Weaving Social Justice in Elementary Mathematics

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Based on nearly three decades of teaching in inner city, bilingual elementary schools in a Midwest industrial city, the author suggests multiple ways to interject social justice issues and concepts into core mathematics curriculum that simultaneously draws on the children's lives. Furthermore, the author uses anecdotal evidence to argue that this approach increases motivation and interest in the study of mathematics. Finally, the author asserts that even in an era of scripted, standard-based, data-saturated curricular mandates, social justice mathematics is both possible and necessary.

Corporate versus Social Justice Mathematics Teaching

For too long, too many educators in the United States have held the notion that teaching and politics must not mix. The dominant narrative is that teachers and teaching are to be "neutral" and "above" politics. Moreover teachers are frequently reminded in both explicit and subtle ways that they should acquiesce to political "realities" in broader social and political debates.

But that attitude is changing. I believe it's changing in large part because of the international attacks on the public sector and public sector unions. It's changing also because of a recognition by educators of the negative impact that edu-business is having on public education. And it's changing because in no other time in history has the craft of teaching been under such sustained assault.

As a teacher activist in Milwaukee, Wisconsin, a medium sized industrial city that by many indexes is one of the most hyper-segregated (by race and poverty) in the nation (Schools and Communities United, 2014), I have witnessed both the intensification of those

attacks and the subsequent resistance. As Paulo Freire stated, "Conflict is the midwife of consciousness" (Horton & Freire, 1990, p. 176).

In the spring of 2011, teachers in the state of Wisconsin led an unprecedented workers' uprising that challenged the attack by right-wing Republicans and their corporate backers on the issue of the right for public sector unions to collectively bargain. The legislation was qualitatively more punitive than any other so-called "right-to-work," anti-union laws that exist in 23 states in the United States. Alongside the anti-union legislation, Wisconsin Governor Scott Walker made the largest budget cut to public education since the Great Depression. He finished off his educational agenda by essentially writing a blank check for programs that privatize education.

These attacks on public schools and teacher unions coincided with a push by "corporate reformers" to impose test-based accountability systems on students, teachers, and schools. Urged on by billionaire philanthropists and multinational textbook/testing companies, with the help of "non-profit" advocacy organizations like *Teach for America* and *Stand for Children* the federal and state government launched various initiatives that, in practice, are destroying the teaching profession through a toxic data-drenched cocktail of scripted curriculum and high-stakes standardized tests. Worst yet, a new generation of teachers are being inculcated with the notion that teaching should be "data-driven" instead of child driven; standardized, instead of culturally responsive; and scripted, instead of critical.

A key factor in this international infatuation with tests, technology and scripted curriculum is the growth of multinational corporations who have their eye on the K-12 education market in the U.S. and beyond. The U.S. market, now mainly spent in the public sector, is projected to be $788.7 billion in 2015. "It's really the last honeypot for Wall Street," Donald Cohen, the executive director of In the Public Interest, told *The Nation* (Fang, 2014).

We must individually and collectively say "enough" to these attacks and join with parents and community partners to ensure that our teaching and schools foster deep understanding of our society and the disposition and skills necessary for students to be active citizens standing on the side of social justice.

This is what I have tried to do in my 30 years of teaching ten and eleven year olds. I've also tried to promote such a view of teaching in my work as an editor of the *Rethinking Schools* magazine and in my

role as President of the Milwaukee Teachers' Education Association, the largest local union in Wisconsin.

Shouldn't a Math Teacher Remain "Neutral"?

But shouldn't math teachers and curriculum just remain "neutral?"

Simply put, teaching math in a neutral manner is not possible. No math teaching—no teaching of any kind, for that matter—is actually "neutral," although teachers may think otherwise. As historian Howard Zinn (1970) once wrote: "In a world where justice is maldistributed, there is no such thing as a neutral or representative recapitulation of the facts."

For example: Let's say two teachers use word problems to teach double-digit multiplication and problem-solving skills. They each present a problem to their students. The first teacher presents this one:

> A group of youth aged 14, 15, and 16 go to the store. Candy bars are on sale for 43¢ each. They buy a total of 14 candy bars. How much do they spend, not including tax?

The second teacher, meanwhile, offers a very different problem:

> Factory workers aged 14, 15, and 16 in Honduras make McKids children's clothing for Wal-Mart. Each worker earns 43 cents an hour and works a 14-hour shift each day. How much does each worker make in one day, excluding fees deducted by employers?

