

UNDERSTANDING THE POWER OF TEACHING AND ITS ROLE (IN)JUSTICE

Deborah Loewenberg Ball

 @deborah_ball

14th International Congress on Mathematical Education

2017 Felix Klein Award Lecture

Wednesday, July 14, 2021 • East China Normal University, Shanghai, China



SCHOOL OF EDUCATION



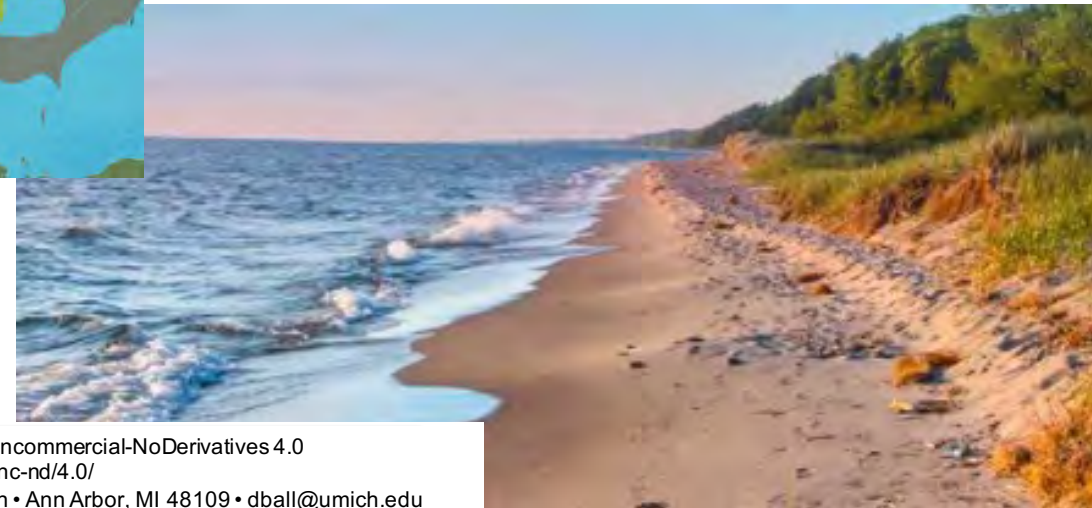
TeachingWorks



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ACKNOWLEDGING THE LAND I AM ON



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ACKNOWLEDGING THE COLLECTIVE NATURE OF MY WORK

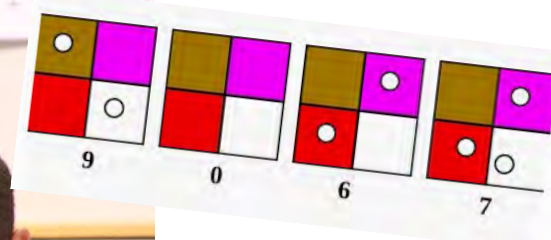
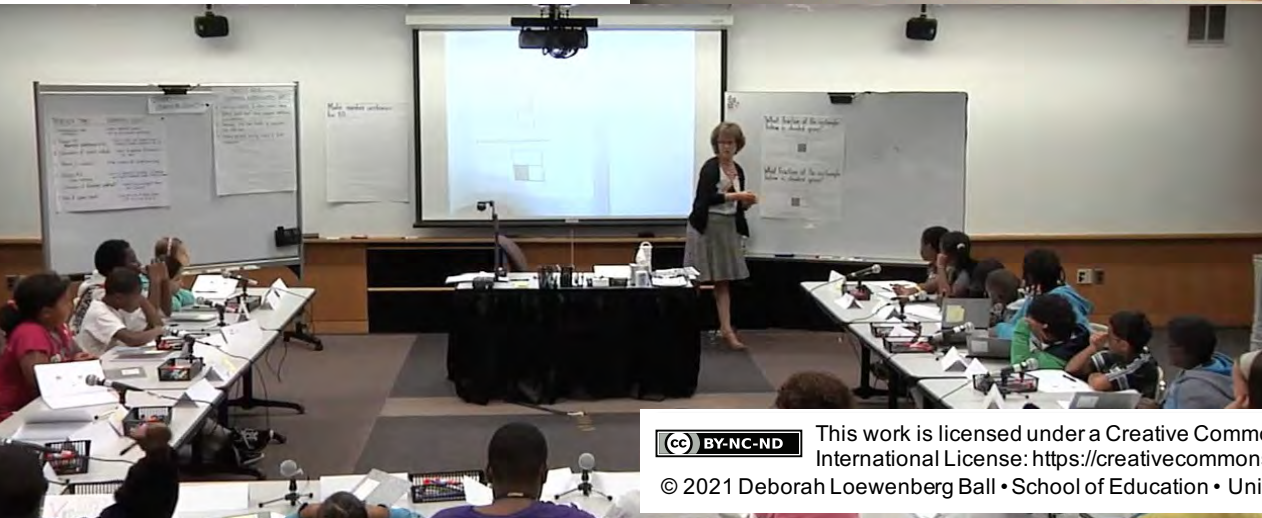
- My colleagues: Chandra Alston, Hyman Bass, Alyssa Brandon, Elena Crosley, Matthew Dahlgren, Nicole Garcia, Maisie Gholson, Imani Goffney, Mark Hoover, Anna Sfard, Meghan Shaughnessy, Kathryn Taylor, Amber Willis
- My students: Karen Ahn, Gabrielle Bernal, Karin Brown, Amber Davis, Rosalie DeFino, Joy Johnson, Lauren Hickman, Lindsey Mann, Mimi Owusu, Darrius Robinson, William Waychunas, Charles Eugene Brooks Wilkes II
- The more than 1,000 children who have been my students over 45 years



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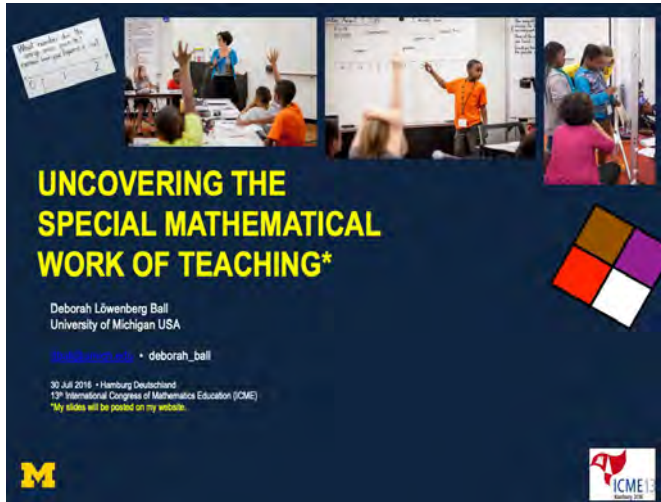
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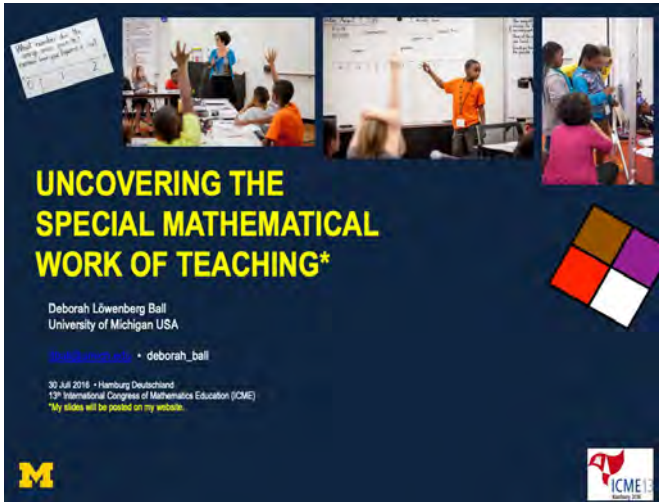


CONTINUING THE JOURNEY



Ball (2016) <https://lecture2go.uni-hamburg.de/l2go/-/get/v/19780>

CONTINUING THE JOURNEY




UNCOVERING THE SPECIAL MATHEMATICAL WORK OF TEACHING*

Deborah Löwenberg Ball
University of Michigan USA

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30 July 2016 • Hamburg Deutschland
13th International Congress of Mathematics Education (ICME)
*My slides will be posted on my website.



Teachers' competencies
Teachers' knowledge of some mathematics
Teachers' pedagogical content knowledge
Teachers' professional knowledge
Teachers' values and beliefs
Teachers' reasoning



WHY “**MATHEMATICAL**” WORK OF TEACHING”?

To look at how **mathematical** listening, speaking, interacting, acting, fluency, and doing **are part of** the work of teaching, not just resources for it

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.

Ball (2016) <https://lecture2go.uni-hamburg.de/l2go/-/get/v/19780>

AND ON . . .



JUST DREAMS AND IMPERATIVES: The Power of Teaching in the Struggle for Public Education

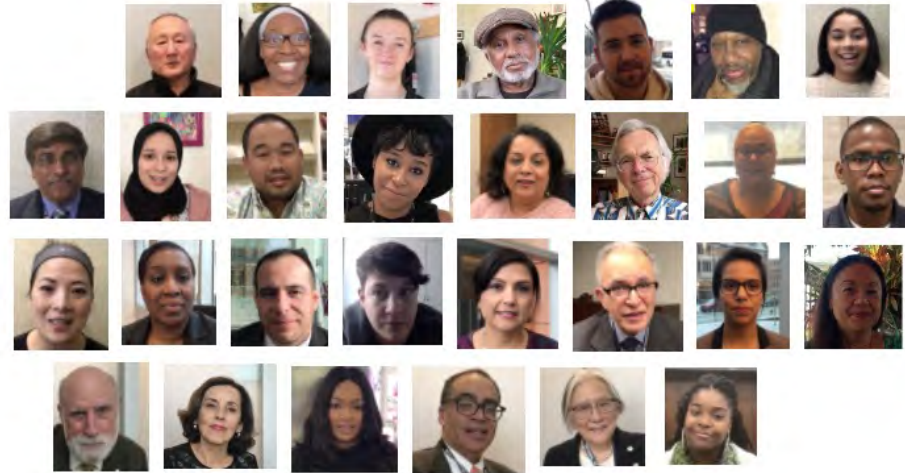
Deborah Loewenberg Ball
@deborah_ball #AERA18 #AERAPres

Presidential Address • 2018 American Educational Research Association Annual Meeting
Sunday, April 15, 2018 • New York

Ball (2018) https://youtu.be/JGzQ7O_SIYY



AND ON ...



JUST DREAMS AND IMPERATIVES:
The Power of Teaching in the Struggle for Public Education

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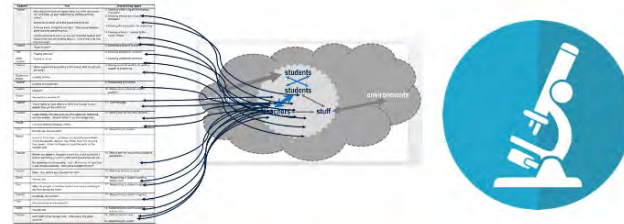
WHAT WOULD IT TAKE TO DISRUPT THE PATTERNS THROUGH WHICH A BLACK GIRL IS MARGINALIZED?



- Seeing Toni's question as key to the class's work
- Taking as axiomatic the brilliance of Black children, and thus Toni and Aniyah

Knowing and using mathematics in teaching (MKT)

Interpreting Toni as asking a mathematical question that she means



How do macro-structures play out in the micro-moments of Black and Brown children's experiences in classrooms?

Ball (2018) https://youtu.be/JGzQ7O_SIYY

UNDERSTANDING THE POWER OF THE WORK OF TEACHING AND ITS ROLE (IN)JUSTICE: WHAT IS MY PROJECT IN *THIS* LECTURE?

1. What is it to *do* the ‘work of teaching’?
2. What does it mean to foreground the ‘power’ of that work and why does it matter?
3. What are continuing challenges in trying to understand that work, and why should we care?

