

**NEW WORKING GROUP: TEACHING MATHEMATICS FOR SOCIAL JUSTICE IN THE
CONTEXT OF UNIVERSITY MATHEMATICS CONTENT AND METHODS COURSES**

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Goals:

There are three goals for this new working group: 1) To create a community of mathematics teacher educators (MTEs) who are (or are interested in) collaboratively teaching mathematics for social justice (TMfSJ) in their university content and/or methods classes. 2) To collaboratively select/develop/modify TMfSJ tasks and implement those in mathematics content/methods classes. 3) To research the implementation of TMfSJ tasks in content and methods classes.

Strategies to Reach Those Goals:

The organizers have all (to some level) incorporated TMfSJ into their teaching. At a recent workshop, many of the organizers collaborated on designing one task to implement in both content and methods courses focused on understanding gentrification across the United States and also locally in each collaborator's own city/area. This collaboration was highly beneficial and led us to envisioning this working group. Our goal is to create a community of MTEs who will collaboratively develop and implement TMfSJ tasks in their university courses and research the implementation for (in no particular order): (a) preservice teacher (PT) learning about the mathematics, (b) PT learning about the sociopolitical context, (c) impacts 'on PTs' view of mathematics and/or teaching mathematics, and (d) the potential for TMfSJ in university methods or content courses to ignite a call for action.

Background:

Children and youth in schools today are increasingly aware of and grapple daily with the social injustices that pervade our world. Mathematics educators face a moral and ethical imperative to support students in their struggles to make sense of and fight against these injustices (Stinson, 2014). Incorporating social issues into the mathematics curriculum offers one way to both deepen students' mathematics knowledge and encourage the application of mathematics to understand and potentially change their world (Frankenstein, 2009). The Teaching Mathematics for Social Justice framework (TMfSJ) includes two critical interrelated ideas. First, school mathematics can be used to teach and learn about issues of social and economic justice. Second, mathematics can be taught through the study of social justice issues - the development of mathematical literacy itself being an important social justice issue (Gutstein, 2003; Raygoza, 2016). A growing body of research shows how TMfSJ lessons can support PK-12 students to learn mathematics, interrogate social justice issues, and deep positive mathematics identities (e.g. Chao & Marlowe, 2019; Esmonde, 2014; Gutstein, 2003; Turner, Gutiérrez, Simic-Muller, & Díez-Palomar, 2009).

Given the power of TMfSJ with PK-12 students, some MTEs seek to integrate TMfSJ tasks into their courses in order to give PTs, who have little or no experience with TMfSJ, opportunities to experience integrated learning of mathematics and social issues and to consider the relevance of TMfSJ to their local communities and instructional possibilities in their future classrooms. Research on TMfSJ in mathematics teacher education tends to focus on PT or teacher learning about the pedagogical conceptions and practices of TMfSJ (e.g. Bartell, 2013; Jong & Jackson, 2016). PTs, however, also need opportunities to develop mathematical knowledge (Ball, Thames, & Phelps, 2008) and political knowledge (Gutiérrez, 2017) for teaching mathematics generally and to enact TMfSJ, specifically. Little attention has been paid to the potential for TMfSJ in mathematics content and methods courses impact PTs' mathematics learning, understanding of social issues, and mathematics identities as well as their teaching practices. In other words, we seek to develop a research program that explores PTs learning not only *about* TMfSJ but also *through* TMfSJ.

Given the complexity of social issues and the challenge of using mathematics in authentic ways, TMfSJ proves more effective through multiple iterations over time (Harper, 2019). Accordingly, TMfSJ with PTs cannot happen in a single class. Instead, we seek to explore these ideas across content and methods courses at multiple spaces so that we can describe the complexity of these and other issues with our future teachers (and hopefully with their future students). This is especially true for content courses which allow elementary PTs to experience such tasks from a learner's perspective and to learn to read and write the world themselves. PTs can then build upon this in methods courses to explore the pedagogical practices for TMfSJ.

Many PTs enter their coursework believing that mathematics is neutral or universal (Greer, Verschaffel, & Mukhopadhyay, 2007; Keitel & Vithal, 2008). MTEs must address the fact that mathematics can never be neutral and no classroom is a neutral space (Frankenstein, 1983; Gutiérrez, 2013; Yeh & Otis, 2019). TMfSJ offers a means of engaging PTs in building their sociopolitical consciousness about the political implications of mathematics and how math can be leveraged to read and write the world (Gutstein & Peterson, 2005) from both a content and teaching methods perspective.

In some cases MTEs have met resistance from PTs when integrating social justice issues into the mathematics curriculum (Aguirre, 2009; Ensign, 2005; Felton-Koestler, Simic-Muller, & Menéndez, 2012; Rodríguez & Kitchen, 2004). However, MTEs have also found that they are able to broaden PTs' perspectives about mathematics and mathematics teaching (Bartell, 2013; Ensign, 2005; Felton & Koestler, 2015; Leonard & Moore, 2014; Mistele & Spielman, 2009) when PTs are given opportunities to engage in TMfSJ tasks during teacher preparation. This aligns with Gutstein's (2003) goal of supporting students in developing their sociopolitical consciousness, and possibly a stronger sense of agency and identity. Given the possibilities for TMfSJ to impact both PT and PK-12 student learning and mathematics identity in similar ways, PME-NA offers an ideal community for spearheading this work by bringing together experts in both student and teacher learning.

Participant Engagement

Session 1: Successes and struggles implementing TMfSJ tasks: 1) Organizers will present (30 minutes) on how they have used TMfSJ tasks in their classrooms. 2) Participants and organizers discuss the successes and struggle in implementing TMfSJ tasks. 3) Towards the end of the session, organizers will introduce one context to focus on for the next two sessions (e.g. gentrification) as well as an online media platform for continued participation with this group.

Session 2: Entry points for TMfSJ tasks: 1) We will discuss various entry points (focus on math and social issue) for TMfSJ tasks. 2) We will collaboratively engage in the use of one context in our classes and potential tasks that could go with that context. 3) Participants will share their own experiences and how they may envision using such a context in their class.

Session 3:1) We (in small groups) will collaboratively create/adapt TMfSJ task(s) to participants' localized contexts to use in their teaching. Participants will leave with a more nuanced understanding of TMfSJ tasks/implementation. 2) We will set up structures to follow up via online media after implementations. 3) The goal will be to meet at next year's PME-NA.

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