Highlights and Update

National Council of Teachers of Mathematics

Robert Q. Berry, III
@robertqberry
NCTM President-Elect
Mission Statement

- The **National Council of Teachers of Mathematics** supports and advocates for the highest-quality mathematics teaching and learning for each and every student.
Strategic Framework

• **Teaching and Learning**: NCTM provides support for research-informed teaching that ensures the learning of each and every student in equitable environments.

• **Access, Equity and Empowerment**: NCTM advances a culture of equity where each and every person has access to high quality teaching and is empowered as a learner and doer of mathematics.

• **Building Member Value**: NCTM fosters communities that engage members to improve the teaching and learning of mathematics.

• **Advocacy**: NCTM engages in advocacy to focus, raise awareness, and influence decision makers and the public on issues concerning teachers of mathematics and high-quality mathematics teaching and learning.
New Membership Model

Tiered Membership for Launch April 2018

- *Introductory Membership* for 2 years: $49. (current full membership $96).
- *Essential Membership*
- *Premium Membership*

Benefits increase as you move up tiers. Details will be released next spring.
MyNCTM

• This will be formally announced next month.
  – MyNCTM is designed to provide opportunities for members and non-members to share, collaborate, mentor and learn.
  – Find, upload, and organize resources and documents.
  – Access a knowledge base of best practices, documents, pictures, videos, podcasts, and more—and contribute your own favorite materials in a safe and effective environment.
  – Save and sort favorite content from NCTM and other members along with your own files.
  – Add notes and give context to resources with commenting and rating features.
A Re-imagined Practitioner Journal

Coinciding with NCTM’s centennial year celebration, in January 2020 NCTM will re-launch the practitioner journals as a consolidated journal. The new publication will provide more frequent and timely content on topics of relevance to math educators.
A Re-imagined Practitioner Journal

The digital version of the journal will embrace the latest technology to promote individual member engagement and community, while continuing to deliver the grade-band specific high-quality classroom resource materials members love and expect.
Catalyzing Change in High School Mathematics

September 25 the Public Review Draft was posted at www.nctm.org/ccreview (October 15)

• The purpose of Catalyzing Change is fivefold:
  1. Explicitly broaden the purposes for teaching high school mathematics beyond a focus on college and career readiness.
  2. Catalyze a serious discussion of the challenges facing high school mathematics as well as recommendations for implementing the actions necessary to overcome those challenges.
Catalyzing Change in High School Mathematics

• September 25 the Public Review Draft was posted at www.nctm.org/ccreview (October 15)

• The purpose of Catalyzing Change is fivefold:

3. Define imperatives for high school mathematics in the areas of structures, instructional practices, curriculum, and pathways for students.

4. Identify essential concepts for focus that all high school students should learn and understand at a deep level in an equitable common mathematics pathway shared among all students.
Catalyzing Change in High School Mathematics

- September 25 the Public Review Draft was posted at www.nctm.org/ccreview (October 15)
- The purpose of *Catalyzing Change* is fivefold:
  5. Provide examples of pathways that include 2½ years of mathematical study expected of high school students, followed by 1½ years of alternate paths of study, differentiated by postsecondary education and career goals.
Regional Conferences

- **2017 NCTM Orlando Regional**
  - October 18–20
- **2017 NCTM Chicago Regional**
  - November 29–December 1
- **2018 NCTM Kansas City Regional**
  - November 1-3
- **2018 NCTM Seattle Regional**
  - November 28-30
2017 Innov8

INNOV8 CONFERENCE
November 15–17
Las Vegas

Breaking Barriers:
Actionable approaches to reach each and every learner in mathematics
NCTM ANNUAL MEETING & EXPOSITION 2018
April 25-28 | Washington, DC

Join Us in Washington, DC

Save the Date!
Using Tasks and Discourse to Position Students as Mathematically Competent

Robert Q. Berry, III
NCTM President-Elect
@robertqberry
#weteachmorethanmath
#blackkidsdomath
The Plan

- Background
- Define situated-mediated identity theory
- Discuss a situated-mediated identity theory in a classroom context
- Discourse connected to situated-mediated identity theory
- Questions
Access, Equity and Empowerment

Advance knowledge about, and infuse in every aspect of mathematics education, a culture of equity where each and every person has access to and is empowered by the opportunities mathematics affords.

A reframing of the Access and Equity Principle from *Principles to Actions*. 
• NCTM has re-framed Access and Equity to include Empowerment, to capture the critical constructs of:
  – Identity
  – Agency, and
  – Social Justice.

