S.:** That's my whole thing. You can find mathematics everywhere, um, and we need...that's again about curriculum. Rather than looking at compartmentalized topics, everything, um relates to everything else if you view it that way.

**Erin S.:** And then I know, I know we're up against time, so I don't know if you want me to keep reading questions, but we had another one about, um, how and only one of the vignettes, that only one of the students race was stated in

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

the vignettes, and that, um, Danny Martin stated that race is central to understanding how students develop mathematics identities. So, what are, what are your thoughts regarding, um, what this could look like in mathematics classrooms and/or experiences?

**Marilyn S.:**

Well, I think it's important that we think about, uh, students' experiences based on their race/ethnicities in classrooms. That's how we learn how to do things better because like, uh, when we talked about stereotypes and beliefs and implicit biases, sometimes, um, students are taught in ways that reflect what teachers believe about the students. And so, it's really important for us to think about the hidden, um, curriculum that goes on in schools. Because whether or not you, you openly think about these issues, the students know- feel what they feel, and they know when someone really cares about how that person interacts with them. Nel Noddings says that caring isn't caring unless students know that you care, and there are a lot of instances where, uh, based on students' race/ethnicities they don't get the same kind of attention that everyone else in their class gets.

**Marilyn S.:**

They don't get the same kind of encouragement or the push, and uh, they don't get challenges that some students have. And sometimes you can go into a high school and it looks like two different high schools when you look at the courses that students are taking. And so, how do we change? I mean, whether we talk about race or not, race is still an important matter in school. Race matters. And so, it's important that we interrogate, um, what's happening in our school systems as teachers, as administrators, as parents. We need focus groups to really look at where students are and who's being successful and what they are having the opportunity to learn. Um, I don't know if I answered your question, but I think the reason why the

## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

author of Calvin's vignette mentioned that he was a Black boy is to highlight what happens to Black males in schools. And so, I think that's really important.

**Marilyn S.:** So we'll move on to the next slide. Thank you all for these wonderful questions. We're not gonna get through everything. But this has really been some great discussions.

**Jami S.:** I think [crosstalk 00:45:12].

**Marilyn S.:** And so, identity firming agency, affirming agency, teaches affirm mathematics identities by providing opportunities for students to make sense of, and persevere in, challenging mathematics. Students engaged with mathematics that requires active participation, asking questions, problem posing. And this form of participation builds a high sense of agency in students. And so, it's really important that students have the opportunity to engage in deep problems to be able to discuss the problems with each other, and to see themselves as successful problem solvers. Ok, next slide.

**Jami S.:** All right. So I wanted to just highlight a little bit of information about *Catalyzing Change*, which was a book that NCTM published in 2018 about initiating these critical conversations about what's happening in our secondary classrooms. Number one, all students should be, um, exposed to essential concepts, and that's why I'm a proponent of what the Common Core State Standards set out to do, um, because it did give us that information plus the mathematical beliefs, um, er, excuse me, the standards of mathematical practices. Um, tracking...I'm really glad that they not only mentioned student tracking, but teacher tracking. If you look back to your career and when you were a new, um, a novice teacher, chances are you

## *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University

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

were put in a lower-level math class rather than the upper-level math classes. And if you want to email me, I can share you this...my personal experience, when I was retaking Algebra as a sophomore, and I had a first-year teacher and what happened, uh, to him.

**Jami S.:**

Um, he was set up for failure, but. It's, I, that whole teacher tracking is something that really frustrates, uh, me and why, why it's done. It shouldn't be, "I've done my time and I will let someone else pay their dues." Also, the four years of mathematics, regardless if they're going to college, or if they're going to the service, or if they're going to a vocational tech school, they should have a solid math background. And that comes from taking math for years. All right, next slide. We will briefly go through these, um, scenarios. This is, um, an example of looking at statistics. Students looking at statistics that bring up racial profiling. It, um, was by, uh, Rico Gutstein I believe his name and, um, let's see. You can probably, there we go. Yeah, *Driving While Black or Brown: The Mathematics of Racial Profiling*. And then the next slide, if you'll go there.

