APPENDIX V – 161

SMARTER TOGETHER!

GETTING ALL STUDENTS TO PARTICIPATE IN CHALLENGING MATHEMATICS

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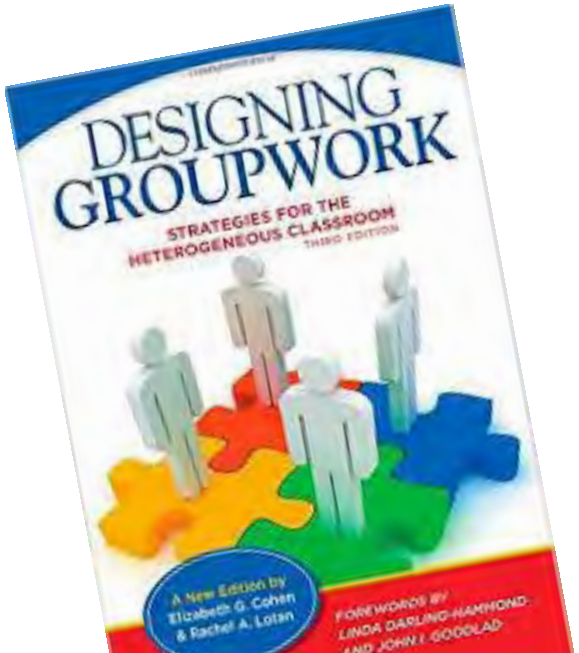
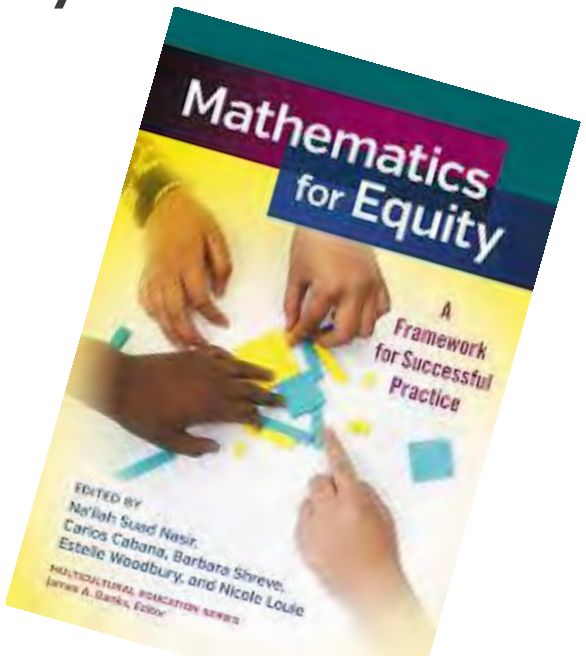
TUSD MAY 6, 2017

COMPLEX INSTRUCTION

- From work of Elizabeth Cohen & Rachel Lotan
- Taken up by Railside High School Mathematics teachers
- Modified for elementary classrooms





PARTICIPATION PROBLEMS

- What **participation problems** are you worried about?

PARTICIPATION PROBLEMS

PARTICIPATION PROBLEMS

- **Underparticipator**
  - Students who are quiet, don't contribute
- **Overparticipator**
  - Students who consistently respond, take over

WHY THESE DIFFERENCES?

- Introversion/extroversion
- Past experiences
- Language
- ….
- **STATUS!**

STATUS

- **Ranking** relative to others
  - Based on **perceptions of competence**
  - **Dynamic**
  - Pervasive

EVALUATION OF COMPETENCE

- Physical appearance – clothes, accessories, and body
- Speech (accent, fluency)
- Gender performance
- Social skills
- Emotional control

STATUS AND PARTICIPATION

- Higher status → Over-participation
- Lower status → Under-participation

WHAT DOES THIS LOOK LIKE?

Overparticipation

Underparticipation

WHAT DOES THIS LOOK LIKE?

Overparticipation

- Hand raised
- All resources
- Quick to respond
- Direct work of others
- Take over work of others
- Demand timeline

Underparticipation – at least 3 kinds

Content

- Quiet
- No eye contact
- Distracted/off-task
- Leaning back

Suppressed

- Interrupted or silenced
- Frustrated
- Eye Contact
- Doing individual work

Solitary Smart

- Thoughtful
- Hard working
- Quiet

WHAT DOES THIS LOOK LIKE?

Overparticipation

- Hand raised
- All ources
- to respond
- rs
- thers

Need
1) redirection of participation
2) opportunities to **stretch**
3) opportunities to see other's **strengths**

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Need spaces participate AND opportunities to show **strengths**

COMPLEX INSTRUCTION 3-STEP PROGRAM

1. Diversify mathematics (content, practices, activities)
2. Structure participation
3. Address status issues

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1. **Diversify mathematics (content, practices, activities)**
2. Structure participation
3. Address status issues

SHIFTING PERCEPTIONS & PARTICIPATION

- What does it mean to be **smart at math** in your classroom?
  - What **content, practices, & activities**?

PERCEPTIONS OF MATHEMATICAL COMPETENCE

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  - What **content, practices, & activities**?

Computation
Algorithms
Numerical strategies

PERCEPTIONS OF MATHEMATICAL COMPETENCE

- What does it mean to be **smart at math** in your classroom?
  - What **content, practices, & activities**?

Talking
Calling out answers
Writing on the board

Computation
Algorithms
Numerical strategies

PERCEPTIONS OF MATHEMATICAL COMPETENCE

- What do
  - What
  - What

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If we want our **underparticipators** to do more, we have to broaden the **mathematics** and **participation** in our tasks so everyone can see the **mathematical competencies of the underparticipators**!

