

**STUDENTS' LEARNING PATHWAYS IN STRUCTURED PROBLEM SOLVING AS A CONTEXT FOR PRODUCTIVE DISCUSSION IN MATHEMATICS PROFESSIONAL DEVELOPMENT**

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The purpose of this presentation is to describe and examine mid-career teachers' learning taking place when they engage in practical research collaboratively with university researchers. We describe a case of a university mathematics professional development (MPD) program in Japan in which the lesson study has been taken root. Attention is paid to how teachers develop their professional knowledge while analyzing and discussing with researchers students' thinking and learning in a structured problem-solving lesson (Stigler & Hiebert, 1999) implemented by those teachers.

Although features of an effective MPD program have been synthesized, a more systematic focus to cast light on the black box of teachers' learning through MPD is needed to understand the catalysts for change and its impact on their learning over time (Goldsmith, Doerr, & Lewis, 2014). In an MPD program, a dynamic between theory and teaching practice is often taken into account. Nevertheless, how it is realized is not uniform across the programs; nor is it clear the process of such dynamic.

In the practical research we focus in this presentation, teachers study on teaching practice to form a mathematics lesson framework, i.e., a conceptual and interpretive model of teaching and learning in a mathematics lesson, concerning their research interest. Activities for the practical research follow those for lesson study. In particular, activity of analyzing and discussing students' problem-solving processes during the lesson constitutes a major part. Teachers also produce a report based on findings.

This presentation intends to provide the following information to build on our understanding of the features of MPD that contribute to teacher's development of professional knowledge:

- to give a concrete example of a university MPD program in which participant teachers conduct practical research,
- to provide a lens to grasp the teacher's learning that is taking place when they engage in their practical research, and
- to point out the role of theory for teachers' professional development.

**References**

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*Last names of the authors in the order as on the paper*

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