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Using the " K_5 connected cognition diagram" to analyze teachers' communication and understanding of regions in three-dimensional space.

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Summary: This paper reports on a study that introduces and applies the " K_5 Connected Cognition Diagram" as a lens to explore video data showing teachers' interactions related to the partitioning of regions by axes in a three-dimensional geometric space. The study considers "semiotic bundles" (Arzarello, 2006), introduces "semiotic connections," and discusses the fundamental role each plays in developing individual understanding and communication with peers. While all teachers solved the problem posed, many failed to make or verbalize connections between the types of semiotic resources introduced during their discussions.

Classification: B50 D69 G49

Keywords: geometric concepts; semiotics; teachers; subject content knowledge; educational research; visual aids

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