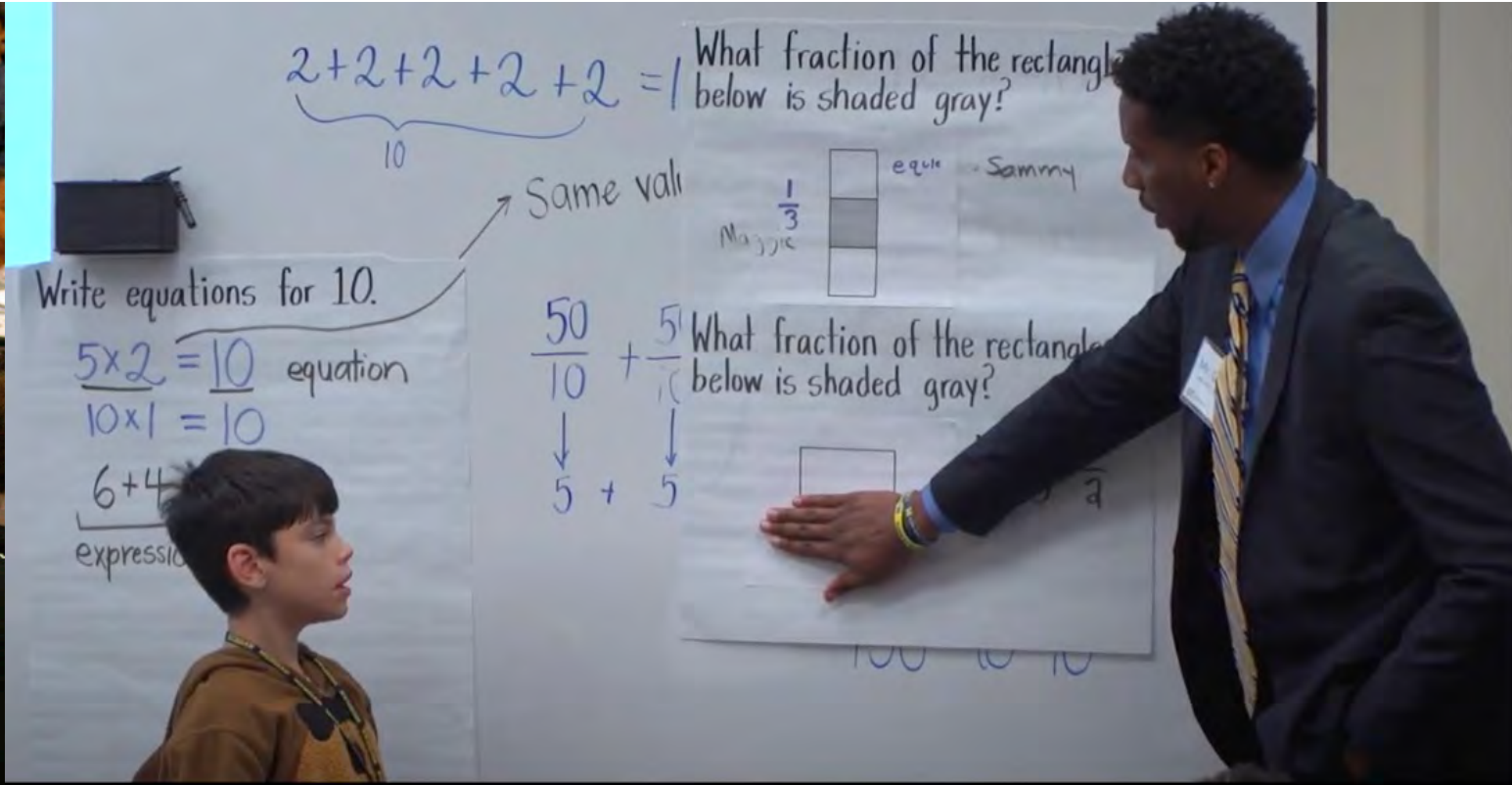
1. What is it to do the 'work of teaching'?



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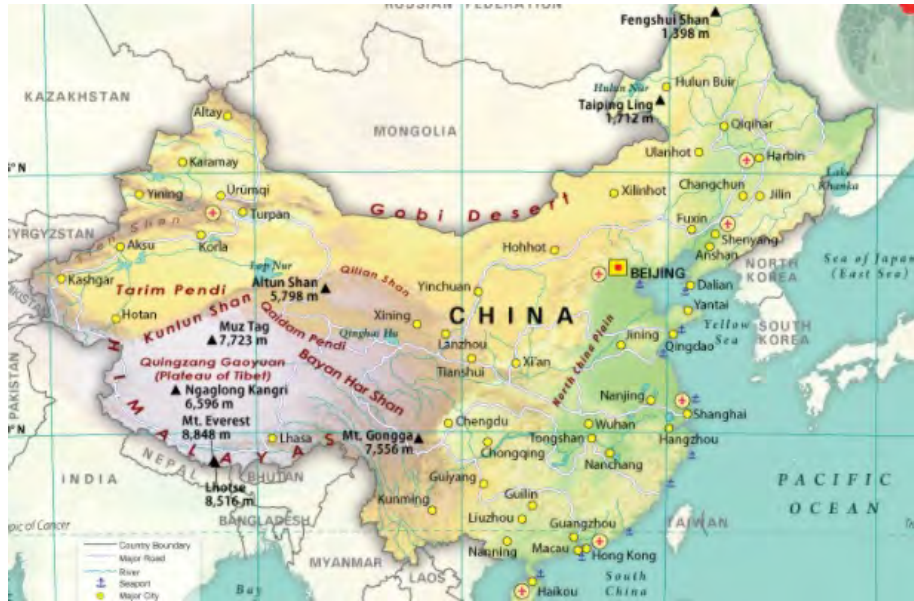
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TEACHING: SO COMMON, AND YET SO COMPLEX



72.5 million teachers worldwide

IT'S COMMON



15 million teachers



8.7 million teachers



410,000 teachers

866,600 teachers



756,900 teachers



1 million teachers



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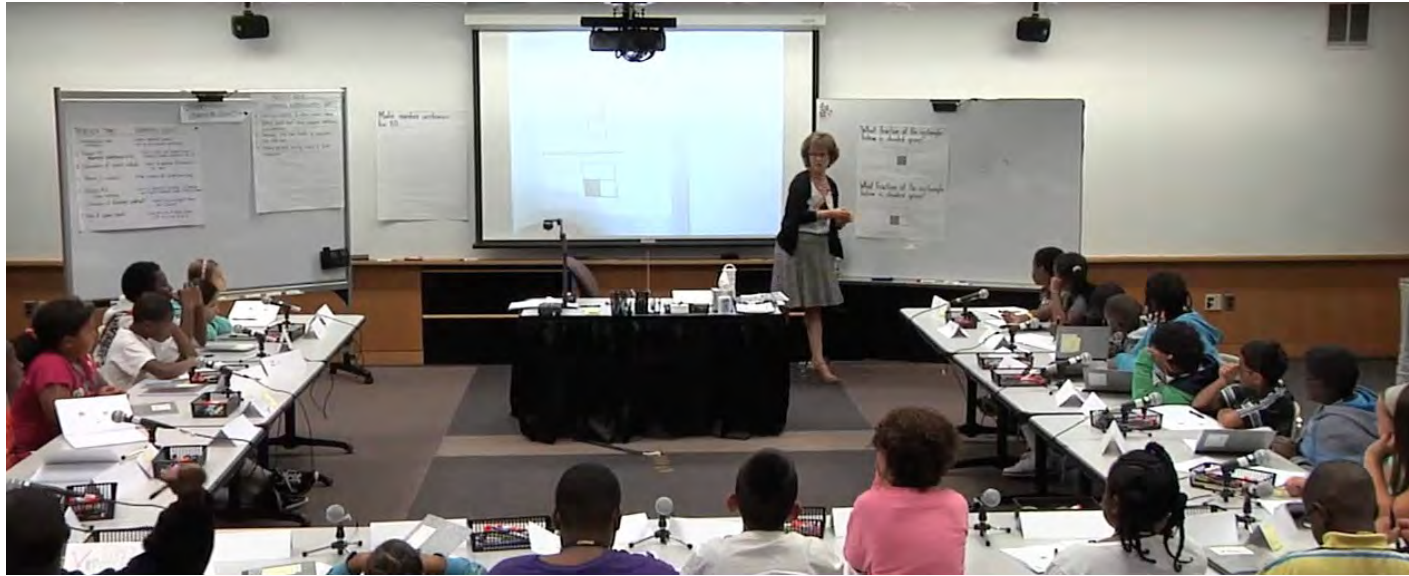
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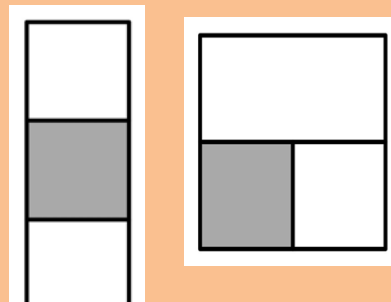
1.4 million teachers

IT'S 'COMPLEX'

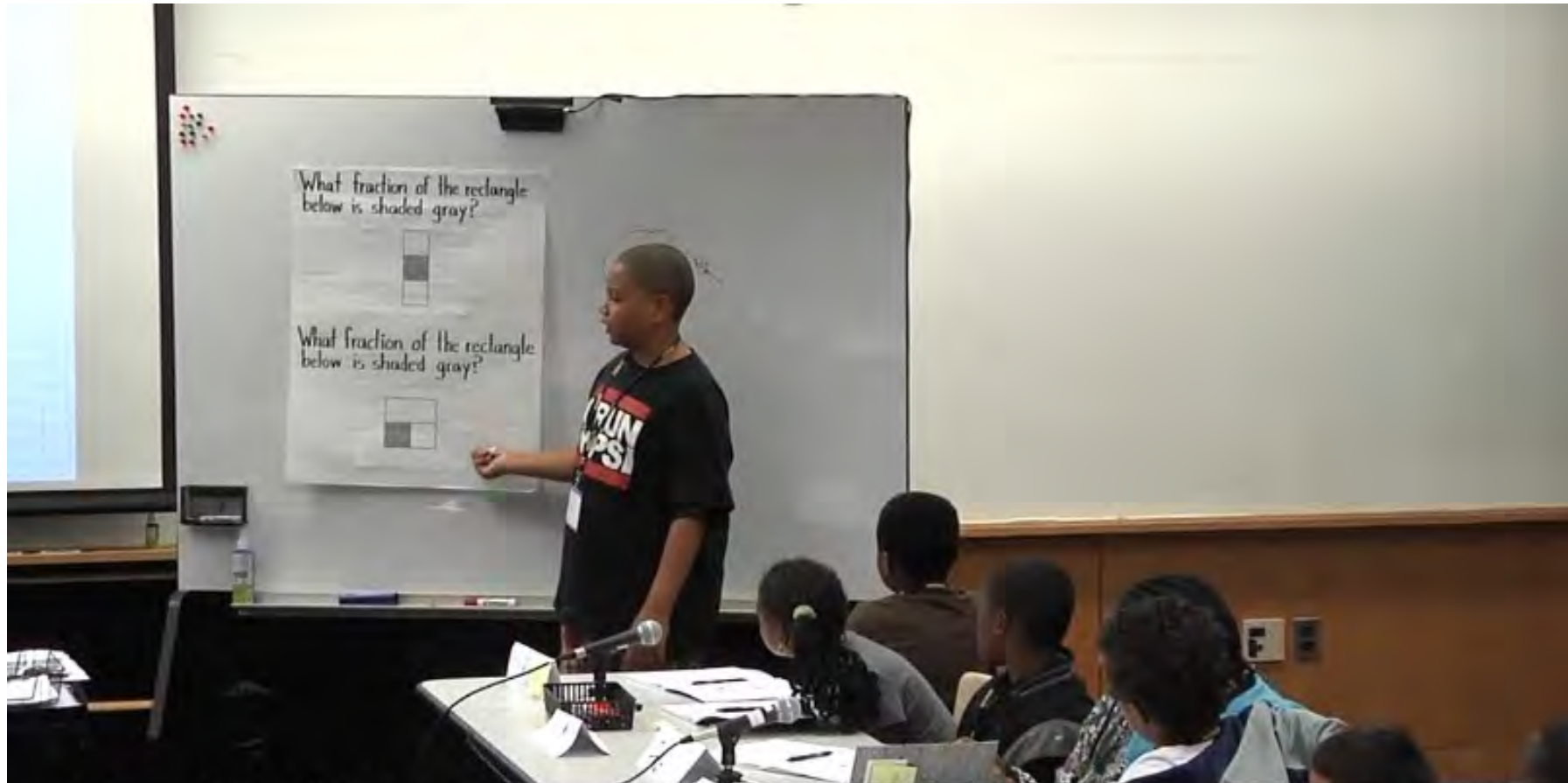
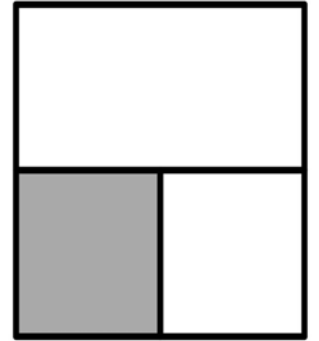


What do you pay attention to?
What is 'complex' here?