TRY A TASK

- What does it mean to be **smart at math** in this task?
  - **Content, Practices, Activities**

TASK LOGISTICS

- Groups of 3-4
- Roles
- Supplies table
  - Task card
  - Set of green cards

TRY A TASK

- What does it mean to be **smart at math** in this task?
  - **Content, Practices, Activities**

DIVERSIFY CONTENT & PRACTICES

- Content (How many different standards are included?)
- Different representations (table, graph, real world, visual, symbolic, words)
- Multiple strategies (direct modeling, counting, number facts, algorithm)
- Varying resources (counters, base ten blocks, paper, calculator, ruler)
- Mathematical practices (modeling, persistence, quantitative reasoning, making connections, construct and critique arguments, use appropriate tools, precision)

DIVERSIFY ACTIVITIES

- Talk
- Draw
- Write
- Listen
- Move manipulatives
- Think
- Gesture
- Cut
- Fold
- Build
- Arrange
- Act out
- Estimate

BENEFITS OF DIVERSIFYING A TASK

- As you diversify a task, you
  - increase the **mathematical complexity** and **challenge**
  - make the task more **mathematically interesting**
  - highlight **strengths of underparticipators**
  - provide **stretches for overparticipators**

COMPLEX INSTRUCTION 3-STEP PROGRAM

1. Diversify mathematics (content, practices, activities)
2. **Structure participation**
3. Address status issues

PARTICIPATION STRUCTURES

- How did the ordering numbers task
  - **support** the participation of underparticipators?
  - **redirect** the participation of overparticipators?

ANOTHER TASK

- Focus on participation structures

TASK LOGISTICS

- Groups of 3-4
- Supplies table
  - Blocks
  - Grid paper
  - Envelopes

PARTICIPATION STRUCTURES

- How did the Build It! task
  - **support** the participation of underparticipators?
  - **redirect** the participation of overparticipators?

MORE PARTICIPATION STRUCTURES

- Roles
- Group questions
- Middle space
- Partitioning
  - Information (clue cards)
  - Objects (names on cards, resources)

MORE PARTICIPATION STRUCTURES

- Norms
  - No one is done until everyone understands.
  - Everyone is a resource. Use all of your resources wisely.
  - You have the duty to assist anyone who asks for help.
  - You have the right to ask anyone in your group for help.

COMPLEX INSTRUCTION 3-STEP PROGRAM

1. Diversify mathematics (content, practices, activities)
2. Structure participation
3. **Address status issues**

ADDRESS STATUS

Task structure gives underparticipators opportunities to shine.
Next step: **Intervene in status issues** to change perceptions of competence

- Point out **strengths** of underparticipators
- Point out the **assumptions** of overparticipators

MULTIPLE ABILITIES ORIENTATION

This task requires:

- Visual reasoning
- Creative thinking
- Logical reasoning
- Sharing information
- Moving between 3D and 2D
- Communicating ideas
- Listening

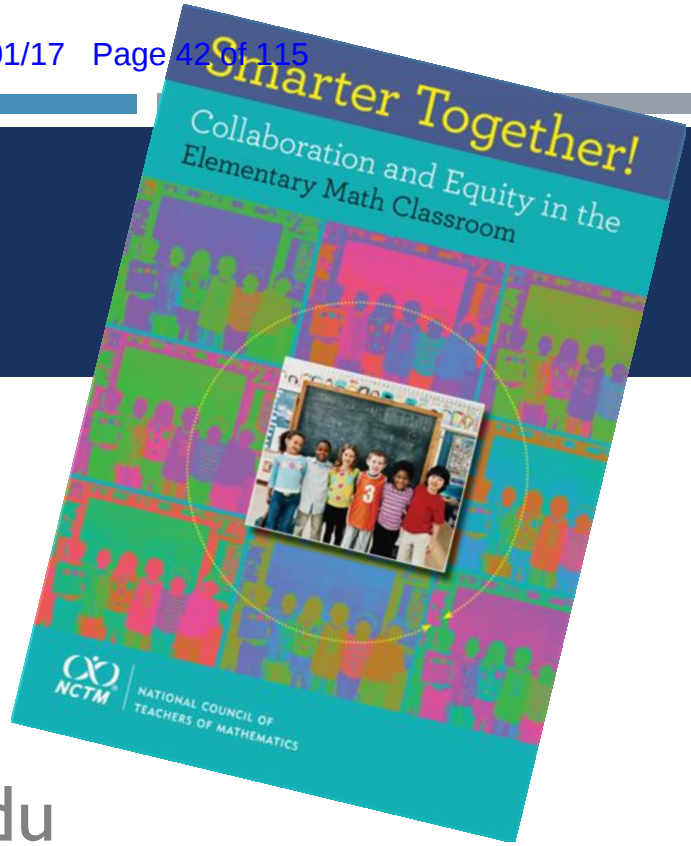
None of us has all of these strengths, but each of us has some of these strengths. Together your group has the abilities to solve this task.

ADDRESS STATUS

- Assigning competence
  - Public
  - Specific
  - Important
  - Academic
- … yet
- Assists

No one of us is as smart as all of us together!

RESOURCES



- Clmath.org
  - Go to Links to More Information
- Marcy Wood mbwood@email.arizona.edu
- Smarter Together! Helen Featherstone, Sandra Crespo, Lisa Jilk, Joy Oslund, Amy Parks, & Marcy Wood. *Smarter Together! Collaboration and Equity in the Elementary Classroom.* Reston, Va: NCTM, 2011.

BELIEFS BEHIND OVERPARTICIPATION

- Some students are naturally smarter than others.
- Many students are lazy and will social loaf if possible.
- Smart students…..
  - Get work done early
  - Are organized
  - Know how to lead a group
  - Should teach other students
- Students know how to work in groups.