Teaching Social Justice through Mathematics: A Self-Study of Bridging Theory to Practice

Lisa Harrison, *Assistant Professor, Ohio University*

Abstract

In this self-study I critically reflect upon my experience guest teaching a seventh grade unit that integrated social justice and mathematics in an urban school district. As a teacher educator who was newly introduced to the scholarship of social justice mathematics, I analyze my meaning making process of bridging my conceptual understanding of social justice mathematics to my actual teaching practice to better understand the complexity of addressing issues of social justice and merging them with the content of mathematics. I end this article by discussing the implications for my role as a middle grades teacher educator who wants her majority middle class white preservice teachers to incorporate issues of social justice into their own teaching practices.

Introduction

As the field of teacher education advances, many teacher educators encounter theories and teaching methods that are new and unfamiliar to their previous experience as a teacher practitioner. When I was a doctoral student, I had a graduate assistantship with responsibilities that included teaching pre-service middle school methods courses and supervising preservice students during their field experiences. Within this capacity I occasionally found myself teaching new theories and methods introduced to be in my doctoral program to preservice teachers solely based upon my theoretical understandings without ever personally engaging within a practical application inside a middle school setting. The friction that I felt teaching pedagogy that I had a theoretical understanding of, yet lacked practical experience with, can be reflective of the divide that often exists between teacher educator programs and K-12 schools. It is not uncommon for concepts discussed in teacher education methods courses not to be implemented during student teaching (Clift & Brady, 2005), which is troublesome because teachers often identify their field placement experiences as their most influential component of their teacher preparation program (Clark, Triggs, & Nielsen, 2014).

Within my own practice, my preservice teachers would often admit that the only time that some university-taught pedagogies and theories were implemented within their middle school classroom is when their university supervisor came to observe a lesson. As a teacher educator, I was often frustrated by these candid confessions and they caused me to reflect upon the tensions between the theories discussed in my middle childhood method courses and the actual implementation or lack thereof within the middle school classrooms of my preservice teachers. As a teacher educator who is interested in improving her practice, I decided to engage in self-study to help me explore the tension between theory and practice. With my increased interest in addressing issues of equity and social justice in schooling, Gutstein's (2006) teaching mathematics for social justice was one such emerging theory that I was newly introduced to during my doctoral studies without practical application inside of a middle school setting.

In this self-study I critically reflect upon my experience teaching a seventh grade mathematics class for social justice in an attempt to:

(1) Contextualize my own theoretical understanding of mathematics for social justice;

(2) Explore how my theoretical understanding translated into a practical application; and
(3) Analyze my own practice to enable me to discover unforeseen issues that might occur for preservice teachers when teaching mathematics for social justice within the classroom.

Though I was no longer employed as a teacher, in order to engage in this work I received permission to teach a week long math unit at the former middle school where I was a seventh grade mathematics teacher. My study coincided with the duration that the actual teacher was out on leave and therefore I was the sole teacher of the class during the time of the study. During this self-study I analyzed my meaning making process behind bridging my conceptual understanding of mathematics for social justice to my actual teaching practice to better understand the complexity of addressing issues of social justice and merging them with the content of mathematics. In conjunction with analyzing my own role as a teacher practitioner, I also reflected on the implications for my role as a teacher educator who wants her majority middle class, white, middle childhood education preservice teachers to be aware of equity issues and to incorporate issues of social justice into their own teaching practices.

Discourse around issues of equity and social justice can be difficult to facilitate when working with white preservice teachers. Two challenges include a resistance by white preservice teachers to accept notions of their own privilege (Butin, 2005) and preservice teachers' lack of cultural consciousness in regards to people of color (Gay & Kirkland, 2003). This creates a context where preservice teachers do not see how concepts of race, class, and other identities connect to education (LaDuke, 2009). In addition, within teacher education, preservice teachers are often not challenged to think of issues of equity, race, and privilege in complex ways because teacher education programs often take a non-critical and traditional approach to discussing issues relating to culture (Cochran-Smith, 2004). As a result, teacher educators who promote these critical pedagogies within their courses often faced strong resistance from preservice teachers (Sleeter, 2002). Though challenging, I believe that it is my duty to engage preservice in such pedagogies. This self-study was designed to inform my understanding of teaching for social justice and therefore better enable me to prepare my preservice teachers to do the same.