What fraction of each rectangle below is shaded gray?



VIDEO: ANTAR AND GABI



Antar: I think it's not a fraction because all of the parts are not equally the same shape.

What is meant by 'complex'?

How is Antar being positioned?

What is the mathematical point of this?

What does Antar mean by 'it's not a fraction'?

Should I put another example up or keep working on this figure?

Shall we stay in whole group or turn and talk in smaller groups?

Should Antar stay at the board while Gabi presents?

How shall I try to position Antar and Gabi?

What shall I say or ask next?

Should I explain or keep the children talking together?

Whom shall I call on?

Are those two students over on the side following this discussion?

Where shall I stand?

How can I get other students to build on what Antar and Gabi have said?

Is this a good moment to give Gabi the 'sticky' line?

How is Antar feeling about his contribution?

What do I mean by the
'work of teaching'?

What do I mean by the 'work of teaching'?

Using myself as the object and tool of my inquiry, I teach mathematics daily to a heterogeneous class of third graders at a local public elementary school. . . . I am increasingly aware that there are many resources beyond knowledge that contribute to wise practice: patience, respect, flexibility, humor, imagination, and courage, for instance. (Ball, 1993)

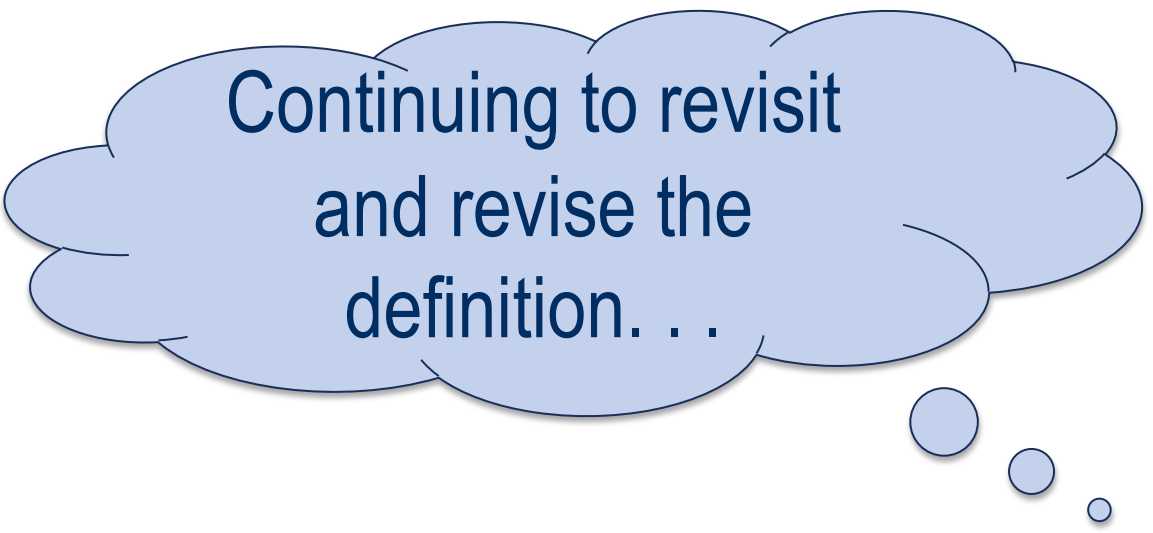
'What do teachers need to do in teaching mathematics—by virtue of being responsible for the teaching and learning of content—and how does this work demand mathematical reasoning, insight, understanding, and skill?' (Ball, Thames, & Phelps, 2008)

' . . . the core tasks that teachers must execute to help pupils learn. . . leading a discussion of solutions to a mathematics problem, probing students' answers, . . . [as well as] planning for instruction, meeting with parents. . . ' (Ball & Forzani, 2009)

The perspective that we adopt here is that curriculum materials could contribute to professional practice if they were created with closer attention to processes of *curriculum enactment*. Our perspective is premised on an understanding of the nature of teaching itself. While "curriculum" is often taken to refer strictly to the textbook or curriculum materials, the enacted curriculum is actually jointly constructed by teachers, students, and materials in particular contexts. (Ball & Cohen, 1996)

WHY "WORK" OF TEACHING"?

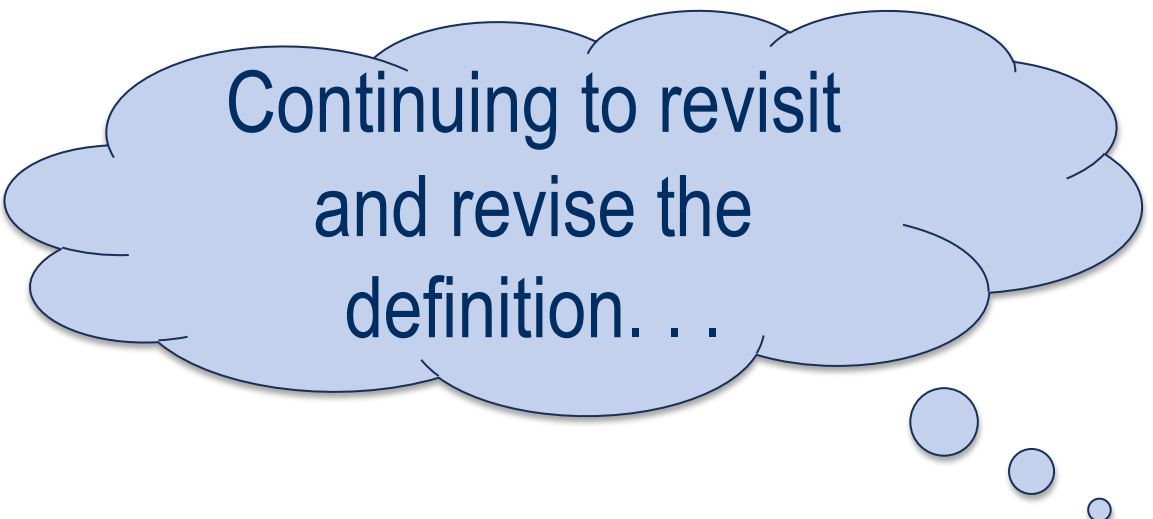
1. To focus our attention on what teachers DO and to distinguish this from other features of classrooms, such as instructional formats, classroom culture and norms, what students are doing, how the curriculum is designed
2. To honor the effortful and deliberate nature of teaching and not to leave it invisible, implicit, and taken for granted



Continuing to revisit
and revise the
definition. . .

What do I mean by the 'work of teaching'?

- In part, this *is* the ongoing inquiry.
- It rests on trying to understand what is involved for teachers in their interactions with learners in contexts, in broad sociopolitical environments.
- It is fundamentally both a theoretical and practical question.



Continuing to revisit
and revise the
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- In part, this *is* the ongoing inquiry.
- It rests on trying to understand what is involved for teachers in their interactions with learners in contexts, in broad sociopolitical environments.
- It is fundamentally both a theoretical and practical question.

1. How to understand the power of teaching to perpetuate or to disrupt injustice, racism, oppression.
2. How to leverage its possibilities for a different world.

2. What does it mean to foreground the ‘power’ of the work of teaching and why does this matter?

The commonness and complexity of teaching have powerful consequences for patterns of racism and oppression in society.



COVID-19 inequity in the US, by the numbers

BLACK PEOPLE REPRESENT



13% OF THE U.S. POPULATION

BUT ALMOST



25% OF COVID-19 DEATHS

COMPARED TO WHITE PEOPLE, BLACK PEOPLE ARE ALMOST **TWICE AS LIKELY** TO DIE FROM THE VIRUS.

AN ESTIMATED

60%

OF COVID-19 DEATHS OCCURRED IN DISPROPORTIONATELY BLACK COUNTIES.



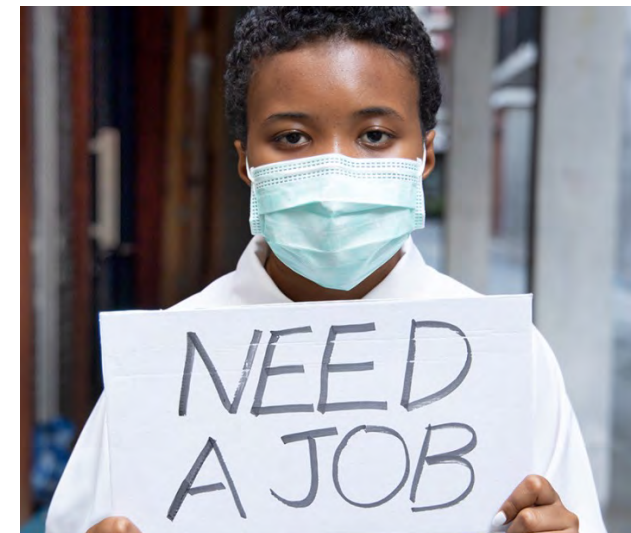
BLACK PEOPLE ARE ABOUT

FIVE TIMES

MORE LIKELY TO BE INFECTED WITH THE VIRUS THAN WHITE PEOPLE.

As of July 26, 2020.
Credit: Cat Weeks
Source: Gilead Sciences Inc.

