LEARNING TO SEE, CONNECT WITH, AND BUILD STUDENTS’ RESOURCES: Focusing on STUDENTS by Zooming in on the Work of TEACHING

SCHOOL OF EDUCATION
UNIVERSITY OF MICHIGAN
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All this talk about not focusing on children’s deficits—why does this matter so much? Isn’t our job to figure out what children don’t know and help them grow?

So—focusing on children’s strengths is crucial for effective and equitable instruction and for advancing social justice.

1. Learning occurs through a process of building on prior knowledge and experience.
2. Strong academic and mathematical identities are a means to developing competence. They are also instructional goals.
3. For children of historically marginalized groups, stereotype threat and other biases interfere with and impede children’s performance.

August 10, 2016
Okay, I see why this is important. But it isn’t easy. How do I learn to be more skillful at recognizing and using children’s strengths?
MY CHOICE OF VIDEO SEGMENTS FOR THIS SESSION

- Non-professional video ("home video quality")
- My own teaching, but why?
- Diverse classrooms: race, ethnicity, language, SES
- Complex mathematical work, elementary level
- Useful for the specific goals of this session: to learn to see and use students’ resources
MAKING THE SHIFT FROM A PREOCCUPATION WITH DEFICITS TO A FOCUS ON STRENGTHS

- Seeing past “distractions” or non-mathematical issues
  - Behavior that distracts the teacher, but not the child or the other children (Noel, 2014)
  - How children talk (as they are learning; and when they are speaking academic language, or in English when that is not their first language)

- Pausing on “apparently incorrect” answers
  - Actually not incorrect
  - Answer to a different (and reasonable) question
  - More correct than incorrect
THE MINICOMPUTER

- Abstract mathematical context for work on number relationships, mathematical structure, arithmetic properties (e.g., distributive property), even and odd numbers
- Also a setting for developing skills of mathematical argument and analysis, as well as proof
- Novel and complex mathematical environment for children

August 10, 2016

Papy Minicomputer
SEEING VIRSHAWN

Virshawn between 11:19 – 11:25

What do you see of Virshawn?

Paper airplane

August 10, 2016
At 11:26, the teacher says, “You know what, Virshawn, I am going to need you to come up here closer where you can see and hear and won’t be distracted.”
Over the next minute, Virshawn is raising his hand to answer questions.
At 11:27, the teacher says, “Virshawn, you get to come up and make a number because you are the closest person to the board.” “You can have two checkers and you can put them wherever you want, and make a number, and then you can call on somebody.”
AT 11:28, VIRSHAWN TAKES THE ROLE OF THE TEACHER
VIRSHAWN, ONE WEEK LATER

THE TWO-CHECKER PROBLEM

What numbers are possible to make on the Minicomputer with exactly two positive checkers?
ADDING A NEGATIVE CHECKER!

The children found that 7, 11, 13, 14, and 15 were impossible with exactly two checkers.

EXTENSION:
Can you make 7, 11, 13, 14, and 15 if you have a negative checker? You must use both positive checkers and you can use one negative checker if it is useful.
VIDEO: HOW DOES THIS DAY RELATE TO WHAT HAPPENED ONE WEEK EARLIER?

Then the purple is a four, the red is a two, and the white is a one, so you couldn't do it without a- without if- without another negative number.

I think the negative checker is Awesome.
WHAT IS THE WORK OF SEEING AND BUILDING ON VIRSHAWN’S STRENGTHS IN THIS EXAMPLE?

- Trusting Virshawn to be mathematically engaged
- Making explicit positive mathematical roles that actively include and support children (e.g., “being the teacher”)
- Creating opportunities to “practice mathematics”
- Making available an opportunity to develop agency through “proving the impossible”
- Focusing on mathematics as a context for positive roles and identity
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SEEING STUDENTS’ RESOURCES AND ASSIGNING MATHEMATICAL COMPETENCE

A set of practices that deliberately deploy the power of teaching to:

1. Broaden and label what being competent in mathematics means
2. Intervene to position who (and what) is seen as competent in math class
3. Support individual children to develop their mathematical and academic identities and competence

Sources: E. Cohen and R. Lotan, complex instruction; J. Boaler’s work; Smarter Together: Collaboration and Equity in the Elementary Mathematics Classroom (Featherstone, Crespo, et al., 2011);
Sounds good. What does that require of me?
WHAT IS TEACHING?

Teaching is co-constructed
- . . . in broad socio-political, historical, economic, cultural, community, family environments
- . . . through the interpretations and interactions of teachers, students, and “content”

Cohen, Raudenbush, and Ball (2003)
21 August 10, 2016
WHAT IS THE WORK OF TEACHING?

Taking responsibility for deliberately maximizing the quality of these interactions . . .

- . . . in ways that maximize the probability that students learn
- . . . worthwhile content and skills
WHY “WORK” OF TEACHING”?

1. To focus our attention on what teachers DO and to distinguish this from other features of classrooms, such as instructional formats, classroom culture and norms, what students are doing, how the curriculum is designed

But what about small group work, open-ended problems, “grit,” etc.? Aren’t those what teachers DO?
WHY “WORK” OF TEACHING”?

1. To focus our attention on what teachers DO and to distinguish this from other features of classrooms, such as instructional formats, classroom culture and norms, what students are doing, how the curriculum is designed

2. To honor the effortful and deliberate nature of teaching and not to leave it invisible, implicit, and taken for granted
TRYING TO SEE THE WORK OF TEACHING

Taking a socio-cultural perspective on teaching and learning, and drawing on many others’ work:

- Discursive nature of teaching and learning (e.g., Sfard, Adler, many others)
- Diversity: language, identities, race and ethnicity, class, gender

means that there is something to the **mathematically interactive, discursive, and performative work of mathematics teaching** that is important to understand.
WHAT DOES “ASSIGNING COMPETENCE” REQUIRE IN TEACHING?

