SITUATING PROFESSIONAL DEVELOPMENT IN THE CONTEXT OF LIVE INSTRUCTION: TEACHERS' LEARNING THROUGH LEGITIMATE PERIPHERAL PARTICIPATION

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BACKGROUND

- Decades of research have demonstrated that many common approaches to professional development do not support increases in teachers' capabilities.
- Momentum around developing new and different forms of professional development such as video clubs (van Es & Sherin, 2006), lesson study (Perry & Lewis, 2009), and the work of the student curriculum and the disciplinary horizon (DeBellis & Rosenstein, 2007).

OUR APPROACH: THE ELEMENTARY MATHEMATICS LABORATORY



- 10-day summer mathematics program for 5th grade students in partnership with a local school district.
- A planned setting developed for the real-time experimentation of the interplay of instructional design, teaching, and learning.
- The teaching is **"public teaching."**
- The involvement for teachers is **legitimate peripheral participation** (Lave & Wenger, 1991) in teaching practice.
- **Structures** for supporting teachers' learning in the peripheral participation.

Documentation

Pre-briefing | **Observation** | **Debriefing**

LEARNING OPPORTUNITIES FOR TEACHERS

Peripheral participation in teaching	**MKT:** ▪ Fractions, Number and operations ▪ Mathematical practices
	Teaching Practice: ▪ Planning ▪ Choosing/modifying tasks ▪ Specifying and reinforcing productive norms ▪ Interpreting the results of student work
	Talk: Language for talking about children and their learning
Professional development	**Teaching Practice:** Discussion
	MKT: Number and operations

RESEARCH QUESTIONS

- **Learning from structured peripheral participation in "live practice":** What do teachers learn? Does (and how does) their participation impact their own teaching practice?
- **Impact of supplementary practice-focused professional development:** Does the addition of professional development focused on math discussions impact teachers' own practice?

METHODS

- Twenty-four elementary teachers, teaching grades 1-6, distributed into two groups.
- Structure of participation:

Spring 2017: Data Collection → Peripheral participation in teaching only OR Peripheral participation + professional development → Fall 2017: Data Collection

- Measures included:

Area of Potential Learning	Measure
Mathematical Knowledge for Teaching (MKT)	Learning Mathematics for Teaching (LMT) Survey
Teaching practice	Three video-recorded lessons analyzed using the Mathematical Quality of Instruction (MQI) instrument
Language for talking about the work of teaching and student learning	Classroom video viewing and response to focus questions
Skill with leading a mathematics discussion	Video recording of a lesson enacted using a lesson plan that we provide

- Professional development focus: Leading mathematics discussions

Framing	Orchestrating	Recording/ Representing Content
Launching Concluding	Eliciting student thinking Probing student thinking Orienting students towards the thinking of others Making contributions	Keeping accurate public records Using representations to convey key ideas

EXPLORATORY ANALYSIS

- Examines four teachers who participated in the peripheral participation and professional development.

FINDINGS – FULL DATA SET

MKT

No statistically significant change in MKT scores across the full data set.

- Before the EML: $M = .189$, $SD = .873$
- After the EML: $M = .362$, $SD = .824$

FINDINGS – CASE STUDY TEACHERS

Language: Sample Responses

Teachers changed their language for describing teaching and student learning. Excerpts from surveys are shown below.

Name and describe the work that you see the teacher doing to support student learning.

- **BEFORE:** The teacher is doing little work to support student learning. She appears to be looking for the correct answer …not trying to understand the students' thinking process.
- **AFTER:** The teacher is allowing students to make errors and restate their explanations in case they have to rethink the problem and draw a better conclusion or change their final answer. She is really supporting their risk taking. She is not coming up with a conclusion to the answers, but she is letting the students draw their conclusions.

Describe what it means to participate in a mathematics class in general. How do you see students in this class participating?

- **BEFORE:** Participating in math class means that students are following along with the lesson by using eye contact and showing their thought process on a dry erase board. Students are explaining their math thinking in front of the class.
- **AFTER:** Students are adding and clarifying information about each other's strategies. They are explaining their strategy in front of the class and justifying their answer. Students are responding as to whether they agree, disagree, have information to add, or a question.

MQI

- Teachers shifted their mathematical quality of instruction, particularly in attending to and remediating student difficulties.
- Teachers' scores adjusted to a more consistent score in the post-data rather than representing a broad range across the areas. See below for one teacher's scores.

	Pre	Post
Lesson contains rich mathematics	3	4
Teacher attends to and remediates student difficulties	3	4
Teacher uses student ideas	5	4
Mathematics is clear and not distorted	5	4
Tasks and activities develop mathematics	4	5
Lesson contains Common Core aligned student practices	4	4

Discussion-leading

- Teachers reduced the number of problematic issues.
- 75% of teachers increased the work they did to help students make connections between ideas.
- 50% of teachers increased their skill with recording and representing mathematical ideas.

NEXT STEPS

- **Continued data analysis:** Examine the impact of supplementary practice-focused professional development.
- **Engagement in a second study:** Examining whether the location of the participation (onsite/remote) in the full program matters.

ORGANIZING TO LEARN PRACTICE
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