ECONOMIC INEQUALITY



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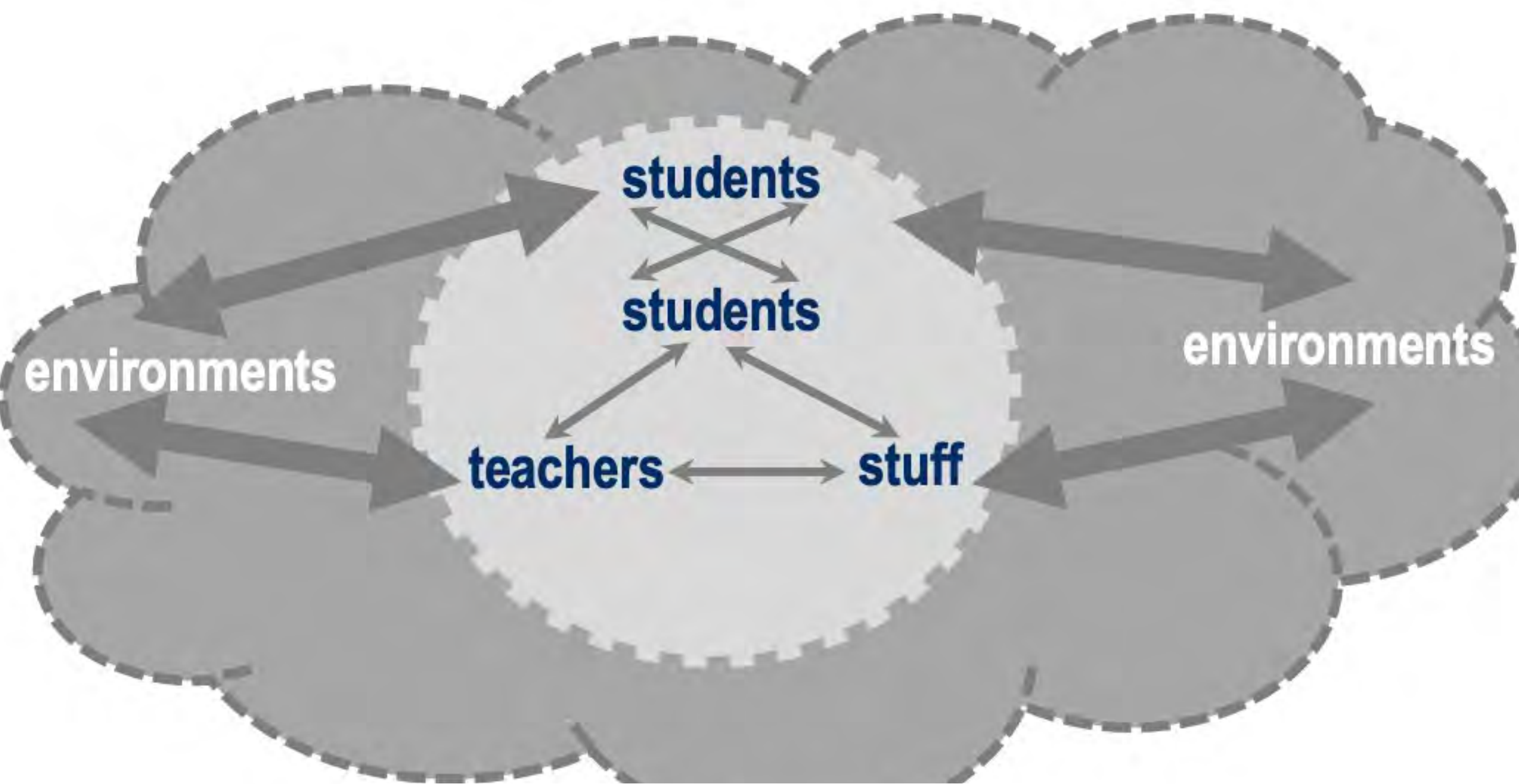
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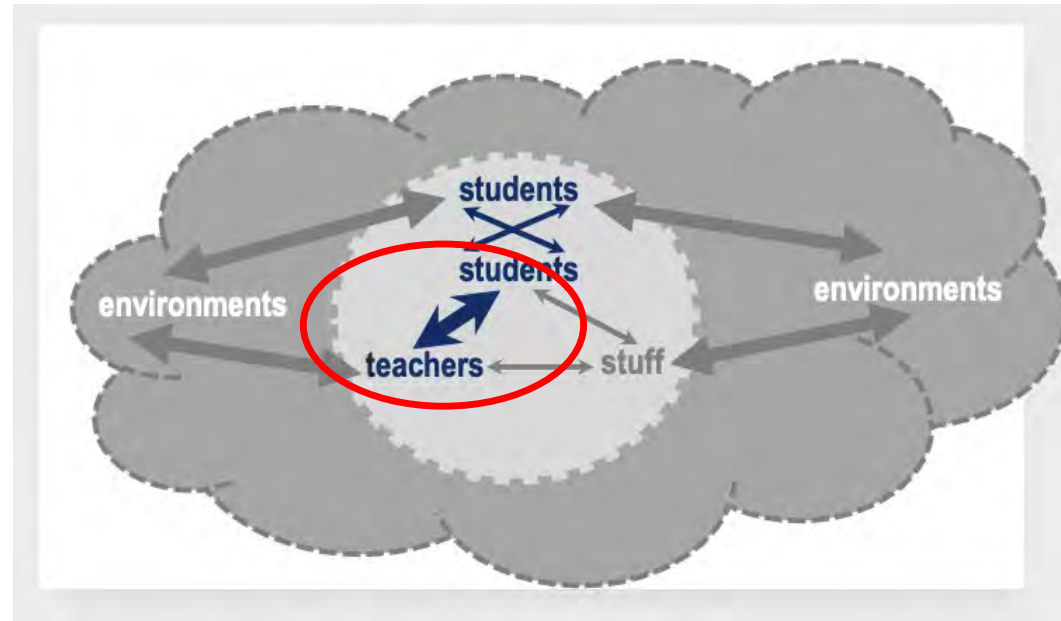
1. **Teaching is powerful.** When it is done with care and judgment, students can thrive — learn mathematics, develop positive identities, learn to value others and work collectively.
2. Teaching also involves **enormous discretion.**
3. How that discretion is exercised can either reinforce racialized and oppressive patterns of social, personal, and epistemic injustice and harm, or it can **disrupt these patterns.**



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Teacher	Who'd like to answer what you think about the second rectangle? We're only going to be able to talk about this briefly. We probably won't finish it.	Launch discussion
Teacher	Who'd like to explain what you think? Antar, what do you think?	Choose student to call on
Teacher	Could you come up to the board and explain? Thank you.	Frame task for student who is presenting
Teacher	I really like the way that people who are coming to the board are doing today. You are explaining really well.	Acknowledge competence
Teacher	Here's a marker. Can you explain your thinking?	Provide material support
Antar	I think it's not a fraction because all of the parts are not equally the same shape.	Listen
Teacher	Can you say that one more time to the class?	Support presenter
Antar	I think it's not a fraction because all the parts are not equally the same.	Listen
Teacher	Can someone repeat what Antar said? Very nice, Antar.	Orient students to presenter
	<i>Many students have their hands up</i>	
Teacher	What did he say? Gabriella?	Choose student to call on
Gabriella	Oh. He said that he doesn't think it's a fraction because not all the parts are equal.	Listen
Teacher	Is that what you said?	Position first student as authority
Teacher	Okay, would someone like to comment on that? Agree or disagree with him?	Orient students to one another
Teacher	Okay, let's see, how about Gabi.	Choose student to call on
Gabi	I disagree.	Listen
Teacher	What do you think?	Pose question
Gabi	I think the fraction is one-fourth.	Listen
Teacher	One-fourth? Do you want to come up and say why you think it's one fourth?	Frame next step, support next presenter
Teacher	Antar, do you want to stay there or do you want to sit down? Okay. Thank you very much. You did a good job of explaining your thinking.	Position student with agency, acknowledge competence
Teacher	So, let's hear what Gabi's thinking.	Orient students to one another
Gabi	I think it's one-fourth because, like he said, all the fractions aren't the same, but you can make them the same by dividing a line down the middle.	Listen
Teacher	Here's something you can use so if someone wants to take it off again, they can. Okay, so now explain what you've done. Talk to the class, okay?	Provide material support
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Teacher	And so then you decided?	Probe
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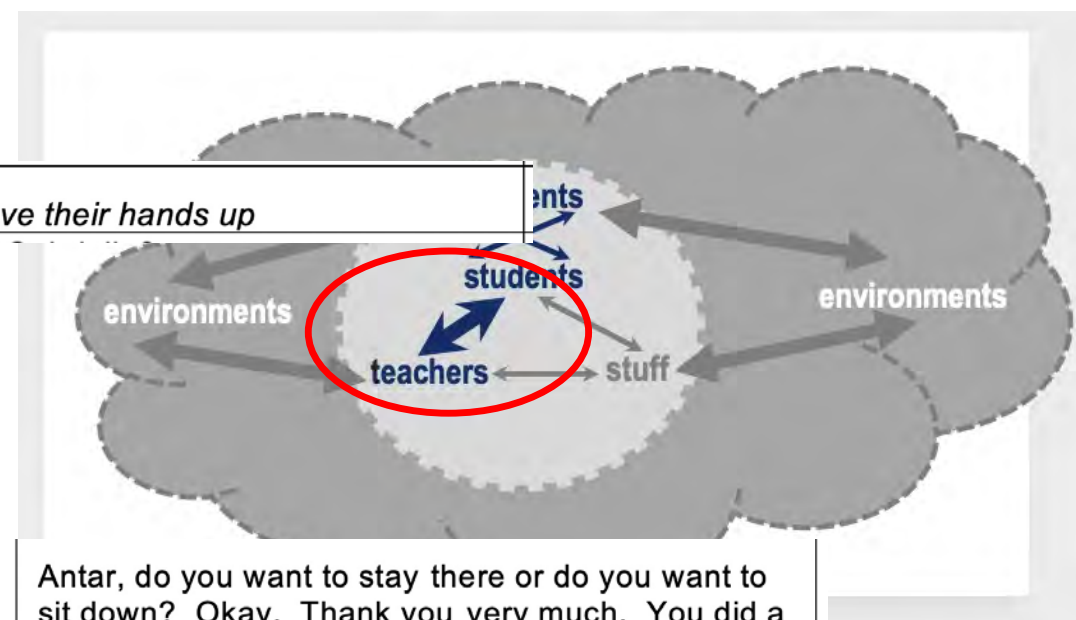


25 in 2:21

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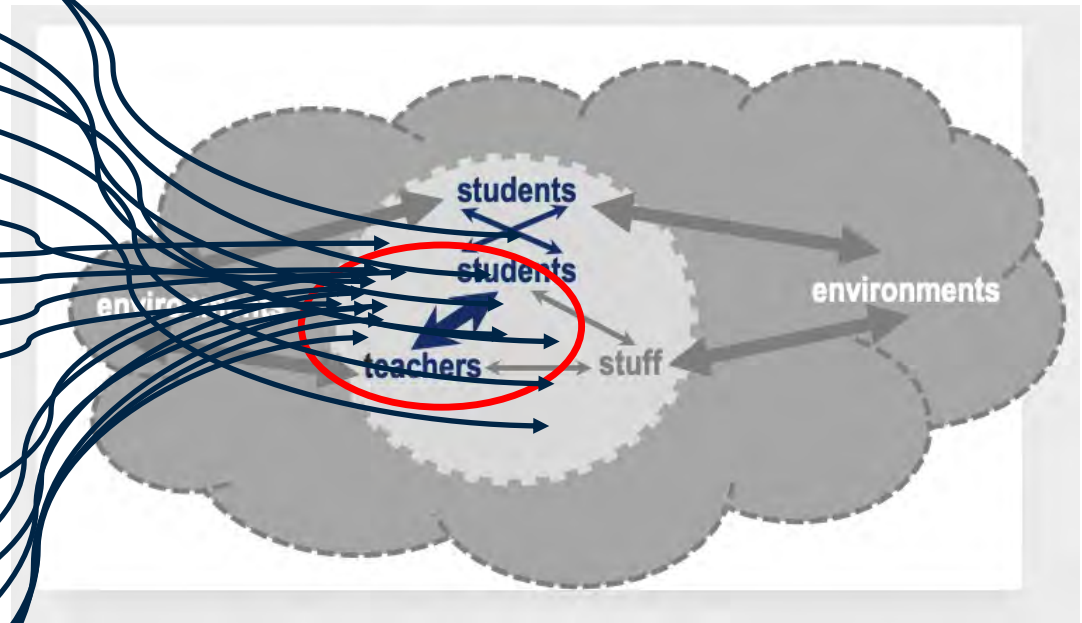
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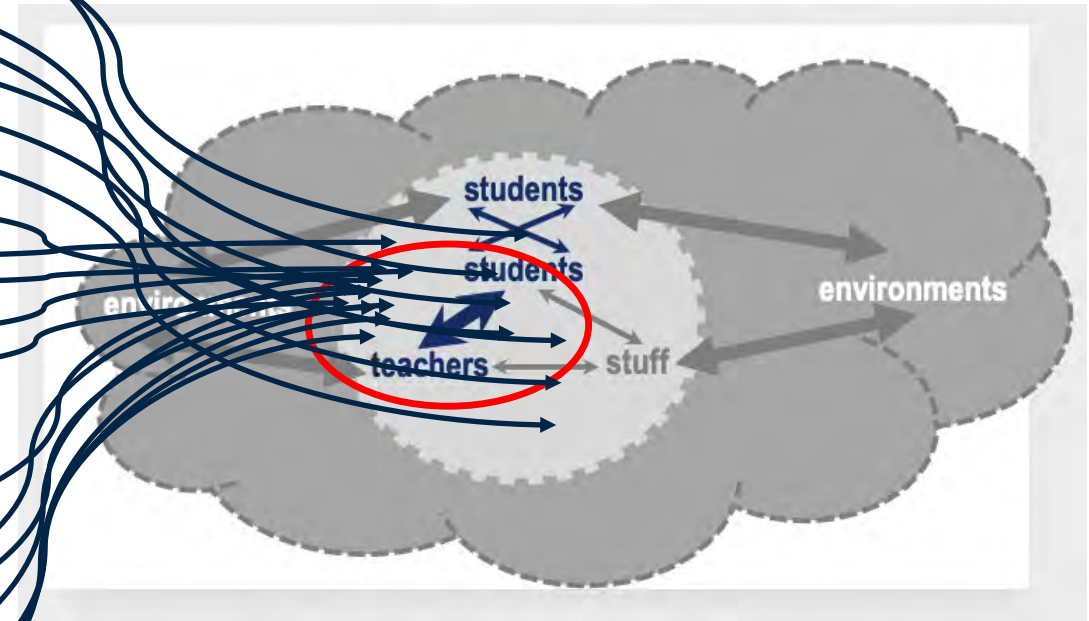
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25 in 2:21

