Teaching Mathematics for Social Justice (TMfSJ) as a context for implementing the CCSS Mathematical Practices

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Agenda

- Defining Teaching Mathematics for Social Justice: TMfSJ
- Theoretical and Pedagogical “roots” of TMfSJ: Brief overview of critical theory and critical pedagogy
- TMfSJ and the NCTM Standards
- TMfSJ and the CCSS Process Standards
- Activities:
  - The Hidden Grain
  - Unequal Distribution of Wealth in the United States
  - Mercator Projection and Peters Projection World Maps Activity
- References
The intent of this presentation is not to limit the definition of social justice, but to provoke more questions and to stimulate new discussions about the many meanings of and possibilities for teaching for social justice (North, 2006), and its relationship with teaching mathematics.

Teaching (mathematics) for social justice as a “sliding signifier”:
- which suggests that defining what teaching for social justice “actually means is struggled over, in the same way that concepts such as democracy are subject to different senses by different groups with sometimes radically different ideological and educational agendas” (Michael W. Apple, as quoted in Bartell 2011, p. 2).

“… doing teacher education for social justice is an ongoing, over-the-long-haul kind of process for prospective teachers as well as for teacher education practitioners, researchers, and policy analysts” (Cochran-Smith (2004, p. xviii).
Social justice mathematics as one approach to critical mathematics:

“Skovsmose (2005), who positions social justice mathematics as just one approach to critical mathematics, continues to re-conceptualize the open and uncertain possibilities of a critical mathematics education.

In so doing, he speaks not only about traveling through different philosophical considerations but also physically traveling through different places around the world, experiencing different people, different cultures, different educational contexts—and different possibilities” (Stinson & Wager, 2012, p. 6).

“Skovsmose claims that traveling through differences constitutes the turbulent development of critical mathematics, as aspirations and hopes are continuously recontextualized and reformulated, and uncertainties appear (Skovsmose, 2009)” (Stinson & Wager, 2012, p. 6).
Wagner (2008): Teaching about, with and for social justice:

- Teaching mathematics *about social justice* refers to the context of lessons that *explore* critical (and oftentimes controversial) social issues using mathematics.

- Teaching mathematics *with social justice* refers to the pedagogical practices that *encourage* a co-created classroom and provides a classroom culture that encourages opportunities for equal participation and status.

- And teaching mathematics *for social justice* is the underlying belief that *mathematics* can and should be taught in a way that supports students in using mathematics to challenge the injustices of the status quo as they learn to read and *rewrite their world* (Freire, 1970/2000).
Cochran-Smith (2004) notes that learning to teach for social justice, for teachers and teacher educators alike,
- “is a long road with ‘unlearning’ a rugged but unavoidable part of a journey during which people double back, turn around, start and stop, reach dead ends, and yet, sometimes, forge on” (p. xx).

Skovsmose (2005) claims that attempts to bring clarification or meaning to a concept such as critical (or social justice) mathematics often takes us in the opposite direction of any fixed meaning in which “clarification of ‘something’ brings us to consider ‘everything’” (p. 216).

I hope that you also start or continue to undertake your own journey of making meaning(s) of teaching (mathematics) for social justice, going through your own process of considering everything as you consider something—starting, stopping, and even sometimes doubling back.

Undeniably, “TMfSJ is a journey, not a destination” (Stinson, Bidwell, and Powell, 2012).
The origin of critical theory is often associated with the Frankfurt School (circa 1920s), which holds a Marxist theoretical perspective: to critique and subvert domination in all its forms (Bottomore, 1991).

“As these critiques, originating in the social sciences, evolved they became known collectively as critical theory sometime during the early to mid-twentieth century.

Scholars such as Theodor Adorno, Jürgen Habermas, Max Horkheimer, and Herbert Marcuse are key figures in the development of critical theory” (Stinson & Wager, 2012, p. 6).

And although the Frankfurt School and the seminal works of Karl Marx (and Friedrich Engels) are foundational in its development, it is important to keep in mind that critical theory is not coextensive with either of these or with both of them together (Crotty 1998).
“In the most general sense, critical theory maintains sociopolitical critiques on social structures, practices, and ideology that systematically mask one-sided accounts of reality which aim to conceal and legitimate unequal power relations (Bottomore 1991)” (Stinson & Wager, 2012, pp. 6-7).

“In the context of education, critical theory, in the mid-twentieth century and beyond, began to provide different theoretical tools to examine schools and their functions and to explore the persistent inequities and injustices too often found in schools” (Stinson & Wager, 2012, p. 7).

“Most critical theory analyses conducted today examine social inequities and injustices within the intersectionality of race, class, and gender as well as sexual orientation, dis/ability, and religion (e.g., Rosenblum & Travis 2008)” (Stinson & Wager, 2012, p. 7).
Critical Pedagogy and the Scholarship of Paulo Freire: (Stinson & Wager, 2012, pp. 6-7):

“Rooted in a democratic project of justice and freedom, critical pedagogy supports pedagogical theories and practices that drive both teachers and students to acknowledge and understand the interconnecting relationships among ideology, power, and culture and the social structures and practices that produce and reproduce knowledge."

