

Department of Mathematics and Statistics Colloquium

An Examination of One Teacher's Perceptions of Learning Trajectory Based Professional Development in Relation to Student Thinking and Classroom Instruction.

Mathematics Education Candidate

In mathematics education research, it has been established that knowledge of children's mathematical thinking influences the work of teachers. To share knowledge of students' thinking with teachers, many researchers have developed and shared frameworks and tools that describe and categorize student thinking in different mathematical domains. One such tool is the hypothetical learning trajectory (e.g., Sarama & Clements, 2009). A *hypothetical learning trajectory* or *progression* is a theoretical framework that describes how a student may come to know and understand a mathematical concept over time. Initial research on the influence of learning trajectory based professional development has documented that knowledge of students' thinking informs teacher knowledge and instructional practice as well as benefits students' mathematical understanding, as measured by standardized tests. Little research exists, though, from the teachers' perspective, as to why. It is important to investigate how this relationship unfolds and develops to shed light on best and most useful practices within professional development and teacher preparation.

To elucidate this phenomenon, I used an ethnomethodological approach, across several months, with three fourth grade classrooms in a diverse, high needs school. Each of the teachers had received professional development on using learning trajectories to formatively assess individual student's thinking as a means to inform classroom instruction. This talk will explore one teacher's perceptions of the role of research on students' thinking in practice. Using Mathematics Teacher Noticing (Jacobs, Lamb, and Philipp, 2010) as an analytical lens, I explored how teachers use knowledge of individual students, gained from task-based interviews, to inform whole classroom instruction and planning. Following this, using a grounded theory approach, I investigated how the teacher referenced research in her noticing and if and how it surfaced in her practices.

Initial findings indicate that teachers notice and make sense of student thinking constantly in their daily work, but it is not always clear, to the teacher, what student thinking implies for instruction. In this particular case, mathematical tasks and teaching strategies were critical in the incorporation of knowledge of students' thinking into practice. Findings also indicate that knowledge of an individual student's thinking can inform teachers of student misconceptions and current understandings of a topic, but much of what informs a teacher's instruction comes from a complex framework of past education and daily experiences with students. Lastly, teachers interpret and redefine research in their own ways as well as reject research depending on how well it agrees with their current practices.

References

- Jacobs, V. R., Lamb, L. L. C., & Philipp, R. A. (2010). Professional noticing of children's mathematical thinking. *Journal for Research in Mathematics Education*, 41, 169–202.
- Sarama, J. & Clements, D.H. (2009). *Early childhood mathematics education research learning trajectories for young children*. New York, NY: Routledge.

Thursday, November 7 at 2:30 in Roop 103 (refreshments at 2:15)