While both problems are valid examples of applying multi-digit multiplication, each has more to say as well. The first example has a subtext of consumerism and unhealthy eating habits; the second has an explicit text of global awareness and empathy. Both are political, in that each highlights important social relations.

When teachers fail to include math problems that help students confront important global issues, or when they don't bring out the underlying implications of problems like the first example above about buying candy bars, these are political choices, whether the teachers recognize them as such or not (Gutstein & Peterson, 2005).

There are distinct differences between a biased curriculum and a

partisan one. Teaching is biased when it ignores multiple perspectives and does not allow interrogation of its own assumptions and propositions. Partisan teaching, on the other hand, invites diversity of opinion but does not lose sight of the aim of the curriculum: to alert students to global injustice, to seek explanations, and to encourage activism. This is the kind of teaching I hope teacher activists and teacher unions will promote (Bigelow & Peterson, 2002).

Why Social Justice Math?

A brief exchange in my fifth grade classroom where students are working in groups during "math time."

"I like this kind of math!" José exclaimed as he and two classmates paused to answer my question "How's it going?"

"Is this stuff really true or is it like the stuff in our math book that's all made up?"

"And boring," added Xavier. "This is interesting."

"Good question," I responded. "These data are accurate—based on research people and groups have done about pay and working conditions in sweatshops around the world. Some of the data is from the people who made the video we watched yesterday when we started the unit."

The students in my fifth-grade, bilingual classroom were in the second day of a 4-day "sweatshops math" project from the book *Rethinking Globalization: Teaching for Justice in an Unjust World* (Bigelow & Peterson, 2002). My partner teacher – who was teaching the identical mini-unit in Spanish – and I had taken a break from the official mathematics curriculum, which had become tedious to both teacher and student.

Using teacher-provided information on sweatshops in 11 different countries, the students were calculating hourly, daily, weekly, and annual salaries while reflecting on the working conditions and age of the workers and the products produced. The students had to locate each country on the world map and make a large poster display including an analysis of data and a self-evaluation. Multiple-step problem solving for 10-year-old children is never easy, and there were some frustrations, but there was definitely no lack of motivation.

Integrating Social Justice, Mathematics, and Other Content Areas

Since the passage of the federal *No Child Left Behind Act* of 2001, the Milwaukee Public Schools, like those of many urban school districts, have become increasingly obsessed with data bits and standardized testing as the "silver bullet" to drive all curricular improvements. Even in historically progressive public schools like the one in which I have taught, La Escuela Fratney (Peterson, 2007), this obsession with data has meant increasing pressures on classroom teachers to "cover" the curriculum and to adhere closely to district wide curricular texts and pacing charts. These pressures have had the unfortunate effect of reducing both time and interest in curricular integration where mathematics, writing, social studies, science, and student interest might shape longer interdisciplinary units.

I've always held that educational reformers should advocate mathematics be taught in all subject areas, promoting "mathematics across the curriculum," comparable to "writing across the curriculum." Too often mathematics is segregated in schools and kept separate from the issues that confront students in their daily lives. The curriculum rarely encourages students to link mathematics and history, mathematics and politics, mathematics and literature – mathematics and people.

There are unfortunate consequences when mathematics is isolated. First, the not-so-subtle message is that mathematics is basically irrelevant, except for success in future mathematics classes, commercial transactions, or in select occupations. Second, students learn that mathematics is not connected to social reality in any substantive way. Thus students approach mathematics in the abstract and are rarely encouraged to seriously consider the social and ethical consequences of how mathematics is sometimes used in society. Third, if students are not taught how mathematics can be applied in their lives, they are robbed of an important tool to help them fully participate in society. An understanding of mathematics and how numbers and statistics can be interpreted is essential to effectively enter most debates on public issues such as welfare, unemployment, and the federal budget. For example, even though the minimum wage is higher than it has ever been, in relative terms it is the lowest in 40 years. But you need mathematics to understand this.

To be clear, I don't mean to imply that distinct mathematics skills aren't important—I am from the old school that holds that children need to learn their basic "math facts" in order to give them the mental fluidity to engage in much deeper and meaningful mathematics. Moreover, integrating mathematics with social studies does not necessarily make teaching more student-centered or content more concerned with issues of social justice. Those important components depend on the teacher's philosophical and pedagogical beliefs. My own beliefs require that I fully engage my students in understanding how to use mathematics to examine issues of social injustice and consider how we can use mathematics to make the world more just.

