

A Sojourn into the Empowering Uncertainties of Teaching and Learning Mathematics for Social Change

David W. Stinson and Anita A. Wager

So I am for keeping things going while they are still stirring; because if we wait till it is still, it will take a great while to get it going again.

—Sojourner Truth, Equal Rights Convention, New York, 1867

WELCOME TO *Teaching Mathematics for Social Justice: Conversations with Educators*. The purpose of this book is to motivate a two-way conversation of sorts between its readers and its contributing authors. These authors include mathematics classroom teachers, teacher educators, and education researchers and scholars—in short, mathematics educators—who have explored, developed, researched, and/or taught mathematics for social change. Within these pages, we have assembled many of the leading critical mathematics educators, *mavericks* who got things “stirring” by re-envisioning different possibilities for both mathematics and mathematics teaching and learning. They are joined here by the next generation of critical mathematics educators who are “keeping things going” as they use and extend the work of these (and other) leading educators. In many of the chapters, contributing authors not only share personal narratives of how they came to do this important work but also offer theoretical, methodological, and pedagogical propositions in solidarity with others who might wish to explore the empowering uncertainties of teaching (and learning) mathematics for social justice.

As we considered which mathematics educators we might invite to contribute to the conversation, we inevitably had to be selective—a requirement that frustrated us, as it is seemingly unjust. Yet, as the idea for this volume emerged from a 2010 American Educational Research Association symposium entitled “Critical Pedagogy and Mathematics Teacher Education:

Learning to Teach Mathematics for Social Justice,”* we intentionally used the overarching theoretical framework of that symposium, critical theory, as our guide regarding who might be invited. While our intention is not to limit the possible definition of critical mathematics or social justice mathematics—or, more broadly, teaching mathematics for social justice—we recognize that *not* including certain research and scholarship in this volume does regrettably appear to set limits. For example, those mathematics educators who position their work in *culturally relevant pedagogy* (e.g., Matthews 2008; Tate 1995) or *funds of knowledge* (e.g., Gonzalez et al. 2000; Turner et al. 2012) would certainly argue that they too are seeking social justice. We are not suggesting that this is not the case—these positions are certainly grounded in social justice—but our intention here is to share the research and practices in the teaching and learning of mathematics that are most specifically grounded in critical theory and, by extension, critical pedagogy. Moreover, we do not intend to suggest that critical mathematics education and social justice mathematics are one and the same; we acknowledge that throughout the volume there are important, nuanced differences in the ways contributing authors label and define or describe their work. Nonetheless, for reading ease, throughout the volume the slashed phrase *critical/social justice mathematics* or the broader phrase *teaching mathematics for social justice* or, more simply, the acronym TMfSJ (see Gau 2005) are used somewhat interchangeably.

We have organized the book into five sections (including this **Part I: Introduction**) intended to guide readers through the historical and theoretical development of critical/social justice mathematics; the teaching of teachers in how to teach mathematics for social justice; the possibilities and challenges of TMfSJ in classrooms; and, finally, the call for a broader concept of social justice, one that aims toward human well-being. In the remainder of this chapter, we first explore the multiple meanings of teaching for social justice generally, and discuss briefly critical theory and critical pedagogy. We then make connections between TMfSJ and the National Council of Teachers of Mathematics (NCTM) Standards. We conclude this introductory chapter with an overview of the remaining four sections by providing brief summaries of each chapter.

The Meaning(s) of Teaching (Mathematics) for Social Justice

It is interesting to note that the phrase *teaching for social justice* is increasingly visible in the United States (and elsewhere) within conversations surrounding education. Specifically, in teacher education, “social justice” is emphasized as part of teachers’ overall “diversity” or “multicultural” initial preparation or professional development (McDonald 2007). More generally, social justice is often found in the mission and vision statements of education organizations (e.g., K–12 schools and colleges of education); in the overarching goals and objectives of education associations and conferences (e.g., Rethinking Schools, and the Creating

*At this symposium I, David Stinson, was the chair; Arthur Powell was the discussant; Tonya Bartell, Lidia Gonzalez, and myself—presenting a paper cowritten with Carla Bidwell and Ginny Powell—were the presenters; and Anita Wager was an audience member. After the symposium, Anita suggested that she and I develop a proposal for an edited volume based on the ideas explored there. This edited volume is the result of that suggestion. Therefore, although the editing contributions of Anita and myself were equal, her name is listed first on the title page to acknowledge that the edited volume was her idea.

