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Submission for Report of Proposed Research**

**Title: Pre-service Teachers' Responses to Student Questions Surrounding Common  
Mathematical Conventions**

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## **Proposal for Future Research**

One way to describe the quality of learning that takes place in a classroom is to assess the nature of questions students ask in class. Students who are curious about the material and involved with the process of learning ask questions that reach beyond those asking for repeated information or attempting to uncover the likelihood that the material will appear on an examination. The responses teachers give to these deep, thoughtful questions have the potential of either piquing students' interests or disillusioning students to think that the subjects learned in school are esoteric. In no subject is the way in which teachers answer questions more deserving of analysis than in mathematics.

All too often in secondary schools, students approach mathematics with the mindset that it is a discipline restricted to experts. One general strategy for dispelling this myth is to allow students to gain ownership over their discovery and learning of mathematics. Often in class, students ask questions about the reasons behind algorithms, or "math rules". In responding to such questions, the knowledgeable and confident teacher may relish the opportunity to delve into the reasoning and logic behind mathematics, thus demystifying the mathematics for the student. The teacher who has lost sight of the broad objective of mathematics education, on the other hand, might give a more perfunctory explanation.

The proposed study will involve interviews with at least eight pre-service middle school teachers in order to seek the types of responses they would give to students' questions surrounding the reasoning behind common mathematical conventions. For

example, why do you multiply by the reciprocal of the divisor when dividing fractions? Why can't you divide by 0? Interviews will be videotaped so that written, diagrammed, and oral responses may be analyzed. The level of detail, mathematical soundness, and grade-level appropriateness of teacher responses will be evaluated with the long-term objective of comparing characteristics responses of pre-service teachers to those of experienced teachers and of analyzing differences among teachers of different grade levels in mind. If feasible, the same pre-service teachers will be observed during their student-teaching experiences to evaluate the extent to which their interview responses are consistent with their treatment of similar questions in the classroom.