

University of McGill

Educational Context

- ❑ The Quebec education program (QEP) requires students in the science and technology program to seek answers or solutions to problems, make the most of their knowledge, and communicate. It also requires teachers to act effectively and respond appropriately (Government of Quebec, 2004, 2016).
- ❑ This requires a need for teachers to attend and respond to student thinking (e.g., Hammer & van Zee, 2006; Levin & Richards, 2011; Levin et al., 2009)
- ❑ This study examines preservice teachers (PSTs)' learning and thinking about teachers noticing students' thinking.

Conceptual Framework

- ❑ Teacher noticing is an effective avenue to explore how teachers engage with student thinking (Jacobs et al., 2010).
- ❑ Teacher noticing is "the process through which teachers manage ... the ongoing information with which they are presented during instruction" (Sherin, Jacobs, & Philipp, 2011, p. 5).
- ❑ This study adopts Jacobs et al.'s (2010) as well as Sun and van Es' (2015) frameworks for teacher noticing- rather than attending to the variety of things teachers notice, they focus specifically on children's thinking.

❑ Learning to Notice Framework (Jacobs et al., 2010):

❑ **Attending to student thinking:** Identifying some significant events in a teaching situation

❑ **4. Interpreting student thinking:** Using knowledge from one's context to reason about the important event identified

❑ **5. Responding to student thinking:** Making connections between specific events and broader principles of teaching & learning

❑ Teaching Practices for Making Thinking Visible (Sun & van Es, 2015):

❑ **1. Making Space for student thinking** (e.g., elicit student ideas or recognize and publicly associate an idea with a student)

❑ **2. Attending to and taking up student ideas** (e.g., Re-voice or rephrase a student's idea for the class to consider)

❑ **3. Pursuing student thinking** (e.g., ask students to explain their reasoning or press for further explanation)

Research Interest

- ❑ An important goal of science teacher education is to help preservice teachers (PSTs) learn to notice student thinking. Yet there is little empirical research in science on how to support this learning (e.g., Hammer & van Zee, 2006)
- ❑ This Study considers three tools to help PSTs learn to notice students' thinking:
 - Ambitious science teaching (AST) has teacher noticing as a central component (Sun & van Es, 2015)
 - Rehearsals help PSTs to better notice students' thinking (Lampert et al., 2013)
 - Video supports PSTs' learning to notice student thinking (Jacobs et al., 2010)

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Research Questions

1. To what extent do secondary science preservice teachers (PSTs) rehearsing ambitious science teaching (AST) notice students' thinking?
2. What impact does discussing videos of PSTs' own and others' rehearsal of AST has on their thinking about what it means to notice student thinking?

Method

- ❑ Case study (Stake, 1995) with design-based research (Cobb et al., 2003) to examine the learning of pairs of PSTs in noticing student thinking
- ❑ Secondary science methods course with a focus on AST practices
- ❑ PSTs have at least an undergraduate preparation in science but the majority have no formal teaching experience
- ❑ PST pair prepares lesson plans, frames teaching in terms of noticing student thinking, and then rehearses science activities to peers (acting as secondary students) and teacher educator acting as coach

Data Collection

Classroom Rehearsal of three-phase activity (15 min.)

1. PST pair eliciting students' prior knowledge on science concepts/phenomena to be taught
2. Students in small groups of three develop models to understand and explain the concepts/phenomena
3. Each student small group presents developed model during whole class discussion to reach a consensus model of the concepts/phenomena

Video Analysis Sessions and Interviews

1. Semi-structured pre-interview with PST pair (45-60 min.)
2. Before each video analysis session, as facilitator, researcher gives background of video to be reviewed, and summarizes the science topics and lessons involved (2-4 min.)
3. PST pair discusses video of their own classroom rehearsal, and answers questions and prompts relating to the five components of teacher noticing student thinking (45-60 min.)
4. PST pair discusses video of another PST pair's rehearsal, answers questions and prompts on the five components of teacher noticing student thinking (45-60 min.)
5. Semi-structured post-interview with PST pair (45-60 min.)

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Data Analysis

Content analysis (Schreier, 2012)

- ❑ Done at two levels (Merriam, 1999):
 - ✓ Within-case analysis to understand each PST pair
 - ✓ Cross-case analysis to uncover the differences and similarities among the four PST pairs
- ❑ Use five components of teacher noticing student thinking as initial categories
- ❑ Extract themes or sub categories from transcripts of rehearsal, video analysis and interviews.

Classroom rehearsal



Research Question 1

Video analysis and interviews



Research Question 2

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