Teaching Social Justice through Mathematics

Teaching mathematics for social justice is rooted in a Freireian (1970) notion of liberatory education. Gutstein (2005) states that

> Students themselves are ultimately part of the solution to injustice, both as youth and as they grow into adulthood. To play this role, they need to understand more deeply the conditions of their lives and the sociopolitical dynamics of their world… Educators working toward an equitable and just society can help students develop not only a sophisticated understanding of power relations in society but also the belief in them as conscious actors in the world. Helping young people develop a sense of personal and social agency can be an important step toward achieving equity. (p. 40)

Teaching mathematics for social justice consists of using mathematical thinking to help students become aware of the social injustices that occur within society at large and in their own lives while also increasing their mathematical understanding. Gutstein (2006), upon whose work I based my theoretical understanding of mathematics for social justice, divided his framework into two broader goals: mathematical pedagogical goals and social justice pedagogical goals. His view of mathematical pedagogical goals is sub grouped within three categories – reading the mathematical word, succeeding academically in the traditional sense, and changing one's orientation to mathematics. Reading the mathematical word consists of having a strong mathematical foundation and

understanding. While the traditional notion of academic success is defined by students' ability to perform well on standardized tests, lack of access to advanced mathematics courses and other barriers act as gatekeepers (Oakes, 1990) for many marginalized students. Lastly, changing one's orientation to mathematics goals requires moving away from privileging traditional regurgitation of mathematics toward helping students to see the interconnectivity between mathematics itself and the world around students' lives.

Gutstein's (2006) social pedagogical goals are also subdivided into three goals: reading the world with mathematics, writing the world with mathematics, and developing positive cultural and social identities. By reading the world with mathematics, Gutstein is referring to the use of mathematics to comprehend, examine, and research issues that affect students' direct lives and the broader social world. Writing the world with mathematics involves social agency. Where reading the world is more of a reflective process, writing the world is more of an active process. Writing the world with mathematics happens when students use mathematics as their voice to change the world. Lastly, developing positive cultural identities requires educators to honor and value students' various cultural backgrounds while also preparing them to maneuver and succeed in dominant culture. The development of positive social identities directly relates to students' self-efficacy as social change agents.

Within this reference to the social justice pedagogical goals, Gutstein (2006) argues that social justice pedagogical goals are "simultaneously independent of, and interdependent with, subject matter" (p. 24). Fundamentally the core principles of social justice pedagogical goals apply regardless of content matter. Though my study takes place within a mathematics classroom, the dynamics of independence and interdependence hold great significance to my role as a middle childhood teacher educator who prepares preservice teachers across four different content areas. While the content matter might differ, my preservice teachers were all preparing to teach young adolescents who are at a prime developmental stage to engage in such pedagogies. Teaching for social justice is a transformative pedagogy to use with young adolescents because it is a time when they are morally concerned with fairness and are capable to view situations from other people's perspectives. Young adolescents' cognitive development, which is transitioning to more abstract thinking, coupled with a heighten interest in what is just presents an ideal context for a curriculum grounded in social justice pedagogies.

Methods

This research is a qualitative self-study. As a methodology, self-study "is used in relation to teaching and researching practice in order to better understand: oneself; teaching; learning; and the development of knowledge about these" (Loughran, 2004, p. 9). Trying to enhance my theoretical and practical understanding of mathematics for social justice within a middle school classroom in order to improve my ability to help preservice teachers to teach for social justice led me to self-study. Staying true to the practice of mathematics for social justice required me to create lesson plans for students that fostered open dialogue, self-reflection, and whole group reflection. The self and whole group reflection embedded within mathematics for social justice allowed students to work as collaborators in the self-study process.

Often self-studies are misconstrued as solely self-centered (Loughran) but that is not the essence of a self-study. Bullough and Pinngar (2001) suggest that a self-study:

> Does not focus on the self per se but on the space between self and the practice engaged in. There is always a tension between those two elements, self and the arena of practice, between self in relation to practice and the others who share the practice setting. Each self-study researcher must negotiate that balance, but it must be a balance—

> tipping too far toward the self side produces solipsism or a confessional, and tipping too far the other way turns self-study into traditional research. (p.15)

Though personal critical reflections were the main data source for my self-study, students' dialogues and reflections allowed me to interact within the space between self and practice. Simply focusing on self without considering the social context and my students' realities and beliefs about the world would potentially lead to faulty findings. Likewise, not focusing on self at all would limit my ability to deepen my understanding of mathematics for social justice and would hinder me from scrutinizing how my own biases and misunderstandings might affect my instruction.