TEACHING IS DENSE WITH “DISCRETIONARY SPACES”

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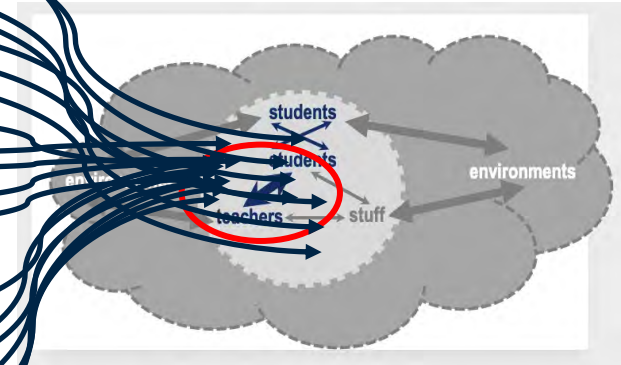


25 in 2:21

DISCRETIONARY SPACES AND THE POWER OF TEACHING

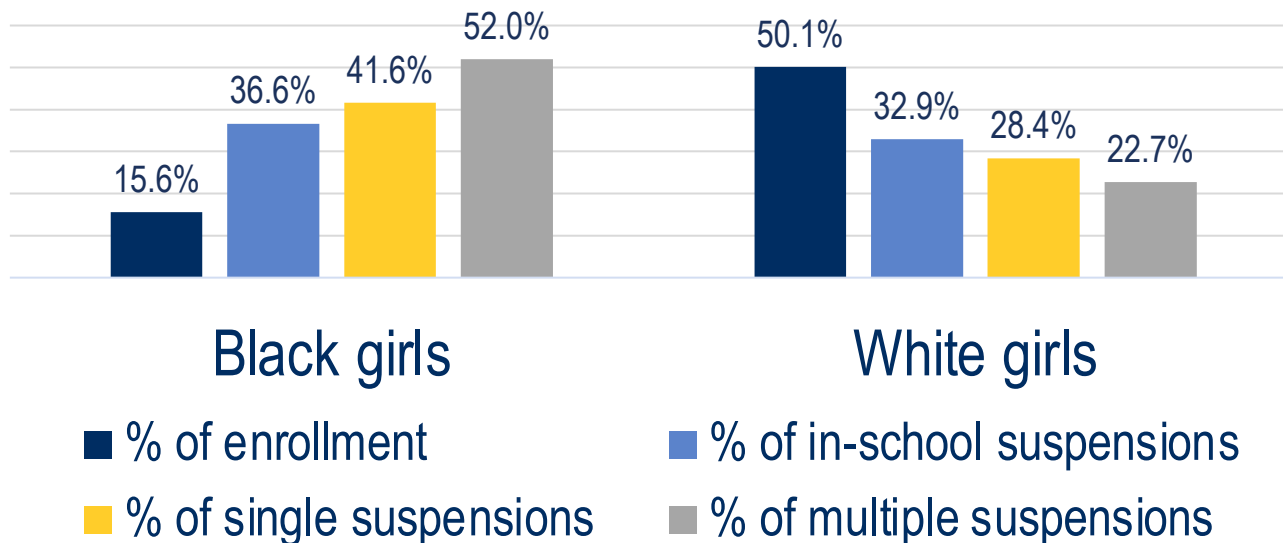
- A discretionary space is where interpretations, next moves, comments, or questions are necessarily determined by the teacher—and not by a policy or curriculum.
- These interpretations and actions are learned through firsthand experience in society and in school.
- These interpretations and actions are also habituated. (Ngo, 2017, Noel, 2018, Sfard)

Speaker	Talk	Discretionary space
Teacher	Who would like to try to explain what you think the answer is? And show us your reasoning by coming up to the board? Who'd like to come up to the board and try to tell... And you know, it might not be right. That's okay because we're learning something here. I'd like someone to come up and sort of be the teacher and explain how you are thinking about it. Who'd like to try that this morning?	1. Deciding when to open whole-group discussion 2. Deciding what to do to launch discussion 3. Framing the expectation for presenting 4. Framing of what is 'coming to the board' entails
Teacher	Okay, Anyah?	5. Selecting a student to present
Tom	Playing with hair	6. Deciding whether to comment
Other children	Laying on arms	7. Deciding whether to comment
Teacher	When someone's presenting at the board, what should you be doing?	8. Setting norms for what to do when a student is presenting
Students in class	Looking at them.	
Teacher	Looking at that person.	9. Responding to students
Teacher	Um-huh!	10. Faving up an individual student question
Anyah	You want me to write it?	
Teacher	You're trying to mark what you think this number is and explain how you figured it out.	11. Clarifying task
Teacher	Listen closely and see what you think about her reasoning and her answer. (Anyah writes 79 by the orange line).	12. Setting task for the other students
Anyah	Just one-seventh because there's...	
Tom	Did she say one-seventh?	13. Responding to student
Anyah	(turns to Tom) Yeah... (continues to draw) Because there's seven equal parts, has one, two, three, four, five, six, and then seven... (Uses her fingers to count the parts on the number line).	
Teacher	Before you agree or disagree, I want you to ask questions if there's something you don't understand about what she did. No agreeing and disagreeing. Just... All you can do right now is ask Anyah questions. Who has a question for her?	14. Setting task for responding to student explanation
Teacher	Okay, Tom, what's your question for her?	15. Selecting student to speak
Dante	You did not!	16. Responding to student speaking across room
Tom	Why did... (laughs at another student who says something to her from across the room)	17. Responding to student laughing
Teacher	Go ahead, it's your turn.	
Tom	Why did you pick one-seventh?	
Dante	You did not!	18. Responding to student speaking across room
Teacher	Let's listen to her answer now. That was a very good question.	19. Setting task for class 20. Responding to student



HARNESSING THE POWER OF DISCRETION

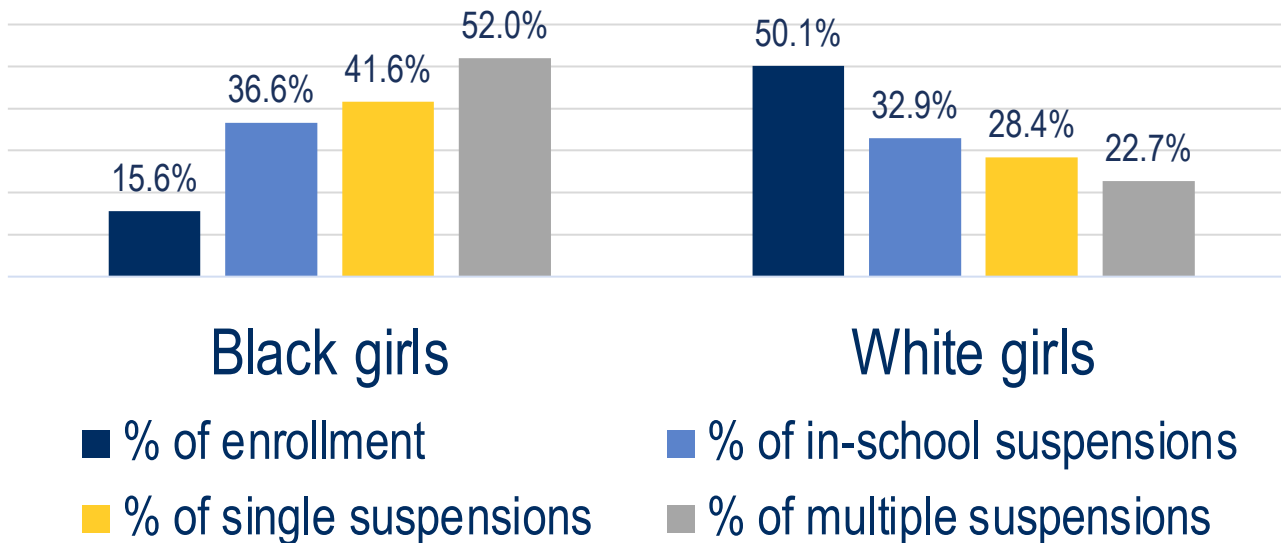
- Teacher education could work to disrupt habits that are embedded in normalized and oppressive patterns of practice.



Epstein, R., Blake, J., & González, T. (2017). *Girlhood interrupted: The erasure of Black girls' childhood*. Washington, DC: Georgetown Law Center on Poverty and Inequality.

HARNESSING THE POWER OF DISCRETION

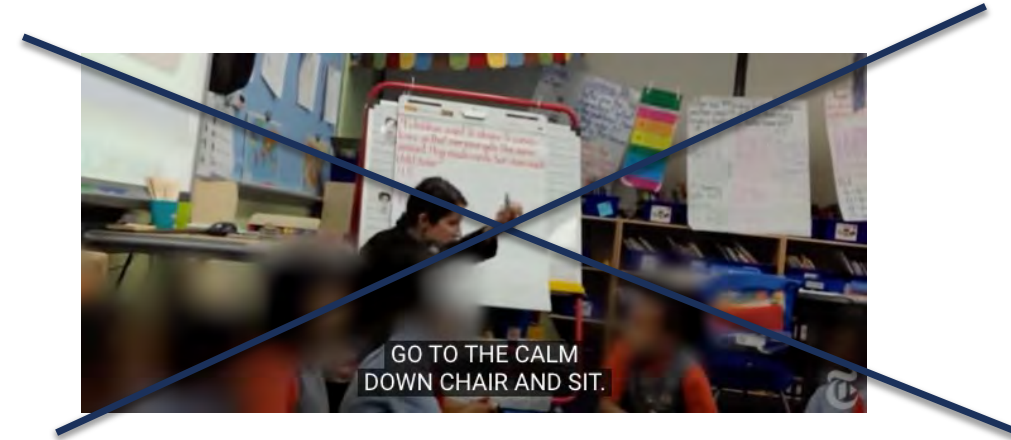
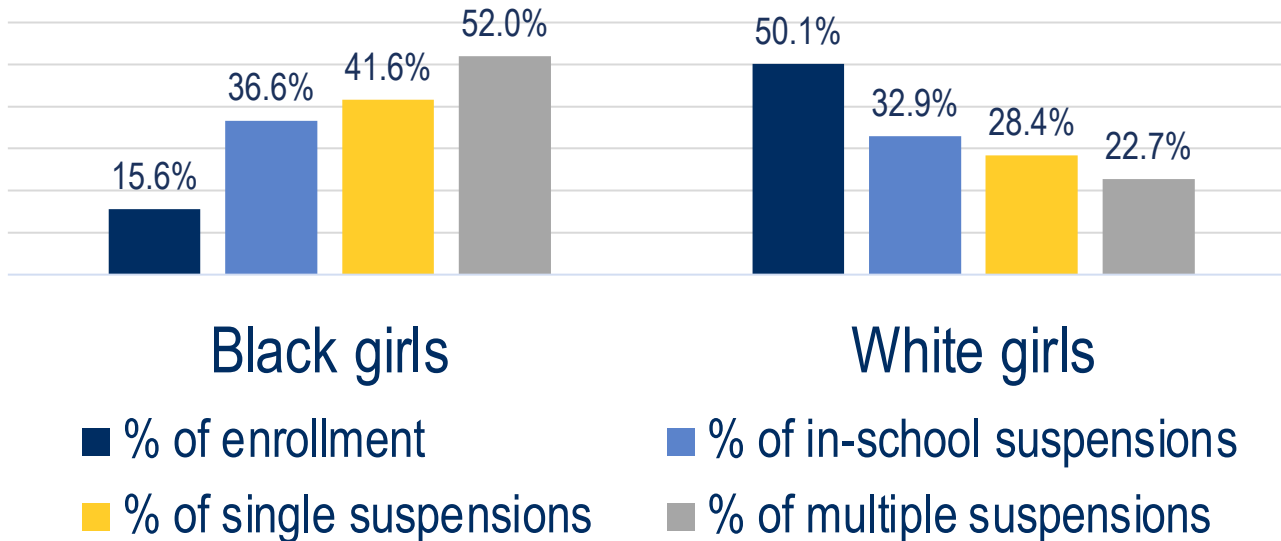
- Teacher education could work to disrupt habits that are embedded in normalized and oppressive patterns of practice.



