

TEACHING SIMULATIONS THAT ASSESS (THE USE OF) TEACHING KNOWLEDGE AND SKILL

Benjamin Dotger & Sharon Dotger, Syracuse University

Meghan Shaughnessy, Susanna Owens Farmer, Timothy Boerst, & Deborah Loewenberg Ball, University of Michigan

Seán Delaney, Annie Ó Breacháin, & Suzy Macken, Marino Institute of Education

Orin Gutlerner & Randall Lahann, Match Teacher Residency



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THE CHALLENGE

- Students, parents, and schools need beginning teachers who are ready for entry-level classroom practice
- Teacher education should focus more directly on **core practices of teaching** (e.g., Ball & Forzani, 2009; Grossman et al., 2009; Lampert & Graziani, 2009)
- The profession needs reliable ways to appraise teacher candidates' skills and knowledge

WHAT DO ASSESSMENTS OF TEACHER CANDIDATES' CAPABILITIES NEED TO BE LIKE?

- Assess entry-level practice: focus on skills and knowledge for the work of teaching
- Provide information about teacher candidates' development and about instructional needs
- Be useful to teacher candidates and program instructors, and also demonstrate professional accountability and rigor to external stakeholders
- Use time efficiently and resources wisely

PREVAILING APPROACHES TO ASSESSMENTS OF PRACTICE

- Field observations
- Video recordings of practice
- Written reflections on practice

These often do not provide adequate evidence of teacher candidates' skills with particular practices or situations. Further, the evidence is not predictable or consistent across candidates.

SIMULATION ASSESSMENTS

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

- Used in other professional fields (e.g., medicine, nursing, dentistry) as well as in most skilled occupations where skill, knowledge, judgment, and client safety are concerns
- Enable common appraisal of candidates' knowledge and skill in ways that control for many sources of variability that complicate assessment of practice

STRUCTURE OF SESSION

- ① **Assessing Preservice Teachers' Conceptions and Explanations of Natural Selection Tenets Through a Clinical Simulation:** Benjamin Dotger & Sharon Dotger, Syracuse University
- ② **Simulations of Student Thinking that Assess Teaching Skill and Knowledge in Use:** Meghan Shaughnessy, Susanna Owens Farmer, Timothy Boerst, Deborah Loewenberg Ball, University of Michigan
- ③ **Assessing Student Primary Teachers' Use of High-leverage Practices at Scale:** Seán Delaney, Annie Ó Breacháin, & Suzy Macken, Marino Institute of Education
- ④ **Using Simulations to Assess Student Teaching Readiness:** Orin Gutlerner & Randall Lahann, Match Teacher Residency
- ⑤ Questions/discussion

SIMULATIONS OF STUDENT THINKING THAT ASSESS TEACHING SKILL AND KNOWLEDGE IN USE

Meghan Shaughnessy, Susanna Owens Farmer,
Timothy Boerst, & Deborah Loewenberg Ball

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WHERE DISCOVERIES BEGIN



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ELICITING STUDENT THINKING

A core teaching practice: to find out what students know or understand, and how they are thinking/reasoning

