Math Teaching for Robust Understanding: Taking a Social Justice Stance

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Welcome & Introductions
SESSION GOALS:

• Provide tools to foster thinking about mathematics through a social justice lens

• Engage with tasks and routines with high levels of cognitive demand

• Cultivate *Anima* (spirit) and skills to examine and adapt instruction and lead mathematical discussions on issues of social justice
Today’s Agenda

➢ Welcome and introductions
➢ Name Tag Glyph
➢ Social Justice Position Statement - Jigsaw
➢ Belief Systems and Structures: Immersion - A child’s story
➢ Curriculum and Instruction: Papi’s Birthday
➢ Lunch
➢ Partnering with Families and Communities
➢ Taking Action for Social Justice
➢ Reflecting on the day
Establishing Group Agreements

◆ Listen carefully and deeply
◆ Share time and space
◆ Be aware of INTENT and IMPACT
◆ Work hard to understand different views
◆ Challenge ideas not people
◆ Expect/accept discomfort and joy as part of the learning process
◆ Engage from a place of compassion (open heart)
◆ Replace judgment with curiosity (open mind)
◆ Because we are all in different places don’t freeze each other in time.
Move in **BRAVE SPACE**

v.s.

**Safe Space**

Would You Rather?

- Find True Love?
- Find $10,000,000.00?
Would You Rather?

• Travel 100 Years Into The Past?

• Travel 100 Years Into The Future?
Would You Rather?

• Life had a rewind button?
• Life had a pause button?
Would You Rather?

• Be Able To Fly?

• Be Able To Read Minds?
Would You Rather?

- Win the Lottery?
- Live Twice As Long?
Name Tag Glyph
NCSM/TODOS Position Statement

JIGSAW Activity
JIGSAW: Numbered Heads Together

At each table, number off from 1 to 4

Everyone reads Our Position

Group 1: Eliminating Deficit Views of Mathematics Learner

Group 2: Eradicating Mathematics as a gatekeeper.

Group 3: Engaging the Socio-political turn of mathematics education

Group 4: Elevating the professional learning of mathematics teachers and leaders with a dual focus on mathematics and social justice
Steps to Implement Social Justice and Mathematics Education

- Acknowledgement

Percent of CA 11th grade students who met or exceeded the standards in Mathematics on SBAC in 2018 (CDE DataQuest)
hat we (STILL) hear people say

- They’re poor.
- It’s their parents’ fault.
- They don’t know the language.
- They can’t do math.
- No books in the home.
- Violence and crime in their communities.
- They come to school hungry.
- These students don’t need college.
- Pervasive low achievement, well, that’s just the way it is.
- It’s always about the kids and their families.

Graham, 2008
Steps to Implement Social Justice and Mathematics Education

• **Action**
  - Belief Systems and Structures
  - Refrain from deficit discourse in professional conversations
  - eliminate tracking
  - change course taking patterns
  - reduce remedial courses
  - create fair assessment systems
IMMERSION (short film)

• How does this story connect to you?
• What are the belief systems and structures that contributed to Moises’ successes and/or failures?
• How is Moises’ story reflective of mathematics education as a social justice issue?
QUICK WRITE

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• What are the belief systems and structures that contributed to Moises’ successes and/or failures?

• How is Moises’ story reflective of mathematics education as a social justice issue?
BREAK
Steps to Implement Social Justice and Mathematics Education

• **Action**
  - Curriculum and Instruction
  - Cultivate positive math identities
  - Culturally Relevant and Responsive Pedagogy
  - Engage students in High Level Cognitively Demanding Tasks
  - Student collaboration and discourse
5 Equity-based Practices

- GOING DEEP WITH MATHEMATICS
- LEVERAGING MULTIPLE MATHEMATICAL COMPETENCIES
- AFFIRMING MATHEMATICS LEARNERS’ IDENTITIES
- CHALLENGING SPACES OF MARGINALITY
- DRAWING ON MULTIPLE RESOURCES OF KNOWLEDGE (e.g. math, culture, language, family, community)
Equity-based Practices

Going Deep with the Mathematics

- High Cognitive Demand Tasks
- Demonstration of Multiple Strategies and Representations
- Involves analysis and justification

Leveraging Multiple Competencies

- Collaborative learning that utilizes varying math knowledge to solve complex problems.
- Tasks with multiple entry points.
- Assessment, content knowledge, and math practices such as examining patterns, generalizing, abstracting, making comparisons, and specifying conditions.
**Equity-based Practices**

**Affirming Mathematical Learners’ Identities**

- Promote persistence and reasoning with complex problems solving tasks.
- Validate math knowledge and experiences as math learners.
- Focus feedback on mathematical ideas and strategies (correct or incorrect; productive and unproductive strategies) rather than mistakes/errors only.