Epstein, R., Blake, J., & González, T. (2017). *Girlhood interrupted: The erasure of Black girls' childhood*. Washington, DC: Georgetown Law Center on Poverty and Inequality.

HARNESSING THE POWER OF DISCRETION

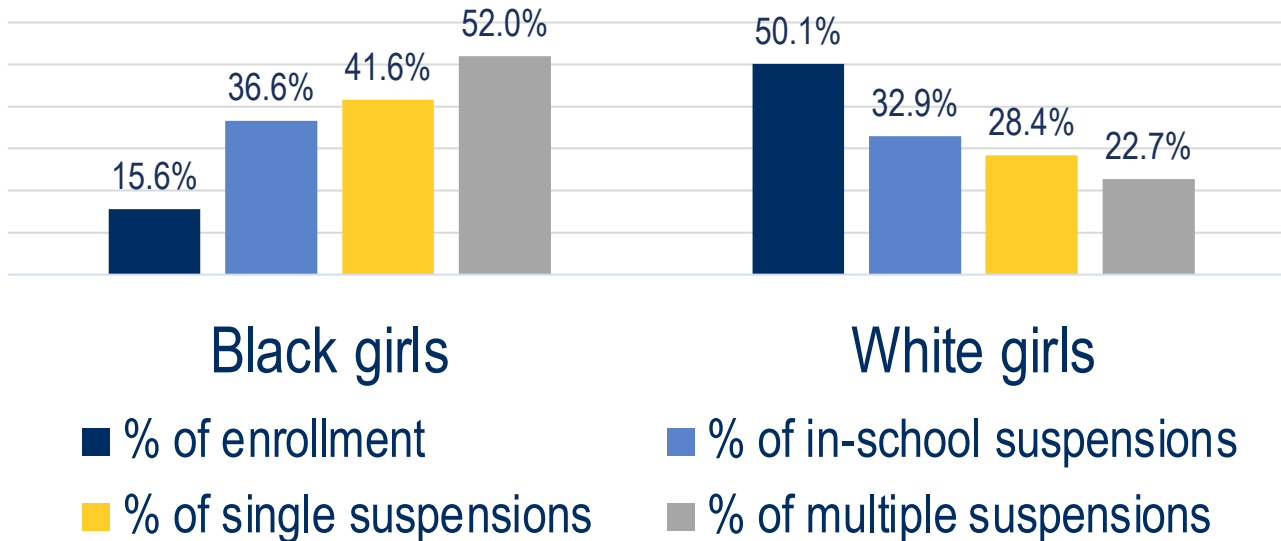
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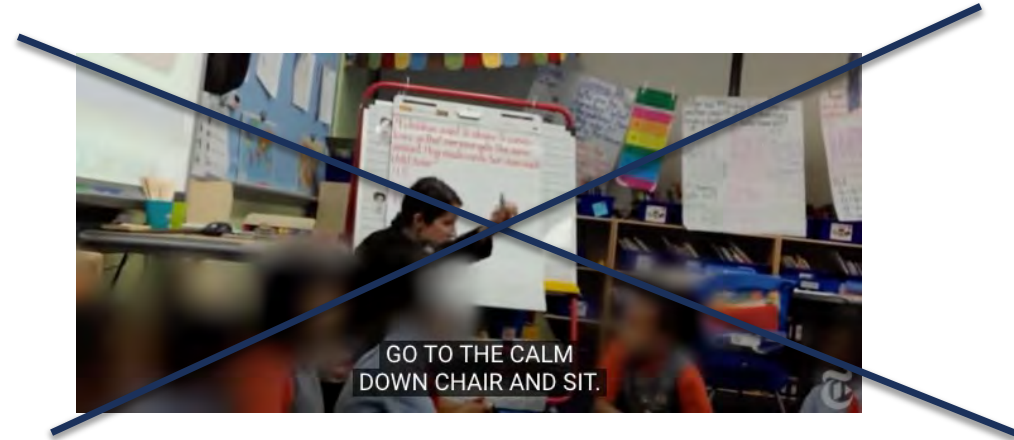
Epstein, R., Blake, J., & González, T. (2017). *Girlhood interrupted: The erasure of Black girls' childhood*. Washington, DC: Georgetown Law Center on Poverty and Inequality.

HARNESSING THE POWER OF DISCRETION

- Teacher education could work to disrupt habits that are embedded in normalized and oppressive patterns of practice.



Epstein, R., Blake, J., & González, T. (2017). *Girlhood interrupted: The erasure of Black girls' childhood*. Washington, DC: Georgetown Law Center on Poverty and Inequality.



- But teachers would need more than awareness and commitment: **They also need knowledge, repertoires of practice, and judgment.**

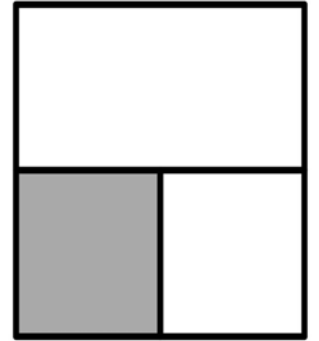


This is the work of teaching.
Studying its broad and powerful role in(justice) is necessary.
But such research is challenging.

3. What are continuing challenges in trying to understand the work of teaching, and why should we care?

Let's return to the classroom.

VIDEO: ANTAR AND GABI



What fraction of the rectangle below is shaded gray?

What fraction of the rectangle below is shaded gray?

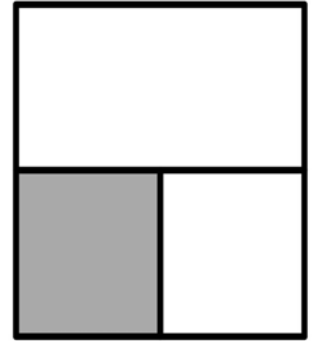
Antar: I think it's not a fraction because all of the parts are not equally the same shape.

AND AS THE LESSON IS ENDING...



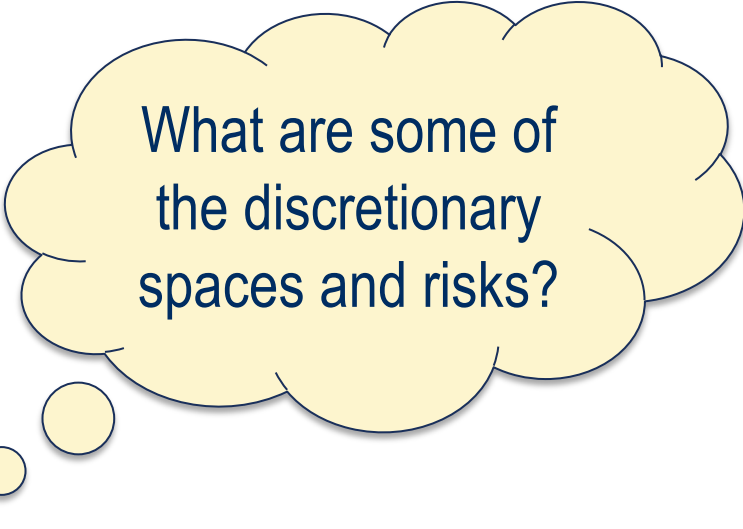
Antar's right.
It's not equal.

VIDEO: KASSIE



Kassie: But he's right, it's not equal. So-
Teacher: That was Antar.

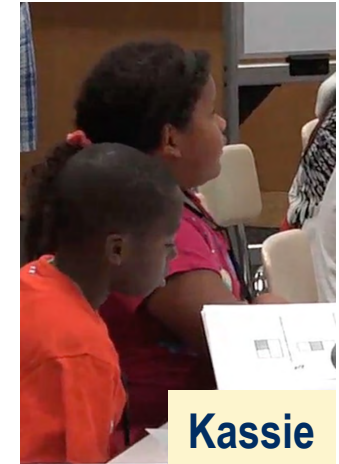
THESE MOMENTS: FILLED WITH DISCRETIONARY SPACES RELATED TO REINFORCING OR DISRUPTING PATTERNS OF RACISM AND HARM



What are some of the discretionary spaces and risks?

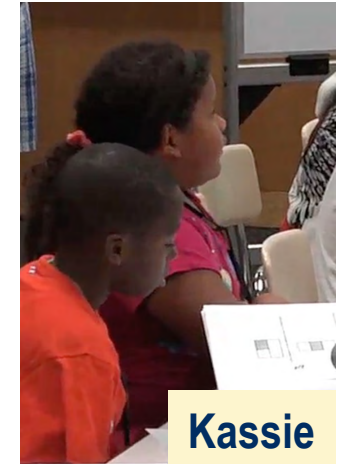
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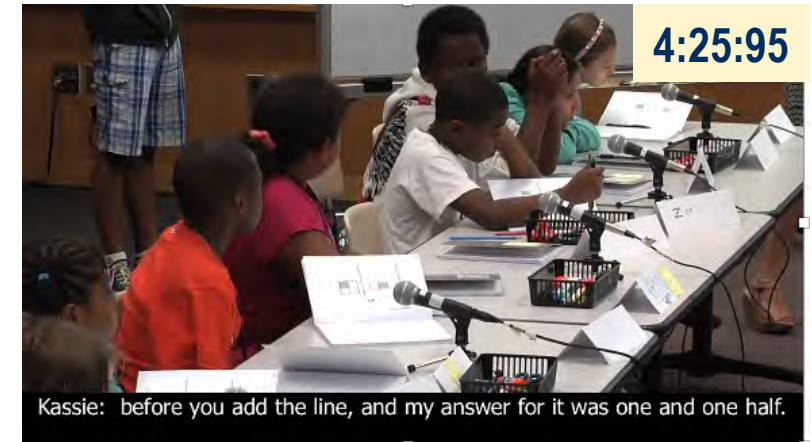
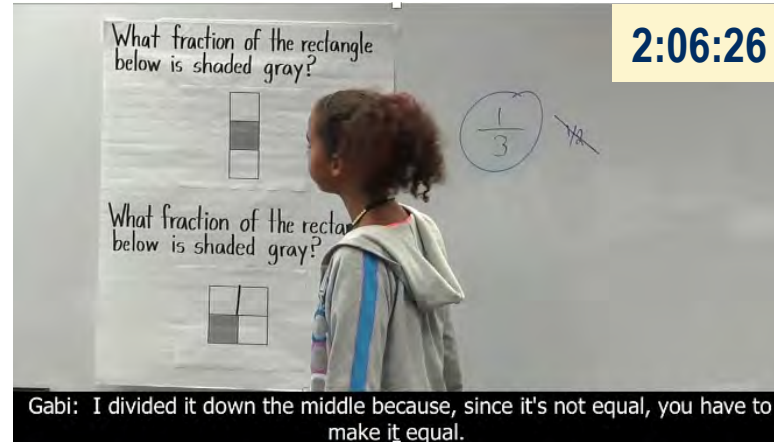
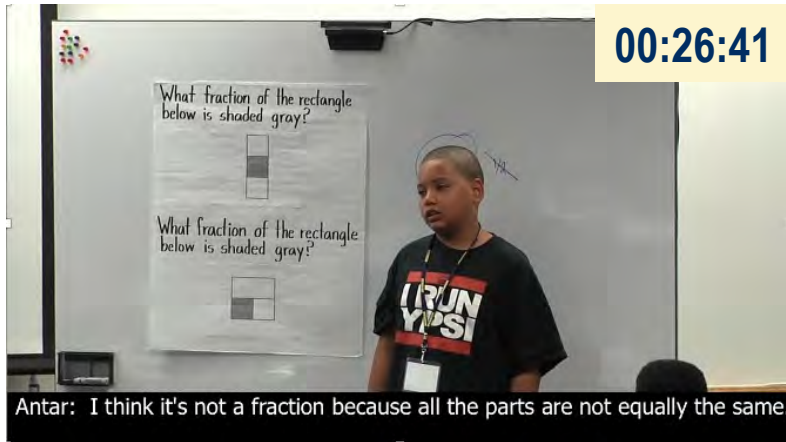


- How are these three different Black children—Antar, Gabi, and Kassie—positioned in front of their classmates—as contributing to the mathematics, as lacking understanding? Are their brilliance and humanity seen?
- What is signaled about being a ‘doer of mathematics’—both what and who?
- What mathematical understanding is developing in the class?
- How are Antar, Gabi, and Kassie experiencing their teacher, their peers, this lesson?
- What are the other children in the class learning about Black children, about who and what it means to be ‘smart’?

