

TALKING ABOUT TEACHING MATHEMATICS FOR SOCIAL JUSTICE

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We are disturbed by the inequities in our world and believe that mathematics educators (consciously or not) contribute to the shaping of this world. Our conversation about teaching mathematics for social justice began in a working group called Mathematics education, society and peace (Powell and Dawson, 2005) at a Canadian Mathematics Education Study Group (CMESG) conference. In this article, we revisit some of our conversation from that context and extend it.

Wagner: To understand our answers to big questions, like “What must we do as mathematics educators interested in social justice?”, it is helpful to understand where we come from. To me it seems unnecessary to explain my interest in correcting disparity. Rather, I would want people who see nothing wrong with the world as it is to explain themselves. However, I think it is appropriate to consider how our backgrounds influence our intentions in education and our beliefs about how to prompt positive change. So, how did you see the development of your present interest in social justice.

Stocker: I suspect the foundation for my interest in social justice came from being raised in an Adlerian family. The basic idea of Adlerian psychology and the associated parenting principles is that people who are encouraged feel capable and appreciated and as a result will tend to act in a connected, cooperative way. The family dynamic is organized democratically and behaviourist practices (such as reward and punishment) are replaced with authentic listening, choice, and real opportunities to shape the environment. Really, from there it's a small step to an interest in social justice: a couple of passionate university professors who were able to articulate the inequity in the world and the reasons why we should all work toward peace and social justice. My partner Kathy is a justice advocate, and I've been teaching for eight years now at a grade seven and eight (12- and 13-year-old students) alternative school, City View Alternative, in Toronto, focussed on these issues. We teach the government-prescribed curriculum but through the lens of justice issues, like race, class, gender, sexuality, ability, and so on. Noddings's work on the ethic of caring (1984) and Kohn's writing on education (1986, 1993, 1999) have been instrumental to our school's ethos. The birth of my son, Jazz, strengthens my commitment to social justice because he will have to live in the community and the world that we are creating right now.

Wagner: Like you, I trace my interest in peace and justice to my family upbringing, which was Mennonite (a Christian denomination). From the beginning, Mennonites have renounced all forms of violence and war, though this view seems to be eroding (Bush, 1998). I grew up hearing

stories of early Mennonites, in the 1500s, refusing to defend themselves when they were tortured and executed as heretics (van Braght, 1951). However, these were just stories for me, a wealthy (by world standards) Canadian white male who had a world of opportunity and who thought that his family's opportunities and wealth were a result of hard work and superiority. My views changed drastically when I backpacked around the world and saw some of the disparity in the world. After teaching mathematics for five years in Canada, my wife Carolyn and I spent two and a half years working in Swaziland with the Mennonite development agency (Mennonite Central Committee), which is known for its work addressing social inequities and advocating for non-violent approaches to peace. During our time in Swaziland, I saw disparity, inefficacy and suffering much closer. I saw that diligence, creativity and intelligence are not enough to deliver most people from their unprivileged existences. There are structural barriers.

Currently, I work with mathematics teachers and with mathematics teachers in training. In these relationships and in my writing, I try to draw attention to people's choices in their mathematics to draw attention to diverse possibilities in these choices and to underscore the cultural nature of mathematics as a way of addressing human problems.

Stocker: It seems to me that in order to have a meaningful dialogue we'll need to agree on some basic principles that describe what we mean by peace and social justice. Clearly peace is not merely the absence of war and violent conflict: it means more than mere stability. I have a poster here in front of me that reads “End violence against women: end poverty.” So economic justice, the elimination of poverty and the redistribution of wealth to meet that end play a part, I believe, in the creation of lasting peace.

If I had to come up with a few guiding principles, they would be:

- non-violent approaches to conflict
- democratic decision-making processes, and
- the elimination of barriers to social, economic and political inclusion based on race, class, gender, sexuality, ethnicity, religion or ability.

Wagner: I share your understanding of peace and social justice, and I like the principles you list, but have some questions about them, questions which I ask myself often. Because of my experiences, I prefer to think about peace and social justice in terms of narrative rather than principles. This is why I began by asking you to describe your back-

ground. Such understanding is as important to me as principles. Considering my place in history, I have to come to terms with the legacy of colonialism associated with Christianity and my European roots. I recognize that much of this colonialism was the result of well-intentioned people trying to make the world better, trying to introduce good (or better) principles to the world. In short, colonialists often see themselves as advocates for social justice. It bothers me that the people who are at the centre of current violence and injustice use the same words we use. They too say they are forces for peace and they too have social- and justice-oriented agendas.

