



Affect in mathematics education: Blurring the boundaries

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Affect has long been recognised as central to mathematics learning, yet its treatment in research and practice has tended to be separate from and secondary to cognition. I argue that meaningful integration of affect and cognition is essential for understanding mathematics learning and the complexity of classrooms. Although affective constructs—such as confidence, self-efficacy, motivation, and emotional wellbeing—feature prominently in high-level policy and curriculum documents, they are rarely valued or assessed with the same seriousness as cognitive outcomes. This imbalance persists even though high achievement accompanied by negative affect is unlikely to support numerate behaviour or sustained engagement with mathematics.

I outline five examples from research projects that demonstrate how cognition and affect can be conceptualised and researched together. First, the Providing the Mathematical Foundation for an Innovative Australia within Reform-Based Learning Environments project showed empirically that teacher knowledge—including confidence and beliefs—can be measured as a rich uni-dimensional construct. This finding challenges approaches that treat affective and cognitive dimensions separately. Second, an expanded framework for mathematical pedagogical content knowledge demonstrated how teachers' beliefs about mathematics, teaching, students, and themselves interact with knowledge in shaping practice. These belief dimensions, particularly beliefs about self-efficacy and student capability, are highly consequential. Third, the Principals as STEM Leaders project conceptualised STEM capability as comprising knowledge, task, context, and dispositions. Dispositions including the belief that everyone can enhance their STEM capability, confidence, openness, flexibility, and adaptability are central to principals' STEM leadership capability. The LYLAC project and related work on inclusive mathematics education suggests that positive affect may be implicitly treated as a consolation prize for students with intellectual or developmental disabilities, revealing tensions between cognitive expectations, affective outcomes, and teachers' beliefs about their roles. Finally, the Critical Mathematical Thinking framework includes dispositions such as initiative, perseverance, openness, empathy, and compassion, as essential for engaging with socio-ecological problems. Classroom trials have shown that some students default to purely financial reasoning, prompting efforts such as the introduction of an “empathy primer” to broaden students' engagement with affective and ethical dimensions. This work demonstrates how affective constructs can shape students' mathematical reasoning.

Systems thinking, including tools based in complexity science, offers a powerful lens for understanding affect and cognition as dynamically interacting components rather than isolated constructs. Beliefs and emotions operate within systems, and interventions must account for emergent properties that arise from these interactions. Analytic approaches are valuable, but understanding the development of positive affect as an inherent part of achieving cognitive outcomes in mathematics is key to moving beyond rhetoric to take student affect seriously.