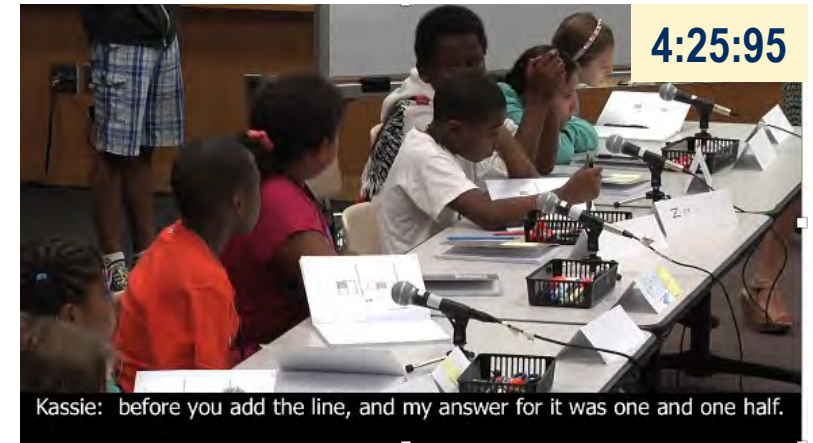
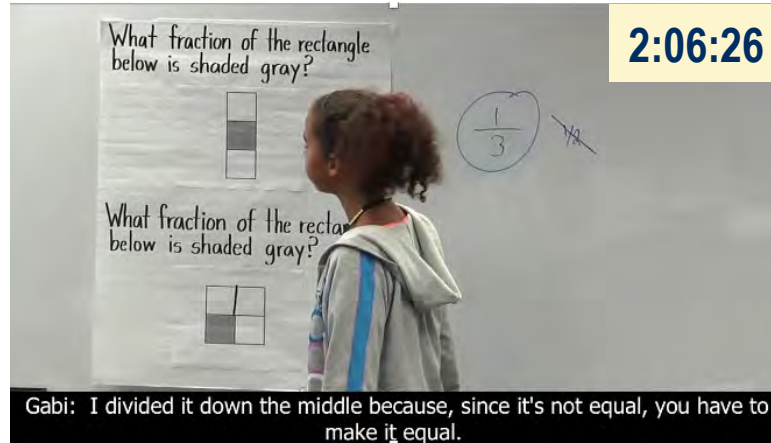
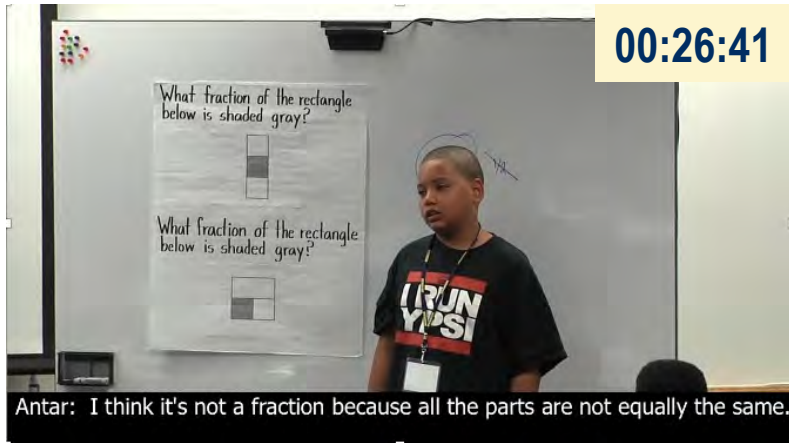


(Gholson, 2021; Wilkes, 2021; Gholson & Martin, 2014; Langer-Osuna, 2015, 2017; Leonard & Martin, 2013; Martin, 2012, 2015)

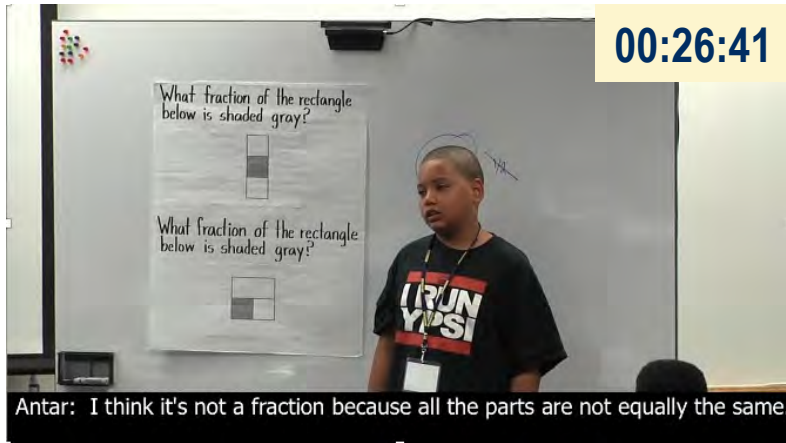
PRACTICING (IN)JUSTICE: UNDERSTANDING THE WORK OF TEACHING



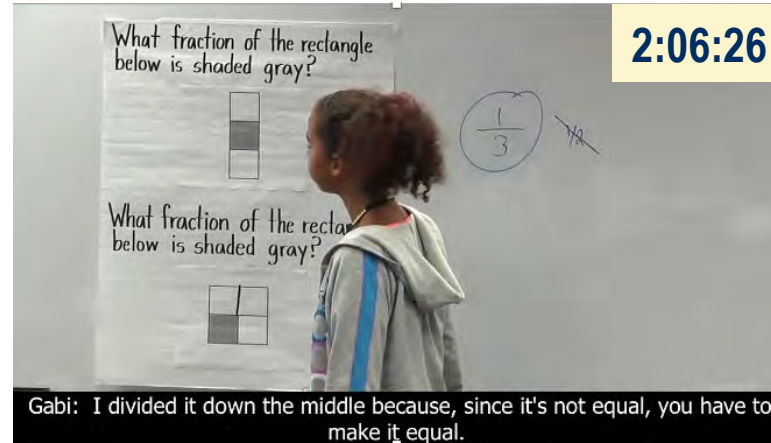
PRACTICING (IN)JUSTICE: UNDERSTANDING THE WORK OF TEACHING



PRACTICING (IN)JUSTICE: UNDERSTANDING THE WORK OF TEACHING



Antar: I think it's not a fraction because all the parts are not equally the same.



Gabi: I divided it down the middle because, since it's not equal, you have to make it equal.

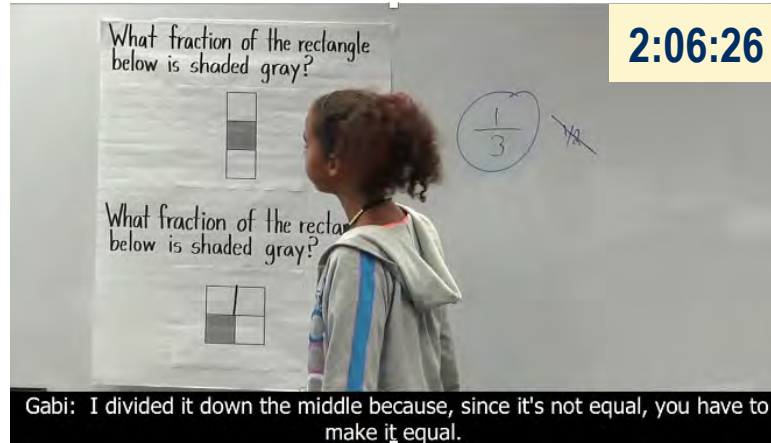
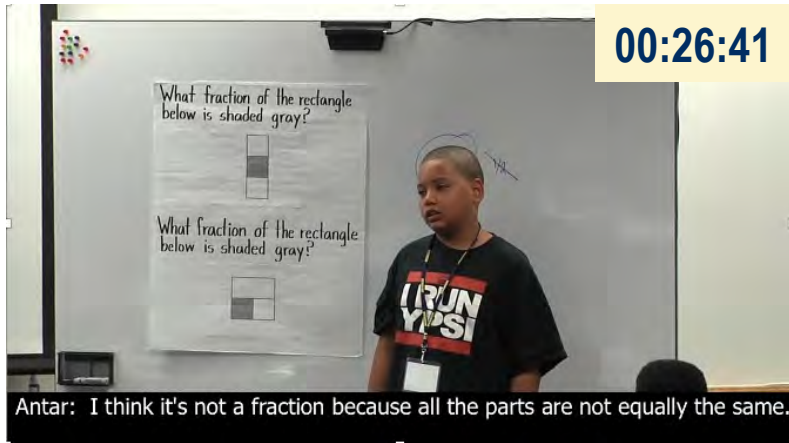


Kassie: before you add the line, and my answer for it was one and one half.

