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CHANGING TEACHING PRACTICE: EXAMINING PROFESSIONAL DEVELOPMENT IMPACT ON MATHEMATICS DISCUSSION LEADING PRACTICE

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PROBLEM STATEMENT

- Many common approaches to PD do not support changes to teaching practice
- Many studies do not examine changes to the quality of teaching practice
- Our goal: To learn about features of professional development that support positive changes in teachers' mathematics discussion leading practices

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

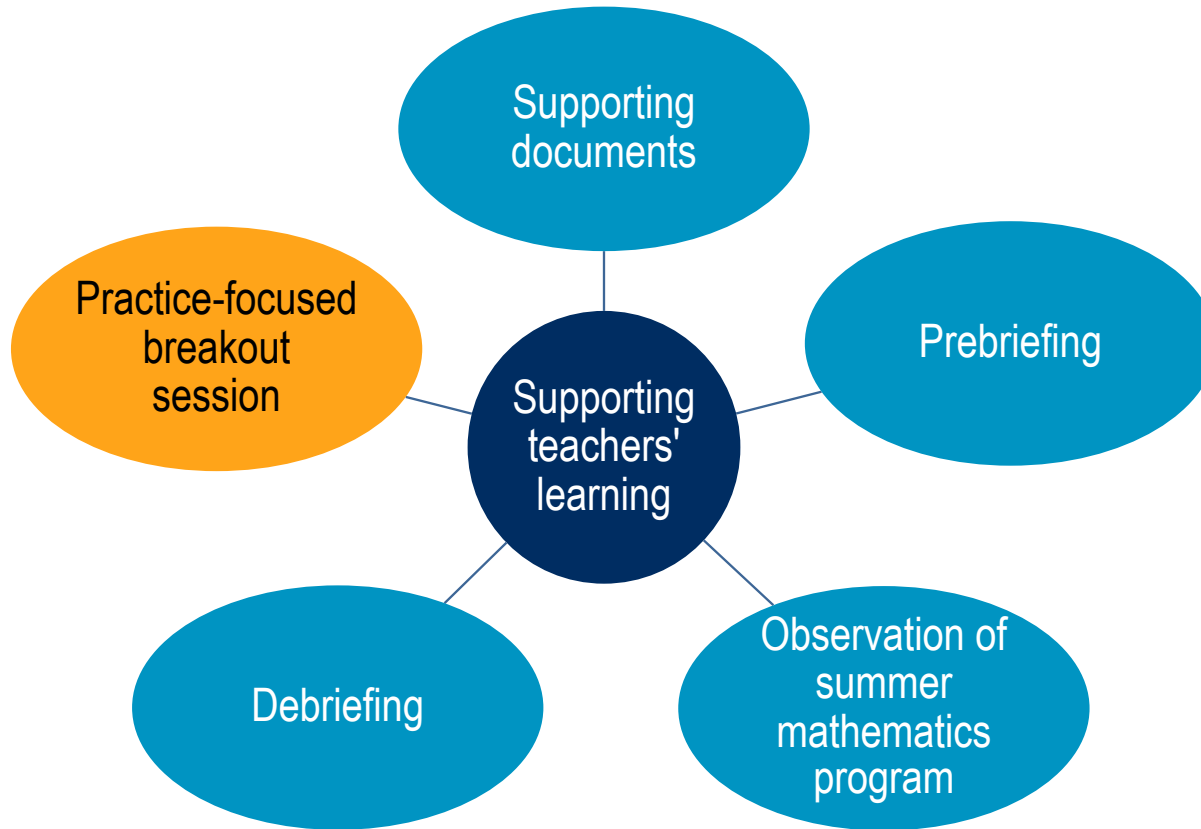
TeachingWorks, 2015

LEADING MATHEMATICS DISCUSSION: IDENTIFICATION OF AREAS OF WORK

Discussion Enabling	Discussion Leading		
Selecting a task Identifying the mathematical point Anticipating student thinking Setting up the problem Monitoring student work	Framing -Launching	Orchestrating - Eliciting - Orienting - Probing - Making contributions	Framing - Concluding
Recording			
Maintaining a focus on the mathematical point			

