MAKING CONTENT EXPLICIT:
THE PRACTICE AND BEGINNERS’ SKILLS

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NCTM Research Conference • San Francisco, CA • April 13, 2016

Acknowledging our colleagues: TeachingWorks Assessment Development Group

This research was supported in part by a grant from the Bill & Melinda Gates Foundation. The opinions, findings, and recommendations expressed are those of the authors and do not represent the views of the Bill & Melinda Gates Foundation.
ENTRY-LEVEL TEACHING AS A CRITICAL FOCUS

§ More U.S. schoolchildren have a teacher with fewer than five years of experience than a teacher with any other number of years of experience

§ Most beginning teachers say they are underprepared for teaching, and on average they are less effective

§ Distribution of beginning teachers is concentrated disproportionately in schools with high concentrations of children of color and children living in poverty

§ Evidence of the power of skillful teaching

§ Promise of a focus on core practices of teaching (Ball & Forzani, 2009; Grossman et al., 2009; Lampert & Graziani, 2009)

§ Performance assessments and standards for entry to independent practice
LEARNING ABOUT BEGINNING TEACHERS’ SKILLS

- To have such information, we must assess practice: actual skills and knowledge for doing teaching
- Information gathered must:
  - Provide information about the skills of teacher candidates
  - Provide information about their instructional needs
- Results will enable efficient and wise use of time and other resources in initial teacher education and professional development
OVERVIEW OF THE SESSION

① Unpacking the core practice of making content explicit
② Assessing skill using a standardized tool
③ Findings about beginning teachers’ skills
④ Next steps and discussion
MAKING CONTENT EXPLICIT

A core teaching practice: to provide all students with access to fundamental ideas and practices in mathematics through:

- Instructional explanations
- Modeling
- Choosing and using representations
- Choosing and using strategic examples
WHY DOES “EXPLICITNESS” HAVE AN UNCOMFORTABLE PLACE IN MATHEMATICS EDUCATION?

1. Dominant patterns of telling in U.S. teaching that often reduces cognitive demand (e.g., Stein, Silver, and Henningsen)

2. The development of constructivism and theories of mathematics learning (e.g., Cobb, Steffe, Simon, Von Glasersfeld)

3. Widely-shared views of mathematics as activity, as a human construction, and a curricular aim of having students “do authentic mathematics”
WHY MIGHT A FEAR OF EXPLICITNESS BE INEQUITABLE?

1. Structure matters for creating spaces in school where students can experiment with possibilities.

2. The role of instruction in intervening on broader societal and cultural views of what mathematics is and who is good at it.

3. **Requesting** is not the same as **teaching**; when rich mathematical tasks and situations are used and students are left to puzzle about them on their own, likely will privilege those who have had opportunities with #1 and #2.
EXPLANATIONS AND MODELING IN CLASSROOMS

- Student explanations
- **Teacher explanations**
- Teacher and student(s) co-construct explanations

...Being able to hear what students explain or co-construct an explanation requires being able to do all of the work yourself.
# DECOMPOSING THE WORK OF MODELING

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<thead>
<tr>
<th>Planning to model</th>
<th>Active modeling</th>
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<tr>
<td>- Determining whether modeling is an appropriate strategy</td>
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<tr>
<td>- Selecting content to be modeled</td>
<td>Making thinking visible by emphasizing thinking and key elements</td>
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<tr>
<td>- Choosing strategic examples and appropriate representations</td>
<td>Using language and representations carefully</td>
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Framing

Closing
CONTEXT OF VIDEO

- An 5th grade teacher in a multi-lingual classroom is leading a discussion around comparing decimals
- Students have worked with several comparison problems and have offered several key ideas related to decimal comparison
- The teacher uses modeling to summarize student ideas to make them accessible to all students

Which is greater, 0.7 or 0.29?

Student ideas:
7 rods > 29 units
7 is in the tenths
7 is 70
0.7 = 0.70
VIEWING FOCUS

- What work of **modeling** is the teacher doing?
- What is being made explicit for students?