Because of my belief that much violence is wrought by people with good intentions, I worry about ends-based (teleological) visions and prefer to envision the processes myself and others would be involved in when addressing violence. I notice that your first two principles are processes and your last one describes an end-based goal. I lean toward avoiding harm and educating awareness as processes, but I am reminded of Archbishop Desmond Tutu's (1984) caution that non-interference in situations of violence is akin to support for the oppressors. I share your interest in non-violent resistance (which is a departure from my tradition's pacifist avoidance of resistance). I think that educating awareness can be a form of non-violent resistance. I have to think more about the democratic decision-making principle because it feels like an end-goal – democracy – which I think is never possible because of inevitable unequal power relations.

It would help me understand your principles if you described for us how you enact your vision for peace and social justice in your mathematics teaching. Do you educate awareness? And, if so, how?

Stocker: I start from a belief that our education system does a poor job of preparing people for meaningful participation in a democracy. Huxley (1932), in his book *Brave new world*, paints a picture of people who do not resist injustice because they have been socialized in such a way that they do not recognize that injustice exists. Typical classrooms are sites for such socialization. What we do extremely well is to perpetuate world order by making

good little workers for future employment. (Gelberg, 1997, p. 215)

We train students to do what they are told to do and not ask questions.

Mathematics, however, is an excellent tool for "making the invisible visible," which Devlin (1998) shows well using diverse contexts. At the beginning of grade 7 (12-year-olds), I ask students to use a spreadsheet to graph the annual worldwide spending on advertising compared to the amount that the United Nations predicts we would need each year to eliminate hunger (advertising is \$319 billion; ending hunger is \$19 billion). Students are outraged: what they thought was an insurmountable task (ending hunger) is shed in a new light. This inspires hope, because this insight becomes a basis for action.

In a mathematics book I've just completed (Stocker, 2006), *Maththatmatters*, the fifty lessons for middle school students are about educating awareness, empowering civic and mathematical literacy simultaneously. Domestic violence, racial profiling, structural adjustment programs, the

Tobin tax (a tax on foreign-exchange transactions), unions, youth crime, defence spending: these topics, which are normally invisible in mathematics classrooms, become visible. Understanding these issues requires competent mathematicians. But the fastest way to create cynics is to stop there and fail to do anything, so our alternative school is focussed on direct action that builds on the students' new awareness of these social issues.

Understanding economic systems and priorities is a focus for me in my teaching. Your sense that much violence is wrought by people with good intentions seems at odds with my understanding of big business – extremely competent people intentionally maximizing profit for shareholders. We know that accumulation of wealth leads to all sorts of problems, including violence (see Chomsky, 2000, pp. 50-51). What is your thinking around this aspect of justice?

Wagner: It is not possible for me to speak on behalf of the people running big businesses, but I will describe my sense of these people. I think that most of them indeed intend to maximize their own profits (and their shareholders' profits to keep themselves in power) and don't really think about the effects their actions have on others. When they do think about the effects, they appeal to their beliefs in things like trickle-down economics (alternatively called supply-side economics: wealth-generation at the top trickles down to increase the wealth of the poorest people). I don't see evidence to support their belief nor do I see much effort from the belief-system's beneficiaries to justify their belief. However, like you, I think that critical thinking requires us to not assume innocence and to recognize the choices that people make and to try to hold everyone (especially ourselves) accountable for their (our) choices. I take this approach in my critical discourse analysis research (e.g., Herbel-Eisenmann and Wagner, 2007).

But our conversation isn't only about the power-brokers. It is also about us. And it is about our students. I plan to make good use of your new book, which reminds me of books by Gutstein and Peterson (2006) and Frankenstein (1989), and of the way D'Ambrosio (1994) advocates critical thinking about science and mathematics. I see value in raising awareness like this. It makes me think of the saying, "If it ain't broke, don't fix it." Our students need to see the broken aspects of their world. But I am haunted by the concern expressed by Immaculate Namukasa during the CMESG discussion group. She was born in a country in which children are kidnapped and forced to act as soldiers. She wondered why we expect our students to engage in adult battles. Can't we let them be children? She led me to think that it would be better for me to take up social justice battles myself (and let my students see and give advice regarding my social justice action), than to co-opt them into battle. Yes, children are part of these battles because they are victims, but they need not be fighters.

Nevertheless, I still want to do something for social justice in my teaching. I return to my sense that power-brokers don't think about the effects of their actions, and that they are relatively blind to the experiences of others. To address this situation, I can lead my students in what I like to call perspective work. I can direct them to attend to their classmates' and other people's perspectives, whether they are

engaged in tasks that consider real-world problems, such as those in your book, or engaged in pure mathematics tasks. I can help them experience the value of seeing other perspectives because such attention to others yields dividends in mathematical understanding and human understanding. Hopefully, this will help them pay attention to other people's experiences outside the classroom too (immediately and when they grow into positions of relative power).