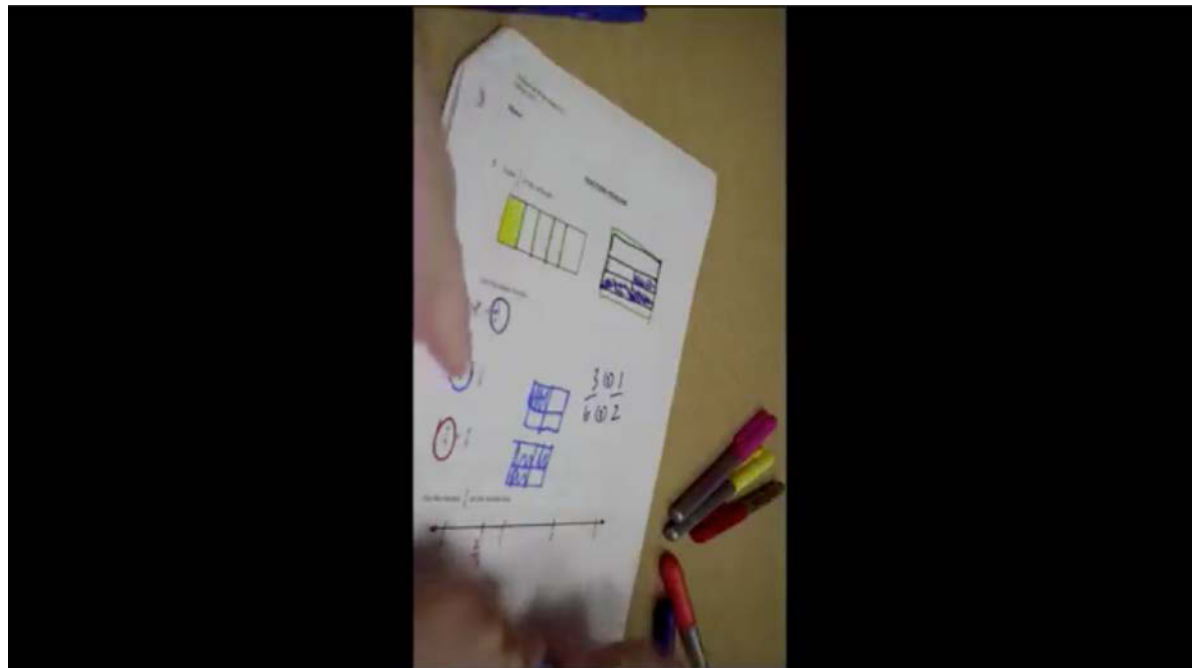
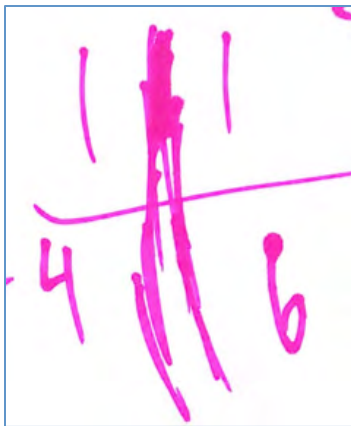
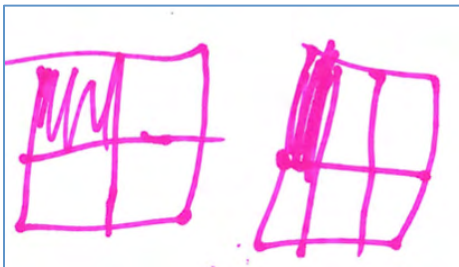
- Launching an interaction with a student
- Asking follow-up questions to learn about a student's:
 - Process for solving a mathematics problem
 - Understanding of mathematical ideas involved in a problem
- Being responsive to students by:
 - Attending to and taking up student ideas
 - Maintaining a tone and manner that encourages the student to share his or her thinking

FIELD-BASED ASSESSMENT

- Teaching interns
 - Interview an elementary school student in his or her field placement
 - Submit a video of the interview
- Instructors view a portion of the interview to assess interns' skill with eliciting student thinking

FIELD-BASED ASSESSMENT

Task: Circle the bigger fraction: $\frac{1}{4}$ or $\frac{1}{6}$



What is the intern doing to elicit this student's thinking?

In this case, not much.

ELICITING STUDENT THINKING: WHAT DO WE ASSESS?

Scoring Criteria	Field-based interview
Uses appropriate tone and manner	Yes
Launches interaction with a question that is neutral, open, and focused on student thinking	Yes

ELICITING STUDENT THINKING: WHAT DO WE ASSESS?

Scoring Criteria	Field-based interview
Uses appropriate tone and manner	Yes
Launches interaction with a question that is neutral, open, and focused on student thinking	Yes
Elicits the specific steps of the student's process	N/A
Probes the student's understanding of the steps	N/A
Attends to the student's ideas in follow-up questions	N/A

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Scoring Criteria	Field-based interview
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Probes the student's understanding of the steps	N/A
Attends to the student's ideas in follow-up questions	N/A

In this assignment, **27%** of the students spontaneously shared their complete process **and** their understanding of the key mathematical ideas involved in the process.

CHALLENGES OF FIELD-BASED ASSESSMENTS

- Contexts may not provide opportunities for interns to demonstrate the skill being assessed
- Teaching interns and students may have shared understandings that influence the interaction
- Teacher educators cannot control the processes students use or the understandings they have
- It takes time to score video interviews
- Variation in assessment contexts makes it difficult to notice patterns across a whole group of interns