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MODELING: EXAMPLE 1

Making content and disciplinary practices explicit
VIEWING FOCUS

- What work of **modeling** is the teacher doing?
- What is being made explicit for students?

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POSSIBLE OBSERVATIONS

- Framing
  - Names a student idea as important
  - Connects to future work
- Highlighting core ideas
  - Focuses the work on place value understanding
- Making thinking visible
  - Uses a highlighter to mark the place values
  - Changes tone and pace to cue students on key ideas
WHY TRY SIMULATIONS?

A simulation is a situation that represents a context of practice with enough fidelity to elicit authentic professional work.

- Enables specification of content, situation, teaching “problem” to ensure that important aspects of teaching are being assessed
- Appraises on-demand rather than at a beginning teacher’s discretion
- Makes possible fairness with respect to specific contextual aspects

(Boerst, Shaughnessy, & Ball, 2013)
## WHAT DO WE MEAN BY STANDARDIZED?

### Planning to model
- Determining whether modeling is an appropriate strategy
- Selecting content to be modeled
- Choosing strategic examples and appropriate representations

### Active modeling

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- Scaffolds for supporting teachers to focus on active modeling
- Allow for comparing performances across a set of teachers
HOW IS EVIDENCE OF SKILL WITH MODELING OBTAINED?

Process

The teacher:

1. prepares for modeling given the following fourth grade task: compare the fractions 5/4 and 5/6 using a number line (20 minutes)

2. models at a whiteboard without students present (10 minutes)

Considerations

- Specifying the content, example, and representation ensure that important aspects of teaching are being assessed
- Without students requires teachers to have to demonstrate all of the work of modeling
TASK: COMPARE THE FRACTIONS 5/4 AND 5/6 USING A NUMBER LINE

Scenario and class background: Your fourth grade students have been working on identifying and ordering fractions. They are familiar with number lines and understand the importance of creating segments of equal length when partitioning the whole into segments of equal length. Students have worked with common fractions such as halves, thirds, fourths, sixths and eighths. They are comfortable with the relationship between halves, fourths, and eighths. Students in general know that if you divide a unit interval into \( n \) equal segments that \( n/n \) is one whole.

- What would you choose to demonstrate and explain?
- What key ideas would you emphasize and highlight?
- How would you represent the mathematical ideas?
- What academic language would you choose to use (or not)?
MODELING: VIEWING FOCUS

What can we notice about this beginning teacher’s skill with modeling?

Evaluate whether the beginning teacher:

- Frames and closes the modeling
- Explains core ideas around comparing fractions using number lines
- Emphasizes thinking and key elements
- Uses language appropriately
- Uses representations clearly and accurately to support student learning
MODELING: EXAMPLE 2
MODELING: VIEWING FOCUS

What can we notice about this beginning teacher’s skill with modeling?

Evaluate whether the beginning teacher:

- Frames and closes the modeling
- Explains core ideas around comparing fractions using number lines
- Emphasizes thinking and key elements
- Uses language appropriately
- Uses representations clearly and accurately to support student learning
POSSIBLE OBSERVATIONS

- Framing
  - Strengths: Stated what is to be modeled; Connected to students’ prior learning
  - Areas in need of further work: Explaining the purpose; Concluding (beyond stating answer)

- Emphasizing thinking and key elements
  - Strengths: Highlighted the distance from zero; Talked about how/why the second number line is built; Emphasized how to use the number line to compare
  - Areas in need of further work: Deciding what to emphasize (too much emphasis on which whole numbers to mark)
MODELING: VIEWING FOCUS

What can we notice about this beginning teacher’s skill with modeling?

Evaluate whether the beginning teacher:

- Frames and closes the modeling
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- Emphasizes thinking and key elements
- Uses language appropriately
- Uses representations clearly and accurately to support student learning
MODELING: EXAMPLE 3
MODELING: VIEWING FOCUS

What can we notice about this beginning teacher’s skill with modeling?

