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# Expert primary teachers' noticing of exemplary mathematics lessons: A case study in Mainland China

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## Background

Teacher noticing is crucial to adjust teaching strategies during instruction by interpreting aspects of the classroom environment (Sherin & van Es, 2009). However, research on expert mathematics teachers' noticing abilities is limited and Western noticing frameworks may not apply to other contexts, such as Eastern Asia. This study aims to use a noticing framework to explore expert mathematics teachers' noticing abilities in primary mathematics lessons in Mainland China. As defined by Mason (2002), professional noticing is the process of observing and identifying aspects of professional practice that can be adopted (p. 30). Jacobs et al. (2010) conceptualized teacher noticing as a set of skills that involve attending to children's strategies, interpreting their understanding, and deciding how to respond. Leatham et al. (2015) developed the Mathematically Significant Pedagogical Opportunities to Build on Student Thinking (MOST) framework (Table 1), emphasizing mathematically significant content, pedagogical opportunity, and students' mathematical thinking as essential components of teaching mathematics.

## Research questions

- 1) What do expert Chinese mathematics teachers notice in exemplary mathematics lessons?
- 2) How can the MOST framework be applied in the Chinese context to understand effective mathematics teaching?

## Methods

For this case study, we analyzed the characteristics of what expert teachers noticed and we examined to what extent their noticing aligned with the MOST analytical framework. Two expert mathematics teachers (ET A and ET B) with similar teaching and academic backgrounds were invited to observe two exemplary primary lessons, each lasting approximately 40 minutes. We adapted the coding framework from Stockero et al. (2017) to analyze what the ETs noticed by agent (what and who: the object of the noticing), specificity of mathematics (whether and how the mathematics in an instance is discussed) and focus of noticing (what about the students was attended to). We examined to what extent the experts' noticing aligned with the MOST analytical framework (see Table 1) (Leatham et al., 2015).

**Table 1: The MOST analytical framework**

Characteristics	Criteria	Description
	Student mathematics	Can the student mathematics be inferred?

Student mathematical thinking	Mathematical point	Is there a mathematical point closely related to the student's mathematics?
Mathematically significant	Appropriate mathematics	Is the mathematical point accessible to students with this level of mathematical experience, but not likely to be already understood?
	Central Mathematics	Is understanding the mathematical point a central goal for student learning in this classroom?
Pedagogical opportunity	Opening	Does the expression of the student's mathematics seem to create an intellectual need that, if met, will contribute to understanding the mathematical point of the instance?
	Timing	Is now the right time to take advantage of the opening?

## Research results

During the lesson observations, both ET A and ET B focused more on the students. ET A noticed specific mathematics, general mathematics, and non-mathematics with proportions of 74%, 5%, and 21%, respectively. She focused particularly on the analysis of students' mathematical thinking. ET B didn't notice non-mathematics and she focused more on students' affective interaction. When making decisions on how to respond to such classroom events, ET A was concerned about the value of student-centered teaching, while ET B focused on evaluations of teaching and a teacher-centered approach. Using the MOST framework, our analysis revealed that both expert teachers did not value high-leverage instances about students' thinking.

## Discussions and conclusions

Expert teachers' different professional noticing characteristics influenced their responses to classroom events and reflected their distinct understandings of effective teaching. However, the study has limitations, such as focusing on two teachers and one mathematics lesson. Using multiple data collection methods can provide more in-depth insight into teacher noticing. Understanding expert teachers' noticing can inform teacher education and improve mathematics instruction, leading to better outcomes for students.

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