“Motivation in Mathematics”

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Abstract
As we gain more information about the impact of standards and curricula, teaching and teachers’ knowledge, social organization and individual differences, one often-neglected variable keeps rearing its head as a key malleable factor predicting learning and performance in mathematics: motivation. In this talk, I will discuss the key factors impacting motivation in mathematics, how those factors play out as a system of thought and behavior, and why the system of motivation is key to understanding why some people seek out mathematical challenge, and why others seek to avoid it. In doing so, I also provide data on the predictive power of motivation, and show it lacking in the absence of other key variables implicated in learning: curriculum quality, teaching effectiveness, social interaction and early math experiences. Rather than a chicken and egg problem, we must begin to see motivation and learning as part of a larger system of adaptive behavior that may or may not induce quality mathematical growth in students. Data from 20 years of research, including current studies, will be used to illustrate this problem.

Biographical Note
James A. Middleton is Professor of Engineering Education and Mathematics Education and Director of the Center for Research on Education in STEM at Arizona State University. He also holds the Elmhurst Energy Chair in STEM education at the University of Birmingham in the UK. His research interests focus in the following areas where he has published extensively: Children’s mathematical thinking; Teacher and Student motivation in mathematics; and Teacher Change in mathematics. He is currently developing methodologies for utilizing the engineering design process to improve learning environments in Science, Engineering and Mathematics. To fund his research, Jim has garnered over $20 million in grants to study and improve mathematics education in urban schools. He just finished a $1.8 million research grant to model the longitudinal development of fractions, rational number and proportional reasoning knowledge and skills in middle school students, and is currently engaged in a project studying the sustainability of changes in urban elementary teachers’ mathematics practices.