Connecting Across Representations in Community College Algebra: Lessons from the Classroom
Dexter Lim, University of Minnesota
Patrick Kimani, Glendale Community College
Irene Duranczyk, University of Minnesota
Laura L. Watkins, Glendale Community College
Saba Gerami, University of Michigan–Ann Arbor
Megan Breit-Goodwin, Anoka-Ramsey Community College
Anne Cawley, California State Polytechnic University

Teaching and learning strategies that emphasize multiple representations of exponential functions are powerful ways to build and demonstrate algebraic understanding of these multiplicative relationships. Observing and making sense of salient characteristics of exponential functions, through various representations (visual, symbolic, numeric, verbal, and physical) that model a variety of real-world contexts, provides space for students to connect the characteristics in meaningful ways. Examples from intermediate and college algebra classrooms in community colleges are examined to illustrate how multiple representations enrich the teaching and learning of exponential functions and provide ideas for practitioners’ reflection.

community college, algebra, exponential functions, multiple representations, instruction

Funding for this work was provided by the National Science Foundation award EHR 1561436. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. We also thank those who assisted with coding the video, as well as the faculty who participated in the project. Without them, this work would not have been possible.

Dexter Lim is pursuing his PhD in education, curriculum, and instruction (STEM education with mathematics focus) at the University of Minnesota. He currently teaches a college algebra class and serves as a research assistant for the NSF-funded AI@CC project, which studies the relationship between algebra instruction and student success at community colleges. His interests include student engagement.

Patrick Kimani teaches at Glendale Community College in Arizona. His research interests are in teacher learning and multiplicative reasoning. Patrick currently serves as a faculty research associate for AI@CC (NSF EHR 1561436), studying the relationship between community college algebra instruction and student success. He has been engaged in the professional development of mathematics teachers and college faculty through various funded projects.
Irene M. Duranczyk is associate professor in the College of Education at the University of Minnesota. She is Co-PI of the Algebra Instruction at Community Colleges: An Exploration of its Relationship with Student Success (NSF EHR 1561436). She began working with community college faculty in 1990 in Michigan with funding from NSF and Eisenhower Higher Education grants.

Laura L. Watkins teaches mathematics at Glendale Community College in Glendale, Arizona, and is a Project ACCCESS Alumnus. She is the PI of the National Science Foundation project AI@CC (NSF EHR 1351436, 2016–2020), that is exploring relationships between algebra instruction and student success. Her professional interests include research into the teaching and learning of mathematics and professional development of mathematics faculty.

Saba Gerami is a doctoral student in mathematics education at the University of Michigan. Saba has a BS and an MS in pure mathematics. Prior to attending University of Michigan, she taught mathematics at Allan Hancock College and Cal Poly–San Luis Obispo. Saba is interested in mathematics instruction at community colleges and teacher decision-making in student-centered classrooms.

Megan Breit-Goodwin teaches mathematics at Anoka-Ramsey Community College in Minnesota and is a Faculty Research Associate for the AI@CC project (NSF EHR 1561436). She is the PI of AMATYC Project SLOPE (NSF 1726891), a member of the RMETYC Committee, and a Project ACCCESS Alumnus.

Anne Cawley is an assistant professor of mathematics and statistics at California State Polytechnic University, Pomona. Her research focuses on mathematics instruction, student course experiences, and issues of equity, inclusion, and diversity at two-year colleges.