Evaluate whether the beginning teacher:

- Frames and closes the modeling
- Explains core ideas around comparing fractions using number lines
- Emphasizes thinking and key elements
- Uses language appropriately
- Uses representations clearly and accurately to support student learning
POSSIBLE OBSERVATIONS

- Explains core ideas around comparing fractions using number lines
  - **Strengths:** Explained how the denominator is represented on the number line; Marked fraction as a point on the number line
  - **Areas in need of further work:** Selecting which ideas to explain (i.e., introduced some distracting ideas such as mixed numbers and how to convert mixed numbers to an improper fraction)

- Emphasizes thinking and key elements
  - **Strengths:** Asked herself questions (“I have to think in my head…”)
  - **Areas in need of further work:** Emphasizing her thinking about ideas which are distracting
BEGINNING TEACHERS’ SKILLS
SKILL IN MODELING TO MAKE CONTENT EXPLICIT

Participants:

- 10 first-year elementary school teachers from a range of grade levels (1-5), school districts, and teacher education programs
- Not intended to be representative of all first-year teachers

Analyzed skill with:

- framing and closing the modeling
- talking and/or demonstrating core ideas
- emphasizing thinking and key elements
- using language
- using representations
SKILL WITH AREAS OF WORK

Consider the level of skill that beginning teachers need with these areas of work:

- Which of the areas of work listed would you expect to see most often at a proficient level for beginning teaching?
- Which of the areas of work listed would you expect to see least frequently at a proficient level for beginning teaching?
Which of the areas of work listed would you expect to see most often at a proficient level for beginning teaching?

Which of the areas of work listed would you expect to see least frequently at a proficient level for beginning teaching?
FRAMING/CLOSING THE MODELING

Only 1 teacher demonstrated skill with at least three techniques

- Framing: States what is about to be modeled  
  - 8 of 10 teachers

- Framing: Explains the purpose of what is being modeled  
  - 2 of 10 teachers

- Framing: Connects the modeling to students’ prior learning, future learning or background and/or experience  
  - 4 of 10 teachers

- Closing: Summarizing or revisiting core ideas  
  - 0 of 10 teachers
EXPLAINING CORE IDEAS

Strengths

- Marking whole intervals on the number line
- Demonstrating partitioning on the number line
- Showing how to use the numerator and the parts which were marked to locate a given fraction
- Labeling fractions on the number line
- Stating which fraction is greater

Additional work needed

- Elaborating the importance of the whole unit before partitioning
- Highlighting the meaning of the denominator
- Explaining partitioning by explicitly using the language of equal parts
- *Stating how to use the number line to determine which fraction is greater*
EMPHASIZING THINKING AND KEY ELEMENTS

- Three techniques:
  - Uses markers (gesture, tone, physical marker) to draw attention to important ideas (3 of 10 teachers)
  - Elaborates and emphasizes most complex or confusing parts (2 of 10 teachers)
  - Explains thinking and decision making behind important ideas (1 of 10 teachers)

- Only 1 of 10 teachers demonstrated skill with all three techniques

Common challenge: Highlighting distracting information
USING LANGUAGE

Strengths

- Using language economically
- Using language which is grade-level appropriate
- Pacing speaking and pausing for emphasis

Additional work needed

- Using language which is mathematically accurate and precise
USING REPRESENTATIONS

Strengths

- Using appropriate representations
- Producing writing and representations that are legible and visible

Additional work needed

- Drawing and labeling representations in accurate ways
- Organizing the board in a way that supports understanding the work
CONCLUSIONS AND DISCUSSION
EMERGING QUESTIONS

- What does the decomposition of the practice afford for assessing and supporting beginning teachers’ skills?
- How could this assessment fit into a trajectory of assessments for assessing beginning teachers’ skills with making content explicit?
- How can we reliably assess teaching practice in ways that account for the role of content knowledge for teaching?
- What might the implications of the findings for additional work with these teachers (and teacher preparation more generally)?
THANK YOU

Slides will be available on the TeachingWorks website: http://www.teachingworks.org/publications_presentations