“Rejecting any claim to “objective” universal truths, critical pedagogy motivates new theories and languages of critique and resistance to examine and transform social and pedagogical practices that maintain unjust social codes (Leistyna & Woodrum, 1996).”

“Critical pedagogy, however, is not a one-size-fits-all pedagogy, but rather a humanizing pedagogy that builds on and values students’ and teachers’ background knowledge, culture, and lived experiences (Bartolomé, 1996) while using social injustices as a point of departure not only for learning but also for action.”

“In other words, to be critical, pedagogy must be developed in and through students’ and teachers’ local knowledges and sociopolitical experiences as both students and teachers advance more equitable and just social and political transformations.”
“Critics of teaching mathematics for social justice—or mathematizing our conscious bodies (to use Freire’s words)—are often concerned that the emphasis on controversial social issues and contradictory political ideologies during mathematics lessons take precedence over learning “rich,” rigorous mathematics (e.g., Ravitch 2005)” (Stinson & Wager, 2012, p. 10).

“On the contrary, the foundation of TMfSJ is rooted, in part, in the belief that all children should have access to rich, rigorous mathematics that offers opportunities and self-empowerment for them to understand and use mathematics in their world—in a word, mathemacy (to use D’Ambrosio’s word)” (Stinson & Wager, 2012, p. 10).
Principles and Standards for School Mathematics (NCTM 2000), the NCTM signature document, opens with the statement:

“Imagine a classroom, a school, or a school district where all students have access to high quality, engaging mathematics instruction” (p. 3).

Many educators “… share this vision for school mathematics and suggest that TMfSJ is a powerful means to achieve these imagined classrooms and schools.
Brief overview of some of the ways in which TMfSJ aligns with and extends (critically) the NCTM Standards:

- NCTM Standards do not explicitly recommend teaching mathematics for social justice, they certainly are not inconsistent with it.
- For instance, the *Principles and Standards (2000)* explicitly calls for students’ understanding of the use of mathematics in everyday life and the workplace.
  - This call for mathematical competencies that offer access to opportunities is a crucial element of TMfSJ. Critical/social justice mathematics, however, extends this notion to prepare students to take action and use mathematics for social change—to read and rewrite their world into more humanizing possibilities with and through mathematics.
- Moreover, a core value on which the *Principles and Standards* is founded is unequivocally shared by teachers of mathematics for social justice:
  - the Equity Principle holds that “all students, regardless of their personal characteristics, backgrounds, or physical challenges, must have opportunities to study—and support to learn—mathematics” (p. 12).
To assist in achieving this core value of equity, NCTM for more than two decades has strongly recommended instruction not only in mathematical content standards but also in mathematical process standards (NCTM 1989, 1991, 1995, 2000).

This blending of content and process standards throughout mathematics instruction, however, demands the development of a different mathematics classroom—one different from the “traditional” mathematics classroom found in most U.S. schools (see Hiebert 2003).

In this different mathematics classroom, students are no longer passive, empty depositories awaiting the teachers’s deposits—what Freire (1970/2000) criticized as “the “banking” concept of education—but rather active co-creators of classrooms “where students of varied backgrounds and abilities work with expert teachers, learning important mathematical ideas with understanding, in environments that are equitable, challenging, supportive, and technologically equipped for the 21st century” (NCTM 2000, p. 4).

The difference is that TMfSJ centers teaching and learning specifically around issues of social political justice and reform. TMfSJ or critical mathematics is understood as a means for student and teacher self-empowerment to organize and reorganize equitable social and political reform.

The suggestion here is “that TMfSJ not only meets many of the broad mathematical goals and objectives of NCTM but also critically extends and enhances them in significantly meaningful and humanizing ways for students teachers alike!” (p. 11).
Mathematical Practices (CCSS, 2012):
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
Not everybody is in favor of this connection between TMfSJ and CCSS: See the following:


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- His research interests include mathematics education; teaching for social justice and critical literacies in urban, multicultural contexts; Freirian approaches to teaching and learning; and Chicago school policy.
Activities:

- The Hidden Grain (Kempf, 1997): Handout
- Unequal Distribution of Wealth in the United States (Handout)

What do these data tell us about the distribution of wealth in the U.S.?
1. First divide the 10 x 10 grid in three regions by coloring each with different colors:

- 1 square = richest 1%
- 19 squares = the next richest 19%
- 80 square = the remaining 80% of families

1. Next divide the pennies into three piles: 39 for the richest region, 46 pennies for the next region, and 15 pennies for the third region.
TMfSJ Activities: Continued:

Mercator Projection and Peters Projection World Maps Activity

(Rethinking Schools, 2001; Gustein, n.d.)