I have worked to integrate mathematics—from the simplest understanding of number concepts to more complex problem solving—with social studies, science, current events, reading and writing. In the interests of clarity (my classroom life is never so neatly ordered), I outline these approaches as: connecting mathematics to students' lives, linking mathematics and issues of equality, using mathematics to understand history, and integrating mathematics into action.

Connecting Mathematics to Students' Lives

For many teachers starting on this road of teaching mathematics for social justice, the first step is to build on what students bring into the classroom, and to connect curriculum to students' lives. Mathematics is a great way to do this. I usually start the year with kids exploring, in small groups, how mathematics is used in their homes and communities. They scour newspapers for numbers, cut them out, put them on poster paper and try to give sense to their meanings, which at times is difficult. They interview family members about how they use mathematics and write up their discoveries. As part of a beginning-of-the-year autobiography, they write an essay, "Numeric Me," tying in all the numbers that connect to their lives, from height and weight, to the number of brothers and sisters they have, to addresses, phone numbers, and so forth. Over the years, I have pushed this assignment to go beyond the self and encourage the students early in the year to explore "math in the community" and "math in the world," which at times is as simple as the population, but it has also gotten into more engaging issues such as the amount of money spent on the Iraq War

or the number of children without access to clean water. Some years I ask them to write a "history" of their experiences in mathematics classes, what they think about mathematics, and why.

This process starts a yearlong conversation on what we mean by mathematics and why it is important in our lives. As the class increasingly becomes sensitive to the use of numbers and mathematics in news articles, literature, and in everyday events, our discussions help them realize that mathematics is more than computation and definitions, but includes a range of concepts and topics—from geometry and measurements to ratios, percentages, and probability.

As part of the autobiography project we also construct a timeline. We start by putting the students' birthdates and those of their parents and grandparents on a class timeline that circles the outer perimeter of my classroom (and which is used throughout the year to integrate dates that we come across in all subject areas). The students also make their own time lines—first of a typical day and then of their life. In these activities, students use reasoning skills to figure out relations between numbers, distance, time, fractions, and decimals.

I also use another beginning-of-the-year activity that not only builds mathematics skills but also fosters community and friendship. The whole class discusses what a survey or poll is and brainstorms questions that they would like to ask each other. After I model one survey, each student surveys their classmates on topics such as their national origin, their favorite fast food restaurant, music group, or football team, or what they think of our school's peer mediation program. Each student tabulates his or her survey data, makes a bar graph displaying the results, and reflects in writing on what they have learned. Later in the year, they convert the data into fractions and percentages and make circle graphs. I encourage the students to draw conclusions from their data, and hypothesize about why the results are the way they are. They then present these conclusions orally and in writing.

This activity is particularly popular with my students, and they often ask to do more extensive surveys with broader groups of people. The activity lays the basis for more in-depth study of polling and statistics around issues such as sampling, randomness, bias, and error.

Linking Mathematics and Issues of Equality

To help my students understand that mathematics is a powerful and useful tool, I flood my classroom with examples of how mathematics is used in major controversies in their community and in society at large. I also integrate mathematics with social studies lessons to show how it can help us better understand the nature of social inequality. Kids are inherently interested in what is "fair," and using mathematics to explore what is and isn't fair is a great way to get them interested in all types of math concepts, from computation to fractions, percentages, ratios, averages, and graphing. Two such explorations that I often use is a world wealth simulation exercise and examinations of current events.

World Wealth Simulation (Bigelow & Peterson, 2002)

During the months of October and November, there is often lots of discussion of poverty and hunger in my classroom, related either to the UNICEF activities around Halloween or issues raised by the Thanksgiving holiday. These months provide a good time to use simulation exercises to help children understand the disparity of wealth in the United States and around the world. In one such lesson, I provide information on the distribution of population and wealth in the six continents, and then have children represent that information using different sets of colored chips. After working with students so they understand the data, we do a class simulation using a map of the world painted on our playground. Instead of chips to represent the population data we use the children themselves. I have them choose a slip of paper from a basket labelled "Chance of Birth" and the children go and stand in the corresponding area of the world—15 cram into Asia, 3 into Europe, 1 into the United States/Canada, 2 into Latin America, and 3 into Africa. One person in the group gets a nametag labelled "Negotiator" and another gets an empty paper bag labelled "wealth." I then distribute the wealth, represented by cookies. I do so dramatically, with great flair, dropping eight cookies into the European wealth bag, and then turning south to Africa to give a half cookie to an equal

number of students (actually Africa has several hundred million more people than Europe). "Unfair! No fair!" students shout.