School Context

This study took place in a middle school in Brooklyn, New York. Approximately 90% of students were eligible for Title 1 funding, 93% of the student population was Black, 4.3% was Hispanic and the remaining students were from other racial and ethnic groups. For this study I taught a weeklong math unit. I took over a single period of instruction, which equated to 45 minutes in a seventh grade mathematics classroom. While I was the sole teacher in the classroom for the duration of the study, I was not the official teacher of this class. The principal allowed me to teach this class because it was the former school in which I had been a seventh grade mathematics teacher. So while I did not have a relationship with these students, I did have an understanding of the school and community context.

Description of the Unit

The weeklong, five-day unit incorporated various mathematics problems integrating different issues of social justice. The unit was not designed to teach new math concepts but rather to explore social justice issues through math problem sets that were grade appropriate. Day one consisted of introductions and an icebreaker to get to know the students, a discussion on classroom expectations, and a discussion defining social justice. This lesson ended with a math problem that explored the social justice issue of hunger through the use of fractions, ratios, and/or proportions. Days two through four focused on a math investigation titled Driving While Black or Brown (Gutstein, 2006). The social justice issue discussed in this activity was racial profiling and the mathematical topics included concepts such as probability, fractions, percents, statistics, and estimation. Finally the fifth day focused on a math activity that critically explored how the unemployment rate is calculated (Frankenstein, 2013). The mathematics used in this activity was percentages. In addition, we had a final discussion on how mathematics can be a helpful tool to address issues of social justice.

Data Sources

My data sources for this study consisted of field notes taken while in the classroom and during three phases of reflective writing. Though this study was mainly about reflecting on my experience, the field notes became a way to record students' comments during the unit because conversations were not digitally recorded. Since the study was for a short duration and I was new to the classroom, I felt that field notes would be the least invasive way to record students' comments. The first phase of writing discussed my expectations of the impact of my unit on my students. Particularly, it discussed what a mathematics for social justice classroom would look and feel like in comparison to a traditional mathematics classroom. It also explored what mathematics were embedded and necessary in the lessons that I constructed, and examined the social justice issues embedded in those lessons. The second phase consisted of daily reflective journals documenting my actions, emotions, and thoughts on that particular day. The field notes of students' comments were used to inform these daily reflections. Finally, the third phase was an overall reflection on the unit, focusing especially on my theoretical understanding and expectations of mathematics for social justice in relation to what actually occurred in the classroom. These

reflections were informed by conversations with colleagues during the teaching of the math unit.

One benefit of self-study is the continuous possibility of knowledge formation. Growth is prolonged through constant dialogue, both with oneself through reflection and with colleagues, which inevitably initiates further reflections. The process continues in a dialectic manner with the research question at the center of self-reflection and group dialogue. In my case, colleagues who were also interested in social justice issues were instrumental in my reflection process. Similar to other university faculty members who are committed to social justice, each person had a different conceptualization of social justice (Cochran-Smith et al., 1999). Therefore, these clarified, and in other cases problematized, issues surrounding social justice, mathematics for social justice, and helping preservice teachers to integrate issues of social justice within their own practice. All three phases of writing consisted of constructed narratives.

Data Analysis

The narrative nature of my data allowed me to adapt Lieblich, Tuval-Mashiach, and Zilber's (1998) notion of categorical content analysis to formulate emergent themes based on the data. The utilization of three phases of "self," before, during, and post teaching mathematics for social justice, created collective "selves" that permitted me to account for the transformation of not only my comprehension of mathematics for social justice but also a heightened awareness of myself as a teacher educator, an advocate for social justice and tensions that occurs in all of these identities. The process of analyzing my data included reading, coding, and memo writing in a cyclical process until my data was saturated and well-defined categories were created. Codes included students' misconceptions about social justice, ideas of social justice, stereotypes, student engagement, math discourse, social justice discourse, and probing. The memo writing process was helpful in developing codes. For example, through this process, social justice discourse and probing combined to form guiding discourse. Eventually, guiding discourse developed into one of my findings that mathematical facilitation of discourse differed from social justice discourse facilitation.

Findings

Three primary findings emerged out of my self-study. The first finding focuses on the impact of teaching mathematic for social justice on the middle school students in the study. Though there were positive transformations that occurred in regards to students' learning, the last two findings focus more on aspects that impeded my ability to be as successful as I had hoped during the unit: first, my emerging awareness of my own uncertainty about what actually constituted social justice; and second, the differences in skillsets between being a mathematics for social justice facilitator and being a mathematics facilitator.