Balance in an Unjust World Conference on Mathematics Education and Social Justice); in the titles of “special issues” of scholarly journals, including mathematics education journals (e.g., Ernest 2010; Gates and Jorgensen 2009; Sriraman 2007); as well as in the titles of an increasing number of books (e.g., Burton 2003), including this edited volume. After all, who in education would claim that they’re *not* for social justice?

Given this increasing presence of social justice, and the title of this volume, one might expect to find a definition of teaching for social justice or, more specifically, a definition of teaching mathematics for social justice in this introductory chapter. We, however, provide neither. Similar to North (2006), who resisted presenting a delimiting, unifying theory or definition in her review of the substantive meaning(s) of social justice, the intent of this volume is not to limit but to provoke more questions and to stimulate new discussions about the many meanings of and possibilities for teaching for social justice. In other words, echoing Bartell (2011), we designate 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).

Our resistance to providing a delimiting definition of social justice and choosing instead to designate it as a sliding signifier springs from our desire to ask readers, as they enter into conversations with contributing authors, to travel on their own journeys in making their own meaning(s) of teaching for social justice in general and teaching mathematics for social justice in particular. We borrow the metaphor *to travel* from Marilyn Cochran-Smith’s (2004) book *Walking the Road: Race, Diversity, and Social Justice in Teacher Education* and Ole Skovsmose’s (2005) book *Travelling through Education: Uncertainty, Mathematics, Responsibility*.

Cochran-Smith (2004) notes that her metaphor of traveling—or walking the road—“makes the case that 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” (p. xviii). Her metaphor of walking the road also represents her personal journey of over two decades in which she has focused seriously on issues of race, diversity, and social justice in teacher education practice, policy, and research at local, state, national, and international levels.

Skovsmose (2005; see also this volume), who positions social justice mathematics as just one approach to critical mathematics, continues to reconceptualize 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. 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).

Similarly, although each contributing author provides her or his own unique, nuanced definition or description of critical/social justice mathematics, these descriptions have developed over time during the author’s own journey and therefore are fluid and continue to change and adapt. Nonetheless, an overarching theme that we believe is somewhat present in

each description is a goal for teaching mathematics *about*, *with*, and *for* social justice (Wager 2008). 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).

But in the end, neither Cochran-Smith (2004) or Skovsmose (2005) nor the contributors to this volume (including us) provide a simple, linear, or certain mapping of social justice for other travelers to journey. Indeed, Cochran-Smith 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). Likewise, Skovsmose 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). We hope that readers will be inspired (as we have been) by the contributing authors’ journeys and undertake their own journey of making meaning(s) of teaching (mathematics) for social justice, going through their own process of considering everything as they consider something—starting, stopping, and even sometimes doubling back. Undeniably, “TMfSJ is a journey, not a destination” (Stinson, Bidwell, and Powell, in press).

From Critical Theory to Critical Pedagogy

Some readers might find it unsettling that we have resisted providing a definition of teaching for social justice. Nevertheless, we do provide a brief discussion of the theoretical foundations that ground much of the work of those who advocate teaching for social justice generally or TMfSJ specifically, including the contributing authors of this volume. Because most of the contributors begin their conversations with critical or social justice mathematics, we thought it important to reach back both theoretically and pedagogically to the “roots” of TMfSJ, providing a brief overview of critical theory and critical pedagogy.

Critical Theory and the Critique of Schooling

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. 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). Included in these critiques is an examination of how social interests, conflicts, and contradictions are expressed (and concealed) through ideology and produced and reproduced in systems of domination (Bottomore 1991). 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. Two early influential and often-referenced critical theory studies within the context of U.S. education are those of Samuel Bowles (1971/1977) and Jean Anyon (1980).

