STANDARDIZED ASSESSMENTS OF BEGINNING TEACHERS’ DISCUSSION LEADING PRACTICE: IS IT POSSIBLE AND WHAT CAN WE LEARN?

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Psychology of Mathematics Education North America • East Lansing, MI

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THE CHALLENGE

- Students, families, 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.

- Many factors beyond sheer skill influence novices’ enactment of specific practices
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.
RESEARCH QUESTIONS

1. Is it possible to design a standardized assessment to assess skill with leading mathematics discussions?

2. If it is possible: What might a standardized assessment afford?
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WHOLE CLASS DISCUSSION

- A period of relatively sustained dialogue among the teacher and multiple members of the class
- In a whole-class discussion, participants respond to and use one another’s ideas to develop ideas about specific content

TeachingWorks, 2015
DECOMPOSING THE WORK OF LEADING A WHOLE CLASS DISCUSSION

<table>
<thead>
<tr>
<th>Discussion Enabling</th>
<th>Discussion Leading</th>
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<tbody>
<tr>
<td>Anticipating student thinking</td>
<td>Framing - Launching</td>
</tr>
<tr>
<td>Setting up the problem</td>
<td>Orchestrating - Eliciting</td>
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<tr>
<td>Monitoring student work</td>
<td>- Orienting</td>
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<td>- Probing</td>
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<td>- Making contributions</td>
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<td>Framing - Concluding</td>
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<td>Recording</td>
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- Practices for orchestrating discussions (Smith & Stein, 2011)
- Talk moves (Chapin, O'Connor, & Anderson, 2013)
- Decomposing practice for novice learning (Boerst et al., 2011)
ELEMENTARY DISCUSSION ASSESSMENT

- Task: “Make number sentences for 10,” a problem with multiple solutions
- Goals: Elicit several solutions to the problem and to have students explain why they are or are not solutions and to notice similarities and differences among the solutions
- Focus: Varies depending on student solutions
SCAFFOLDING THE WORK

Lesson plan including supports for:
- Anticipating student ideas
- Understanding the mathematics
- Detailed instructions for setting up the task

<table>
<thead>
<tr>
<th>Grades 2-3</th>
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<tbody>
<tr>
<td>Generate number sentences for 10 using multiple operations</td>
<td>Students will likely generate number sentences for ten that move beyond integer pairs that sum to 10 (e.g. 1 + 9). Their expressions are likely to contain multiple terms and are likely to incorporate subtraction, although some students may need prompting. The types of expressions that students might generate include: 1 + 1 + 1... = 10, 2 + 3 + 5 = 10, 11 - 1 = 10, 83 - 73 = 10</td>
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<tr>
<td>determine whether the value of a proposed expression is 10</td>
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<td>listen to classmates and provide justification for agreeing or disagreeing with specific</td>
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<tr>
<th>Materials:</th>
<th>Paper for students to use for recording their work on the problem</th>
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<tbody>
<tr>
<td>Suggested Timing</td>
<td>Activity</td>
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<td>5 min</td>
<td>Set up</td>
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### Launch and conclusion
- Launching and concluding the discussion

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- Has attention of all students before launching
- Prompt efficiently engage student in the mathematical work
- Prompt directly attention toward the mathematics that is intended for the discussion

### Orchestrate

#### Eliciting multiple responses

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- Multiple solution strategies or ideas were elicited
- A range of student understandings or methods was represented
- Multiple students shared responses

#### Probing students’ thinking in relation to the mathematical goals

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- Questions were posed to get students to explain and elaborate their thinking about processes
- Questions were posed to get students to explain and elaborate on their understanding of key mathematical ideas
- Responses were followed up on to make sure student thinking about the mathematics available
- Support was given for students to complete their contributions or clarify their thinking

#### Orienting students to the contributions of peers

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- Students are prompted to talk to the whole class
- The teacher ppurges questions to students about other’s ideas and contributions several times during the discussion
- Students are asked to listen, add to, or repeat another student’s ideas or do so without prompting
- The listener of the class is supported as needed by moves that ask all students to respond to another’s work (e.g. agree/disagree, written responses)
- Students are encouraged to attend, listen, and respond in order to maintain productive and focused interaction

### Recording

- Recording and representing content

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<th>Problem (yes/no)</th>
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- Teacher records of student ideas are true to the students’ contribution
- Attends to the accuracy of records and representations
- Teacher recording is clear, organized and visible in the class
- Recordings support student understanding and participation
ANALYSIS TOOL: ORIENTING STUDENTS TO THE CONTRIBUTIONS OF PEERS

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2. If it is possible: What might a standardized assessment afford for:
   - eliciting and revealing variations in skills across teachers;
   - providing fine-grained detail about the performance of particular teachers for feedback purposes; and
   - accounting for existing classroom norms?
METHODS

- Pilot study with first year teachers ($n = 17$)
  - 9 Elementary teachers, 8 Secondary teachers
  - 45 minutes preparation time

- Data sources
  - Video records of discussion assessments (15 - 45 min)
  - Background surveys
METHODS OF ANALYSIS

- Research team independently analyzed videos
- Discussed coding to reach consensus using repeated viewing and code book
- Subset was coded by trained rater (85% agreement)
- Compared coding across videos to examine assessment’s capabilities
FINDINGS – ELICITING AND REVEALING VARIATION IN SKILL

Eliciting

Probing

Orienting

Making contributions
WHAT EVIDENCE OF ORIENTING DO YOU SEE IN THIS TEACHER’S ORCHESTRATION?
# TECHNIQUES FOR ORIENTING STUDENTS TO THE CONTRIBUTIONS OF PEERS

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WHAT EVIDENCE OF ORIENTING DO YOU SEE IN THIS TEACHER’S ORCHESTRATION?
FINDINGS: PROVIDING FINE-GRAINED DETAIL ABOUT THE PERFORMANCE OF TEACHERS

**Orienting**

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| The teacher poses questions to students about others’ ideas and contributions several times during the discussion |
| Students are asked to comment on, add to, or restate another student’s idea or do so without prompting |
| The listening of the class is supported as needed by moves that ask all students to respond to another’s work (e.g. agree/disagree, written response) |
| Students are encouraged to attend, listen and respond in order to maintain productive and focused interaction |

**TEACHER:** Rachel, as big a number that you can think of, do you think that you could subtract a different number and get back to 10?

**RACHEL:** Yeah.

**TEACHER:** You do?

**RACHEL:** Um hmm.

**TEACHER:** How many agree with Rachel, that no matter how big of a number you do end up getting, you could subtract a different number and wind up back at 10? Luke, you don't think you could? Aiden D, you don't think you could? Ryan L, you don't think you could? I agree, I think you could. So how many solutions, just using two numbers, do you think there would be if we were going to subtract one number minus another number? Joey?

**JOEY:** A gazillion.
THREE TYPES OF FINDINGS

- Eliciting and revealing a range of skill in discussion leading practices
- Providing fine grained detail about the performance of individual teachers
- Accounting for classroom norms
DISCUSSION

- Potential of standardized assessments
  - Research tool for exploring patterns in beginning teachers’ skill
  - Role of scaffolds in focusing assessment
  - Importance of having a clear decomposition of practice

- Implications for use in teacher education
  - Reveal patterns across and within candidates
  - Allow for targeted support and program-level design
  - Improve efficiency for teacher educators
RELATED STUDY ON VALIDITY

Garcia, N., Selling, S.K., & Wilkes, C. Standardized assessments of discussion leading practice: Are they valid measures?
THANK YOU!

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