Source: http://www.nctm.org/News-and-Calendar/Messages-from-the-President/Archive/Matt-Larson/A-Renewed-Focus-on-Access,-Equity,-and-Empowerment/
<table>
<thead>
<tr>
<th>Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establish mathematics goals to focus learning.</td>
<td></td>
</tr>
<tr>
<td>2. Implement tasks that promote reasoning and problem solving. (Build mathematics identity)</td>
<td></td>
</tr>
<tr>
<td>3. Use and connect mathematical representations.</td>
<td></td>
</tr>
<tr>
<td>4. Facilitate meaningful mathematical discourse. (Position as Competent)</td>
<td></td>
</tr>
<tr>
<td>5. Pose purposeful questions.</td>
<td></td>
</tr>
<tr>
<td>6. Build procedural fluency from conceptual understanding.</td>
<td></td>
</tr>
<tr>
<td>7. Support productive struggle in learning mathematics. (Sense of Agency)</td>
<td></td>
</tr>
<tr>
<td>8. Elicit and use evidence of student thinking. (Position as Competent)</td>
<td></td>
</tr>
</tbody>
</table>
Shalunda Shackelford

- School: Tyner Academy
- Teacher: Shalunda Shackelford
- Class: Algebra 1
- Curriculum: IFL Lessons *Creating and Interpreting Functions*
- Class Size: 26

At the time the video was filmed, Ms. Shackelford was a teacher at Tyner Academy in the Hamilton County School District. The lesson occurred in April in an Algebra 1 class.
Bike and Truck Task

A bicycle traveling at a steady rate and a truck are moving along a road in the same direction. The graph below shows their positions as a function of time. Let $B(t)$ represent the bicycle’s distance and $K(t)$ represent the truck’s distance.
1. Label the graphs appropriately with B(t) and K(t). Explain how you made your decision.

2. Describe the movement of the truck. Explain how you used the values of B(t) and K(t) to make decisions about your description.

3. Which vehicle was first to reach 300 feet from the start of the road? How can you use the domain and/or range to determine which vehicle was the first to reach 300 feet? Explain your reasoning in words.

4. Jack claims that the average rate of change for both the bicycle and the truck was the same in the first 17 seconds of travel. Explain why you agree or disagree with Jack and why.
Bike and Truck Task

Discussion question introduced by the teacher:

Between what two seconds did the truck drive the fastest? How do you know?
Shalunda Shackelford

- How are mathematical identities supported?
- Are students positioned as mathematically competent?
- How does one see themselves as doers of mathematics?
Orchestrating Productive Mathematics Discussions

1. **Anticipating** likely student responses to challenging math task
2. **Monitoring** students’ actual responses to the task (while students work on the task)
3. **Selecting** particular students to present their mathematical work during whole group discussion
4. **Sequencing** student responses that will be displayed in a specific order
5. **Connecting** different students’ responses and connecting to key mathematical ideas.
The situated-mediated identity framework describes three types of identity growth:
1. Situated Identity
2. Positionality

Our identities are situated within the context of the learning environment and are mediated by the environment in which they act.
Situated Identity

Situated identity implies that a person’s identity is multi-factor, fluid, and situationally determined.

• Jacobi and Charles in Shalunda Shackelford’s class.
  • How are Jacobi and Charles’ identities similar or different in other classrooms?
  • When situations or contexts change, so does the manner in which one represents or expresses oneself, as the varying context mediates the representation of self.
• Teachers create classroom environments for building identities. Think Shalunda Shackelford.
Intersectionality

Self

- Social Identity
- Math Identity
- Science Identity
- Religious Identity
- Cultural Identities
- Racial Identity
- Gender Identity
Situated Identity

• Different situations elicit different modes of interactions and behaviors.
• For students, identities are mediated from classroom to classroom
Positionality refers to the tension between individual representations of self and the ascriptions made of the individual by wider society.

- In other words, how individuals position themselves in a social context depends on both the manner in which they wish to be represented and their perceptions of how others view them.
- How did Shalunda Shackelford position her students to be active participants and contributors?
Positionality

• DeShawn, a Black Boy who is a 10\textsuperscript{th} grader, appears to be shy and reserved, reluctant to ask questions whole group because he does not want to appear deficient in his mathematics abilities.

• However, he thrives in small groups where he has time and freedom to think and discuss his ideas. The manner in which this student positions himself is largely dependent on and mediated by the social setting.
Agency

Agency refers to the expression of one's identity. The enactment of agency is an individual’s self-presentation to the world.