Teaching Mathematics for Social Justice Impact on Students

Overall, I was able to account for initial positive transformations within the students that aligned with several of the goals behind teaching mathematics for social justice. One such outcome was that mathematics for social justice was a successful way to engage students, by tapping into young adolescents' already inquisitive and talkative nature. This was a testament to the power of centering instruction on social justice issues. Teaching math through social justice became a way to make the learning more relevant and interesting to the students. More so, contextualizing the math within a social justice framework gave the students a reason to do the math.

Additionally, there was an increased yet still limited understanding of what is meant by social justice for the students in the class. When I began the lessons I was discouraged by the students' lack of knowledge of what social justice meant. Some of the students' initial definitions included: something solved in court, problems solved socially, a type of law, and a story using patterns or numbers to solve mysteries. While it was

evident that students were trying to make meaning of these two words together, and the last response in the context of a mathematics classroom, I was taken aback that their initial level of understanding did not match my assumptions. I anticipated that some of the students might not know what social justice meant but expected that a good majority of the students would have an idea. Understanding the socio-cultural context of the students and their communities, I knew that issues of racial profiling, inequitable housing, and other social injustices were infringing on their human rights and therefore wrongfully assumed that they would understand the term. However, after further interaction, discussions, and reflection I realized that it was not that students did not possess any concept of social justice, but they were not able to articulate their awareness under the label of social justice. One reason is because they did not recall any teacher discussing the term social justice in their previous or current schooling and thus did not have enough experience and the vocabulary to define social justice.

Furthermore students were often able to identify things as fair and unfair but were not able to articulate the social and political underpinnings behind the injustice. For example, one of the students stated that wearing school uniforms was a form of social injustice. At this particular public school there was a constant battle between administrators who tried to strictly enforce a mandatory uniform policy and students who desired to wear "street" clothes. This student's reasoning behind seeing the school's uniform policy as a social justice issue was because he thought it was unfair for his choice to be limited. Though having students look at their own schooling and lives was a productive way to get students to start thinking and talking about social injustice, and therefore social justice, it was hard to move from simply focusing on what was fair and unfair to the students to placing it in relation to socio, political, and cultural issues of fairness. A student could argue that a school-wide policy that enforces mandatory school uniforms is unfair but that does not make it a social justice issue. However, when this discussion is placed in a socio, cultural, and/or historical context, this issue of mandatory uniforms can become a social justice issue, such as when the essential questions are framed around the types of public schools that try to enforce mandatory school uniforms, the justifications behind their choice to enforce mandatory school uniforms, and their effectiveness in achieving their goal.

Though classifying student uniforms as a social justice issue may be debatable, by asking those three questions it changed the unfairness from a personal infringement of rights to a larger social discourse. Research indicates that schools with a higher percentage of minority students and free and reduced lunch, such as the school in which this research took place, are more likely to enforce a school uniform policy than affluent schools (Brunsma, 2004). Proponents of a mandatory uniform argue that school uniforms increase school wide safety, reduce behavioral problems, decrease the presence of gangs, foster school unity, reduce social pressures and level status differentials, and increase student self-esteem and motivation (Brunsma, 2006; Wade & Stafford, 2003). However in a comparative study between three public middle schools that enforced school uniforms and three that did not, Wade and Stafford concluded that while teachers' perceptions of the presence of gangs was lower in schools with uniforms, the students' perception of the presence of gangs did not vary across schools. Furthermore, both students' and teachers' perceptions of school climate did not vary across schools and students at schools with uniforms had lower self-perception scores than students from schools without uniforms. In addition, reports of school districts that attribute school uniforms to improvement within their schools are frequently based on anecdotal data and often implement other changes including increased security guards and metal detectors. These additional factors make it hard to determine if uniforms were the direct cause of a positive change in school environment.

While this knowledge is not something that I expect my students already to possess, it is

information that could help them move from seeing school uniforms as a personal or school issue to a larger social justice issue regarding which bodies are policed. It also provides a framework for me to use mathematics to bring forth these disparities that exist. In hindsight I realized that I could have had the students pick 10 school districts within the city and determine how many schools in each district enforced mandatory school uniforms, while also finding the various schools' demographic data including race, socioeconomic status, suspension and expulsion. With this information students could use statistical analysis to examine the differences between schools that enforce uniforms and schools that do not. Though students would not have to conclude that school uniforms are a social justice issue, they would be able to use mathematics to make a more informed decision and personal argument about their own school's choice.