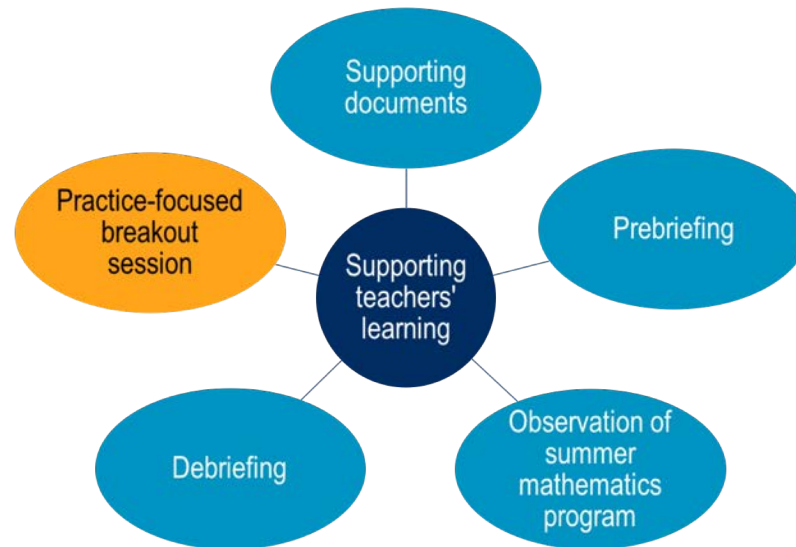
- Practices for orchestrating discussions (Smith & Stein, 2011)
- Talk moves (Chapin, O'Connor, & Anderson, 2013)
- Decomposing practice for novice learning (Boerst et al., 2011)

FEATURES OF PROFESSIONAL DEVELOPMENT DESIGN



RESEARCH QUESTION

**What do teachers learn from this PD model?
Does (and how does) their participation impact their own
teaching practice?**



STUDY DESIGN

24 teachers
1-week professional development



PRE- AND POSTTEST MEASURES

AREA OF LEARNING	MEASURE
Mathematical knowledge for teaching	LMT Survey
Teaching practice	Three video-recorded lessons (2 teacher-choice, 1 provided) analyzed using Mathematical Quality of Instruction-Lite 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	Analyze same video set using a discussion instrument

ANALYSIS METHODS

Discussion Instrument

- Probing questions
- Orienting students to the thinking of others
- Making mathematical connections
- Teacher's contributions to discussion
- Problematic areas

MQI

- Richness of math
- Remediation
- Teacher use of student ideas
- Clarity of mathematics
- Development of mathematical ideas
- Common Core student practices



RESULTS

MQI INSTRUMENT PRE-DATA: THE QUALITY OF INSTRUCTION BEFORE THE PD

Understanding the scores

1	2	3	4	5
Not at all true of this lesson		Default score		Very true of this lesson

	T12	T14	T18	T22
Lesson contains rich mathematics	3	3	4	2
Teacher attends to and remediates student difficulties	2	3	4	3
Teacher uses student ideas	3	5	4	3
Mathematics is clear and not distorted	2	5	3	4
Tasks and activities develop mathematics	2	4	4	2
Lesson contains Common Core aligned student practices	3	4	4	3

PRELIMINARY RESULTS

DISCUSSION INSTRUMENT: CHANGE IN TEACHERS' DISCUSSION-LEADING PRACTICES

Areas of work	Teachers Showing improvement	Total Categories in Area of Work	Categories with Change	Categories with improvement only
Probing	2 of 4	5	5	0 of 5
Orienting	1 of 4	4	4	2 of 4
Making Connections	3 of 4	3	3	1 of 3
Making Contributions	1 of 4	5	4	2 of 4
Problematic areas	4 of 4	13	9	7 of 9

RESULTS

- Teachers who attended all sessions showed growth in aspects of discussion-leading practice
 - Teachers had fewer problematic areas:
 - Content errors
 - Dominance of T-S v S-S talk
 - Over-scaffolding/doing math for students
 - Absence of visual representations
 - Probing questions, an area with little focus in the PD, did not improve at all
 - Orienting, one focus of PD, showed most improvement (50% categories improved)



NEXT STEPS

- **Impact of supplementary practice-focused breakout session:** Does the addition of the afternoon breakout session focused on aspects of discussion-leading practice impact teachers' own classroom practice, and if so, in what ways?
- **Examining the setting of PD**