**Jami S.:**

These next vignettes are from *Access & Equity: Promoting High Quality Mathematics*. There...NCTM has a series. This is a situation from the 9-12 book where students were asked what they knew about Pythagorean Theorem, and they were asked to define accessibility...disability and then accessibility, and look at what they could do in their school to increase the accessibility. And by looking at how many students did use wheelchairs, and then proposing different ramps that could be used to provide mor wheelchair acc--better wheelchair access for the students. And that's something that a person might not think about until they're in a wheelchair, then everything, um...you know, it makes you very aware of that there. So,

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

all righty. So, it did develop into a social justice lesson relating to accommodations, access and accommodations. Next slide.

**Jami S.:** Thank you. And so, this is a ... Marilyn, do you want to speak about this one, since this was actually from your chapter, the double periods?

**Marilyn S.:** Well, this is um...and I'll just talk about it really quickly. In this, um, article or chapter, um, the teacher...this teacher actually had two student teachers interning with him, and they decided to do a social justice lesson with the students. And the lesson focused on, you know, is there a difference...a disparity or difference between...well let me just backup. Is there a disproportionate number of students in the statistics class based on race/ethnicity, to the rest of the school? And so, um, the statistics class went through, um, a lot of different, um...they actually did a survey to find out if in fact that were true. And then they also...one of the things that the teacher and the uh, pre-service teachers did was they shared a video with the students in the class from Lee Stiff. And he was talking about how students are sometimes placed in courses not based on their abilities, but by other factors like demographic factors and so on.

**Marilyn S.:** And within this class they found out that, um, it was true that the number of students was disproportionate to the number of, uh, race/ethnicity groups in the school. And so one of the things that they actually ended up doing was asking the principal to create double periods so that students could make up the time from when they were not in college prep classes. And so, this gave some of the students who started out not in good strong math tracks to be able to catch up. And so, in this case, the students, they did a lot in terms of problem solving. They came up...they looked at a situation and then they came up with a solution. So they developed two types of agency.

Copyright © 2020 by Great Lakes Equity Center

The contents of this document were developed under a grant from the U.S. Department of Education (Grant S004D110021). However, the content does not necessarily represent the policy of the Department of Education, and endorsement by the Federal Government should not be assumed.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

One agency was that they developed really strong problem-solving skills, and then the other agency was becoming change agents, not just for themselves but for their peers.

**Marilyn S.:** And so, I think it's really important that we use mathematics as the tool to help students critique the world.

**Jami S.:** Ok. Thank you Marilyn. So again, the whole...the idea behind these scenarios that were presented are the fact that we do want our, um, students K-12 and up to be aware of the socio-political aspects that are...that are around in the world. And we want to give them a sense of social agency. I know I have several students that will say, "be the change that you wish to see in the world," which is, you know, Mahatma Gandhi's quote. But it's one thing to say something, and it's another to actually do something. And so, having some type of plan to move the work forward there. So because if we don't decide to do something, we've made a choice, and that's not the right choice. So, from the free will from rush, I always remember that quote. And so, and, um, it is our responsibility to learn as much as we can about other cultures, and, um, also recognize and instill in our students that we are diverse.

**Jami S.:** There's a lot of, um, ways that we are the same and ways that we are different. We celebrate, um, our sameness, but ... I said that backwards. We, you know, recognize what we have in common. That's always, uh... common, uh, ground is good, but we need to appreciate and celebrate what we have that's different because that does, um, help everyone learn when we look at other people's perspectives. Next slide.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

**Marilyn S.:**

Ok. And, um, this case study, or this chapter, comes also from the 9-12 *Access & Equity* book. And it focuses on Terrica, who's an African American female senior who is hesitant about taking AP Calculus, and how she's successfully presented a complex mathematical topic that had not been covered in her course to her peers at the end of the semester, with poise and confidence. According to Frank and Hickson, students like Terrica were often overlooked when teachers were selecting students to move on to AP Calculus. A course that many students saw as only meant for a few math whizzes in their school. Terrica's teacher, Mrs. Hickson, had talked Terrica into taking the class because Terrica had always demonstrated a keen ability to think critically about complex mathematical topics, even though her grades did not reflect this.

**Marilyn S.:**

Mrs. Hickson knew that Terrica would be successful with the right support. And we need more teachers to encourage students who have the potential to be successful in Calculus and other higher-level mathematics courses to take them. And in, in talking with Terrica, her teacher actually had to change Terrica's narrative about herself, because Terrica didn't believe that she could be successful in the Calculus class. And many African American students believe that because they don't see themselves in those classes. And so, it's really important that we change their narratives. Um, in the article...or chapter...Frank and Hickson states that teachers as identity workers must interrogate, mediate, and counter negative discourses. And they gave two sets of strategies that can help in terms of, uh, motivating African Americans and other students who normally do not take, um, Calculus courses, to take Calculus courses.



## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

**Marilyn S.:** And these are some of the strategies that they identify. And these are aimed specifically at African American students, but it doesn't necessarily have to just be about African American students. So, so strategies that they identified as cultural and effective include: creating a climate where African American students feel a sense of belonging, which they contend is a step beyond the commonly suggested notion of inclusion. So it's not enough to include students. You have to help them to feel that they belong and, um, help them feel encouraged that they can add to the class discussion; counter false narratives about African American students and their ability to do Calculus; and establishing clear expectations in warm, yet demanding ways. Notice: warm *yet* demanding. So it really...stating that they can be successful.

**Marilyn S.:** And then strategies that are academic in nature include: identifying and preparing African American students who have the potential to succeed in AP Calculus earlier in their mathematics course taking. So, starting early, encouraging students that they can be successful in college prep courses so that they can have options when they decide what they want to do when they graduate from high school. Being selective and intentional about sharing student exemplars. So sharing some examples of students who are like them so that they can see that they too can be successful. And then, fostering strong peer networks through peer-to-peer instruction. And so inviting students to do think/pair/shares in your classroom, allowing students to be the instructor and using their own, uh, ways of uh, um, helping students to gain the knowledge, and so on.

**Marilyn S.:** And then, uh, and then finally pulling all of what we've been talking about together, um, according to Nasir, the relationship between learning and

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

identity is bi-directional, with access to learning, supporting stronger identities and identity in turn supporting stronger learning. And so, it's like when students really believe that they can do mathematics, they're going to want to learn more mathematics. And we set the stage for that by how we teach mathematics. Next slide.

**Jami S.:**

Um, I think we'll skip the next three slides, which are on the math teaching practices and our social justice schools, but they'll be on the visual aid here. But, uh, we've just got a little bit of time left. But based on what you've heard today, what's one action step you can immediately take to make your classroom more equitable and empowering? If you want to put in the chat feature or I'm gonna give you choice. If you would rather look at what are the results of having high expectations of all students? And then the last one, which I think all of us...that's why we're here today, how can we eradicate harmful assumptions that impede students learning in our school buildings and districts? So, if you'll choose one of those questions, you could put one, two, or three in front of it, but think, and then you can ink and share in the chat feature.

**Erin S.:**

Um, we have a response that came in from Kathleen Williams speaking to having high expectations and how that'll allow each student to feel valued as a math student.

**Jami S.:**

Absolutely. Teach up. This book.

**Erin S.:**

John Staley mentions really being intentional and thinking through the language that is being used as a teacher.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

**Jami S.:**

And I liked that what Victor said about making interesting and messy problems to do, which made me think of...Oh my goodness. I don't have the book up there all these other good resources, I forgot to mention one of my favorite books is the *Five Practices for Orchestrating Productive Math Discussions*. Um, and the five practices are anticipating, monitoring, selecting, sequencing, and then connecting. And if teachers took that time to give those messy problems, and let the students teach each other, they'd be amazed at what could happen rather than worrying about that standardized test, so.

**Erin S.:**

That kind of aligns to just, uh, one of the comments that was made about, um, just the importance of high expectations for students because that can translate into their beliefs for themselves. There's also comments about calling in, um, other staff members or teachers that might have assumptions about students and really exploring those assumptions. Um, expanding on the warm demanding...warm demanding expectations for all students. Um, eradicating harmful assumptions that impede students' learnings in our buildings and districts. Um, intentionally fostering regular dialogue around issues of inequities. Um, having accountability and challenging processes amongst colleagues.

**Jami S.:**

Doing a book study on, um...what's the...oh, I can't think...Robin DiAngelo's book, *White Fragility: Why it's So Hard to Talk to White People about Race* um, would be a good one. But people that are made uncomfortable, um, but that's good when they're made uncomfortable, that means hopefully the pendulum, or the needle will shift a little, so.

**Erin S.:**

Ok, I'm gonna, um, not cut in, Dr. Stone, but um, I put this message in before and I'm gonna put it in here, um, now just because I know some

Copyright © 2020 by Great Lakes Equity Center

The contents of this document were developed under a grant from the U.S. Department of Education (Grant S004D110021). However, the content does not necessarily represent the policy of the Department of Education, and endorsement by the Federal Government should not be assumed.

