

CHANGING ASSESSMENT PRACTICES IN TWO CONTEXTS: USING SIMULATION ASSESSMENTS WITH PRESERVICE TEACHERS

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WHAT DO ASSESSMENTS OF PRESERVICE TEACHERS' CAPABILITIES NEED TO BE LIKE?

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

PREVAILING APPROACHES TO ASSESSING TEACHING PRACTICE

- Field observations
- Video recordings

But solely using these types of assessments is challenging...

USING STANDARDIZED SIMULATIONS TO ASSESS TEACHING PRACTICE

Simulations are approximations of practice that can be used for both assessing and supporting ongoing learning.

Simulations:

- are commonly used in many professional fields
- place authentic, practice-based demands on a participant
- purposefully suspend or standardize some elements of the practice-based situation
- can provide information that are not possible or practical to determine in real-life professional context

FOCUSING ON ELICITING FROM THE BEGINNING OF TEACHER EDUCATION

Early attention to eliciting student thinking is crucial, because:

- people are likely to develop ways of doing this in everyday life
- learning and attending to what young people think is foundational to teaching
- many other teaching practices rely on being able to elicit and interpret learners' thinking

ELICITING STUDENT THINKING

A high-leverage 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 their thinking

THE PRESERVICE TEACHER PREPARES

The preservice teacher:

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

$$\begin{array}{r} 29 \\ + 36 \\ \hline 623 \\ \textcircled{83} \end{array}$$

Final answer 83

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

$$\begin{array}{r} 29 \\ + 36 \\ \hline 623 \\ \textcircled{83} \end{array}$$

Final answer 83

Correct answer, alternative algorithm, degree of understanding is unclear

THE PRESERVICE TEACHER ENGAGES IN A SIMULATION

$$\begin{array}{r} 29 \\ 36 \\ + 18 \\ \hline 623 \\ \textcircled{83} \end{array}$$

The preservice teacher:

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 an alternative algorithm (column addition), except the student is working from left to right
 - Applies the method correctly and has conceptual understanding of the procedure
- General orientations towards responses such as
 - Talk about digits in columns in terms of the place value of the column (e.g., 23 ones)
 - Give the least amount of information that is still responsive to the question
- Responses to anticipated questions

THE PRESERVICE TEACHER IS INTERVIEWED

The preservice teacher:

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
3. **Responds to questions about her/his interpretation of the student's thinking, including predicting the student's response on a similar task**

Interviewing about interpretations

Preservice teachers are asked to

- Describe the student's process
- Indicate what the student does and does not understand about the process

Preservice teachers are asked to apply what they learned to

- Anticipate how the student would solve a similar problem
- Provide interpretations of understandings that are at the core of the process

$$\begin{array}{r} 27 \\ + 48 \\ \hline \end{array}$$

CASE #1: UNIVERSITY OF MICHIGAN-FLINT



SCHOOL OF
EDUCATION
UNIVERSITY OF MICHIGAN



EDUCATION



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UM-FLINT CONTEXT

- Preservice teachers take either 4 or 9 Mathematics Education courses, all focused on mathematics and methods
 - Emergent Mathematical Thinking
 - Whole Number Operations
 - Geometry I
 - Fractions & Proportionality (w/ practicum component)
- Preservice teachers
 - Mix of non-traditional and traditional

RATIONALE FOR DEVELOPING AND USING SIMULATIONS

Rationale

- Course: to begin to understand our pre-service teachers ability to elicit and interpret the thinking of children, or to provide the pre-service teachers with formative feedback prior to tutoring children
- Program: to secure TE relevant information about incoming preservice teachers and to have evidence for programmatic changes we make

FALL 2017

- Emergent Mathematical Thinking
- Whole Number Operations (First Experience)*
- Geometry I
- Fractions & Proportionality (Second Experience)

- Capstone class – simulation used as way of providing pedagogical feedback prior to students completing a tutoring project

FALL 2017

- Whole Number Operations Course
 - 10 preservice teachers in the course, 8 preservice teachers completed the simulation
 - 2 of the 8 preservice were taking the course for the second time
- Preservice teachers participate during the first week of the semester, it is an assignment they are required to complete as part of the course

