

Mathematics Tutors' Perceptions of Their Role

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Undergraduate students who work as mathematics tutors completed surveys and interviews to assess their attitudes towards mathematics and their beliefs about the roles of a tutor and instructor. Tutors in this study viewed their role as supplementary to that of a teacher, and emphasized tutors' ability to tailor their mathematical content to the individual.

Keywords: mathematics tutors, beliefs, roles

In a recent study, 97% of institutions surveyed offered mathematics tutoring to Calculus students (Bressoud, Mesa, & Rasmussen, 2015), so tutors are a prevalent resource for student learning outside of the classroom. Research on classroom teachers has investigated how teachers' perception of mathematics and their role as a teacher affects instructional practice (Thompson, 1984), and how teachers notice students' mathematical thinking (Jacobs, Lamb, & Philipp, 2010). Similar questions may be asked of mathematics tutors. This study will report on undergraduate mathematics tutors' views of mathematics and their perceptions of their role as a tutor and how that compares to the role of a mathematics instructor.

The participants in this study were undergraduate tutors from drop-in mathematics tutoring centers at one large research university in the Midwestern United States and one small private university in the northwestern United States. Twenty-six tutors were given surveys prior to the start of the Fall 2017 semester asking about their beliefs about mathematics, mathematics instructors, and mathematics tutors. The surveys were made up of items that were modified from the CSPCC math attitudes survey (Bressoud, et al., 2015) and the NCTM Teaching and Learning Beliefs Survey (NCTM, 2014). Additionally, tutors recorded tutoring sessions, answered reflection questions, and were interviewed to allow them to elaborate on their responses.

As an example of the results, one Likert scale survey item asked participants to choose whether an effective mathematics tutor "guides students step by step through problem solving" or "provides students with appropriate challenges, ... and supports productive struggle". The same question was asked about effective mathematics instructors. Survey responses revealed that the tutors seem to be split between whether tutors should be a guide or provide challenges. However, most of the tutors believed that instructors should provide challenges to students.

In the interviews, 82% of the tutors made statements that indicated that the instructor is the one who presents the theoretical material and "lays the foundation" while the tutor's role is to work with specific examples and "fill in the gaps." Other themes were tutors' ability to personalize their instruction to meet individual student needs and to offer a different perspective than the instructor. One tutor said that tutors "slow-walk students through a problem by asking simple closed-ended questions." Another tutor said that tutors may have more insight into how the mathematics can be applied to classes in the students' specific majors. Several of the tutors mentioned that tutors are more equipped than instructors to encourage students and attend to affective issues.

Future studies will investigate how these perceived differences between the role of a tutor and instructor impact tutors' noticing of students' mathematical thinking and their attention to student affect, and other aspects of their tutoring practice.

References

- Bressoud, D., Mesa, V., Rasmussen, C. (Eds.). (2015). *Insights and Recommendations from the MAA National Study of College Calculus*. Washington, DC: MAA Press.
- Jacobs, V., Lamb, L., & Philipp, R. (2010). Professional noticing of children's mathematical thinking. *Journal for Research in Mathematics Education*, 41(2), 169-202.
- Thompson, A. G. (1984). The relationship of teachers' conceptions of mathematics and mathematics teaching to instructional practice. *Educational Studies in Mathematics*, 15(2), 105-127.
- National Council for Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. Washington, DC: MAA Press.