

# THE ASSESSING TEACHING PRACTICE PROJECT: SIMULATIONS OF ELICITING AND INTERPRETING STUDENT THINKING

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Erin Pfaff, and D'Anna Pynes*



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# OUR PROJECT

- Our work is situated in the context of a practice-based teacher education program
- As teacher educators, we needed ways to track on our preservice teachers' developing skills with teaching practice
- In 2011, limitations of prevailing assessment approaches led us to consider simulations
- We develop, use, and study teaching simulations as a way to assess and support the learning of high-leverage teaching practices and mathematical knowledge for teaching
- We have been funded by the National Science Foundation since 2013 and have developed 14 simulation assessments

# OUR GOAL FOR MATHEMATICS TEACHER EDUCATION: WELL-STARTED BEGINNERS

Preparing elementary teachers of mathematics who are ready for professional work with students from the day they assume responsibility for classrooms of their own through learning experiences that integrate and advance:

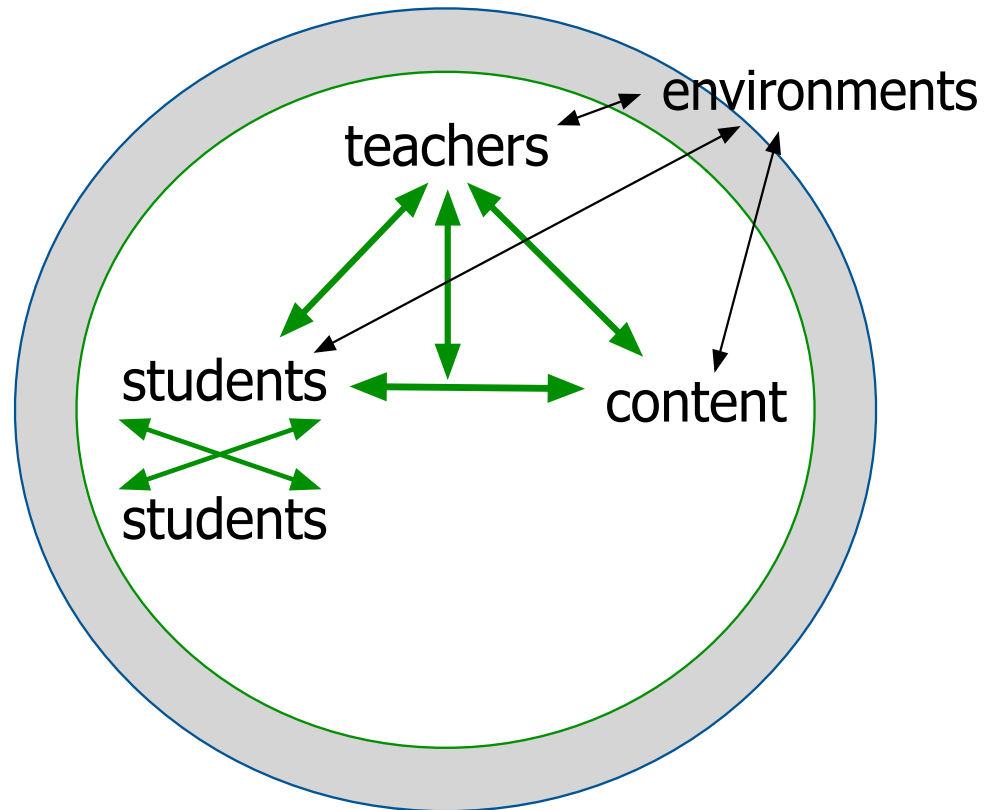
- High-Leverage Teaching Practices
- Content Knowledge for Teaching
- Professional Ethical Obligations

*.... all with room (and tools!) for further growth and development*



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# THEORETICAL FOUNDATIONS: TEACHING AS INTERACTION



(Cohen, Raudenbush, and Ball, 2003; Lampert, 2001)

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# THEORETICAL FOUNDATIONS: PEDAGOGIES OF PRACTICE

- Representations of practice
- Decompositions of practice
- Approximations of practice

(Grossman et al., 2009)



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# ELICITING STUDENT THINKING

- A high-leverage teaching practice that involves finding out what students know or understand, and how they are thinking/reasoning
- Our decomposition of this practice includes:
  - Establishing an environment in which students are comfortable sharing their thinking
  - Posing questions to get students to talk
  - Listening to and hearing what students say
  - Probing students' responses
  - Developing an idea of what a student thinks
  - Checking one's interpretation

# USING THE SIMULATION WITHIN TEACHER EDUCATION

Simulations are used as formative assessments that:

- Provide preservice teachers with feedback about their skill and MKT
- Provide teacher educators with information about preservice teachers' strengths and needs
- Inform the design and improvement of teacher education courses

# SIMULATION OF A TEACHING SITUATION: AN APPROXIMATION

## Sample of written work

*Mathematics task  
presented to the student:*

Which fraction  
is greater:  
 $\frac{3}{7}$  or  $\frac{2}{5}$

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

So:  $\frac{3}{7} > \frac{2}{5}$

Correct answer, alternative algorithm,  
degree of understanding is unclear



# KEY COMPONENTS OF THE SIMULATION SITUATION

## Sample of written work

*Mathematics task presented to the student:*

Which fraction is greater:  
 $\frac{3}{7}$  or  $\frac{2}{5}$

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Correct answer, alternative algorithm, degree of understanding is unclear