My Understanding of Social Justice

One of my most eye opening findings was that teaching mathematics for social justice challenged my own understanding of what is meant by social justice. During the pre-reflection phase, I wrote about the optimistic impact I thought teaching mathematics for social justice would have on my students' learning.

> It is my belief that mathematics for social justice would inspire students to take education seriously, provide a curriculum that was relevant to their daily lives, give numbers meaning, create a more engaging learning environment, and provide an opportunity to channel the abundance of young adolescents' energy with constructive dialogue and mathematical problems.

However, not as much pre-reflection attention was placed on what social justice truly means. My concept of social justice was always in relation to what I was going to teach and what knowledge I wanted my students to gain by solving a certain mathematical problem or answering a particular question. So instead of centering my thoughts on what social justice really means, I would start by identifying some social justice issues. It was from that space that my lesson plans were created. While an understanding of social justice is embedded in the ability to identify social justice issues, it is still different than conceptualizing social justice in and of itself.

My lack of preparation in conceptualizing social justice came out as a weakness in my ability to successfully teach mathematics for social justice. I was confronted with my limited understanding on the first day of my lesson when I had students to voice their understandings of social justice. As they gave me responses that I knew did not fit my construction of social justice, whatever that might have been, I was left pondering how I would answer this question myself. At that moment I realized that I came into this experience with a notion of social justice instead of a solid base of understanding. This weakness was further highlighted when students would bring forth their own ideas of social justice issues. Often it was only after the class was over and I had time to reflect about the lesson and speak to colleagues that I would see how I could take a student's comment, connect it to social justice, and then find a way to link it to mathematics. I discovered through this process that while I had a teaching mathematics for social justice framework, it was also important for me to have a social justice framework.

Mathematics Facilitator vs. Mathematics for Social Justice Facilitator

Mathematical discourse is a very important concept in mathematics education. Though there are often various methods to solve a mathematics problem, normally there is only one correct solution. These various avenues to get to the solution are often viewed as objective in nature. Typical teaching strategies of probing, scaffolding, using manipulative or pictorial presentation, and wait time are often used to facilitate a mathematical dialogue about a topic or problem. While the strategies that are necessary to facilitate discussion in a traditional mathematics classroom are still needed in mathematics for social justice

classroom, the actual maneuvering of the discussion in a mathematics for social justice classroom based on the subjective nature of the context in which the mathematics is done makes it more difficult to facilitate a conversation. As I engaged in the unit, I found myself becoming uncomfortable and in some ways struggling with how to facilitate a conversation with the students in the class. I felt fairly confident in my ability to help students with mathematical misunderstandings but soon discovered that there was a difference in the skillsets needed to facilitate conversations about social justice.

One example of the need for delicate maneuvering occurred when a student stated that, "We're going to the Middle East to take oil and this is the same thing that Mexicans are doing to us." I knew that his statement was wrapped in a plethora of social justice issues, including the media's role in shaping particular ethnic groups' social identities. This student was trying to make sense of the world around him, presumably based on comments made by adults around him. Unfortunately, at that moment I could not facilitate a conversation to take advantage of the opening that his statement provided. I knew that probing into his comment would be a good strategy to facilitate a dialogue, however I was stumped at what questions to ask him and honestly I did not know where I wanted the class to go with this discourse. In a traditional mathematics classroom, I generally move the conversation in the direction of finding a correct solution to a problem. Furthermore, not only did I fail to take up his comments and tie them to social justice issues, I also failed to see how mathematics could help examine some of the issues embedded within his comment. Upon further dialogue with colleagues, I realized that a cost benefit analysis of illegal migrants, not just illegal Mexican immigrants, might be a good mathematical concept to help explore this student's comment.

From this study I concluded that one of the largest differences between facilitating a mathematics lesson and mathematics for social justice lesson is the degree of vulnerability I felt as a teacher. When facilitating a traditional mathematics lesson the conversation typically goes in circles, backwards, completely divergent, or towards the universally accepted answer. Though there can be uncertainties within a mathematics classroom, this view of a perceived universal truth provided a safety net for me as a teacher. Even if I did not know an answer to a student's math question, I knew there was a way to find the correct answer and therefore I usually was successful at keeping classroom discussions within a package. However, this was not the case for the conversations within a mathematics for social justice classroom. In these conversations, what I saw as the truth was not necessarily the universally accepted truth, which also added to my sense of vulnerability. Even though this was a mathematics classroom, and mathematics was taught and used, the implications of the mathematics were often debatable.

