Justifications Students Use When Writing an Equation During a Modeling Task

Elizabeth Roan
Texas State University

Abstract: Literature typically describes mathematization, the process of transforming a real-world situation into a mathematical model, in terms of desirable actions and behaviors students exhibit. We attended to STEM undergraduate students’ quantitative reasoning as they derived equations. Analysis of the meanings they held for arithmetic operations provided insight into how participants expressed real-world relationships among entities with arithmetic relationships among values. We extend the findings from K–12 literature (e.g., using multiplication to instantiate a rate) to STEM undergraduates and found evidence of new ways of justifying the usage of arithmetic operations (e.g., using multiplication to instantiate an amount).

Relationships Between Dimensions of Authenticity During an Inquiry-Oriented Abstract Algebra Activity

Holly Zolt
Anthony Tucci
Texas State University

Abstract: One of the goals of advanced undergraduate mathematics courses is to engage students in activity that is authentic to the mathematics discipline. However, engaging students in such activity often involves managing tensions between authenticity-to-students and authenticity-to-the-discipline. In this paper, we use the Authentic Mathematical Proof Activity (AMPA) Framework to further explore potential relationships and tensions between different dimensions of authenticity. We analyzed classroom data from an inquiry-oriented abstract algebra course where instruction focused on unpacking the fundamental homomorphism theorem. Our results focus on the complexity dimension of authenticity and how this dimension relates to other dimensions of authenticity within instruction. We identify ways that instructor decisions shape authenticity even within the context of a carefully developed task.

Elizabeth Roan received her bachelor’s of science in mathematics at University of Arkansas and is currently a Mathematics Education Ph.D. candidate at Texas State University. Her primary research interests are in undergraduate mathematics education focusing on students reasoning while mathematical modeling. After graduation, she plans to pursue a career in academia.

Holly Zolt is a fourth-year math education PhD student at Texas State University. Her main research interests are in student understanding and instruction in abstract algebra. She is currently working towards proposing her dissertation study which focuses on pedagogical decision making and quotient groups in abstract algebra classrooms.

Anthony Tucci is in his fourth year of the math education PhD program. His main research interests are in the teaching and learning of advanced mathematics and the experiences of students taking undergraduate mathematics courses. He is currently planning a dissertation with the goal of studying coherence between instructors' intentions and students' experiences with assessment in proof-based math courses.