

2013

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Recommended Citation

Presented in proceedings of the 35th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. University of Illinois at Chicago. 2013.

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CONTEXTS OF STUDENT-CONSTRUCTED STORIES ABOUT NEGATIVE INTEGERS

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Keywords: Middle School Education, Number Concepts and Operations, Rational Numbers

A holistic understanding of number is abstract and challenging; however, negative integers are particularly difficult because they cannot be physically modeled in the world. Because of this, connecting negative integers to contexts provides a typical pedagogical tool to explain the existence and relevance of negative integers. The *Common Core State Standards for Mathematics* (Council of Chief State School Officers, 2010) suggested uses of contexts include, “temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge” (p. 43). However, other studies have shown that negative integers may not intuitively emerge from these contexts for students (e.g., Whitacre, Bishop, Lamb, Philipp, Schappelle, & Lewis, 2012). This poster will describe a study that aims to investigate the ways students connect negative integers to their world. This study used a story-telling approach (Mukhopadhyay, 1997) as a way to determine how students apply context to negative integers.

Six eighth-grade students from the Midwest, after more than two years of instruction on negative integers in school, participated in this study. Following a semi-structured interview protocol, students constructed stories for ten different open number sentences involving negative integers (i.e., $8 - 20 = \square$, $-5 + \square = 21$). After students constructed their stories, they were asked to reflect on how the number sentences connected to their stories.

Findings show that students did not typically utilize the traditionally advocated contexts (e.g., temperature, elevation) in their stories about negative integers. Of the traditional contexts that the students employed, the students utilized the context of credits/debits most frequently. However, the students did not always use the context of credits/debits in ways that connect to the traditional notions of money. This poster will share specific examples of stories that students constructed that are parallel to the conventional credits/debits contexts and are considered to be non-conventional stories. These non-conventional contexts and what they indicate about students’ understanding of integers will also be reported. For example, for the number sentence $-17 + 12 = \square$, “I want 17 baseball cards. I got 12 baseball cards. I still want 5 cards” represents a nonconventional context provided by a student. These findings have implications for the types of contexts we use with both instruction and research with integers.

References

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