"Wait! Quiet!" I call out, "You'll get your chance to discuss and debate this." I tell the students that they are not to eat their wealth yet, but instead discuss as a group what strategy and arguments their negotiator might use. I then tell the negotiators, "Go visit other parts of the world and seek out what's best for your people." Depending on how restless the students become, the negotiating session lasts anywhere from 3 to 10 minutes. Sometimes the students representing North America are very generous and other times they sit and eat their cookies—without concern for what might happen later to them during recess. One year while Hector was holding the wealth bag for Asia, he proceeded to eat five of the six cookies for Asia. His "Asian" counterparts were furious, but after I prevented a popular uprising for cookies, we later reflected on how Hector's actions—and the other students' response—might be a closer representation of reality than my staged simulation. Wealth is not divided fairly anywhere in the world!

The activity is high energy. Emotions run raw. Tears sometimes flow. "That's not fair!" is the most common refrain. Despite my rules, at times there is mass (illegal!) migration and even war. As an incentive to get my kids back into the classroom with the least amount of collateral damage, I let them know that there are more chocolate cookies in the classroom for anyone able to follow basic decorum on the way up.

Afterwards, we discuss the simulation and write about the activity. I know this activity has several limitations: (a) it doesn't take into account huge inequality in wealth within individual countries, such as our own; (b) it seeks to describe a situation, not explain it; and (c) as a simulation, it can in no way re-enact the violence of poverty and hunger that kills tens of thousands of children daily. Nonetheless, these kinds of simulations can be powerful tools in motivating students to want to ask and answer the essential question, "Why?" Or in the words of some of my students: "Why does Asia have so many people and so little wealth?" "How did Europe and North America get to be so wealthy?" "Why are things so unfair?"

In order to compensate for the first limitation – the simulation's blind spot on inequality within countries or continents, I usually follow up this activity with Peggy Kellogg's (1998) simple "Ten

Chairs of Inequality" activity which has ten chairs each representing 1/10 of the wealth of the United States and then 10 students each representing 10% of the US population. Through dialogue and my directing certain of the ten students to move into the appropriate chairs, students see that 10% of the population—represented by one student—occupies seven chairs, and his or her arm (which I say represents 1% of the US population) must stretch out over four chairs).

Each simulation not only connects mathematics to human beings and social reality but also it does so in a way that goes beyond paper and pencil exercises; it truly brings mathematics alive. It would take much less class time if I just tell my students about the world's unequal distribution of wealth. But that wouldn't have the same emotional impact as when they see classmates in the United States and Europe get so many more cookies even though they have so many fewer people.

Examining Current Events

Another way I help students analyze inequality is to use current events. News articles are filled with mathematics. Regularly, I photocopy a newspaper article and have students use yellow highlighters to highlight all numbers and number words. We then discuss their meaning, I pose problems using the numbers, and remind the students that only by being well skilled at mathematics will they be able to understand and influence the world.

For example, in small groups, students might examine data such as unemployment or job trends, convert the data into percentages, make comparisons, draw conclusions, and make graphs. This exercise is a great way to help students understand the power of percentages. They also use a computerized graph-making program; in doing so, they realize how the computer can be a valuable tool.

One group, for example, looked at news stories summarizing a university report on the 10,000 new jobs created in downtown Milwaukee due to commercial development. According to the report, African Americans held fewer than 8% of the new jobs, even though they lived in close proximity to downtown and accounted for 30% of the city's population. In terms of the higher-paying managerial jobs, Latinas/os and African Americans combined held only 1%, while

white residents, who are overwhelmingly from the suburbs, took almost 80% of the new managerial jobs. Using these data, students made bar and pie graphs of the racial breakdown of people in different jobs and in the city population. They compared the graphs and drew conclusions.

