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Chang, Briana L.; Cromley, Jennifer G.; Tran, Nhi

Coordinating multiple representations in a reform calculus textbook.

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Summary: Coordination of multiple representations (CMR) is widely recognized as a critical skill in mathematics and is frequently demanded in reform calculus textbooks. However, little is known about the prevalence of coordination tasks in such textbooks. We coded 707 instances of CMR in a widely used reform calculus textbook and analyzed the distributions of coordination tasks by chapter and for the type of task demanded (perception vs. construction). Results suggest that different coordination tasks are used earlier and later in learning and for different topics, as well as for specific pedagogical and scaffolding purposes. For example, the algebra-to-text coordination task was more prevalent in the first chapter, suggesting that students are being eased into calculus content. By contrast, requests to construct graphs from algebraic expressions were emphasized in later chapters, suggesting that students are being pushed to think more conceptually about functions. Our nuanced look at coordination tasks in a reform textbook has implications for research in teaching and learning calculus.

Classification: U20 I10

Keywords: calculus; conceptual understanding; functions; multiple representations; textbooks

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