OBSERVATIONS

- 6 preservice teachers asked what the simulated student did
- 2 preservice teachers “filled” – meaning they incorrectly told the simulated student what they did.
- 4 preservice teachers asked about the traditional algorithm, 2 who elicited and 2 filled

WHAT I LEARNED

- The preservice teachers are asking what was done
- They often missed the order in which the simulated student solved the problem
- The preservice teachers go after the procedure but not the conceptual understanding
 - They do not ask about the meaning of what the simulated student did, so struggle to interpret what the student understands about the mathematics

CASE #2: UNIVERSITY OF MICHIGAN, ANN ARBOR



SCHOOL OF
EDUCATION
UNIVERSITY OF MICHIGAN



EDUCATION



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UM-ANN ARBOR CONTEXT

Undergraduate Teacher Education:

- Preservice teachers take two mathematics focused education courses and two mathematics content focused courses
- Preservice teachers
 - matriculate as juniors ($n \sim 40$)
 - are in cohorts comprised of majority white, female
 - increasingly include students transferring from community colleges (currently about a third of students)

RATIONALE FOR DEVELOPING AND USING SIMULATIONS

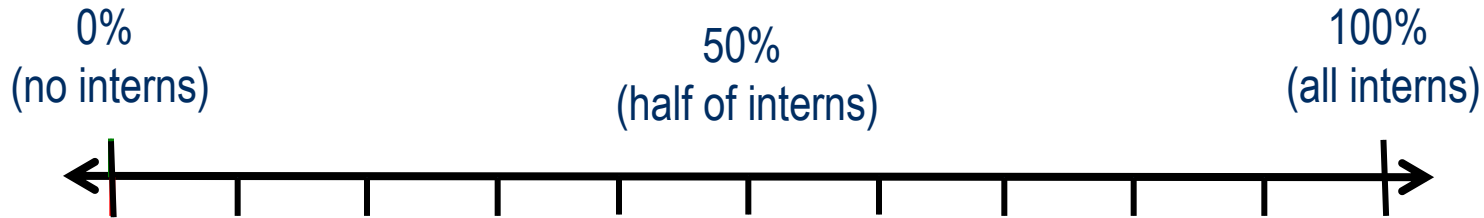
Rationale

- Course: to have information on the eliciting and interpreting practices of preservice teachers far enough ahead of time to be useful
- Program: to secure TE relevant information about incoming preservice teachers and to have a way to gauge their progress over time in the program

BASELINE LOGISTICS

- All preservice entering the Elementary TE program engage in orientation week activities which include time for participating in a range of baseline assessments
- Course instructors and volunteers including graduate instructors and field instructors prepare to facilitate
- 2-3 simulation “set-ups” are used to implement and video record preservice teacher engagement in the simulation
- 30 minutes are provided total for each preservice teacher, with an overlap of 10 minutes in which the next preservice teacher is completing the analysis of student work needed for the simulation
- Schedule permits “cross talk” focused on performance, proctoring, scoring questions
- Scoring in the moment is later checked against video and scoring questions are settled