The students then performed a role-play, with some students pretending to be representatives of community organizations trying to convince the mayor and major corporations to change their hiring practices. What began as a mathematics lesson quickly turned into a heated discussion of social policy. For instance, at one point a student argued that the new jobs should be split 1/3 Black, 1/3 Latina/o, and 1/3 white, because those are the three principal ethnic groups in Milwaukee. Others, however, disagreed. Needless to say, this led to an extensive discussion of what is fair, of reasons why minorities had so few of the jobs created downtown, and what it would take for things to be different. And more importantly, in my mind, it once again demonstrated the power of understanding mathematics.

Using Mathematics to Understand History

It is important for students to be aware of whose voices they hear as they read history books or the newspaper, or watch a movie. Who gets to narrate history matters greatly, because it fundamentally shapes the readers' or viewers' perspective. We can analyze these issues with kids and help them become more critical readers of books and other media. In this process, mathematics plays an important role.

During our unit on the European invasion of the Americas, I have students in groups do a relatively easy, although depending on the book, somewhat tedious tabulation activity. Students analyze children's books on Columbus, tabulating whose views are represented. For instance, how many times do Columbus and his men present their perspective, versus the number of times the views of the Taíno Indians are presented? Using fractions and percentages the students make large graphs to demonstrate their findings and draw potential conclusions. Large visual displays—bar graphs made with sticky tape, for instance—are good points of reference to discuss and analyze. Math concepts of percentages, proportions, and comparisons can be used to help kids discuss the statistics they've uncovered and the graphs they've made.

A similar tabulation and use of percentages can be used to analyze popular TV shows for the number of "put-downs" versus "put-ups," who is quoted or pictured in newspapers, stereotypes of females in popular cartoons, who is included in textbooks, and who is represented in the biography section of the school library. One year, when students were doing historical research project on a person who fought for social justice, two students noticed a huge discrepancy between what was in the new CD ROM encyclopedia about Harriet Tubman compared to Thomas Edison. Their discovery and class discussion led to a whole class project in examining bias in encyclopedias based on inches of type. Students did physical measurements, created bar graphs and compared data. A year later, after I was named the Wisconsin Elementary Teacher of the year, a right wing talk radio talk show host used that lesson, which I had written up in *Rethinking Schools*, as the grounds for asserting that I was committing "child abuse" in my classroom (Peterson, 2009a).

In the aftermath of the 2000 presidential election, in which the US Supreme Court selected George W Bush to be US president, I was talking about George Washington and slavery during social studies. I explained that while I respected him as a great general, I was critical that he owned 317 slaves. One student added that Thomas Jefferson also was a slave owner. And then, in part to be funny and in part expressing anger over vote fraud involving African Americans and the U.S. Supreme Court's delivery of the presidency to George W. Bush, one of my students shouted, "Bush is a slave owner, too!"

"No, Bush doesn't own slaves," I calmly explained. "Slavery was ended in this country in 1865."

Short exchanges such as this often pass quickly and we move onto another topic. But then one student asked, "Well, which presidents were slave owners?"

She had me stumped. "That's a good question," I said. "I don't know."

Thus began a combined social studies, math, and language arts project in which I learned along with my students, and which culminated in a fascinating exchange between my students and the publishers of their U.S. history textbook.

After I admitted that I had no clue exactly which presidents owned slaves, I threw the challenge back to the students. "How can we find out?" I asked.

"Look in a history book," said one. "Check the Internet," added another.

I realized that I had entered one of those "teachable moments," when students show genuine interest in exploring a particular topic. Yet I had few materials about presidents and slaves, and no immediate idea of how to engage 25 students on the subject. I played for time.

First, I had a student write down the question—"Which presidents were slave owners?"—in our class notebook, "Questions We Have." I then suggested that a few students form an "action research group," which, in my classroom, means an ad hoc group of interested students researching a topic and then doing something with what they learn. I asked for volunteers willing to work during recess. Several boys raised their hands, surprising me because I would have guessed that some of them would have much preferred going outside to staying indoors researching.

After several weeks of research, class discussion, math and social studies lessons that involved extensive data crunching and graph construction one of my students summed up our mathematical findings in a letter to the publisher of the fifth grade US history textbook—which had no reference to any president owning a slave. She wrote:

> I see that you do not mention that some of the presidents had slaves. But some of them did. Like George Washington had 317 slaves. So did Thomas Jefferson. He had 267 slaves. If you want to teach children the truth, then you should write the truth. The children should really know the truth about the Presidents. Or do you know the truth about the Presidents? Did you know that some of the Presidents owned slaves? Because my class has done research about the Presidents and slaves. We have found out that John Adams did not have no slaves. We have also found out that 10 out of 18 of the first Presidents did! In math we figured out that 69% of the years between 1789 and 1877 we had a President who had been a slave owner (Peterson, 2009b).