For example, one of the mathematics problems that I used within my lessons was as follows.

> One billion of the world's people do not get enough to eat, yet half the grain grown in the world is fed to livestock. Why? To fatten the cattle up for sale to people who can afford to buy meat. Chronically hungry people rarely have the money to buy meat. Most cattle today do not graze freely on pasture grasses – if they did, their meat would be leaner and healthier. Instead, they are penned up in crowded "feedlots" and given large quantities of grain. The meat from grain-fed cattle is higher in fat. For every 16 pounds of grain fed to a cow, we get only one pound back in meat on our plates. Producing that pound of meat requires 2,500 gallons of water. In many areas of the world, people do not have access to even a small amount of clean drinking water and must walk miles a day to get it. If your entire class went to McDonald's and each student ate one Quarter-Pounder, how much grain was used to produce the class's lunch? How much water was used? Explain why you

> think this is or is not a problem. If it is a problem, what are possible solutions? (Kempf, 2005, p. 74)

The mathematics in this problem led to one correct answer – 26 students mean 6.5 pounds of beef, which equates to 104 pounds of grain and 16,250 gallons of water. Not all students knew the mathematics within the problem but I had the confidence, experience, and skills to assess what they knew and bridge to what they needed to know to get the one correct mathematical answer. However, the second part of the question lent itself to many possible responses. It was in these crucial moments that I often was stumped on how to facilitate the rest of the lesson in a constructive manner. I was in a position where I did not want to impose my beliefs on students nor did I want to shut them down. I quickly learned that it takes a different set of skills to facilitate classroom discourse in a productive manner when teaching social justice through mathematics.

Implications for Teacher Education

Continuously reflecting upon my role as a teacher educator while I taught mathematics for social justice provided me with some insight into how I could improve my own practice. My limitations in understanding social justice made me realize the importance of providing opportunities for my preservice teachers to truly conceptualize social justice. In order to achieve this, teacher education must be viewed as a "learning problem rather than a training-and-testing problem or a problem of large-scale implementation of particular teaching technologies (Cochran-Smith, 2004, p. 2). Teaching is contextual and there is not one model of practices that will work for all students. The manner in which teacher educators incorporate social justice issues within their instruction should reflect this contextual nature of teaching. Therefore, when teaching for social justice, teacher educators might focus on broader notions such as equality, racism, classism, privilege, sexism, oppression and equity.

Incorporating these concepts may have implications for how preservice teachers conceive of social justice. It is impossible to void conversation of such societal structures when trying to deconstruct social justice. I found that when I had time to reflect on and discuss with colleagues about the issues that the middle school students would bring forth, our ability to connect their concerns and comments to broader issues such as equity, racism, and disparity enabled me to bridge their lives and misunderstandings to social justice issues. Furthermore, having a foundation in these concepts allowed me to see how mathematics could be used to help students gain a better understanding of the social injustices within their lives and the world around them.

Having a foundation in concepts such as classism and privilege is important, but teacher educators should also discuss explicitly how those issues connect to social justice. As a part of this process teacher educators need to focus on assessing preservice teachers' dispositions to social justice (Villegas, 2007). It is essential for pre-service teachers to be aware of race and class and to understand how such constructs influence their students' lives and therefore their practice as teachers. Gutstein and Peterson (2013) argued that one of the best ways for preservice and inservice teachers to get started with integrating social justice concepts into mathematics is to get to know the students and communities where they are teaching and the issues that students voice. Furthermore, the very nature of social justice requires one to move from awareness to active engagement in breaking down barriers. Preservice teachers need to be prepared with a social justice perspective so they can see how their practice as a teacher can be used to help eradicate social injustices within the school system (Ukpokodu, 2007).

Focusing on grand notions of social justice is important for teacher educators who view teaching for social justice as an essential component of their practice, however there are valuable practical suggestions that teacher educators need to incorporate within their instruction as well. For example, teacher educators need to prepare preservice teachers to

find comfort within uncomfortable situations. Unlike the majority of my preservice teachers at my university, I came into this study with previous teaching experience in an urban school setting, had a similar racial background as the majority of the middle school students, and possessed a vested interest in teaching for social justice. In spite of this, I still experienced many moments of uneasiness while teaching mathematics for social justice that inhibited me from being as successful as I had hoped. As teacher educators we have to be realistic and open with our preservice teachers to prepare them to be successful in their endeavors and to combat discouragement.

