



STEMTLnet
March 2021 Theme of the Month
The Challenge of Creating Equity in
Science Education
Synthesis

Introduction

[Sharon Delesbore](#), Ph.D. was the facilitator for the March Theme of the Month, entitled "The challenge of creating equity in science education." She set the stage, both in her blog and in her introduction to the expert panel, making several key points.

1. Science literacy is "the foundational key to help us make good decisions and to build good citizenship." Fostering equity in science education is necessary if we are to support all children in getting access to science literacy. This means being able to acknowledge the diversity of our student population.

2. Diversity as we meet it in our schools includes but goes beyond skin color. Sharon quoted the NCLB list of "accountability groups" to illustrate this point:

- Economically disadvantaged students,
- Students from major racial and ethnic groups,
- Students with disabilities, and
- Students with limited English proficiency.
- Further, student diversity is extended by adding three groups:
 - Girls,
 - Students in alternative education programs, and
 - Gifted and talented students

However, what we see in our classrooms is not categories, but children, actual people who are growing socially, intellectually, and emotionally. So to authentically invite all these children to claim science literacy as a real value, benefit, and resource for themselves, we need to acquire an *equity* mindset, rather than thinking in terms of *equality*.

3. Equity means a commitment to *inclusion*. This in turn means "a change of mind that takes work, thought, and practice." This change of mind is not just in attitude: it has to take the form of policies, practices, procedures, and mutual accountability among all stakeholders. "When conversations pivot from equality to equity is when the band-aids of practices that allowed diverse groups to feel [just] tolerated came off."

The Panel

The [expert panel](#) for this month's Theme was composed of 4 outstanding STEM educators. [Sharon Delesbore](#), *PhD*, served as the panel facilitator. Dr. Delesbore is the president of the Association for Multicultural Science Education (AMSE), an Alliance of Affiliates (AoA) governance of the National Science Teaching Association (NSTA) and founder of Science Mama Enterprise. [Chelia McCoo Dogan](#) is currently the Science

Department Chair/Secondary Science Teacher at Elsie High School in the Alief Independent School District located in Houston, Texas, and has been in the district for 27 years. [Kara Branch](#) is the Founder and CEO of Black Girls Do Engineer Corporation a 501 (c) (3) nonprofit organization founded in June 2019 and located in Houston, TX. [Alicia Conerly](#) has worked in education for over 12 years. She is also the first African American administrator of Monticello Elementary School, serving as the campus principal.

[The panel](#) explored several dimensions of how to meet the challenge of creating equity — a culture of equity — in science education. Equity and inclusion are not add-ons to the science curriculum. Rather, equity should be part of how teacher and students build their relationship as they learn science's way of encountering and making sense of our amazing and diverse world. Below

Relationships are essential.

The panelists stressed that it's just "teaching 101" for teachers to know our students. This means more than knowing their names; students need to be seen for who they are, where they live, their families, the realities of their daily lives.

Chelia Dogan said,

You have to know the demographics of your district...the demographics of your school...look at what your classroom role is and look at the demographics of your classroom. I ask, 'Do you live with your mom, do you live with your dad, do you live with both? Do you live with your grandparents, do you live with an aunt or uncle, do you live with a guardian? Where do you live? If you want to build a rapport, you got to know your students.[But] I'm not my student's friend... I want to make sure that you're successful.

Alicia added:

As an administrator, I always think about when those children are getting off of that bus, the homes of which they are coming from.... Part of equity is knowing the background of your students because before you can even begin to teach them you have to have their relationship, even as an administrator. When we set the tone as administrators showing equity and not just talking equity, but showing equity, then our teachers will begin to pick it up.

Sharon said "Relationships are everything, with every stakeholder, the students, the parents. I know that there are leaders on here that are administrators, that are central office personnel, that are policy makers. "

Providing Role Models

Sharon raised the importance of identity work. This is not separate from serious academic work, but rather helps students envision a future that they might choose for themselves.

We need more science teachers that look like our students, that look like students of color, so that they can be encouraged. My high school science teacher was my role model. She was my 10th grade biology teacher and she was beautiful, and she was smart, and she was black like me. That helped me to really go, 'Wow, science isn't necessarily that hard! There are things that I have to do in order to discipline myself in order to learn different things, but I can do it. She's teaching me how to do it.' ...that role model in the classroom ...really has always been my undergirding motivation to continue in science education.

Keeping it Relevant

Chelia addressed the importance of creating projects and curricula that are relevant to the student lives and culture. She said:

My students, the largest population I have, of course, is going to be right now is Hispanic and I have more females than I do males. So, I'm going to start with case studies that's going to interest them. When you bring in something that interests them, you can build up on that the entire year. Of course, that keeps them engaged in science, to me, because science is fun. I love science, I'm a nerd for science, and I make my students feel comfortable in talking about anything...

She continues:

I love the National Case Study site. You have that, you have Sickle Cell, obesity, you can talk about stuff that has to do with your students, that they will take in and not take it personally, especially obesity, hypertension. I have students that have hypertension. So, just all of that.

Ensuring a rigorous learning experience

In addition to making learning fun, and relevant to student lives, the panelists stressed the importance of emphasizing critical thinking, and high expectations. Several panelists emphasized the importance of believing in students abilities to tackle complex projects and problems.

Cheila offers a related :

I love Turner's Graph of the Week because I want my students to think critically. I want them to be able to analyze any data that's given to them....There's a graph every week. Of course, there is stuff on there if you wanted to do lesson plans, but I just pull the graphs and once you see the graphs, the different types of graphs that they have, and the questions that you ask of the graphs, that helps them think and then they share.

Now that we're in this platform with Zoom, we use Zoom, of course they're put into breakout rooms and of course, they have to be in there for a certain period of time and then they come back and they choose someone to speak on their behalf. They'll do a little bit of debating, and then they come back, and then we have to agree to disagree if you can't reach a solid conclusion. It's okay that you

don't have to agree with someone, what they believe or what they don't, that's just disagreement and that's okay.

Providing Encouragement and Connections to Careers

Kara Branch point that it was important to provide a student with positive feedback as well as encouragement that they could use those skills for a career. She also spoke of the important of injecting joy and a love of learning.

I had one teacher, when we would do science activities, she would make up songs. Create songs that would be catchy and I would get the concept. I was like, this is pretty cool.... [Another] one of my science teacher's said, hey, if you pass the tack test you'll be exempt from the final. There was some rule she came up with and I was the only person in my class to really do well at my science tack test and became the only one exempt....I was shocked and surprised, but I was intrigued, like science is my thing. What can I do with this? I must be really good at it. Because of teachers like that, I am who I am today. Every time I progress in my career, I always think of that one teacher that did that for me and that's how come I'm a chemical engineer today.

Holding ourselves and our systems accountable

- Keep science visible. Alicia pointed out that one way the educational system declares something is valuable is by testing. This sends a strong message to teachers, to students, to parents, and to administrators as well — if it's tested, it's to be taken seriously.

Science isn't tested until 5th and 8th and then biology. Three times in a student's K-12 setting and that isn't enough for a child to really grasp it in order to say, I want to enter a field in STEM. That's something we need to work at changing with our legislatures, with people who are on the battlefield, because also I find that as an administrator...that when it's not tested, a lot of times teachers do not put emphasis and priority in it.

- Teachers need to hold themselves accountable for doing equity. As Sharon said, teachers should keep challenging themselves and each other,

"How do I know if my teaching is equitable? What do I look for to judge where I need to improve or if I'm doing better?....Whether we're white teachers, whether we're white teachers instructing diverse students, whether we are minority teachers instructing minority students, whether we're minority teachers instructing white students. We have to be able to look within ourselves to say, when I am creating my lesson plans, when I am even creating the environment within my classroom, what is it that I'm projecting? What is it that I'm celebrating? What is it that I am neglecting?"

It's really important that as educators we work to collectively create that culture so that we have others in our building, others that we can talk to, other

who are within our realm that we can bounce questions, and ideas, and thoughts off of. So, I think communication is one big thing that really helps in that questioning piece.