Connecting History to the Present

In this exercise, as the students and I study history, we pay particular attention to dates and data. I try to highlight numbers that relate to

social movements for equity and justice. For example, as we look at women's struggle for equality in the United States we try to imagine what it was like for the women's rights leader Susan B. Anthony to go to work as a teacher and get paid $2.50 a week, exactly half the salary of the previous male teacher. Much can be done with such a statistic—from figuring out and graphing the difference on an annual or lifetime basis, to looking for wage differentials in other occupations and time periods, including the present. I have found children particularly interested in looking at wages paid to child workers—whether it be in coalmines or textile mills. We compare such wages to the price of commodities at the time, to wages of adult workers, and to wealth that was accumulated by owners of industry. Such historical connections can be easily linked to present-day concerns over U.S. child labor and minimum wage laws or to international concerns over multinational corporations exploiting child labor in Asia or Latin America to make consumer goods for worldwide markets.

One math/history connection that can range in sophistication, depending on the level of the students, is to look at who is represented in different occupations and areas of power in our society, and how that has changed over time. For example, students can figure out what percentage of the signers of the Constitution were slaveholders, common working people, women, wealthy individuals who held bonds, and so forth. A similar exercise would be to analyze U.S. Presidents, or the people our country has chosen to honor by putting their faces on currency and coins. Such historical number crunching can take a contemporary turn if the students analyze the gender and racial breakdown of the U.S. House and Senate, the editors of major newspapers, or the CEOs of the Fortune 500.

It's important for students to understand that such numbers are not permanent fixtures of our social structure, but have changed as result of social movements such as the Civil Rights and women's movements. To demonstrate this change, a teacher might have students tally the current percentage of African Americans or women in selected professional occupations and compare it to the 1960s, before the rise of affirmative action, through people's struggles.

The History of Mathematics—Whose History?

Another area is to teach the history of mathematics, pointing out the contributions to mathematical thought of various non-European cultures and civilizations. Greek mathematicians, for instance, were heavily influenced by their predecessors and counterparts in Africa and Asia. Arab mathematicians inspired European Renaissance scholars. The Mayans were one of the first peoples to develop the concept of zero and make sophisticated mathematical calculations. I have used a unit on the Mayan counting system with base 20 with my fifth-graders to demonstrate such sophistication and to help students expand their understanding of place value (Ortiz-Franco, 2005).

Integrating Mathematics into Action

Integrating mathematics into current events is a no-brainer; using mathematics to influence future events requires a bit more effort.

The "sweatshop math" project (previously mentioned) is used to focus on double digit multiplication, division, and problem solving skills. In this integrated mathematics, geography, reading, and writing project, I have students manipulate current data about pay and working conditions in various workplaces around the world and make a poster display their findings using a world map. They reflect on their findings and connect it to their own lives, particularly consumer items they buy. One year when I was preparing my students for the project, I put on the overhead some photos of child laborers—kids carrying bricks in India, child weavers in Pakistan, and a farm worker in Central America. We were discussing why families have to have their kids work when Osvaldo, a chunky Mexican-American boy raised his hand and said, "That's what I used to do in Mexico. I worked with my grandma in the fields."

The rest of the kids turned and looked at Osvaldo. "Oh really," I said trying to quickly think how I would lead this discussion. "Tell us more."

"Well, I worked in the fields with my grandma," Osvaldo rarely contributed much to class discussions, not because he wasn't smart or following along, but mainly because he was shy.

"How was it working in the fields?"

"It was OK."

"Well I bet you wished you were going to school instead," I half asked, half stated.

"No."

"Yeah I wish I could work instead of going to school," another student called out. The conversation wasn't going in the direction that I had hoped.

I ignored the student's comment and continued questioning Osvaldo. "Why didn't you want to go to school?"

"Because the teachers were really mean in the school."

"Mean?"

"Yeah, like if you misbehaved in school they put biting ants down your back and it really hurt!" Kids gasped, unbelieving. "It's true!" Osvaldo said. "I didn't want to go to school."