When using a social justice pedagogy, some areas of discomfort can be used as a starting point for dialogue within teacher education courses. Questions to pose include: How do you get students to come to their own awareness without forcing your opinion on the students? How do you respond to students when you know their comments are based off of misconceptions that might be reflective of their parents' views? How do you discuss social justice issues about which you might have limited understandings yourself? It is also essential that preservice teachers reflect upon their own biases and to discuss what type of effect these biases have on their teaching practices. This self-reflection process is imperative in developing cultural critical consciousness among preservice teachers (Gay & Kirkland, 2003). Lastly, teacher educators need to reinforce the value of teacher collaboration. It was through conversing with colleagues who challenged some of my assumptions and gave me suggestions about pedagogy that I was able to develop a deeper theoretical and practical understanding of mathematics through social justice. Middle school practices such as teaming and common planning time can be used as a way to discuss the benefits of teacher collaboration.

Finally, as teacher educators move to supporting preservice teachers in this work, we need to model ways to create learning environments that are compassionate, safe and open. This is necessary to allow both preservice teachers and students to feel comfortable and confident in discussing and asking questions on a diversity of topics. It is only after creating such spaces that the work of teaching social justice can be done effectively. Laying this foundation will allow teachers and students to challenge each other's assumptions respectfully, to ask difficult questions, and to allow teachers to navigate complicated and uncertain discourse.

Limitations

It is important to note that this study is not without limitations. One of the limitations is that the math unit was only one week long. It is conceivable that teaching a longer unit would allow students to developer a deeper understanding of the interconnectivity of social justice and mathematics. And it would allow me to develop a more nuanced understanding of teaching social justice through mathematics. Unfortunately, it is not always feasible for teacher educators to engage in an in-depth study for new teaching practices and often we rely on the research and experiences of others to inform our practice. One of the benefits of this study is that it is a realistic example of how teacher educators can advance their own understanding even through limited exposure to a new teaching practice.

Another limitation was that I was a guest within the classroom instead of the sole teacher from the beginning of the school year. As a guest teacher I did not have an intimate understanding of the individual students and therefore could not bring their unique perspectives and experiences into the curriculum. Though I did not know the students individually, I did previously teach at the school and the demographics remained similar. Therefore, I guided this unit by broader social justice issues and pre-established math problems that I thought these students might find engaging and relevant based on my previous experience teaching within the school.

Conclusions

Similar to Cochran-Smith (2001, 2004) and Nieto (2000) I believe that it is the duty of teacher education programs to prepare students to teach for social justice. Unfortunately, even though teacher education programs have had an increase commitment to social justice, they often have limited impact on preservice teachers' beliefs (Tatto, 1996). While there are many factors that might contribute to this inability to change preservice teachers' dispositions, engaging in self-study can serve as a way to help teacher educators to develop a sense of credibility with preservice and inservice teachers when introducing concepts like teaching for social justice. In addition, self-study serves as a way to deepen teacher educators' understandings of the pedagogies in which they teach and the misunderstandings, troubles, and hesitations that preservice teachers might have about implementing such pedagogies.

Loughran (2004) articulated the importance of self-study the best when he stated:

> By doing that which one advocates for one's students, so it will offer insights into teaching and learning that might otherwise not be fully appreciated or understood if such learning was not genuinely experienced…It is also clear from the literature that beyond individuals' desire to be better informed about how they think and act, is an expectation that their learning through self-study might also help to positively challenge and change teaching and teacher education practices more generally. (p. 154)

One such positive change is for preservice teachers to become conscious of social justice issues and how education is used to create, recreate and often reflect social ills within society. Currently, one of the alarming social justice issues within education is the school to prison pipeline. Conversely, preservice teachers also need to be empowered to see the liberatory powers that exist within education, especially when teaching racially marginalized student populations (Murrell, 1997). Embracing Gutstein's (2006) social justice pedagogical goals, my practice as a middle childhood teacher educator is driven by creating a dynamic where my preservice students view and see the power of education and their practice as a way to foster transformative middle school students who read the world, write the world, and develop positive cultural and social identities. ❖

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