Bowles (1971/1977), in his study, provided a comprehensive, yet condensed, explanation of why U.S. schools remain unequal (both between and within schools). Through a critical, historical class analysis of schools, he outlined four components of U.S. education: (a) schools evolved not in pursuit of equality but in response to the developing needs of capitalism (e.g., a skilled and educated workforce); (b) as the importance of a skilled and educated workforce grew, so did the importance of maintaining educational inequality in order to reproduce the required class structure of capitalism from one generation to the next (e.g., teacher/student and employer/employee); (c) from the 1920s to 1970s the class structure in schools showed no signs of diminishment (a similar argument can be made from the 1970s to the early twenty-first century; see Bowles and Gintis 2002); and (d) the inequality in schools had its root in the class structures that it serves to legitimize and reproduce. As a result, Bowles claimed that efforts to equalize education continue to fail because they seek “to eliminate educational inequalities without challenging the basic institution of capitalism” (p. 150). Without such a challenge, Bowles argued that such efforts will merely “scratch the surface of inequality,” noting that “as long as jobs are defined so that some have power over many and others have power over nothing—as long as the social division of labor persists—educational inequality will be built into U.S. society” (p. 150; see also Bowles 1972).

Similarly, Anyon (1980; see also 1995), through her study, provided a critical, fine-grained analysis of socioeconomically stratified U.S. schools that uncovered the “hidden curriculum” (1980, p. 89). She claimed that the hidden curriculum of schooling is the invisible, yet visible, positioning of some children for specific tasks within a socioeconomically stratified society through differing curricular and pedagogical and evaluation practices that emphasize different cognitive and behavioral skills. These differences make certain relationships between children and physical and symbolic power possible—and others impossible. That is to say, schooling experiences—

[differ] qualitatively by social class. These differences may not only contribute to the development in the children in each social class of certain types of economically significant relationships and not others, but would thereby help to *reproduce* this system of relations in society. (pp. 89–90, emphasis in original)

Anyon is claiming here that different schooling experiences not only support class division, similar to Bowles’s (1971/1977) claim, but also produce and reproduce these unjust divisions through the differing curricular (and pedagogical and evaluation practices) that are made available.

Critical theorists on the whole contend that analyses such as Bowles's (1971/1977) and Anyon's (1980) act as catalysts to bring about an awakening of false consciousness and an awareness of social injustices, which, in turn, motivate *self*-empowerment and social transformation. Nevertheless, it is important to note that both these analyses, as with many early critical theory analyses, stayed true to the Marxist tradition of a narrow focus on social class. This limiting focus has motivated other scholars to extend some of the ideological foundations of critical theory into examining issues of race (e.g., Dixson and Rousseau 2006) and gender (e.g., Hesse-Biber and Yaiser 2004). Moreover, most critical theory analyses conducted today examine social inequities and injustices within the intersectionality of race, class, and gender as well as sexual orientation, disability, and religion (e.g., Rosenblum and Travis 2008).

Critical Pedagogy and the Scholarship of Paulo Freire

But beyond critical analyses of how schools function or the intersectionality of race, class, and gender, the significant influence of critical theory within the context of education has been and continues to be the ongoing development of *critical pedagogy*. 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 and 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.

In varying degrees, the tenets of critical pedagogy are found in a historical and continuing legacy of educators—from the early twentieth century (e.g., John Dewey and W. E. B. Du Bois) to the twenty-first century (e.g., Michael Apple and bell hooks)—who have labored to advance democratic ideals within education (Darder, Baltodano, and Torres 2003). Nonetheless, critical pedagogy as a pedagogical movement in the United States could be said to have its origin in 1970 when two essays by Paulo Freire (1921–1997), the Brazilian educationalist and “inaugural philosopher of critical pedagogy” (McLaren 1999, p. 49), were first published in English translations (see Freire 1970a, 1970b). These publications coincided with the release of the first English translation of his seminal book *Pedagogy of the Oppressed* (Freire 1970/2000), “something of an event” (Shaul 1970/2000, p. 34). These translations as well as the totality of his prolific writings have securely positioned Freire as not only the inaugural but also the most influential education philosopher and theorist on the development and practice of critical pedagogy.