"I wouldn't want you to be treated like that either," I said. And then in hopes of wrapping up this part of the discussion, I suggested that Osvaldo might want to write a poem about this experience working in the fields.

Later that day he came up to my desk and showed me a neatly written poem. It read:

A Five Year Old Boy
Based on the true life of Osvaldo

I am a 5-year-old boy working to support my family
I am a boy walking for a mile just to get clean water out of the pozo
I am a boy carrying a sack full of caña more than a mile
I am a boy watching for snakes and scorpions while working
I am a boy carrying food for my farm animals
I am a boy working for hours in the sun
I am a boy working in pain in my back and arms and legs
I am a boy sleeping with pain and bruises on my fingers

"That's great! Your words make me get a picture in my head and I feel like I am right there." Osvaldo smiled. "Might you be interested in writing a second part to the poem about when your family came to the United States?" I asked.

Osvaldo shook his head no, and I understood. I never push kids to

tell more about how their families arrived in the United State than they want to. "Well, how about how you felt once you got here?"

The next morning Osvaldo showed me the second half of his poem:

I am a 5-year-old boy living in the United States
I am a boy eating strange food
I am a boy going to school
I am a boy seeing for my first time a show
I am a boy having my first game station
I am a boy seeing other people like African American, Puerto Ricans, and Americans
I am a boy living happily in my new home
I am a boy feeling sad for being far away from my grandma and grandpa
I am a boy getting chubbier each year for not working

At our author's tea that Friday, Osvaldo shared his poem in its entirety with his classmates and received an extra loud round of applause.

Cost of War

That same year (2006)—like I have every year since the Iraq War started in 2003—I used the cost of our wars as a way to teach place value and the importance of understanding large numbers. Whether it's having the students guess the population of the world or a large number I write down that has a lot of zeros, many students are quick to guess a whole range of (wrong) numbers (Peterson, 2005).

Despite the fact that my fifth graders have been taught place value throughout their elementary years, there is something about big numbers that lends itself to guessing. Perhaps it's the omnipresent state lottery advertisements that tend to blur big numbers together. Or more likely it's the fact that big numbers are just difficult to read, much less understand. Imagining a billion boggles my mind, whether I'm trying to fathom that number of galaxies swirling around the universe or the number of H_2O molecules in a drop of water.

With some work, though, kids can connect the large numbers both to their own lives and to bigger social issues like the cost of war. After a mini-math lesson on the cost of the Iraq War that included rather

tedious large group math calculations, my fifth graders calculated that the United States was spending about $3,600 each second on the Iraq War.

"That's six PS360s! [a video game system] every second!" Ben exclaimed. "That's one heck of a lot of money." Ben started going off on the "stupid war" and said some derogatory comments about Bush. I refocused the conversation saying that "name calling—even of a President you disagree with was not allowed in my classroom" but students were welcome to discuss and debate different points of view on the war and other important issues. A normally quiet child raised her hand and shared that her cousin was in the military and another boy shared that his sister was currently in Afghanistan. At one point, I asked students who had family or close friends in the military and a third of the 25 students raised their hands.

When one student mentioned that he thought it was silly to spend that much money on the war, I suggested that we take a look at a website that tallies the cost of the war. Any mention of the Internet sparks interest in my class so they all focused in on the classroom computer where we went to the website www.costofwar.com. Students were excited to see numbers streaming by fast on the screen. After showing a student how to freeze the tally, I choose one student to read off the number. As he did so digit by digit, I knew we had some work to do on understanding and reading large numbers. I wrote the time and then number on the whiteboard and as a class we practiced reading the number. In the process, I reviewed place values up to the hundred billions place.

The following day, I brought in a newspaper photo of a "die-in" from the previous night in which anti-war protesters laid on the steps of the federal building. I told the students I had participated, although some were skeptical because I was not part of the photo. That didn't stop us though, and we checked the cost of war again and practiced reading the number.

On the third day, for our early morning activity, I had students calculate how much money had been spent in the last 3 days—and then by doing a very long division problem we determined that the United States spends about $265,000,000 per day on the war. We checked out other parts of the website and found, for example, that the amount spent on the war could buy over 14 million 4-year college scholarships. "That's a lot!" exclaimed several students, but in reality the number

was so large that it was near meaningless.

I decided to try to make the number more understandable by having the students figure out the cost in smaller units of times. Working in pairs and then as a large group and with a whole lot of discussion we calculated how many "tax dollars" are being spent in an hour, a minute, and then a second.