PREVALENCE OF ELICITING MOVES: PROCESS AND/OR UNDERSTANDING

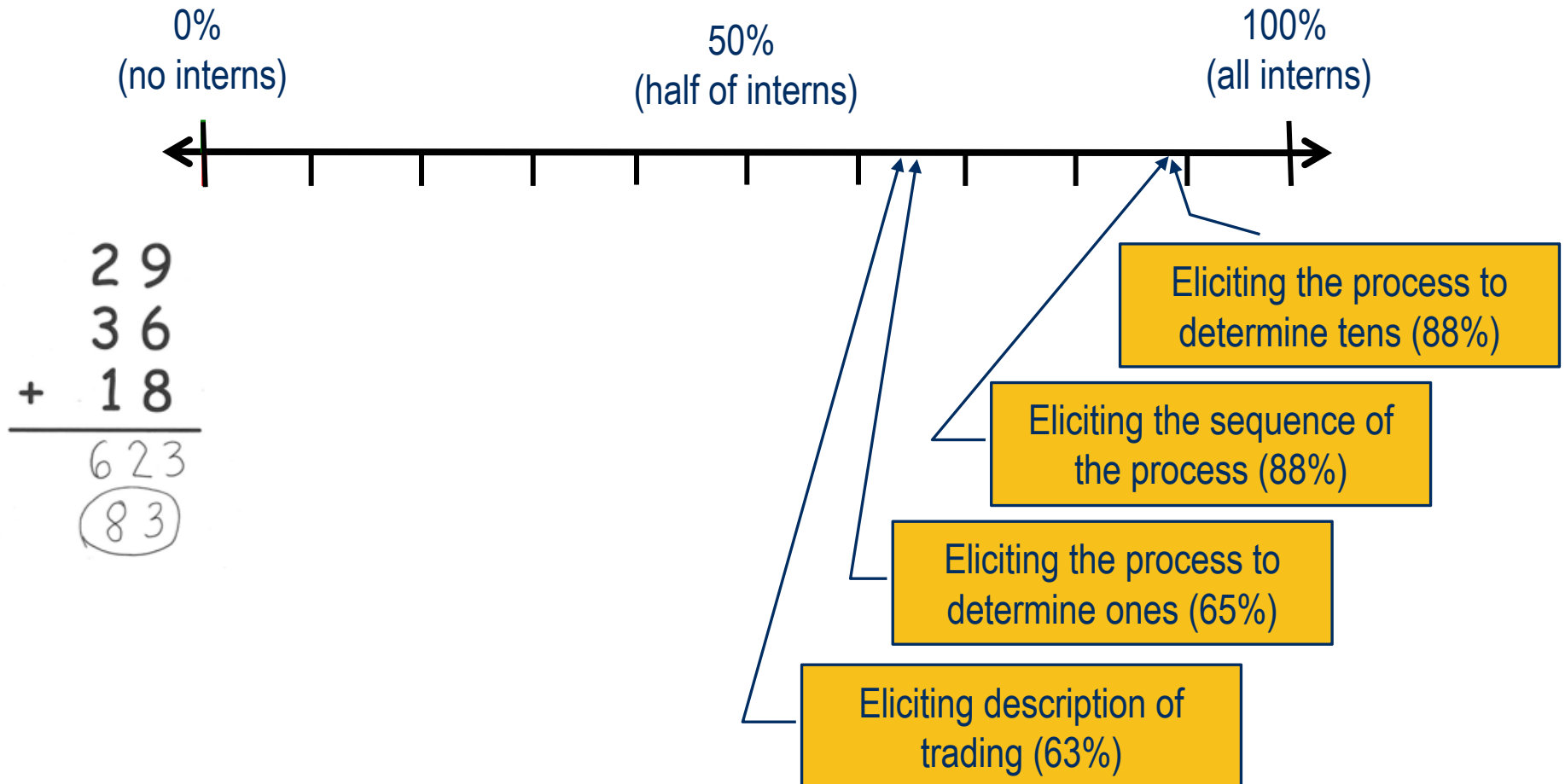


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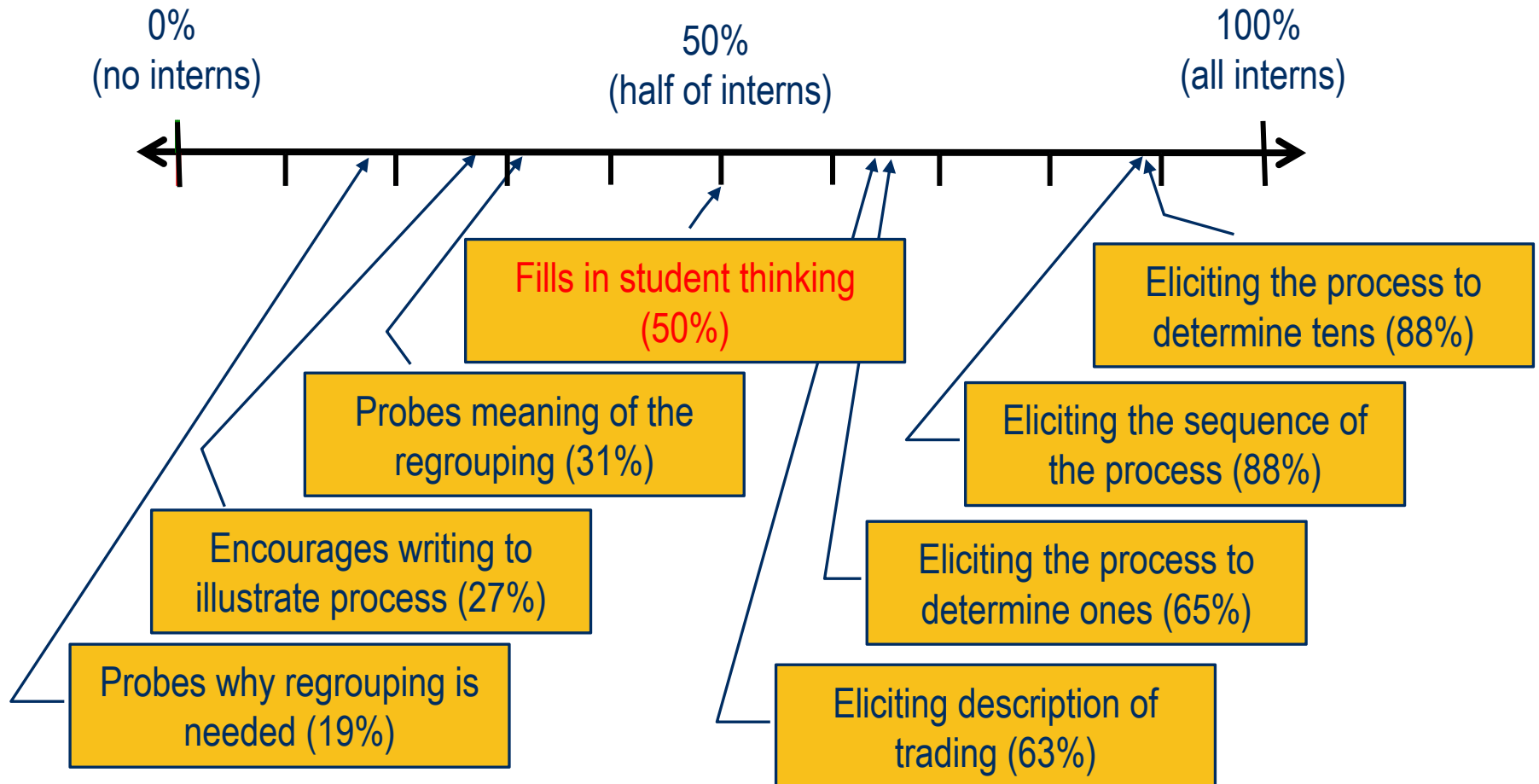
Eliciting description of trading	Fills in student thinking	Encourages writing to illustrate process
Eliciting the sequence of the process	Eliciting the process to determine ones	Poses purposeful follow-up problem
Probes why regrouping is needed	Probes meaning of the regrouping	Eliciting the process to determine tens

Based on the example shared earlier, which of the moves listed would you expect to see the most often/least often at the beginning of a teacher education program?

PRESERVICE TEACHER STRENGTHS: ELICITING STUDENT THINKING



PREVALENCE OF MOVES: ELICITING UNDERSTANDING



MAKING USE OF THE BASELINE

- Knowing the kinds of eliciting approaches that can be built upon, introduced or need to be countered
- Apprenticing future teacher educators
- Professional development

NEXT STEPS: INTERNAL CONSIDERATIONS

- Gearing up for using different simulations (e.g. knowing how scores relate)
- Establishing meaningful thresholds for performance at different points in the program
- Gearing up to use simulations as learning opportunities, as well as for assessment purposes

CONCLUSIONS



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NEXT STEPS:

COLLABORATION ACROSS PROGRAMS

- Learning how to use the assessment across sites
- Learning different approaches to logistics
- Considering different ways to leverage the learning from the assessments
- Learning across programs about variation and commonalities in preservice teacher performance