**Challenge Spaces of Marginality**

- Positions students as mathematical resources.
- Distributes math authority as interconnected among students, teacher, and text.
- Encourages student-to-student interactions.
## Drawing on multiple resources of knowledge
(e.g. math, culture, language, family, community)

- Tasks involve stories and situations to solve or represent a problem.
- Previous knowledge is a bridge to new learning.
- Taps math knowledge and experiences related to students’ culture, community, family and history as resources.
- Recognizes and strengthens multiple language forms (e.g. connections between math language and everyday language.
- Affirms and supports multilingualism.
Mathematizing Fairness
The case of papi’s birthday
What is a “fair share”?

- Math standpoint (i.e. math topics/concepts)
- Social standpoint
- Provide some examples to help illustrate your ideas.
Three Read Strategy

• 1\textsuperscript{st} Read - What is the situation about?
• 2\textsuperscript{nd} Read - What are the quantities in the situation?
• 3\textsuperscript{rd} Read - What mathematical questions can we ask about the situation?
Papi’s 70th Birthday
A true story

It was Señor Aguirre’s 70th Birthday. His three children wanted to throw him a big party to celebrate. The hall rental, mariachi, food, and decorations will cost a total of $4,500. The brother, a special medical doctor (anesthesiologist) who makes about $20,000 per month, suggested that the three children split the cost equally.

One of the sisters, a university professor who makes about $6,000 per month, said that would not be fair. She suggested the following: the brother pays $3,150. She would pay $900, and the other sister, a partner in the family business and single mom of 2 boys who makes about $3,000 per month, should pay $450.
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**TASK**: Write a position statement using mathematical evidence (e.g. proportions, ratios, percent) to support your conclusion to the following questions:

- Which person do you agree with and why?
- What is *fair* in this situation?
- Can you think of an alternative financial arrangement that might be better?
Activity Debrief:

How does the Papi’s Birthday Task incorporate the Five Equity-Based Teaching Practices?
Lunch!
Steps to Implement Social Justice and Mathematics Education

• **Action**

3. Partnering with Families and Communities as Resources for Mathematics Learning
   - Learn about the math knowledge, practices, and experiences of the communities that can be used for math lessons
   - Create respectful, bi-directional feedback pathways with parents
COMMUNICATING OUR MATH VISION

Routine practices: Parent-Teacher Conferences
Communicating student progress: Parent-Teacher Conferences

“a mixture of hope and dread” or productive opportunities to support math learning?
The teacher began listing all her “weaknesses,” from struggling with memorizing her addition, subtraction, and multiplication facts, to her inability to solve word problems. The teacher said that if Xiomara did not know her facts that she would be unable to solve more complex problems in fourth grade. The teacher showed examples of mistakes our daughter made on the most recent unit review test. Confused, I asked the teacher why she gave Xiomara a score of “3–meeting grade level standard” in mathematics on her most recent report card. The teacher responded by saying, “She seems to pull it together for the tests.” I asked, “Is there anything Xiomara can do in math?” She simply said, “No. Xiomara really struggles.” Then the teacher described all the “interventions” she gave our daughter during math lessons, such as extra tutoring from herself or a parent volunteer and extra time to complete assignments. We were unaware of this extra help that was being given to our daughter, and we asked why we had not been told earlier of her struggles since this was December. The teacher replied, “Don’t you see the graded assignments and tests?” We walked away from this conference very upset. Our daughter had no mathematical strengths, only weaknesses. What does that mean? How can we help? There were no resources given to us.
Pair-Share

• What math learning and identity issues are raised for the student, parent, and teacher in this parent-teacher conference situation?
Parent-Teacher Conference: (Suggested Guidelines)

