Dissertation Defense

Elahe Allahyari

Thursday, April 25, 2024 10:00am-12:00pm

At the virtual room:
https://tinyurl.com/ElaMathEdDissertation2024

A Microgenetic Learning Analysis of Contextuality in Reasoning about Exponential Modeling

I explore the complex cognitive processes students engage in when addressing contextual tasks requiring linear and exponential models. Grounded within Piagetian constructivism and the Knowledge in Pieces (KiP) epistemological perspective (diSessa, 1993; 2018) this empirical study in a clinical setting develops a Microgenetic Learning Analysis (MLA) of the reasoning of fourteen students from an Algebra II course. It reveals the critical role of cognitive disequilibrium as an essential cognitive state for conceptual development and the process of re-organizing knowledge systems. The study uncovers the fluctuations in students' reasoning patterns and the significant impact on students' reasoning patterns of task-specific features, such as linguistic cues embedded in contextual tasks. The findings of the study underscore the importance of incorporating cognitive challenges and context-rich tasks into educational practices and advocate for instructional designs that promote metacognitive awareness and reflective thinking. This research contributes to our understanding of cognitive dynamics in learning mathematics and suggests implications for curriculum development, instructional design, and future educational research. Join me as I share these key insights and discuss their far-reaching implications for enhancing mathematics learning.

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