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

people might need to log off. Um, I put in the message with our PSQ link. Um, that's our post session questionnaire. So please, before you log off, if you have a minute, just fill out, we love, um, hearing about your experience in the *Virtual Roundtable* and that helps us to do better, um, in the future. Could we scroll back to the Center resources? Ok. Um, at the end of every *Virtual Roundtable* we like to provide, um, resources that connect to the topic. So, I know a lot of resources were shared during the conversation, but two, and I'm gonna put them in the chat right now. Um, two that we specifically want to call attention to...the first, um, is the *Critical Conversations into Action, Fostering Students' Mathematical Identities*.

**Erin S.:**

Um, we want to provide, um...Oh, sorry, let me start over. So you want to thank each of you for participating in this *Virtual Roundtable, Critical Conversations into Action: Fostering Students' Mathematical Identities*. Um, I apologize for botching that up. We want to give a special thank you to Dr. Stone and Dr. Strutchens for taking this time to be with us today to share their expertise and insights. In addition to the resources shared by Dr. Stone and Strutchens, we'd like to highlight a few additional resources from the Map Center. Um, the first is the prequel to today's Roundtable, which was also hosted by Dr. Stone. This was entitled *Rehumanizing Mathematics: Why it is Needed and What it Means in the K-12 Context*.

**Jami S.**

And Dr. Strutchens was part of it too.

**Erin S.**

Thank you for adding that in, I apologize.

**Erin S.:**

This Roundtable provides an understanding definition of rehumanizing mathematics and why rehumanizing is more appropriate word choice than equity in mathematics education. It also discusses, m, why students'

## Critical Conversation into Action: Fostering Students' Mathematical Identities

### *EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

mathematical identities and ways of knowing should be honored in the mathematics classroom, and provides roadmaps/frameworks that can support school districts efforts to rehumanize mathematics. The second resource is a podcast by Equity Fellow, Dr. Crystal Morton entitled *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 experiences of Black girls in mathematics can help inform how educators can create more equitable mathematics learning opportunities.

**Erin S.:** Um, finally, we have one of our *Equity Tools* entitled *A Framework Towards Critical Literacy and Mathematics Instruction*. This tool is designed to support educators in reflecting in their mathematics instructional practices and ways of being to move towards a more critically conscious stance. Lastly, we want to encourage you to visit our website for tools and resources in our Equity Resource Library, such as our bimonthly *Equity Dispatch* and *Digest* publications, our *Equity Podcast Series* and our *Equity Tools*. You can access all materials on our website as well as stay abreast of upcoming events via our Calendar of Events.

**Jami S.:** Um, Erin, there was a question about where the participants could find the slides.

**Robin J.:** I was just responding to that. Yes, this presentation will be posted to our website. I can't say for sure right now when I'm going to say within the next month and a half. And shameless plug, if everyone online right now will go to our website and subscribe to our publications, you'll get a notification as soon as it is posted.

## Critical Conversation into Action: Fostering Students' Mathematical Identities

*EquiLearn Virtual Roundtable*

Dr. Marilyn E. Strutchens, Professor of Mathematics – Auburn University  
Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

- Jami S.:** So, but if they just want the slides, is that possible?
- Robin J.:** Um, I don't think so. We would just have to wait for, um, the presentation, the whole thing to be posted. If you all are, um, wanting maybe a list of all the resources that have been mentioned during the presentation, we can get that out to you. And the address to our website is [greatlakesequity.org](http://greatlakesequity.org). Next slide please.
- Erin S.:** Um, In addition to our website, if you are on social media, please follow us on Facebook or Twitter. Um, we are constantly posting every day about events we have coming up, when new resources are published, and just connecting to equity resources that are pertinent to whatever is going on in our current context. Um, I mentioned that the PSQ, um, was in the chat. Thank you so much for participation. We would like to hear how you felt about the session. Please provide your opinions and feedback on the session in the post session questionnaire, which has been posted in the chat bar. I'll put it in there again in a second. Thank you so much for attending.
- Robin J.:** Thank you all. Thank you, Dr. Strutchens, Dr. Stone, Erin, Diana, and everyone who was in participation today.

[End of Audio]