Stocker: I, too, remember the concerns that Immaculate had for us during our working group on these issues. And in workshops that I do with pre-service teachers I often meet with these same concerns. I don't come from a war-torn country so my reply to Immaculate and others is tempered by my (lack of) experience, but I do have some thoughts.

The first is that we, unavoidably, have students in our classrooms who are dealing with these issues on a daily basis. Domestic abuse, racial profiling, and certainly poverty come to mind right away. In not confronting these issues directly, I worry that we take students who are disempowered to begin with and silence them further.

The second is that people tend to think that tackling difficult issues is necessarily a depressing task, when in fact that has not been my experience. I prefer that my grade seven and eight students (12 and 13 years old) speak for themselves. Here is a sampling of their response to my questions about the 'heavy' nature of the topics:

If we don't know about social issues, if we don't learn to be critical, we won't form views of our own. We'll grow up in a politically impotent society. Only through learning can things change.

Schools need to teach this stuff. Children can't be hidden from the world.

Amongst the other responses, I notice themes of empowerment, of hope, of students wanting to be treated as if they mattered and as if they were agents of change in the world. Tessa writes, "We can't make the world better if we're living in a bubble."

Wagner: I share your belief in the significance of students and the importance of their unique perspectives and potential for contributions to society: my research has been underpinned by this belief (e.g., Wagner, 2007). I hear you saying that social justice battles are the children's battles as much as they are their parents' because the children are victim to disparity and to enculturation. I am realizing that I am guilty of essentializing you: I have been listening to you describe your social awareness work with mathematics as if it is the only thing you do mathematically. I assume you also lead your students in some pure mathematics - basic fraction skills outside of contextual situations, for example - to equip them to deal with the social issues. I would be interested to know how you do this kind of teaching. I am uncomfortable with the idea that a mathematics teacher is socially irresponsible when not leading students to mathematise social justice data, but I doubt that you think this. It is a question of balance, I think.

A related question of balance has to do with the didactic tension between pointing our students' attention in particular ways and promoting their personal agency. It is ironic that

students recognize their agency when you direct their eyes toward particular issues. Directing eyes is an act of power, but directing them in the way that you do seems to be empowering.

Stocker: I think you're right, that directing eyes is an act of power. It seems to me that no matter what we do we direct student eyes (toward or away from things, intentionally or not). We have a limited amount of time with students and choices to make about what and how to teach. Teachers may follow a long history of mathematical word problems (Gerofsky, 2004) and introduce pseudo-real-life questions, perhaps finding the perimeter of cattle fields, or engage students in pure mathematics. Alternatively, we may apply mathematics to current pressing social problems and look, for example, at the mathematical validity of the "trickle down" economics argument. All are choices. So I think we can direct eyes toward personal agency and responsibility, or not. It seems we often don't.

At CMESG someone made the assertion that what we do in our classrooms amounts to a type of violence, or at the very least a low level of social abuse. At first, that seemed like too strong a statement to me (of course, because my own experiences of mathematics were different!), but each day that I spend with my students I become more convinced of its truth. When I don't create a meaningful context for the mathematics, I lose student interest. Worse, I scare students who feel incompetent and don't know why we're doing what we're doing. So, to return to the idea of a mathematics teacher being socially irresponsible when not making sense of the real world - I'd like to push the argument and say "yes." To some extent, yes - not to engage students in relation to social issues shirks responsibility to both society and students.

It's been a while since I was a high school mathematics student but when I look at the elementary curriculum documents it seems to me that most skills can be taught by providing a rich, real-world problem for the students, encouraging them to solve it in any way that they can, individually or ideally in groups, and then facilitating the sharing of different approaches - formalizing the strategies if need be. The departure to a class on pure mathematics seems rarely necessary (unless I'm pressed for time, which, come to think of it, is a huge structural barrier to good mathematics teaching). Now, to be honest, that's my goal. There are skills where, for the life of me, I cannot find a meaningful context. This bothers me. Is this a reflection of my teaching ability or on the value of the math, or both?

Wagner: I want to respond to a few points you raise here. First, low-level social abuse can occur in various forms, including, as you say, providing meaningless contexts for mathematical application while asserting that mathematics is useful for addressing meaningful contexts. Another form of social abuse is for teachers, from their position of power, to force their agendas on children. This type of abuse is inevitable with outcomes-oriented curriculum, which you mention as being a structural barrier to the kind of exploration you want to do, but it is also present when teachers impose a social justice agenda or a pure mathematics exploration (avoidance of cultural engagement) agenda. Nevertheless, we may locate the problem with the agenda (and

indeed some agendas are better than others – for example, I would not advocate teaching students that the best way to do something is already determined), but I suggest that the real problem is elsewhere.

