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A Century of Leadership in Mathematics and Its Teaching

Reimagining Mathematics Teaching and Learning Beyond Standardized Measures

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PREFACE

While mathematics in school is widely perceived as an objective subject, standardized measures of academic performance have been recognized as insufficient methods for mathematical teaching and learning. The field of mathematics education has increasingly acknowledged factors, such as emotions, that play a role in measuring educational outcomes.

Recent studies in the field of mathematics education have increasingly placed more weight on the emotions in learning mathematics. The role of affective domains in mathematics education have been studied extensively, through the topics of problem-solving (e.g., Polya, 2014; Hannula, 2012; McLeod, 1992), enacted lessons (e.g., Pekrun & Stephens, 2010; Vogel-Walcutt et al, 2012), achievement (e.g., Hoffman, 2010; Goldin et al, 2011), and others. With such growing attention to emotions, the Fall 2025 issue of the Journal of Mathematics Education at Teachers College brings together a set of contributions in that regard, with three research-based articles and one note from the field that offers insights for practice.

In the first research-based article, Dragone and her team establish a methodology with non-cognitive indicators for academic effectiveness in mathematics beyond traditional performance measures. By analyzing the six dimensions including interest, perceived usefulness, perceived difficulty, expectations of success, self-efficacy, and mathematical anxiety, their study highlights the importance of non-cognitive factors and their relation to cognitive dimension of learning.

The second research-based article by Uddin deeper investigates one of the non-cognitive aspects of learning, math anxiety. Using a phenomenological study design framed by critical pedagogy, the article looks into 9 teachers' perspectives on what triggers students' math anxiety based on semi-structured interviews. The study suggests the need for targeted professional learning for teachers to foster student agency while challenging the systemic barriers.

Adding onto the discussion on aiding teachers, the third research-based article examines preservice mathematics teachers' conceptions and beliefs about teaching mathematics through multiple sessions of mathematics confidence workshops. Audio-recorded conversations and written reflections were analyzed to suggest the importance of such purposeful dialogues to help preservice teachers to build confidence as future teachers.

Lastly, Duru and his team's note from the field showcases specific ways to promote mathematics education that transcends standardized lessons

that may rely on rote memorization. Through examples of deriving geometric formulas for volume of a cone and distance on a sphere, the article argues for the importance of deeper conceptual understanding, calling for more reasoning-focused practice.

Kihoon Lee
Daria Chudnovsky

Guest Editors

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