What Does an Inclusive Mathematics Classroom Look Like?

Carmel Schettino, Ph.D.
TCM @NCSSM 2017
The Plan

1. About Me
2. What is inclusion in the classroom?
3. Why is it important in mathematics?
4. What are the issues?
5. Mini-Deep-Dive (a little self-promotion)
6. Focus on Bias
7. What can you do?
INCLUSION?

1. Age
2. Class
3. Gender
4. Ethnicity
5. Sexual Orientation
6. Race
7. Religion
8. Ability

Sometimes disabilities are invisible.
NCTM THEMES

Algebra for All

Embracing Mathematical Diversity

Creating Mathematical Bridges

Overcoming Obstacles to Make Mathematics Work FOR Students
Commitment to access & equity includes developing socially, emotionally, and academically safe environments for mathematics teaching and learning—environments in which students feel secure and confident in engaging with one another and with teachers.

Principles to Actions, 2014
High-rigor course access is not a reality across all of our nation's schools.

CONSIDER

Sometimes disabilities are invisible.
Claudie Solar - Inclusive Mathematics Pedagogy

Not “Multiculturalism” in the Classroom

Stemmed from other consciousness-raising pedagogies like radical, critical, feminist

Four Dialectical Aspects:

Silence vs. Speech
Passivity vs. Active Participation
Powerlessness vs. Empowerment
Omission vs. Inclusion
“Often, inequalities in achievement are perceived as the result of a hierarchy of competence. When the very students who have been given more opportunities to learn show higher achievement than students provided fewer opportunities to learn, they are perceived as more capable or having more aptitude. This manner of talking about achievement gaps without mentioning opportunity gaps that cause them invites a focus on deficit models to “explain” low performance in terms of factors such as cultural differences, poverty, low levels of parental education, and so on.”

NCTM Principles to Action; Access & Equity, 2014
Further, research shows:

21% classtime teachers talking to students – demo methods

48% classtime students practicing methods working individually

15% classtime teachers questioning class in whole class format (Boaler)

IRE is method of discourse most commonly found in math classrooms (Cazden)
PROPOSED CHANGES

From Andrew Stadel, Ignite talk NCTM, 2016
**UNPRODUCTIVE BELIEFS**

- Students' innate levels of ability can't be changed by instruction.
- Equity is the same as equality.
- Equity is only an issue for schools with significant racial & ethnic diversity.
- ELLs need to be in separate tracks for math.
- Math ability is a function of opportunity, experience, & effort.
- Equity is attained by students receiving differentiated supports.
- Equity needs to be addressed in all school settings.
- ELLs can learn math at grade level or beyond at the same time that they are learning English.

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NCTM. Principles to Action. Essential: Access & Equity. p. 63
Mathematics learning is independent of students' culture & does not need to be considered by the teacher.

- Effective teaching practices open up greater opportunities for higher-order thinking and raise achievement for all students including low-SES.
- The practice of isolating low-achieving students in low-level or slower-paced groups should be eliminated.
- All students are capable of solving challenging mathematics problems.

**UNPRODUCTIVE BELIEFS**

- Effective math instruction is independent of students' culture & does not need to be considered by the teacher.
- Effective teaching practices open up greater opportunities for higher-order thinking and raise achievement for all students including low-SES.
- Tracking promotes students' achievement by allowing students to be placed in groups to make greatest gains in learning.
- Only high-achieving students can reason and persevere in solving challenging math problems.

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PROPOSED CHANGES

- Establish mathematics goals to focus learning.
- Implement tasks that promote reasoning and problem solving.
- Use and connect mathematical representations.
- Facilitate meaningful mathematical discourse.
- Pose purposeful questions.
- Build procedural fluency from conceptual understanding.
- Support productive struggle in learning mathematics.
- Elicit and use evidence of student thinking.
Student voice can be seen as the different ways in which classroom communication in different media move a student through growth in their educational process as well as attending to the multiplicities of identities that students construct as they move through the process of belonging to a community of practice.
PROBLEMS WITH STUDENT VOICE WORK

Student voice…may not currently have the practical or theoretical tools…to explain, or to contend with, the multifarious ways in which power relations work within school…processes. As a consequence, it may find itself implicated in reproducing, rather than unsettling or transforming, the hegemonic-normative practices it sought to contest. In addition, it may remain bound by the presumption that…such dialogue is itself a manifestation of a classed, gendered and ‘raced’ form of cultural capital (2009, p.169).

The idea of “giving” students voice, especially when it refers to students of color, only serves to reify the dynamic of paternalism that renders Black and Brown students voiceless until some salvific external force gifts them with the privilege to speak. Rather than acknowledge the systemic violences that attempt to silence the rich voices, cultures, and histories that students bring into classrooms, this orientation positions students, and by extension, the communities of students, as eternally in need of institutional sanctioning.
BELONGING?