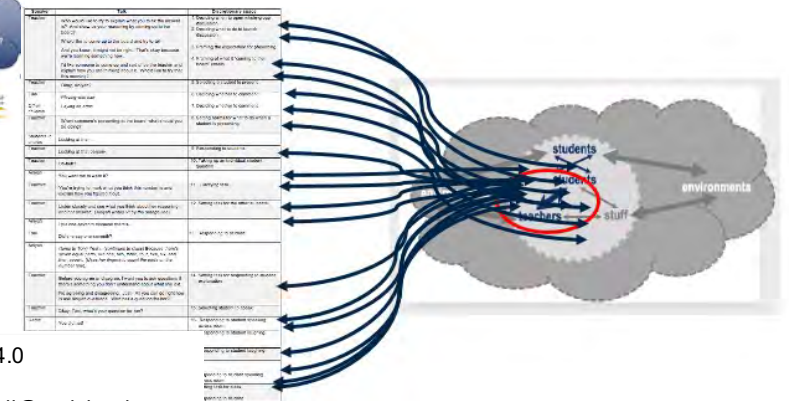
- Racial narratives about 'ability' and struggling learners (Nasir & Shah, 2011; Shah, 2017)
- Patterns related to Black girls (Gholson, 2016, 2021; Joseph, 2017; Sengupta-Irving, 2020; Sengupta-Irving & Vossoughi, 2019)
- Area models with fractions
- Patterns related to being a 'doer of mathematics' 'while Black' (Martin)
- Views of mathematics as centered on narrow ideas about 'correctness' and 'errors'



PRACTICING (IN)JUSTICE: UNDERSTANDING THE WORK OF TEACHING

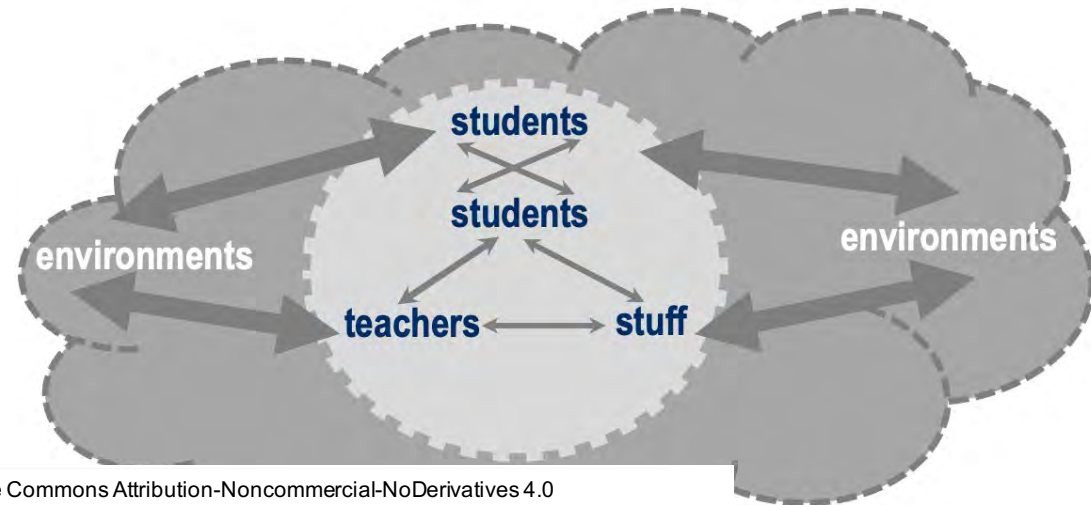
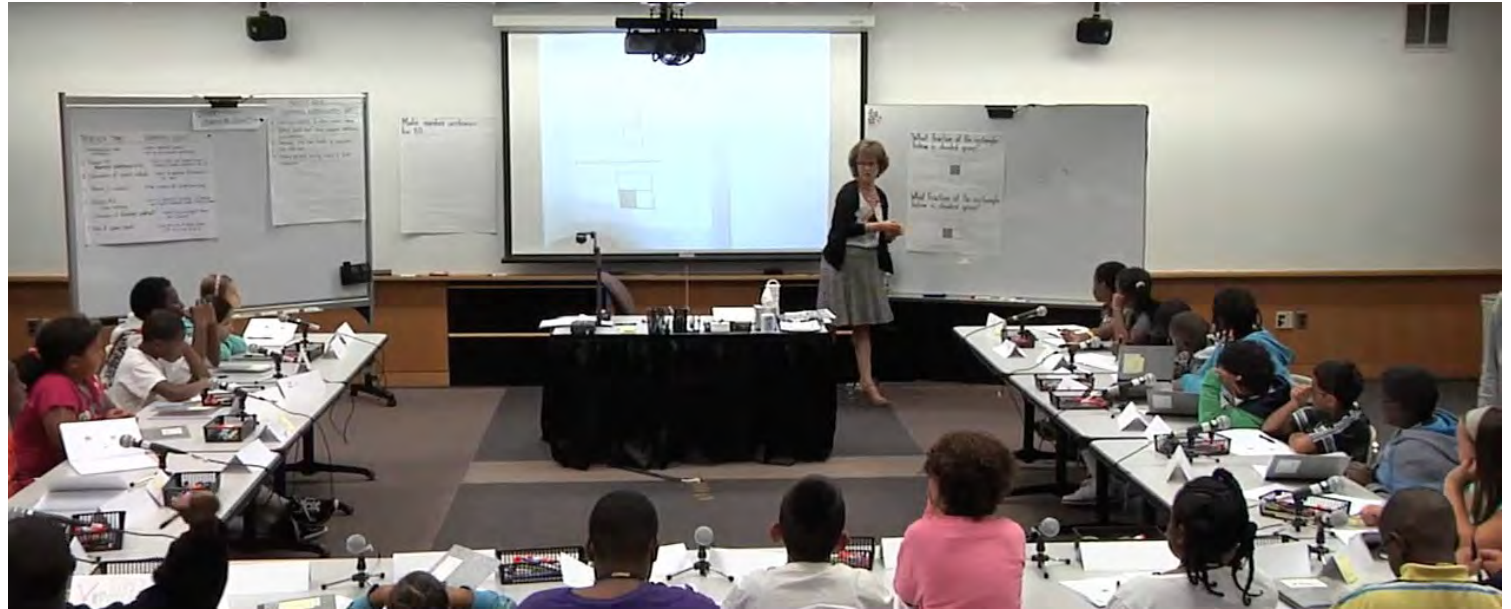


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- Patterns related to Black girls (Gholson, 2016, 2021; Joseph, 2017; Sengupta-Irving, 2020; Sengupta-Irving & Vossoughi, 2019)
- Area models with fractions
- Patterns related to being a 'doer of mathematics' 'while Black' (Martin)
- Views of mathematics as centered on narrow ideas about 'correctness' and 'errors'



CHALLENGES IN STUDYING THE WORK OF TEACHING (IN)JUSTICE

1. Combining the embodied and relational dimensions with the cognitive and knowledge entailments.
2. Building theory and insight while contextualizing the work and centering identities.
3. Connecting the dots between macro-structures and micro-interactions.
4. Using care to distinguish prescription from detail.
5. Representing the work in a usable discourse of practice.



AND ALSO . . .



AND ALSO . . .



- Developing our approaches to understanding the work of teaching (in)justice is collective work.
- It demands diversity in who 'we' are as scholars and as a research community.
- This will broaden what we consider evidence, what we think the objects of study are, and what we value: epistemology, ontology, axiology.

谢谢你

- The ICMI Felix Klein Award Committee
- The ICME-14 organizers
- My doctoral students, present and past
- My young students, the children I have taught over four decades
- My colleagues at the University of Michigan
- My U.S. and international professional colleagues

Email: dball@umich.edu

THANK YOU!

dball@umich.edu

Slides will be available on my website

<https://deborahloewenbergball.com/>

(Google Deborah Ball)



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Location map of the State of Michigan in the United States.
Retrieved from https://www.nationsonline.org/oneworld/map/USA/michigan_map.htm



Image on slide 2:
Map of treaty lands in what is today called Michigan.
Retrieved from <https://theways.org/map>



Image on slide 2:
Photo from “The Post-Post-Apocalyptic Detroit” by Ben Austen, *The New York Times*.
Retrieved from <https://www.nytimes.com/2014/07/13/magazine/the-post-post-apocalyptic-detroit.html>



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Photo from “Lake Michigan Beaches,” Experience Grand Rapids.
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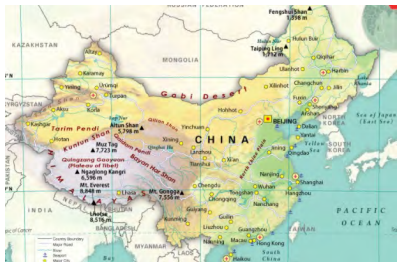


Image on slide 12:
Map of People’s Republic of China.
Retrieved from <https://www.mapsofworld.com/answers/geography/what-are-the-key-facts-of-peoples-republic-of-china/#>



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Political Map of India.
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Image on slide 12:
South Africa Provinces Map.
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Image on slide 12:
Map of Canada
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Map of Turkey.
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Photo from “Mass Incarceration Is Declining — But Not For Women” by Robert P. Alvarez, Institute for Policy Studies. Retrieved from <https://ips-dc.org/mass-incarceration-is-declining-but-not-for-women/>



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Photo from “Housing cuts would exacerbate inequality” by Laura Mascuch, Kristin Miller, Jolie Milstein, and Barika Williams, *New York Daily News*. Retrieved from <https://www.nydailynews.com/opinion/ny-oped-housing-cuts-would-exacerbate-inequality-20200623-k2gxn6btrvh6bos6sgwlijokby-story.html>

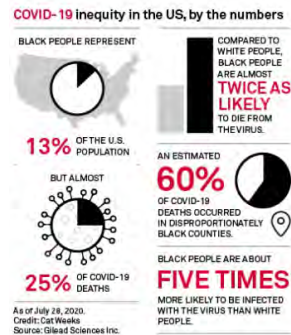


Image on slide 23:

Graphic from “Enough is enough: Gilead-Morehouse study racial, ethnic disparity in COVID-19,” by Michael Gibney, S&P Global Market Intelligence. Retrieved from <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/enough-is-enough-gilead-morehouse-study-racial-ethnic-disparity-in-covid-19-60035253>



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Graphic from “Six policies to reduce economic inequality” by John A. Powell, Othering & Belonging Institute.
Retrieved from <https://belonging.berkeley.edu/six-policies-reduce-economic-inequality>



Image on 23:

Photo from “On International Day, UN spotlights indigenous peoples' right to education,” United Nations.
Retrieved from <https://news.un.org/en/story/2016/08/536292-international-day-un-spotlights-indigenous-peoples-right-education>



Image on slide 23:

Photo from “UN agrees to urgent debate on racism and police violence,” Deutsche Welle (DW).
Retrieved from <https://www.dw.com/en/un-agrees-to-urgent-debate-on-racism-and-police-violence/a-53807879>



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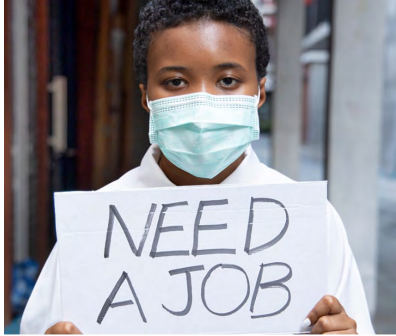


Image on slide 23:

Photo from “Black and Hispanic women, less educated workers among those hardest hit by COVID-19 job losses” by Sara Savat, *The Source*, Washington University in St. Louis.

Retrieved from <https://source.wustl.edu/2021/04/black-and-hispanic-women-less-educated-workers-among-those-hardest-hit-by-covid-19-job-losses/>



Image on slides 24–26:

Photo from “Why You Need an Experienced Real Estate Agent” by Elizabeth Weintraub, *the balance*.

Retrieved from <https://www.thebalance.com/experienced-real-estate-agents-1798883>



Image on slides 24–26:

Photo from “Black doctors earn less than white peers, study reveals” by Stacy M. Brown, *The Philadelphia Tribune*.

Retrieved from https://www.phillytrib.com/lifestyle/health/black-doctors-earn-less-than-white-peers-study-reveals/article_2d359910-85c8-524b-b6d2-15d1705ad762.html



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Photo from “Trump Rioters Storm U.S. Capitol (photos),” *Variety*
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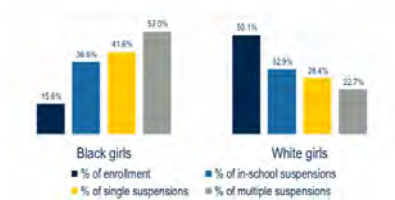
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Photo from “20 Classroom Interventions for Children with Anxiety Disorders” by Jerry Kennard, Ph.D., HealthCentral. Retrieved from <https://www.healthcentral.com/article/20-classroom-interventions-for-children-with-anxiety-disorders>



Image on slide 26:

Photo from “10 Ways Well-Meaning White Teachers Bring Racism Into Our Schools” by Jamie Utt, everyday feminism. Retrieved from <https://everydayfeminism.com/2015/08/10-ways-well-meaning-white-teachers-bring-racism-into-our-schools/>



Data on slides 34–37:

Epstein, R., Blake, J., & González, T. (2017). *Girlhood interrupted: The erasure of Black girls’ childhood*. Washington, DC: Georgetown Law Center on Poverty and Inequality.

Retrieved from <https://www.law.georgetown.edu/poverty-inequality-center/wp-content/uploads/sites/14/2017/08/girlhood-interrupted.pdf>



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Retrieved from <https://www.gettingsmart.com/2017/02/7-ways-to-build-strong-relationships-with-students/>



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Map of the World.
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