• Through agency, people tell others through words and actions who they are and what their purpose is in that particular setting, space and situation.
  • If one see themselves as a doer of mathematics, then they engage in behaviors that present themselves as a doer of mathematics.
Connecting Identity to Agency

• If we accept that participation is a risk-taking event, how do we create structures such that students are willing to take risks?
Agency

“I like being with the smart kids because that means I am one of the smartest...since I answer all of the questions in math that means I am the smartest of the smart kids.”

Clayton 8th grader
Math, Men, & Mission

Teachers are identity builders who position learners as being mathematically and socially competent by creating time and space for learners demonstrate their agency.

Summer 2015
Math, Men, & Mission

We do that by engaging in cultural practice inquiry and by creating mathematics tasks ground in social interactions from which learning can occur.

Summer 2016
Using tasks and discourse to position learners as competent
What do you notice

Source: Michael Fenton’s Reason and Wonder Web Site:  http://reasonandwonder.com/charge/
What do you wonder?

Source: Michael Fenton’s Reason and Wonder Web Site: http://reasonandwonder.com/charge/
Taking Risks
Taking Risks: Dyad

If we accept that participation is a risk-taking event:
• How might noticing and wondering support risk-taking?
• How does noticing and wondering support discourse?
• How noticing and wondering position learners as competent?

Identity, Positionality, and Agency
Wonder: At what time will the phone be fully charged?

Source: Michael Fenton’s Reason and Wonder Web Site: http://reasonandwonder.com/charge/
What Is Your Guess?

Too high – ______
Too low – ______
Just Right - ______
What Information Do We Need?

At what time will the phone be fully charged?
Some More Data

Source: Michael Fenton’s Reason and Wonder Web Site http://reasonandwonder.com/charge/
Some More Data

Source: Michael Fenton’s Reason and Wonder Web Site http://reasonandwonder.com/charge/
Some More Data

Source: Michael Fenton’s Reason and Wonder Web Site http://reasonandwonder.com/charge/
<table>
<thead>
<tr>
<th>Time</th>
<th>Percent Charged</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:02</td>
<td>5%</td>
</tr>
<tr>
<td>9:10</td>
<td>14%</td>
</tr>
<tr>
<td>9:14</td>
<td>19%</td>
</tr>
<tr>
<td>9:26</td>
<td>33%</td>
</tr>
</tbody>
</table>
At what time will the phone be fully charged? (Individually 3 mins)

Source: Michael Fenton’s Reason and Wonder Web Site http://reasonandwonder.com/charge/
Rough Draft Talk
Rough Draft Talk

**Principle 1: Foster a culture supportive of intellectual risk taking.** Explicitly tagging initial discussions of solutions as “rough drafts” encourages students to share in-progress thinking.

- This tagging reduces the threat of being wrong. A non-evaluative stance by the teacher empowers students.

Principle 2: Promote the belief that learning mathematics involves revising understanding over time. Revising mathematical thinking promotes learning through refining ideas.

- Sentence stems/starters
  - The strategy I am confident about is ____ because ____
  - After talking to ____ , I did/did not revise my strategy ____
- Promote the use of mathematics vocabulary
Rough Draft Talk

• **Principle 3: Raise students’ statuses by expanding on what counts as a valuable contribution.** When rough-draft talk is recognized as valuable for supporting learning, then more students can be positioned as competent mathematical thinkers.
  
  • A teacher can ask a student to share, even if he or she is struggling to understand.
Two Drafts-One Sheet
Every 9 mins + 10%

I started at 8:57 because it would be 0%. Then I multiplied x 90 because 9 x 10 = 90 and that's how much time it should take so I got …10:27

But I compromised with Damarion who got 10:25 so we did 10:26 as our final answer
What Happened & Why Did It Happen?

- https://www.desmos.com/calculator/hzlch8fx0x
What happened? Why?

Source: Michael Fenton’s Reason and Wonder Web Site
http://reasonandwonder.com/charge/
Framing Identity, Positionality, and Agency

Tasks supporting Impasse
- Decision-making
- Multiple Entry Points

Discourse & Questions
- Noticing & Wondering
- Rough Draft Talk
- Questioning that promote reasoning

Identity & Agency
- Identity-Affirming Engagement
- Risk-taking
- Competence
The important thing about rain is that it is wet.

It falls out of the sky, and it sounds like rain, and makes things shiny, and it does not taste like anything, and is the color of air.

But the important thing about rain is that it is wet.

Margaret Wise Brown, The Important Book
The important thing about identity and agency teaching is __________________________

– Really great detail #1
– Really great detail #2
– Really great detail #3

But the most important thing about identity and agency teaching is
Questions, Wonders, or Musings

robertberry@virginia.edu
@robertqberry
#weteachmorethanmath
#blackkiddsdomath