1. Broaden and label what being competent in mathematics means
2. Intervene to position who (and what) is seen as competent in math class
3. Support individual children to develop their mathematical and academic identities and competence

1. Be able to see what is “mathematical” and what is “competent”
2. Have techniques for making these moves to intervene
3. Strategically using these techniques with particular students in authentic and well-timed ways

August 10, 2016
30 fifth grade students
21 African American, 4 Latin@, 4 White
Low-income community
Most children have been unsuccessful in school mathematics
AN INHERENT FACT OF TEACHING

Is that we are always communicating, relating, and making sense across difference, including:

- Age
- Gender
- Race, ethnicity, culture, religion
- Identities
- Language
- Experience

So this means that fundamental to the work of teaching is attuning to other people, and being oriented to others’ ideas and ways of thinking and being.
THE STUDENT’S TASK

What number does the orange arrow point to? Explain how you figured it out.
VIDEO: ANIYAH AND TONI

This video and additional supporting materials are available online [here].
WE WILL WATCH ANIYAH AND TONI AGAIN, AND A LITTLE MORE, BUT FIRST . . .

What is involved in seeing individual children before the discussion of solutions?

- While all the children are working on this task, before Aniyah goes to the board, the teacher circulates around the room.
- The teacher scans what children are writing to decide how to discuss solutions.
READING STUDENTS’ WORK

2/4

Explain how you know: because there are equal parts and you are painting to the second one so it's $\frac{2}{10}$.

Give a complete sentence with one goal for yourself for our math class.

I will listen to other people's ideas. I don't just because I know the answer that I will still listen to others.
What number does the orange arrow point to?

Explain how you know:

There's 0 2 spaces

1 2 spaces then 2 2 spaces

in those 2 2 spaces are fractions
What number does the orange arrow point to? \( \frac{1}{4} \)

Explain how you know:

- because it's divided into units and it's one of the parts.
READING STUDENTS’ WORK

1/3 without mathematical explanation

What number does the orange arrow point to? _______

Explain how you know: ____________________
ANIYAH, TONI, LAKEYA, DANTE

What does each student know? What is he or she able to do?
What number does the orange arrow point to? \( \frac{1}{3} \)

Explain how you know: Because it's in 3 parts.
LAKEYA

What number does the orange arrow point to? 2

Explain how you know: because there are equal parts and you are pointing to the second one so it's \( \frac{2}{10} \).
What number does the orange arrow point to? \( \frac{1}{2} \)

Explain how you know: *Because if you look at it and Count.*
WHAT IS INVOLVED FOR THE TEACHER?

- Hearing, seeing, and reading students, in “real time”
  - During a class discussion
  - While circulating in the classroom
  - When reading students’ writing
What does Aniyah know and what can she do? What does Toni know and what is she able to do?
WHAT DO MANY “HEAR” IN ANIYAH AND TONI?

ANIYAH
- She has the wrong answer: 1/7

TONI
- She is playing with her hair and trying to get attention
- She is trying to embarrass Aniyah
WHAT DO ANIYAH AND TONI KNOW AND WHAT CAN EACH DO?

ANIYAH

- Uses the definition for a fraction to explain
  - She identifies the “whole”
  - She makes sure the intervals are equal
  - She counts intervals and not tick marks
  - She knows how to write “one-seventh”
- Produces a mathematically well-structured explanation
- Presents her ideas clearly

TONI

- Listens closely to a classmate’s presentation
- Uses the definition for a fraction to ask
  - How Aniyah decided on 7 parts
- Asks a pointed mathematical question
USING TECHNIQUES AND STRATEGIES FOR ASSIGNING COMPETENCE

Identify the competence to be highlighted. Consider how to disrupt hierarchies of status in class by which child is to be “called out” as competent.

- Call out an individual child’s competent move or contribution publicly (“___ just shared a very important idea”)
- Ask a child to explain another child’s contribution that the teacher highlights
- Ask the class to identify things that were part of an important contribution by one of the children
- Write something publicly that a child or children came up with or contributed that is important
- Accord expertise to children through assigning roles explicitly in a group
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DILEMMAS OF LEARNING TO SEE AND HEAR STUDENTS’ RESOURCES

1. Feeling committed to students as sensemakers who bring many strengths and feeling pressure to make sure students get it “right”

2. Using yourself yet also suspending assumptions based on what you would mean or feel

3. Knowing mathematics well enough to see “mathematics” in children’s talk, representations, etc. while also not letting your own mathematical knowledge overtake your capacity to see and hear what they are saying or showing
WHAT IS INVOLVED FOR THE TEACHER IN SEEING AND BUILDING ON STUDENTS’ STRENGTHS?

- Listening carefully to what they say, reading attentively what they write
- Making deliberate choices about how to see and interpret students
- Both of these involve using what you know, but also suspending what you assume
OPPORTUNITIES TO LEARN TO BUILD SKILLS IN SEEING, HEARING, AND BUILDING ON STUDENTS’ RESOURCES

- Examining challenging video clips with others
- Looking at students’ written work
- Doing the mathematics that children are doing
- Seeing children outside of school, in community settings: look not just for mathematical content but also practices
THANK YOU!

dball@umich.edu

Slides will be available on my website
(deborahloewenbergball.com)

NEW! AVAILABLE 8/12/16!
Graphic on slides 7, 8, 14, 15, and 16:

Graphic on slides 21 and 22: