Advancing Equity & Strengthening Teaching through Mathematical Modeling

University of Arizona (Erin Turner, eturner@arizona.edu; Cynthia Anhalt, canhalt@math.arizona.edu)
University of Washington Tacoma (Julia Aguirre, jaguirre@uw.edu)
Montana State University (Mary Alice Carlson, mary.carlson5@montana.edu)
George Mason University (Jennifer Suh, jsuh4@gm.edu; Padhu Seshaiyer pseshaiy@gmu.edu)

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Mathematics modeling has the potential to “re-humanize” mathematics (Gutierrez, 2018) by providing students opportunities to make connections, and experience mathematics in a way that can help them navigate the realities in their daily life. Mathematical Modeling has several attributes of an approach that “(re)humanizes” mathematics. By tapping into students’ funds of knowledge, mathematics becomes personally relevant, and using real-world problems illustrates the usefulness of mathematics to students’ everyday situations and becomes a tool through which both students and teachers can affect social change.

Pivotal Spaces that promote equitable participation and modeling competencies
In the modeling process, we identified pivotal spaces for equity and for rigorous mathematics: a) In these spaces, teachers have to make decisions that could advance, or hinder equitable participation and diverse contributions. In other words, teachers have to make and enact instructional decisions that have consequences with respect to equity; b) They have the potential to foster the development of MM competencies which are central to modeling as content/practice standards (Kaiser, 2007; MAAC, 2006; CCSSM, 2010). This is key given such cognitively demanding competencies are often under-emphasized in elementary settings serving historically marginalized children. Our work focuses on these pivotal spaces and teaching practices to support equitable participation and development of modeling competencies in elementary students.

Math Modeling and Cultural/Community Social Justice Contexts
Selected Resources

Major Report:

Books:


Elementary


Middle School/High School


**k-12 Professional Development/Teacher Education related to modeling and social justice mathematics teaching**


**MATH MODELING RESOURCE WEBSITES:**

*Mathematical Modeling with Cultural and Community Contexts (M2C3)*
Active NSF research project focused on teaching and learning with math modeling grades 3-5.
https://sites.google.com/qc.cuny.edu/m2c3/

*Immersion Project: Integrating Mathematical Modeling in Elementary Grades*
Elementary math modeling project funded by NSF
http://completemath.onmason.com/math-modeling/

Math Works Math Modeling Challenge (MC3)
https://m3challenge.siam.org/resources

Stepping Stones Modeling Project
http://www.indiana.edu/~hmathmod/projects.html
40 modeling projects have been written and tested by high school teachers under the direction of university mathematics and education professors.

CPALMS (Several Modeling Eliciting Activities in various content areas including math, science and STEM
http://www.cpalms.org/Public/

Case Studies for Kids
Purdue Engineering modeling eliciting activities based on the work of Dick Lesh.
https://engineering.purdue.edu/ENE/Research/SGMM/CASESTUDIESKIDSWEB/resources.htm

Forthcoming Springer Book in Spring 2021
*Exploring Mathematical Modeling with Young Learners* Suh, Jennifer M., Wickstrom, Megan H., and English, Lyn (Eds.),

Recent Presentations
