Barriers/Challenges

Unconscious bias

It’s hard to undo all the negative experiences students had before coming to me.

Student resistance

Fixed mindset

Student background;

Diversity of students, amount of time for each students required

Past experiences

Negative (or positive!) past experiences leading to fixed mindsets

Negative learning experiences in math from previous learning

Vicious cycle — students don’t feel good when they do math so they don’t do math so they don’t succeed

Excluded. Don’t feel a part of the community.

Adult learners have had much of their negative identity for years

Math faculty may be uncomfortable with going there—that is, socioemotional things

Learning differences

Either in style or learning differences that require different teaching methods

Entrenched - already adults - they’ve decided if they are food in math or not

Cultural barriers

Mathematics is about thinking not mimicking

Administration pushback
Implications for 2-Year Colleges

Students have a sense of belonging that enables them to participate fully and thus learn

Happier students and teachers!

Better attendance
Improved test scores
Improved pass rates
Reduce inequities

Faculty advising

A classroom full of confident math students

Retention

It's more than just the mathematics you need to teach for your course, but more about the mathematics they need for their life....

Next Steps/Actions

Continue being MathMazing math fair to our local community

Reflect on how I position students and take explicit action to position students as sources of mathematical authority.

Network with our local news to empower learning mathematics and promote math events as sport events
Developing and Supporting Positive Mathematical Identity

Why it Matters

Trena Wilkerson, President
National Council of Teachers of Mathematics
Professor, Baylor University
AMATYC Conference October 2021

@TrenaWilkerson
@nctm.org
Goals

• To explore what contributes to a positive mathematical identity and how it impacts the teaching and learning of mathematics
• To examine effective ways of aiding students in developing a positive mathematical identity
• To share challenges and effective practices around student mathematical identity and agency and implications at the two-year college level
NCTM

• **NCTM’s Mission:** The National Council of Teachers of Mathematics advocates for high-quality mathematics teaching and learning for each and every student.

• **NCTM’s Strategic Framework:**
  - Teaching & Learning
  - Access, Equity & Empowerment
  - Building Member Value
  - Advocacy
AMATYC Mission

- to provide high quality professional development, to advocate and collaborate at all levels, and to build communities of learners for all involved in mathematics education in the first two years of college.

- Strategic Framework
  - Advocacy
  - Professional Development
  - Research
  - Curriculum
  - Connections within community of educators
What do we mean by mathematical Identity?

• “The dispositions and deeply held beliefs that students develop about their ability to participate and perform effectively in mathematical contexts and to use mathematics in powerful ways across the contexts of their lives.” (Aguirre, Mayfield-Ingram, and Martin 2013, The Impact of Identity in K–8 Mathematics Learning and Teaching p. 14)

• Comes from student’s successes in the math classroom, feelings of competency that have been developed, and the value they feel as a member of the math community of practice (Wenger, 1998)
Mathematics Identity

- How we see ourselves, how others see us
- Our personal history, abilities, character, culture, gender, language, religion, community, family, and academics.
- Frames the knowledge, skills, habits, attitudes, beliefs, and relationships students need
- Each identity connects, impacts, shape, or influences the others
- Influenced by others such as teachers, peers, families, and media.

Allan & Schnell, MTMS, 2016, Developing Mathematics Identity; Catalyzing Change 2018, 2020a,b)
Mathematics Identity-continued

• Shaped by math experiences both in and out of school
• Opportunities for sharing thinking and reasoning are foundational to developing math identity.
• Forms From Early Childhood and continues through adulthood-lifelong process
• Impacts school and career trajectory
Barriers/Challenges

• What are barriers or challenges to recommended practices/ways to developing a positive mathematical identity?
Identity-Agency-Authority

Positive Mathematical Identity

Strong Sense Mathematical Agency

Shared Mathematical Authority

Students as Empowered Thinkers and Doers of Mathematics

Agency: students’ identity in action

https://www.nctm.org/catalyzingchange/
Consider....

• Learners who have a strong mathematical identity see themselves as mathematical beings and have confidence to do mathematics. (NCTM CC for EC & Elementary, 2020)

• Learners who have positive mathematical identities are confident problem solvers, eager to take risks, and willing to work through challenging tasks. (NCTM CC for EC & Elementary, 2020)

• “How learners are positioned to participate in mathematics affects not only what they learn but also how they come to see themselves as learners.” (p. 28, CC HS, NCTM)

• An essential step to promoting positive mathematical identity is to start with knowing the learners. (Brown and Seda 2021)

• Impacts Achievement
Negative messages

• Some are just not math people
• Math is just rules and procedures
• Cannot be changed—fixed
• Deficit views & language—labels
• Culture does not matter
• I am not good at math so it is okay that you are not.
• This next problem is ‘easy’....
Positive Messages

• Math is a powerful tool to understand our world
• Everyone can and should do math
• Strengths/asset based view
• All students bring brilliance to the learning environment
• I believe in you.
• Begin with Strengths of students
• Important of all aspects of identity
Reflection Questions, p. 405

- What is my own mathematics identity?
- How do I see my own mathematics identity reflected in that of my students?
- Do I see patterns in the mathematics identities of my students based on their other identifications, especially gender, class, and ethnicity?
- What am I still grappling with? Do I fully understand the mathematics myself?
- How can I invest in my own mathematical identity?
- How can I share this with my students?
Implications

• What are the implications of developing and supporting positive mathematical identity, agency and authority with students?
Consider your role, your students, your classroom and affect

“How students are positioned in your classroom can affect their ability to develop content and language competencies in the classroom. Therefore, positioning is critical to each student’s success and learning in the mathematics classroom.” P. 11

Dr. Kathryn Chval, Equipping Educators to Position Multilingual Learners for Success
Quote from her recent book.
Three Critical Focus Areas for K-12 Math Teachers and Leaders

- Grade-level Content
- Equitable, Effective Teaching Practices
- Advocacy

www.nctm.org/mathematics2021
Foundations for Equitable, Effective Teaching Practices

Cultivating Productive Instructional Mindsets and Practices

Building Positive Mathematical Identities

Creating an Equitable Classroom Culture

Making Connections through Instruction

Creating a Culture of Collaboration

Continuing the Journey: Mathematics Learning 2021 and Beyond, NCTM, NCSM, ASSM,
Next Steps/Actions

• What are my next steps or actions to support student positive mathematical identity, strong sense of mathematical agency and shared mathematical authority?
We must continue to cultivate and support an equitable classroom culture that strengthens and supports positive mathematics identities.
Thank You!

Q & A

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https://www.nctm.org/
References