SIMULATIONS FOR ASSESSING SKILL WITH ELICITING STUDENT THINKING



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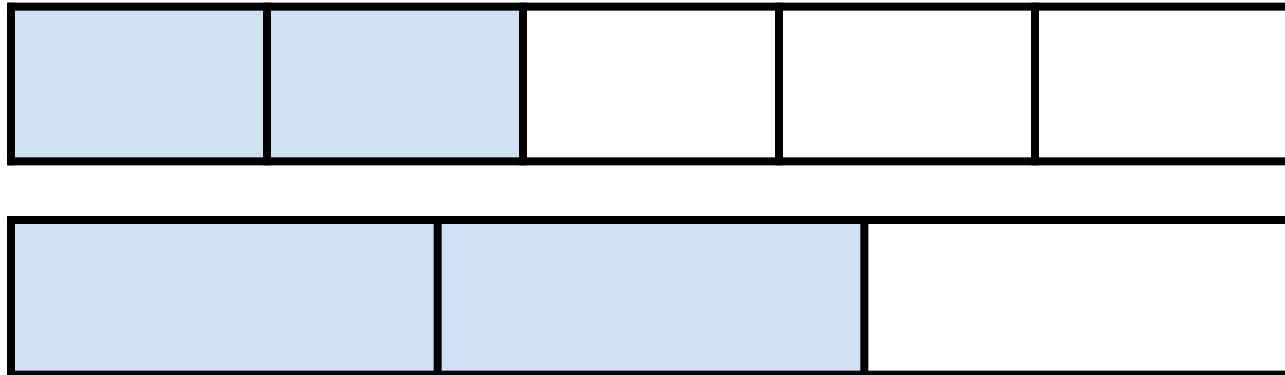


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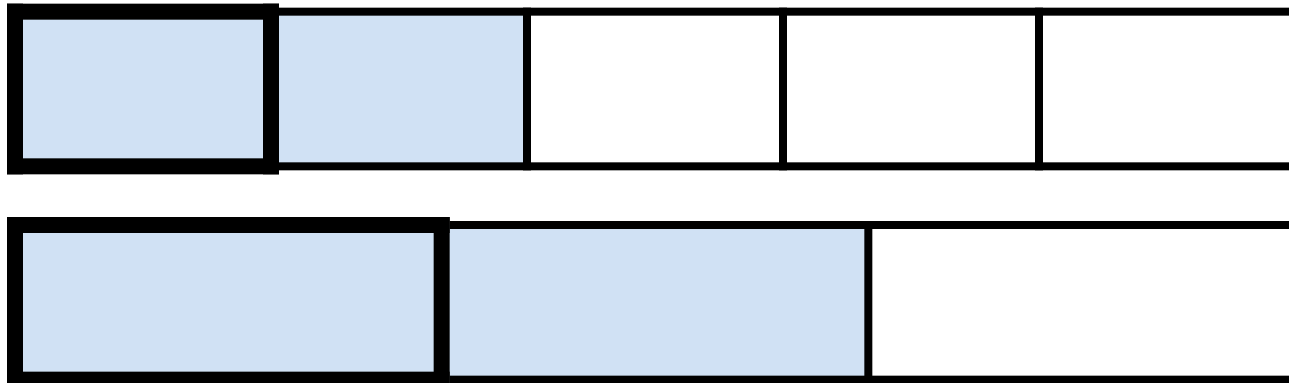
COMMON NUMERATOR METHOD FOR COMPARING FRACTIONS

$$\frac{2}{5} \text{ and } \frac{2}{3}$$



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$$\frac{2}{5} \text{ and } \frac{2}{3}$$



SETTING THE STAGE FOR ELICITING

The teaching intern:

1. Prepares for an interaction with a standardized student about one piece of student work

Mathematics task presented to the student:

Which fraction is greater:

$$\frac{3}{7} \text{ or } \frac{2}{5}$$

Student work:

$$\begin{aligned} \frac{3}{7} &= \frac{6}{14} & \frac{2}{5} &= \frac{6}{15} \\ \frac{6}{14} &< \frac{6}{15} \\ \text{so: } \frac{3}{7} &< \frac{2}{5} \end{aligned}$$

Your goal is to elicit and probe to find out what the “student” did to produce the answer as well as the way in which the student understands the steps that were performed.

Incorrect answer, alternative algorithm, degree of understanding is unclear

HOW IS EVIDENCE OF ELICITING SKILLS OBTAINED?

$$\frac{3}{7} = \frac{6}{14} \quad \frac{2}{5} = \frac{6}{15}$$

$$\frac{6}{14} < \frac{6}{15}$$

$$\text{so: } \frac{3}{7} < \frac{2}{5}$$

The teaching intern:

1. Prepares for an interaction with a standardized student about one piece of student work
2. **Interacts with the student to probe the standardized student's thinking**

A Standardized Student

Developed response guidelines focused on:

- What the student is thinking such as
 - Uses a common numerator approach to compare fractions
 - Once has common numerators, always chooses the fraction with the larger denominator as the greater fraction
- General orientations towards responses such as
 - Don't make errors representing fractions
 - Give the least amount of information that is still responsive to the question
- Responses to anticipated questions



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ELICITING A STUDENT'S THINKING



What is the intern doing to elicit this student's thinking?