- Academics not their strength in general
- Math has never made sense
- It did before Algebra, sense of self worth declined
- Demoralized by a standardized test
- Negative messages from home
- “We’re not math people”
- Combatting stereotypes of math ability
**ON REFLECTION**

- Meaning-making process
- Systematic, rigorous, disciplined way of thinking
- Needs to happen *in community*, interaction with others
- Requires attitudes that value personal and intellectual growth of all

Weekly Learning Reflection

Week of: Sept. 8-12

What I don’t know yet:
I don’t know what 'configuration of points' means in the homework.

What do I need to help me make these improvements?
I need to participate more in class and write more notes on ideas.
I need to improve finding patterns in problems so that I can explain my answer clearly. I sometimes struggle to explain why my answer is correct, so I need to find a way that helps me gain a better understanding of what I’m doing.

What will I do to make sure I improve this week?
I may also just use their ideas and try to verify if it makes sense or to just find support for it.

This week my learning successes were:
This week, I learned how the Pythagorean Theorem was originally used to find the area of shapes. I also learned how to use Notability efficiently, and I learned why the two squares from the activity we did during class would always form a larger third square. It could all be explained by the Pythagorean Theorem.

What mistakes did I make that helped me learn?
Some of the answers I offered during class in order to explain why the two squares would add up to a big square were wrong and faulty. However, by listening to others’ ideas, I was able to understand that the Pythagorean Theorem was the explanation to the problem. From there, I was able to notice patterns in the problems we did, and I was able to understand and explain my answers more easily and with logical support.
PRACTICES THAT INHIBIT BELONGING

- Emphasizing competition
- Assuming there is “one kind of smartness”
- Devaluing their individuality
- Correcting the inconsequential
- Utilizing only one method of assessment
- Using Cold-Calling as a discipline strategy

Some from https://teachingmathculture.wordpress.com/2016/05/20/who-belongs-in-our-math-classrooms/
PRACTICES THAT FOSTER BELONGING

• Focusing on student ideas & valuing all perspectives
• Describing mathematics with “dynamic subjectivity”
• Letting students create connections
• Helping students create their own mathematical identity
• Authorship of Ideas/Solutions
• Sharing the Authority of Mathematics
PBL Framework

Connected Curriculum
- scaffolded problems
- de compartmentalized topics
- the connected nature of mathematics

Ownership of Knowledge
- Encouragement of individual and group ownership
  - journals
  - student presentation, revoicing and other deliberate discourse moves

Shared Authority
- Dissolution of authoritarian hierarchy
  - discourse moves to improve equity
  - send message of valuing risk-taking and all ideas

Justification not prescription
- Focus on the “why” in solutions
  - foster inquiry with multiple perspectives
  - value curiosity & assess creativity
WHAT DO STUDENTS SAY?

…I’ve been given the opportunity to express myself…my identity has changed as a person. I feel like this course is kind of like that. I could be on the side where, I like to solve it this way and someone else could be on the side where they like to solve it that way, and the fact that we both get to express our opinions and even if one of us is wrong and one of us is right, or even if both of us is right. It’s changed my identity and given me kind of like a voice in math. Whereas I didn’t really have one before. It was a silent voice.
1. “the portion of the mind that houses hidden biases”

2. Gain awareness -> adapt behavior to outsmart the “machine”

3. Treating people differently to the extent that there are advantages and disadvantages that they experience.
Your brain operates on two different levels

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<thead>
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<th>Intuitive</th>
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<tr>
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<td>Unconscious</td>
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<td>Explicit</td>
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Google Image Search

“Teacher Yelling at Student”

“Teacher Angry at Student”

“Teacher disciplining student”

Images where anger is actually shown – majority of images is White adult and Student of Color
1. Explicit attitudes & implicit associations are only mildly correlated. (Cameron 2012)

2. Measure of implicit racial bias can explain teacher, administrator or parent perpetuate inequalities in even very diverse schools. (Diamond & Lewis, 2015)

3. Teachers who are high in implicit bias are actually more able to have successful interracial interactions than less biased peers, but only when able and willing to devote cognitive resources to regulating their behavior. (Mendes & Koslov, 2013)
“Inclusive teaching adds to effective teaching - a framework for understanding why teaching is effective, along with an intentionality of producing more equitable outcomes for students. A faculty member may teach effectively without consciously considering inclusiveness, but by being more intentional about the desired outcomes of learning and designing every aspect of the learning to address students’ needs, they could help to create even better results.”

Darryl Yong, Ph.D.
WHAT CAN YOU DO?

1. Go to the **Project Implicit** website & take a test
   https://implicit.harvard.edu/implicit/takeatest.html

2. Follow Darryl Yong & Ilana Horne: profteacher.com or
   TeachingMathCulture.wordpress.com

3. Attend NAIS POCC http://pocc.nais.org/Pages/default.aspx

4. Attend White Privilege Conference
   http://www.whiteprivilegeconference.com/

TO LEARN MORE ABOUT PBL, TAKE MY COURSE AT THE ANJA S. GREER CONFERENCE FOR MATH, SCIENCE AND TECHNOLOGY AT EXETER, NH JUNE 25-30, 2017