Prospective Secondary Teachers’ Covariational Reasoning in Circle Contexts: Distinguishing Figurative from Operative Thought

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Abstract:

Researchers have extolled covariational reasoning—individuals’ conceptions of measurable attributes (i.e., quantities) varying in tandem—as being critical for students’ (and teachers’) mathematical development. Many researchers have used tasks involving “fundamental” geometric objects (e.g., angles and circles) to investigate students’ ways of reasoning covariationally; however, few researchers have examined how an individual’s conceptions of these fundamental geometric objects relates to her (co)variational reasoning. In this talk, I present findings from a teaching experiment focused on exploring and developing prospective secondary teachers’ (PSTs’) quantitative and covariational reasoning. I focus on results from two tasks, which involved circles from my perspective. Using Piaget’s distinction between figurative and operative thought, I make inferences regarding two PSTs’ activated circle concepts—the meanings for circle each PST demonstrated while solving these tasks. In my analysis, I foreground the ways in which each PST’s covariational reasoning was supported or constrained by her activated circle concept.

Hamilton Hardison is a lecturer at Texas State University. His primary research interest is investigating students’ mathematical thinking. Hamilton’s current research is focused on building explanatory models of students’ construction of circular quantities including angularity and arc length.

Next Friday, February 16: Alejandra Sorto, Texas State University

Developing PCK instruments to compare the effectiveness of “mostly in person” vs. ‘in distance” coach training models in Mexico.

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