The Role of Mathematics in Learning to Participate in a Diverse Democracy

Deborah Loewenberg Ball
University of Michigan

University of California, Davis
School of Education and Graduate Group in Education

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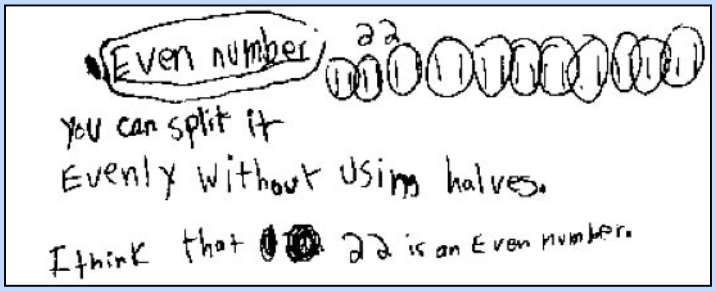

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The Claim of Tonight's Lecture

Mathematics has special role to play in preparing people with the habits, skills, and dispositions central to learning to participate in a diverse and democratic society.

This requires weaving

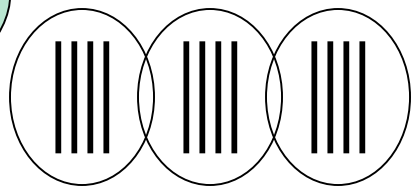
respect for **individuals**

together with

efforts to work toward **collective** ends

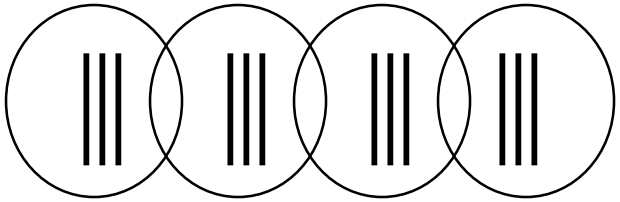
How much is three-fourths of a dozen?

Shouldn't one fourth have **four** in it?



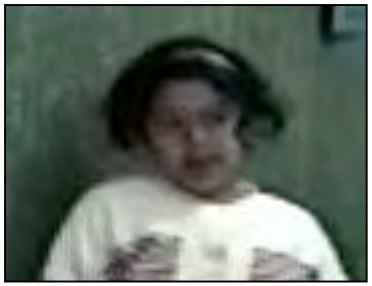
$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

Here's **four** groups, so one of these is **one-fourth.**



$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

There's only three groups, so one of these makes **one third.**



Rania:

I still disagree. . . I want to say something. This is what I think three-fourths is— I'm saying that <u>three-fourths is like three groups of four</u>.

Kevin:

I think she disagrees because she think like—she thinks one—the reason she thinks one fourth should have four is because of the four in the bottom number.

Shea:
Can we vote?

Equity , Diversity, and Social Justice and School Mathematics

1. Some practices of "good teaching" require **emphasis** in order to reduce the wide gaps in access,opportunity, and outcomes.
2. Some practices of "good teaching" **impede** equitable teaching: they may serve to reproduce inequality.
3. Mathematics offers special resources for the development of a **diverse democratic society**.

The Claim of Tonight's Lecture

Mathematics has special role to play in preparing people with the habits, skills, and dispositions central to learning to participate in a diverse and democratic society.

Three Possible Arguments in Support of the Claim

1. **Cultural diversity:** Mathematics is the creation of human beings across time in many settings and cultures. Rich mathematics is the basis for a diverse array of cultural practices.
2. **Political activism:** Mathematics offers tools for examining critically the unequal distribution of resources, power, and opportunities.
3. **Use of difference as a resource:** Mathematics offers shared experience with understanding, respecting, and using difference for productive collective work.

The Basic Argument for the Claim

Mathematics is about problem solving.

Solving mathematics problems in school can provide a context in which:

- difference is a resource for solving problems
- the use of difference is structured and supported by common disciplinary language, norms, and practices

Disciplinary Mathematics Can Be a Resource

What does it take to make mathematics work in school a setting for the cultivation of skills and values for a diverse democracy?

- The choice of instructional tasks
- The cultivation of attention to and respect for others' ideas
- The development of skills, habits, and norms of collective work

Choosing Instructional Tasks

Use the numbers 9, 1, and 2 once on each line to make 6 different numbers. The first one is done for you:

1 9 2 _ _ _

_ _ _ _ _ _

_ _ _ _ _ _

Today's date is **9/12.**

- How many three-digit numbers can you make using 9, 1, and 2?
- How can you be sure that you have all the possibilities?

Task: What is three-fourths of 12?

Context: Students' first work with fractions

- Can be represented in different ways
- Involves developing shared understanding of the meaning of "three-fourths" — public mathematical knowledge
- No set context for interpreting $\frac{3}{4}$

a) 

b) 

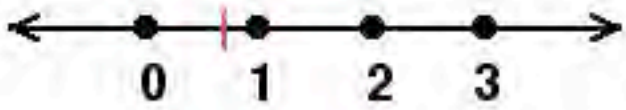
c) 

d) How many 4's are there in 3?

e) 18 crayons out of a box of 24

f) .75

g) I want to share 3 bottles of soda equally among 4 people. How much will each person get?

h) 

i) 

Features of Instructional Tasks That Contribute to Using Difference as a Resource for Collective Work

- Develop common skills, language, and practices
- Can be represented in a variety of ways
- Do not depend unfairly on unevenly distributed experience or knowledge
- Profit from others' interpretations

Investigating Mathematics in School as a Context for Using Difference

- Same third grade class, four months earlier
- Working on even and odd numbers, their precise definitions, and conjectures involving them
- Learning how to decide whether something is true or valid in mathematics

I was just thinking about 6 . . .
I'm thinking it can be an odd number, too
. . .that it could be an odd *and* an even number—

Viewing Focus

- What do you notice that might be relevant to learning to participate in a diverse democracy?
- In particular, what do you notice about:
  - The task
  - The ways in which students treat one another's ideas
  - The ways in which the students work as a collective, any practices, skills, norms in use

Cultivating Attention to and Respect for One Another's Ideas

- Civility focused on ideas
- Learning to listen carefully to what others say, check for meaning before disagreeing
- Referring to others' ideas by name (giving credit)
- Critiquing others' ideas, not the individuals themselves, using tools and practices of the discipline

Developing Skills, Norms, and Practices of Collective Work

- Use of shared experience, past agreements about meaning
- Using and contributing to one another's ideas
- Seeking agreements on meanings and solutions

What Are Other Experiences with Difference that Students Can Have in School?
The Unique Contributions of Different School Subjects

- Political decision making
- Interpreting texts
- Writing and commenting on others' writing
- Understanding the past
- Using scientific theory to interpret phenomena
- Appreciating art or music

Mathematics as Context for Experiences with Difference

- Imperative to reach consensus
- Norms and tools for agreement and reconciling disagreements, for deciding what is right or valid
- Ideas and solutions can be proposed and tested by students—common work

Slides will be available at:

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