Novice Calculus Learning Assistants' Learning to Notice

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Learning Assistants (LAs) are undergraduate near-peer tutors who aid in the instruction of large lecture STEM courses (Otero et al., 2010). While many LAs do not pursue a career in teaching, they assume a para-professional role in classrooms. This experience has been shown to be transformative for students in these courses and for LAs themselves (Schick, 2018); however, the precise mode of LAs' development is not well understood. This study extends prior research on LAs as potential future teachers (Fineus & Fernandez, 2012; Gray et al., 2012; Vandegrift et al., 2020) by asking how the professional noticing of novice LAs develops over their first semester in a calculus classroom. Noticing refers to what teachers attend to and interpret in their instruction. Noticing is widely recognized as an important element of mathematics teacher development (van Ess & Sherin, 2008).

This study is a part of a multi-disciplinary project for reforming introductory STEM courses at a large, public, northeastern university. The four LAs participating in this study were in their first semester of teaching in a calculus course. The course follows a format of a large lecture (approx. 160 students) and recitations (approx. 20 students) led by a graduate teaching assistant. LAs were only present in recitations, helping small groups work through conceptually rich activities. The LAs also attended a weekly meeting on pedagogical topics, e.g., metacognition, types of questions, student ideas and content preparation. Data includes beginning and end of semester interviews, four written reflections throughout the semester, and video of recitations. In the interviews, LAs were asked to analyze samples of student work, reflect on clips of their teaching, and share their thoughts on the social dynamics in class. Interviews were coded on Stockero's (2008) five dimensions of noticing: actor, topic, stance, specificity, and artifact focus.

In their first interviews, LAs' comments were fairly general – discussing mathematics without relation to teaching or learning, and often evaluative in nature – LAs judged their pedagogical ability to provide students with clear, correct mathematical explanations. Comments about student thinking the classroom environment lacked detail, using the labels "good" or "not as good". This changed in their final interviews as LAs discussed specifics of student thinking and offered conjectures and explanations on classroom events. The focus of their comments shifted toward how the mathematics of a task created space for student learning. LAs also talked at length about specific students' ideas in relation to social dynamics of their classroom. LAs largely dropped their evaluative stance for making more assertions about teaching and learning.

Undergraduate peer tutoring is a growing phenomenon in introductory STEM courses, which provides unique teaching and learning experience. By characterizing how LAs professional noticing evolves, our study will advance understanding of LAs' growth as mathematics teachers and of their interactions with students. This will also provide greater insight into how LAs function within and contribute to undergraduate mathematics classrooms.

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