@Practice
Assessing Teaching Practice

STRENGTHENING THE QUALITY, DESIGN AND USABILITY OF ASSESSMENTS OF TEACHING PRACTICE

Meghan Shaughnessy and Timothy Boerst*

mshaugh@umich.edu and tboerst@umich.edu

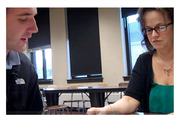
BACKGROUND

- **Eliciting and Interpreting Student Thinking:** A high-leverage teaching practice that entails posing questions or tasks that provoke or allow students to share their thinking about specific academic content (TeachingWorks, 2011). Interpreting is the work that teachers do to give meaning to what they see and hear.
- **Simulations**: An approximation of practice that places authentic practice-based demands on a participant. Can provide information that is not feasible or practical to determine in a real-life professional context.

RESEARCH QUESTIONS

- **Design Resources.** How can assessment designers generate authentic, research-based, student profiles that can be used as the basis for simulation assessments?
- **"Standardization" of the student.** Given similar training and materials, in what ways are people in the role able to standardize their responses to questions and create representations, and in a larger sense maintain the student's mathematical thinking and "way of being"?
- **Developing performance expectations.** How do preservice teachers and practicing teachers perform on the simulation assessment? How might the performance of different groups be used to establish appropriate expectations for performance of preservice teachers on the assessments?





FINDINGS: DESIGN RESOURCES

- Simulation assessment design requires resources such as:
  - A sample of student work on a mathematics problem
  - Detailed and believable student dialog/representation
  - Knowledge of preservice teachers
  - Ability to facilitate, collect evidence, and evaluate the teaching practice
- Simulation assessment design can be supported using a range of resources, including:
  - Mathematics education research – student thinking, preservice teacher knowledge and skills
  - Elementary mathematics curriculum materials
  - Cases of student thinking about a mathematics problem

Still requiring the wisdom of practice that teacher educators bring

- Resources provided by each approach include:

Research	Curriculum Materials	Cases of student thinking
▪ Examples and categories of word problems ▪ Descriptions of patterns of student thinking ▪ Examples of students employing strategies	▪ Categories of approaches to solve problems ▪ Multiple descriptions of approaches ▪ Images of using representations	▪ Samples of student work ▪ Specific, detailed examples of student talk and representation ▪ Responses to questions tailored to reflect those preservice teachers might ask

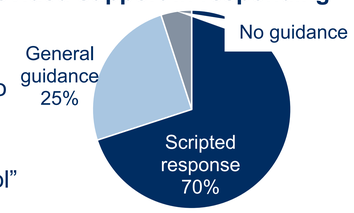
- Each approach also presents challenges. When using "cases of student thinking":
  - **Challenges for administrators:** Authentic dialog/representations can be hard to replicate/standardize; Path of student thinking might not be practical to elicit in the allocated time frame.
  - **Challenges for preservice teachers:** Student talk and/or representations might be contradictory or vague or convoluted.

FINDINGS: STANDARDIZATION OF THE STUDENT

- Trained 4 teacher educators external to the project to be the standardized student for one simulation assessment.
- Each teacher educator administered the assessment 6-12 times.
- Examined the degree to which (a) the "student role protocol" provided provided support in responding to questions from preservice teachers; and (b) each of the teacher educators responded in ways that aligned with the "student role protocol."

Degree to which the student profile provided support in responding

- Across the 36 performances, there were 457 cases in which a preservice teacher posed a question to the student.
- In 95% of the cases, the "student" had information in the "student role protocol" to support them in responding.



Degree to which the standardized student responded in ways that were aligned with the "student role protocol":

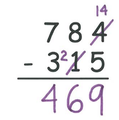
- **When a scripted response existed in the "student role protocol":** Shared appropriate information 71% of the time. Most common error was to "omit information."
- **When no scripted response existed in the "student role protocol" but there was guidance for responding:** Shared appropriate information 78.5% of the time.

Conclusions

- The "student role protocol" was comprehensive enough to reasonably cover the range posed by preservice teachers.
- Because it is not possible to script responses to all possible questions, the "general guidance" in the student role protocol is key.
- After participating in a training, teacher educators were able to carry out the student role in a reasonably standardized fashion.

SIMULATION ASSESSMENT

Preservice teachers engage in three parts:



- **Preparation:** Preparing for an interaction with a standardized student about a specific piece of student work.
- **Simulation:** Eliciting and probing the standardized student's thinking to understand the steps the student took and the student's understanding of the key mathematical ideas.
- **Interview:** Interpreting the student's thinking.
  - Describing the student's process for solving the problem as well as their understanding of the process.
  - Using the student's process to solve a similar problem and anticipating the student's understanding of particular parts of the process.
  - Generalizing about the mathematical validity of the process.

Student Role Protocol to Standardize the Assessment

What the student is thinking:

- Uses an algorithm that is not conventional in the U.S. in which you add the same amount to the minuend and subtrahend to keep the difference the same.
- Understands that the process keeps the difference the same (adds 10 ones to the minuend and 1 ten to the subtrahend)
- Understands that 10 ones is equivalent to 1 ten.

General orientations towards responses such as:

- Talks about digits in columns using place value language.

Responses to anticipated questions

- **Question:** Why did you cross out the 1 and write a 2?
  Answer: I added 10 ones to 784 so I needed to add ten to 315.

PRODUCTS (IN PROGRESS)

- Two simulation assessments:
  - Early elementary: Number & operation.
  - Upper elementary: Geometric measurement.
- Training materials to support using the assessments, including scored video exemplars.
- Performance expectations for eliciting and interpreting for use inside a teacher education program.
- Documentation of the potential to standardize the role of the standardized student.
- Analysis of the affordances and challenges of using different approaches to design a simulation assessment.

*The research reported here was supported by the National Science Foundation under Award No. 1502711. Any opinions, findings, and recommendations expressed are those of the authors and do not reflect the views of the National Science Foundation. The authors acknowledge the contributions of Merrie Blunk, Rosalie DeFino, Susanna Owens Farmer, Emily Therialut-Kimmey, and Xueying Ji Prawat. For more information on the Assessing Teaching Practice Project, visit http://sites.soe.umich.edu/at-practice/.

SCHOOL OF EDUCATION
UNIVERSITY OF MICHIGAN