Consistent with critical theory, the concepts of self-empowerment and social transformation are recurring themes found throughout Freire's prolific writings (see, e.g., 1970/2000, 1985, 1994, 1998, 2005). Generally speaking, Freire's pedagogical theories and practices promote a

humanizing education “through which men and women [boys and girls] take themselves in hand and become agents of curiosity, become investigators, become subjects in an ongoing process of quest for the revelation of the ‘why’ of things and facts” (1994, p. 105). Collectively in his scholarship, Freire advances a critical, dialectical reading of the word and world so as to write the word to *rewrite* the world. In reading, writing, and rewriting the world, Freire advocates for a problem-posing pedagogy in which *Subjects* (i.e., students and teachers) who know and act—in contrast to *objects*, which are known and acted upon—“develop their power to perceive critically *the way they exist* in the world *with which* and *in which* they find themselves” (1970/2000, p. 83, emphasis in original). Within a dialogical, problem-posing pedagogy “the teacher-of-the-students and the students-of-the-teacher cease to exist” and a more human possibility emerges: “teacher-students with student-teachers” (p. 80). Here the teacher “is no longer merely the-one-who-teaches, but one who is [herself or] himself taught in dialogue with the students, who in turn while being taught also teach” (p. 80). Persuasively supporting a humanizing education for students and teachers alike throughout his prolific writings, Freire offers multiple pedagogical possibilities and recommendations. He repeatedly cautions, however, that his recommendations are not offered as some prescriptive method to follow but rather as a point of departure for humanizing possibilities that must be invented anew in every teaching and learning context.

It is important to note that even though Freire began his lifework as an educator and theorist in the context of literacy, specifically, developing literacy for and *with* the peasants of Brazil in the 1960s, his theories on (and practices of) knowledge, teaching, learning, and living have extended into nearly every discipline of human thought. Months before his death in May 1997, in a rare, video-recorded interview (de Tarso Mendonça 1996), Paulo Freire spoke directly about his life work and its implicit and explicit connections to mathematics education. In the interview, which was proposed by Jeremy Kilpatrick and conducted by Ubiratan D’Ambrosio and Maria do Carmo Mendonça for the 8th International Congress of Mathematical Education (Seville, Spain 1996), D’Ambrosio began by asking: “Do you [Freire] see an equivalent to literacy, a form of ‘mathemacy’? Is there a mathematical equivalent to ‘alphabetisation’ in your work?” (Freire, D’Ambrosio, and Mendonça 1997, p. 7). Freire responded—

This is a good starting question, the first time I have been faced with this question and I think it makes sense, and not only as a question offered to me. It is a question that should be made to all of us. I confess, on that earlier occasion, I did not think about this. I would not lie now and say: “Ha! Even back then, forty years ago, I was concerned with this.” No, indeed I did not think about this before. But today I understand this. I have no doubt about the importance of every effort, which should not be exclusive to mathematicians, to the professor of mathematics, but that in my understanding of every man and woman, mathematician, physicist or carpenter, that is exactly the effort to recognize ourselves as *conscious bodies mathematized*. (p. 7, emphasis added)

As we have focused almost exclusively on Paulo Freire in our brief discussion of critical pedagogy, our intent has not been to imply that critical pedagogy begins and ends with Freire. Undoubtedly, it does not. But given that nearly every contributing author to this volume acknowledges Freire as having a significant influence on her or his work, we thought it was important to provide a somewhat fuller account of his scholarship. Despite its brevity, we hope

that this accounting explains why for many, Paulo Freire has been the impetus (in part) behind their own journeys into teaching mathematics for social justice.*

Teaching Mathematics for Social Justice and the NCTM Standards

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). 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). This foundation is clearly aligned with the NCTM Standards. Indeed, the *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). We, and the other contributors to this volume, share this vision for school mathematics and suggest that TMfSJ is a powerful means to achieve these imagined classrooms and schools.

What follows is a brief overview of some of the ways in which TMfSJ aligns with and extends (critically) the NCTM Standards. We claim that although the 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,

*To learn more about Paulo Freire, see The Freire Project: The Paulo and Nita Freire International Project for Critical Pedagogy at <http://www.freireproject.org>. For a broader discussion of critical pedagogy, see the edited volumes *Breaking Free: The Transformative Power of Critical Pedagogy* (Leistyna, Woodrum, and Sherblom 1996) and *Critical Pedagogy: Where Are We Now?* (McLaren and Kincheloe 2007).