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2014

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Nicole Wessmann-Enzinger
George Fox University, nenzinger@georgefox.edu

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UNCOVERING CONCEPTUAL MODELS OF INTEGERS

Nicole M. Wessman-Enzinger, Edward S. Mooney
Illinois State University

Isaac, a Grade 8 student, reflected about learning negative integers, "It's harder because you haven't used negative numbers your whole life. You've been using positive numbers your whole life." Students' limited experiences with negative integers may be one reason for the difficulty in understanding negative integers and connecting them to their world. Also, students may find negative integers challenging because of the lack of physical materials to model the negative integers (e.g., Peled & Carraher, 2008). Researchers have shown that students do not intuitively use negative integers from contexts, like the owing and borrowing of money (e.g., Whitacre et al. 2012). This study was conducted with six Grade 8 students, ages 12 to 14, in the Midwest US. We sought to understand how students make sense of the integers, particularly negative integers, and how they connect them to contexts. The students posed stories for ten open number sentences involving addition and subtraction of integers during a task-based interview. The stories were analyzed using grounded theory according to the context utilized and the broader ways of thinking that the students used (Strauss & Corbin, 1998). Results indicated that students often used unconventional contexts in their stories for integers (e.g., good/bad deeds). Conceptual models, or ways of reasoning, about integers emerged from the students' stories and will be discussed at the poster session (i.e., bookkeeping, counterbalance, translation, relativity, and rule). These conceptual models point to mathematical ways that students use the integers. Each of the conceptual models that emerged from this study will be described in depth at the poster session. An implication from this study is that different types of thinking may be promoted by the use of different contexts.

References

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