This brings me to my second point, that the way you describe your planning seems backwards but understandably so because you are operating in a system that holds you responsible to ‘deliver’ curriculum outcomes. You look at your outcomes first and then strive to connect these to community issues (which is what I did when I taught in the school system too). Does it not seem more appropriate to start with current problems and issues faced by our local and global communities and then to develop our students’ skills to deal with these as part of a response to these issues and problems? In conversations with some Aboriginal elders in eastern Canada, it has become clear that this is the only approach that would allow students to use their ‘common sense,’ that is their sense of the world and their place in it (Wagner and Lunney, 2006)

And this question brings me to my third comment: though I advocate problem-based education instead of outcome-based education, and take this approach in my work with graduate and undergraduate students, I believe it is appropriate to take time to play, which is not very compatible with outcome-based orientations nor with some approaches to problem-based teaching. Play does not allow for external agendas. Not every moment of my life should be spent with focused attention on a burning social issue (but much of my focused attention should be spent thus) I think there is a place to exercise our imaginations by trying out various perspectives and approaches to non-critical or fictional problems. Such exercises might include spatial puzzles, word puzzles, reading and writing poetry or fiction, board games, or pure mathematics challenges (or, dare I say it?, mathematical challenges set in fantasy or hypothetical contexts). There is social value in perspective work. You might ask what the value is, which is a fair question. My answer would be that I do not know how to articulate my sense of its value. But it feels human to play. I play with my children. You play with yours.

My sense is that balance is the key. I want to work for social justice and I want to play, to explore perspective. I want to lead my students to do both too. I sense that engagement and play are connected somehow.

Stocker: I agree that we should be starting with current problems and issues and helping to develop skills that would allow and encourage students to respond. I think though it’s likely that whatever the outcome-based expectations are, there are ways to address them with current issues. Why is this important? From a tactical perspective (the expectations seem to be getting more entrenched in curriculum documents as time passes), getting new and potentially hesitant teachers on board with teaching mathematics and social justice may require us to demonstrate that they are still fulfilling jurisdictional requirements. Unless of course we re-envision our teaching environment by creating private schools, which to my mind is untenably classist. I’m open to other ways around it, but I haven’t yet found them.

The idea of balance is a bit tricky in my mind. I ask myself how many of the thousand hours or so of mathematics

students receive in twelve years of schooling are connected at all to social justice and my sense is that they are receiving none at all. I see one of those balance scales with an elephant on the one side and a pea on the other (although the pea might be too generous). Do I want to cut that pea in half when there’s no doubt that students will be overwhelmed with the elephant? (And overwhelmed in a more dangerous way: silently?) So we graduate all sorts of mathematically capable people who go on to do business and economics because their only experience with mathematics has been in association with these fields. This suggests to me that mathematics teachers are playing a causative role in the problem of global inequity. If those with a proclivity for justice work come from other fields, do they have the mathematical skills to challenge the ‘wisdom’ of the free-market business world? I don’t know.

I think play is important, crucially so. It does fit in the education system: we have a lot of fun at City View. And I would hope that people feel warmth, empathy and kindness (and a freedom to disagree) no matter what we’re learning. Where it emerges best is the question for me, and that seems to be more organic.

Wagner: I think we agree that mathematics teachers, like all other educators, have a responsibility to address social justice issues. I sense that your concern about balance between time spent explicitly addressing social justice issues and time spent exploring and learning in other ways is not so much a concern about balance itself, but rather a recognition that people too often claim ‘balance’ as an argument to continue their present practices without reflection. I agree with you: we all need to re-evaluate our current practices, and not assume that our ‘balance’ is justified. My conversation with you has encouraged me to do just this.

Stocker: That’s true, but I see other aspects as well. The claim that we ‘seek balance’ may be, as you say, simply a way to avoid reflection. Alternatively, it could be a tactical strategy (“we’ll make our message more palatable to people with power so that they’ll at least come to the table”), and also I think there are times where the claim that we should seek balance simply does not apply. For example, it would be inappropriate to say we need some balance in affording people their human rights. Or, we couldn’t say, let’s have some balance in providing a gay-positive learning space at our school. I’m suggesting that mathematics for social justice is one such issue – something to be maximized. I’ve watched as people have taken what I see to be something of absolute value and water it right down to something rather innocuous and ineffectual. Malcolm X is reported to have said “An extreme illness cannot be cured with a moderate medicine.” (Latner, 2005)

We spoke outside of this conversation about how to end and it seemed that to wrap the discussion up into “neat conclusions” would discourage readers from continuing to reflect upon, struggle with and develop the discussion on their own. I would like to thank you, though, for sharing your perspective and giving me the opportunity to clarify and question my own beliefs. I look forward to future conversations.

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