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**Moore-Russo, Deborah; Conner, Annamarie; Rugg, Kristina I.**

**Can slope be negative in 3-space? Studying concept image of slope through collective definition construction.**

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Summary: Developing deep conceptual understanding of what Ma (ME 2000f.03889) calls fundamental mathematics is a well-accepted goal of teacher education. This paper presents a microanalysis of an intriguing episode within a course designed to encourage such understanding. An adaptation of Krummheuer's (part of ME 1995e.02763) elaboration of Toulmin's diagrams is used to examine video recordings and transcripts of a group of graduate students in secondary mathematics education grappling with the idea of a three-dimensional line having negative slope. The graduate students' understandings of slope are examined using an expansion of Stump's (ME 2000b.01034 and ME 2001c.02039) categories of conceptions of slope. The episode ends in an interesting impasse, in which the graduate students agree to pursue the idea no further, purposely ignoring the question of negative slope, despite the clear intention of the task. The analysis explores the argumentation, factors of the learning environment, and conceptions of slope that may have contributed to this impasse.

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*Keywords:* understanding of slope; concept image; argumentation; Toulmin diagrams; prospective secondary school teachers; teacher education; educational research;

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