ELICITING STUDENT THINKING: WHAT DO WE ASSESS?

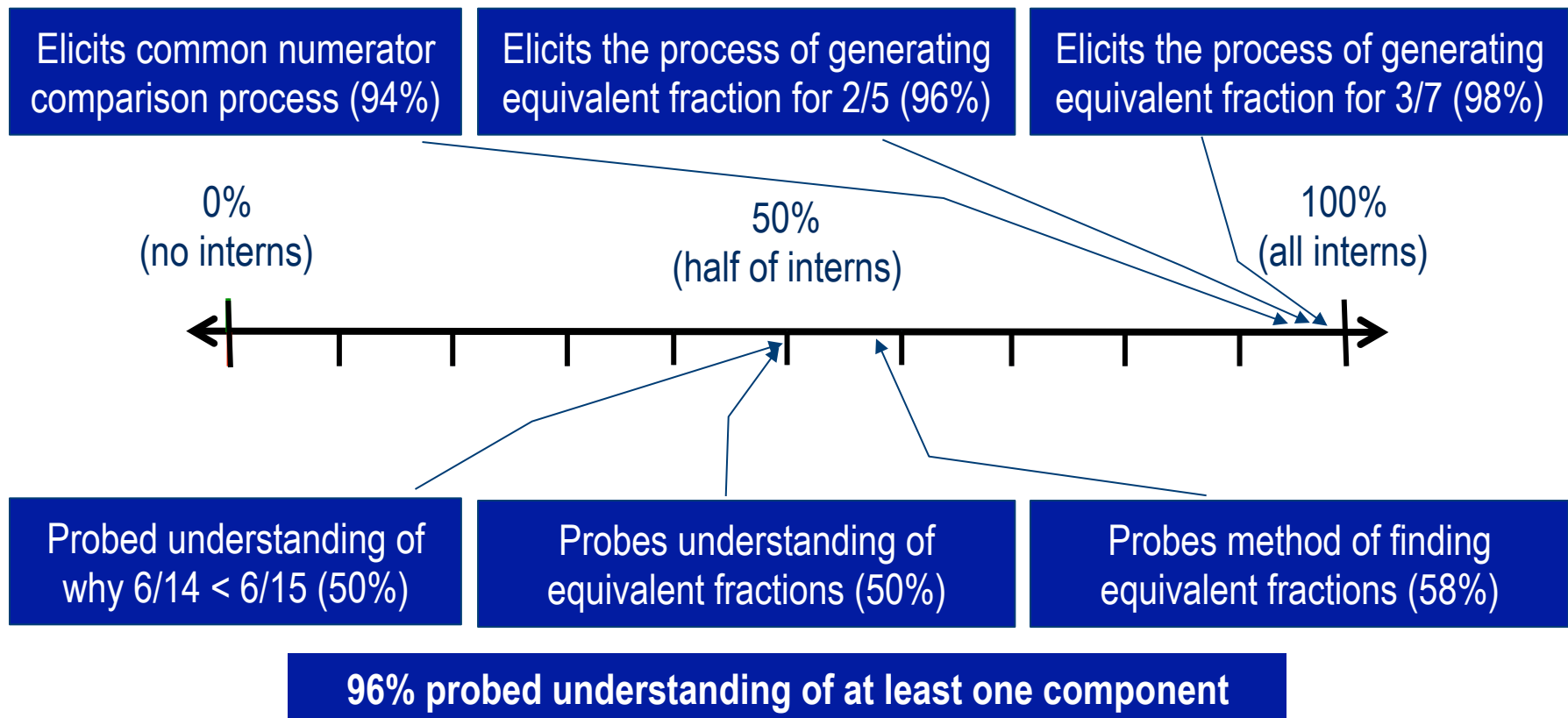
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Scoring Criteria	Field-based interview	Simulation
Uses appropriate tone and manner	Yes	Yes
Launches interaction with a question that is neutral, open, and focused on student thinking	Yes	Yes
Elicits the specific steps of the student's process	N/A	Yes
Probes the student's understanding of the steps	N/A	To some extent
Attends to the student's ideas in follow-up questions	N/A	Yes

PREVALENCE OF ELICITING MOVES



USING STANDARDIZED SIMULATIONS TO ASSESS ELICITING AND INTERPRETING



- **Parity:** Makes possible fairness with respect to specific contextual aspects
- **Detail:** Enables specification of content, situation, teaching “problem” to ensure that important aspects of teaching are being assessed
- **Efficiency:** Standardization allows for the assessment of many teaching candidates in a compressed timeframe