That's when Ben shouted out the number of PS360s that could be bought each second—assuming, Ben clarified, "you buy the $600, not the $500 model." Isaiah suggested that you could take those six and resell them on e-bay and make a lot more money. I could tell that my attempt at getting kids to reflect on the social cost of the war was losing out to their consumerist fascination with the latest video game technology. My frown must have communicated my disappointment because Ben quickly added that with all that extra money from the e-bay sales, we'd have all the more money to help people who needed it.

I made one last attempt to concretize the cost by having a student go to the part of the cost of war website on public education, that calculates the additional number of teachers (at that point, 2007, over 6 million) that could be hired for a year. I told the kids there are about 80,000 public schools in the United States, then as a class, we calculated that every school could have 75 more teachers—or each school getting two more teachers for the next 38 years. Given that we don't have a music or gym teacher in our school, students related to that. "No offense, Mr. Bob," one told me later. "You're a good gym teacher, we'd just like to have a real one."

The war had become a low-level conversation in my classroom. Occasionally, one of the students would come in and announce the new cost of the war from their Internet work they had done the night before.

The war also found its way into our school in different ways. In 2010, when district budget cuts threatened our school's full-time librarian, I helped fourth and fifth graders form the "Rescue our Librarians Club," which petitioned, testified in front of federal and local officials, and protested in favor of our librarian. I encouraged students to compare the cost of war with the cost of librarians. As I wrote later:

> At the Rescue Our Librarians Club, we did some calculations. Assuming that wages and benefits for a librarian average $75,000

a year, and that there are 95,000 public schools in the United States, the government would have to find $7,125,000,000 to ensure a librarian for every school.

"Wow, that's a lot!" one student exclaimed.

And it is. I directed the children to the website The Cost of War (costofwar.com), where we discovered that the United States spends nearly $300 million daily on the wars in Iraq and Afghanistan. We figured out that funding all those librarians for a year was equivalent to 25 days of war spending.

The use of mathematics and the stark comparisons between the cost of war and students' real needs further motivated students in their efforts (Peterson, 2010).

The year that Osvaldo revealed he had worked as a child laborer, I was scheduled to go to New York to give a keynote speech at a mathematics conference about how numbers count. I explained to my students about my trip and repeated what I had said all year: numbers are really important if we want to understand and change the world. I said if anyone wanted to write a poem that would show how numbers count, they could. Osvaldo addressed the poem to president Bush. He wrote:

Numbers Count

Numbers do count Mr. President
2,453 America soldiers are dying
17,648 soldiers are wounded
35,161 innocent Iraqi people are dying
281,864,948,707 dollars are wasted in the war.
Imagine how much we can do around the world
With that money!
We can feed the needy
Build houses
Give Scholarships
And much more
Do you care about the people?
I do.

Concluding Words

Of course the level of sophistication and complexity of the mathematics we use in our classrooms depends on the developmental level of our students. Teachers, however, too often underestimate what students are capable of doing. To the degree that I provide quality instruction, clear modelling, and purposeful activities, I am usually pleased with the enthusiasm with which my kids take on such math-based projects, and the success they have in doing them. I have observed in such social justice-based math projects and activities that the my students demonstrate considerably more "stick-with-it" attitudes, than in more mindless math assignments.

I have found that as a result of trying to implement "mathematics across the curriculum"—and in particular, integrating mathematics and social studies—my students' interest and skill in mathematics have increased, in terms of both their understanding of basic concepts and of their ability to solve problems. Furthermore, they can better clarify social issues, understand the structures of society, and offer options for better social policies.

Even during an era of scripted curriculum and obsessive standardized testing, I believe that social justice math teaching is not only possible, but more necessary than ever. Teachers can weave social justice into even the most prescribed math lessons and find state or Common Core standards that connect to most uses of these types of mathematical questions. Math concepts and skills are universal. There is no reason why such concepts and skills can't be taught in a social context, pushing students to examine issues of injustice.

Of course, this approach takes more time, preparation, and occasionally some delicate political manoeuvring. By working collectively – whether in school-based groups or through committees in our unions—teachers will likely succeed at this important work of interjecting social justice math into our scripted-curriculum dominated classrooms. By doing so we will become better teachers, feel that our work is more meaningful and, most importantly, give our students the tools they need to make this world —their world—a more just and sustainable planet.

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