- Get up and Welcome Parent/Caregiver
- Provide a brief overview of conference purpose
- Start with parent/family member’s views about child’s academic & social strengths:
  - Acknowledge that the parent(s)/care giver(s) knows, watches, listens, and engages with the child more than anyone, and ask them to share with you anything that might help you to support their child's learning (e.g., strengths, activities at home and/or outside of school, interests)
- Discuss Student Strengths & Needs (MAP)
- Show student work to help explain points
- Discuss Math Action Plan (MAP)
- Invite parent comment/questions
- Make sure parent leaves with MAP and resources
- Follow up with Parent about MAP progress
Strength-based approach: All students have mathematical strengths and growth areas

- Provide data (e.g. student work, not just test scores) that show strengths and needs to:
  - convey mathematical progress
  - affirm positive math identity
  - focus on productive next steps
- Work with parents (and student) to construct a **math action plan** (MAP) for continued math learning.
  - Parents have ideas/resources to offer
  - Minimize 1-way conversations, but be ready to offer additional resources to support the action plan
Parent-Teacher Conference Template

Math Vision: Your core mathematics learning goals, affirming why mathematics is important for children to learn (for example, working together to learn math together!). Every child can be successful in mathematics with the proper instruction, support, and encouragement.

Student:  
Teacher:

Mathematics Progress

Mathematics Strengths (Areas of Strength):

Mathematics Needs (Areas for Improvement):

Mathematics Action Plan (MAP)

Student Action:

Teacher Action:

Parent Action:
COMMUNITY MATH WALK

Bridging math in and out of school
Community Mathematics Exploration

Community Walk

Lesson Design

Community Mathematics
Exploration Goals

• Engage with students’ communities

• Increase knowledge and familiarity with students’ communities, particularly of activities and practices that might relate to mathematics instruction

• Deepen understanding of students’ out of school activities and practices

• Broaden perspectives on students’ competencies
Teachers went on community walk with Latina parent

Teachers interviewed women about factors they considered when doing laundry.
  • Average 6-10 loads per week (depending on family size and sucio of clothes)
  • Average $15-30 per week

• Today in fact you have 10 loads of laundry. Help your mother …
She wants to know how much it will cost to wash (not dry) all the clothes. Can you help her? How many solutions are there? What is the maximum and minimum you might pay? (You already have the detergent.)

After the washing...now you and your mother have 10 loads of wet laundry. How much will it cost to dry all the loads? (On average, each load of laundry will need 45 minutes to dry.)

Use numbers, words, drawings, manipulatives, etc. to show your group’s work and solutions.

Mathematics used in the setting:
• Multi-step Operations
• Estimation
• Calculations with Money
• Comparing Prices

Extensions involving rates and fractions

...determine the maximum and minimum cost if each family member “makes 1 1/2 loads of dirty laundry.”
CME Example (Shortest Route)

Find the shortest distance to walk from a specific community location (i.e., park, middle school, football field, tennis courts) to our elementary school.

How many blocks is the shortest route?

How do you know it is the shortest route? Explain.

- Teachers went on community walk with colleagues, parent and first grader
- Noticed landmarks, homes, parks, football fields, tennis courts…
- Students raised the issue of “short cuts”
So what? The importance of this approach

- Refocuses routine practices toward positive messaging about mathematics
- Gives pre-service and practicing teachers tangible starting places with communicating to families about themselves and their vision for teaching
- Provides opportunities to partner with families as resources for math lessons.
Steps to Implement Social Justice and Mathematics Education

• **Accountability**
  - Create professional learning opportunities and accountability systems that monitor progress of implementation of actionable items.
  - Conduct annual audits on implementation progress of social justice action items.
  - Make informed adjustments to professional offerings and resources.
What can I do?

TAKE ACTION!
Let’s sort the Action statements

Things I already do
Things I can easily do with support
Things I hope to do but will be challenging
Things unrelated to my professional practice

Now compare at your table. What stands out to you?
SOCIAL JUSTICE AND MATHEMATICS
ACTION PLAN!
TAKE AWAYS FOR YOU...

• Language and Activities for professional actions
• Math tasks & Routines
• Family/Community Engagement Ideas: Routine practices
• Social Justice Statement Task Sort Activity
• Social Justice & Mathematics Action Plan Template
FINAL REFLECTION

What did you hear, say, or do that invited you to lead differently about mathematics and social justice? (Or that invited you to plan to take action as a leader)

What activity (or activities) resonated most deeply with you? Why?
Thank you for investing your time with me!

I am grateful for your work and your presence in the lives of students and their families!

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