Building on MOSTs: Investigating Productive Use of High-Leverage Student Mathematical Thinking

Blake E. Peterson, Laura R. Van Zoest, Keith R. Leatham, & Shari L. Stockero

Mathematical Opportunities in Student Thinking

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Building Prototype Subpractices

Make Precise

Make the object of consideration clear.

Grapple Toss

Turn the object of consideration over to the students with parameters that put them in a sense-making situation.

Orchestrate

Orchestrate a whole-class discussion in which students collaboratively make sense of the object of consideration.

Make Explicit

Facilitate the extraction and articulation of the mathematical point of the object of consideration.

Research Questions

1) What does it look like to build on MOSTs in a way that simultaneously coordinates the core principles underlying productive use of MOSTs?
2) What are variations in how enacting the building subpractices coordinate the core principles?
3) What are teachers' experiences in attempting to build on MOSTs?

Timeline

	Fall	Spring	Summer
2017-2018	Develop, pilot and refine MEPs Recruit teacher-researchers (T-Rs)		T-R retreat to prepare T-Rs to enact MEPs
2018-2019	MEP Cycles 1 & 2 Data collection Ongoing analysis of MEP & meeting data	MEP Cycles 3 & 4 Data collection Ongoing analysis of MEP & meeting data	MEP retrospective analysis
2019-2020	MEP retrospective analysis Refining the building prototype		T-R retreat to share revised building prototype
2020-2021	MEP Cycles 5 & 6 Data collection	MEP retrospective analysis Refining the building prototype	

Outline of Activities

Creating MOST-eliciting prompts (MEPs)

To create investigable instantiations of building, we need predictable MOSTs that teachers can be prepared to build on. We developed MEPs and associated instructional materials to support building on those MOSTs. MEPs are brief mathematical undertakings that have a high likelihood of surfacing particular MOSTs as students share their thinking in response to the MEP.

Preparing teacher-researchers (T-Rs) to enact MEPs

We will prepare T-Rs to enact the building practice by engaging them in learning about (1) MOSTs; (2) the MEPs and related student mathematical thinking; (3) the building prototype; and (4) how to build on the MOSTs that are elicited by the MEPs.

Studying MEP enactments with T-Rs

Each T-R will engage in enactment cycles around two different MEPs. Each cycle will include (a) implementing a MEP, (b) providing initial reactions and feedback, (c) participating in a small-group debriefing meeting, and (d) participating in a large-group research meeting. The goal of the iterative cycles is to capture increasingly better enactments of the building practice.

Analyzing MEP data to refine the building prototype

Our analysis of the building practice will be both ongoing and retrospective. The ongoing analysis will inform our work with the T-Rs, including modifications to the building prototype and how to best support the T-Rs in future MEP enactments. Through retrospective analysis we will determine (a) whether our current building prototype satisfies the core principles in practice; (b) if there are other collections of subpractices that also satisfy the core principles; (c) what each subpractice looks like; and (d) the effectiveness of different enactments of the subpractices.

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