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By Teaching We Learn

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KEY IMPLICATIONS

Every moment in teaching is an opportunity for learning.

What Shulman (1987) implied in his model of pedagogical reasoning and action is that teachers can learn from their own teaching activities, which include lesson planning, lesson enactment, and reflecting about lessons. There is a place and time for more elaborate teaching inquiry as part of a teacher's professional learning. Here, we suggest building on our current culture of teacher learning to emphasize teacher learning from his or her own teaching.

Learning from teaching is a dialogic process.

Teachers need to learn to teach differently, and they need to teach differently to learn. They learn to teach *differently* by noticing critical aspects about content, student learning, and teaching approaches from their own experiences and those of others. Although teaching differently does not mean teaching better, teachers will need to take the first step to try these new ideas for learning to take place.

Documenting teaching is a key lever for reflective practice.

Teachers need to learn what and how to document their practices in ways that enhance their productive noticing of content, student learning, and teaching approaches. This, in turn, can provide the stimuli for learning for reflection and future learning

BACKGROUND & FOCUS OF STUDY

Learning from teaching occurs when teachers have opportunities to negotiate among three aspects of their teacher knowledge: understanding of mathematics, curriculum materials, and knowledge of how students learn (Sherin, 2002). While productive noticing has been demonstrated to be a key lever for professional learning and can potentially change teaching practices (Choy, 2016), how it can be enhanced in a more sustainable manner beyond professional development courses remain unclear. The purpose of this research is to develop a proof of concept for a new professional learning model to promote productive teacher noticing in a sustainable manner.

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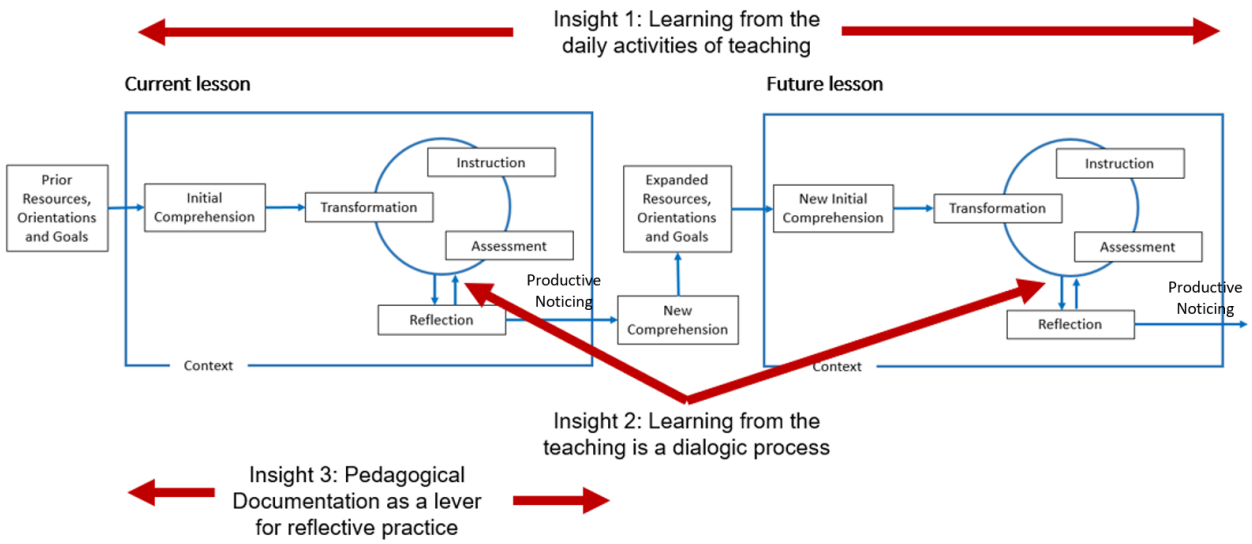
KEY FINDINGS



Building on ideas from both Shulman (1987) and Schoenfeld (2011), we developed an adapted model of pedagogical reasoning and action to highlight the dialogic processes involved when learning from teaching. The strength of Schoenfeld's ideas lie in the fact that teaching is goal-directed, rests on a set of resources, and driven by a teacher's orientations. Together with the insights, the following model provides a way for teachers to pinpoint the actions they need to take in order to learn from their practice.

SIGNIFICANCE OF FINDINGS

Implications for practice

The model developed from this project suggest new possibilities for mathematics teachers to improve their teaching by learning from how they are teaching. Seeing every moment in their teaching as opportunities to learn position teacher learning as a day-to-day activity instead of a one-off workshop or professional development course. What the model has provided is to pinpoint possible sites for learning and how to increase the likelihood to learn by enhancing their productive noticing through pedagogical reasoning.

Implications for policy and research

The findings reiterate the importance of giving time for teachers to collaborate and learn together. Building on the strong culture of professional learning in Singapore, it is important for policy makers to recognize the time and effort needed by teachers to plan, enact, and reflect on their lessons for the purpose of learning from these teaching activities. How the model can be applied in other specific teaching and learning issues will be a useful area for future research.

Proposed Follow-up Activities

A new Networked Learning Community has been set up to translate and scale up some of these ideas in other schools. In addition, a publication, A Handy Guide for Enhancing Our Mathematical Noticing, will be published and distributed to facilitate teachers in learning from their own teaching

RESEARCH DESIGN

A total of 39 mathematics teachers from three primary schools were involved in the project. We adopted a design-based research approach to develop the model in which we provided teachers opportunities to focus on unpacking content, sequencing content, observing lessons, and reflecting on their lessons in the context of a community of inquiry. We co-designed protocols to guide each professional learning session as teachers worked together to plan and teach a unit of work. As each session lasted about an hour and so, it was crucial that we built in specific focus for each session to facilitate more productive discussions. We also

provided teachers access to relevant research and practice-based articles when requested, as well as templates to facilitate teachers' inquiry processes. Data collected include voice and video recordings of the discussion during the sessions, photographs of lesson artifacts such as lesson plans, discussion notes, and when available, samples of students' work. Evidences for our model and insights come from our analysis of critical events – events that raised questions about teaching approaches or student understanding, or those can potentially deepen our understanding of teaching and learning of mathematics – which occurred during the learning sessions.

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