## Simulated student

- Teacher educator
- Trained to use a set of response guidelines that specify
  - The student's process
  - The student's understanding of key ideas underlying the process
  - General "ways of being"

*Student role protocol includes general guidance and specific responses to anticipated questions*

# STRUCTURE OF THE SIMULATION

The preservice teacher:

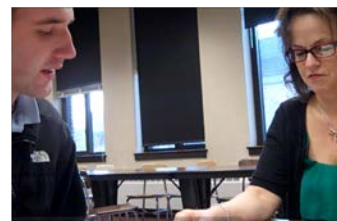
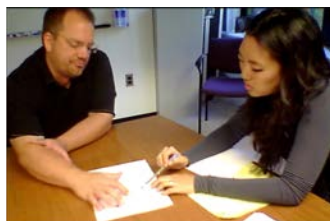
1. Prepares for an interaction with a standardized student about one piece of student work
2. Interacts with the student to elicit the student's thinking
3. Interprets the student's thinking in a follow up interview, using evidence from the interaction

*Mathematics task presented to the student:*

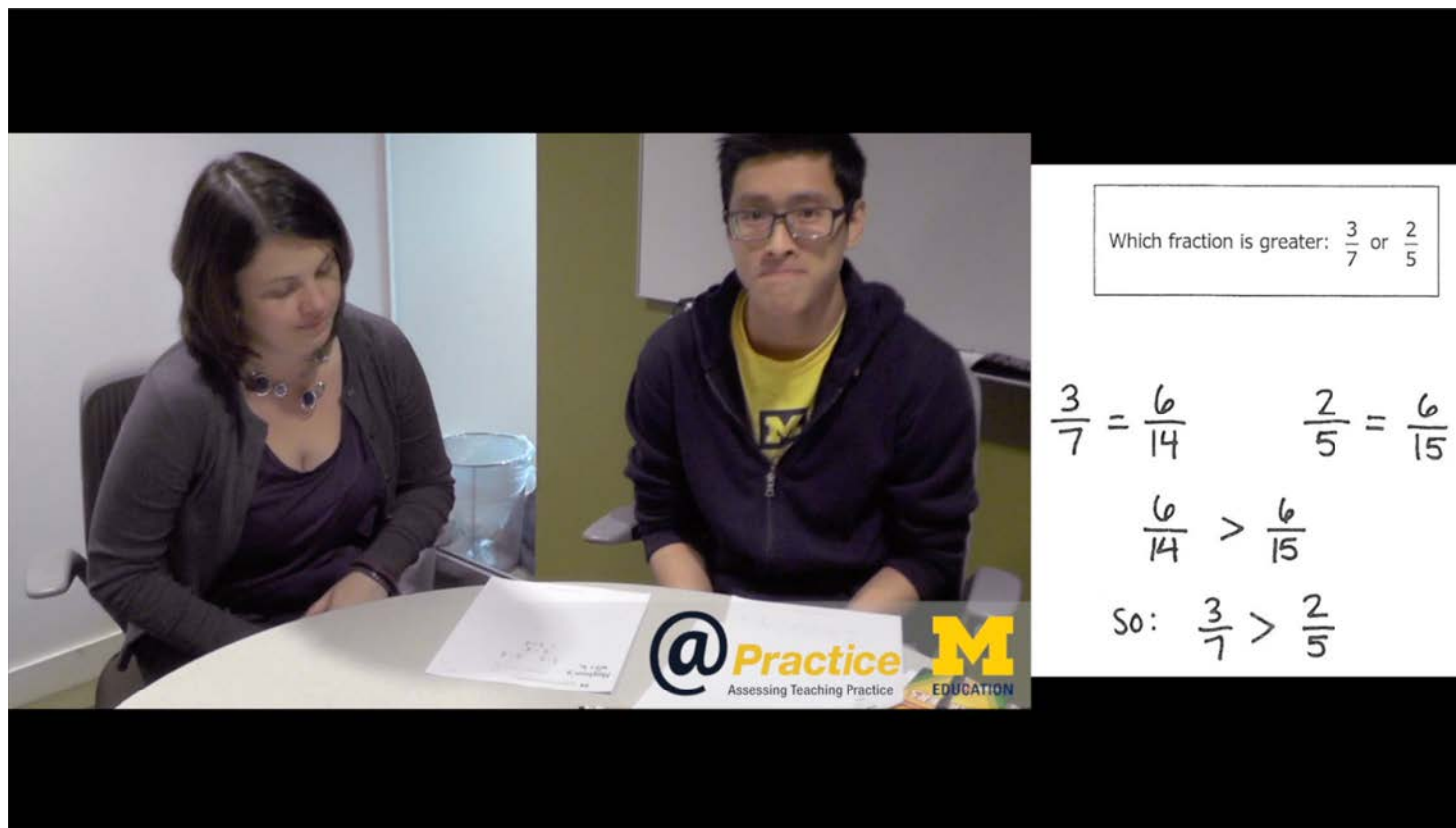
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# A REPRESENTATION OF THE SIMULATION

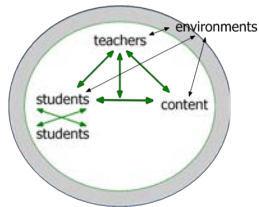


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# CREDITS



- Cohen, D. K., Raudenbusch, S., & Ball, D. L. (2003). Resources, instruction, and research. *Educational Evaluation and Policy Analysis*, 25 (2), 119-142.
- Lampert, M. (2001). *Teaching problems and the problems of teaching*. New Haven, CT: Yale University Press.