The pandemic challenge

All the panelists agreed that the pandemic had brought important challenges and opportunities — and equity has been a constant question. As Sharon put it, this pandemic has been an ordeal for all of us.... Having to balance the use of technology, having to ensure that all students have accessibility, that right there has been the greatest divide right now, so then it goes back into when we're looking at creating an equitable environment, we can't even reach some kids.

Alicia emphasized the importance of the teacher's commitment to their core mission, which has not changed despite the pandemic pandemonium:

It's all about the delivery and how you give the information. We did not come at them with the attitude of, 'they're falling behind, they're going to fail.' It was, 'We are genuinely concerned,' which we were and we are....over half of my students were virtual.

Sharon tied together many of the threads in the conversation:

The bottom line is that there are going to be people that are making decisions that don't connect with kids... it is up to us as the educators to build those relationships with our school board members, with our business partners, with our associations that are outside of schools, our informal associations... it takes everyone having the boldness, and the courage, and the bravery to have conversations with any and every part of each stake holding piece that helps to educate our kids, so that they can have the face of the kid on their mind, and not just the number, and not just the dollar sign...We talk about relationships, relevance, rigor, and that really is what helps us to become successful in the challenges that we face in science education.

Closing thoughts

Our expert panelists concluded by offering closing thoughts for the encouragement of the participants in the webinar:

From Kara:

We can teach about STEM in school, but the real life after college and going into these professions and you still the only who looks like you, you're not comfortable. It's hard and so we tell them the truth, the hardness.challenge your students. They want to be challenged and critical thinking is the key.

From Alicia:

My statement would be to go forth in the most humble way that you can because we will reach more when we are humble....everyone who is listening, watching, and who will continue this conversation, remain humble and a plethora of things

will come across you to where it's going to blow your minds and empower others to do the same.

Chelia McCoo Dogan:

Know your area. Know where your students live. Shop in their area. Know your students.

Sharon:

I would like to leave this webinar with is just the fact that we have to be honest with ourselves. Equity is about accountability, so who are you being accountable to each day you work and your walk in whatever position that you're in?

Recommendations for teacher-leaders

Teacher-Leaders can play an important role as catalysts for cultural change in a school. This means taking risks to ask questions about one's own practice, and about the school and system, as the panelists recommended. There a wealth of resources to support this kind of work, and as ever, the TL often can serve by being the ice-breaker, not necessarily the expert.

A salient theme in the Discussion that followed the webinar was going deeper into the issues associated with race, and this is one example of how a teacher can lead by the example of their own honest inquiry: Read the following exchange, and examine how it applies to your practice, and then invite colleagues to do the same exercise:

One participant asked "As a white educator, what advice would you give to me to help support students who do not look like me?" Panelists replied "It's important that we don't take the approach that color does not matter. Having a safe classroom environment is key so diverse students feel comfortable asking questions...create science experiences that are relevant to students circumstances... Be authentic, compassionate, and NEVER try to over compensate. They will see right through it."

Remember the panelists' advice: *Know your students and where they live; equity is about accountability; be honest with ourselves; critical thinking is the key; go forward in humility.*

Recommendations for administrators

The creation of an inclusive culture in a school or district - making sure that students and teachers, and indeed all stakeholders, are seen and listened to — is central to addressing the challenge of equity in science education. Administrators can take positive steps to take stock of the practice of inclusiveness in their school or district, and exercise leadership by learning how to talk about and improve school culture. There are abundant resources (for example the library of resources [collected by ASCD](#)).

Recommendations for researchers

The idea of "voice" can be a fruitful way to talk about the creation of an inclusive school culture. What is the role of the student voice in examining and creating an inclusive school culture, especially for science education?

How does the teacher's understanding of the nature of science support or inhibit equity in the science classroom?

There is much more to learn about how to recognize, support, and understand "equity culture" in the science classroom. For example, If "equity" is a culture, then it is not a goal to be achieved once-and-for-all: How is an equity culture maintained over time, for example if school leadership changes, or in the face of major demographic shifts? A school culture is embedded in a community — What aspects of community culture support or inhibit an equity culture in science education?



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