

# MATH, SOCIAL JUSTICE, AND PROSPECTIVE TEACHERS IN U.S.A. AND URUGUAY: LEARNING TOGETHER

Paula Guerra

Woong Lim

Raisa Lopez

Kennesaw State University

University of New Mexico

IFD-Pando

*In this study prospective teachers from the United States and Uruguay participated in a Teaching Mathematics for Social Justice (TMfSJ) project. The authors analysed data using discourse analysis with a critical mathematics approach in order to examine initial self-perceptions demonstrated by the participants and their conceptualizations of TMfSJ. Our findings indicate that while participants in both countries needed help supporting their emerging skills in creating effective lessons to teach social justice in the classroom, U.S. participants demonstrated resistance to social justice teaching, whereas Uruguayan participants showed interest and embraced the social justice curriculum.*

## INTRODUCTION

It is crucial that children learn mathematics as a tool to understand and change the world (Freire, 1979/2000; Gutstein, 2006). In order for children to participate in this kind of experience, teachers need support to recognize the power of mathematics as a social tool (Moses, 2001). To do this, teacher preparation programs need to provide prospective teachers with meaningful opportunities to experience mathematics as a social tool and reflect on teaching mathematics for social justice for themselves. Part of our efforts to provide such opportunities have included a project in which prospective teachers in the U.S. interact with prospective teachers in Uruguay to learn more about TMfSJ.

In this study prospective teachers in the U.S. and Uruguay shared their perspectives on TMfSJ and attempted to construct social justice curriculum by writing a lesson plan. The dialogues that took place throughout the project enabled the authors to understand the participants' perceptions, changes, and experiences. In addition, the data were used to analyse the nature of context that could cause participants' interest, awareness, or resistance to social justice learning. The comparisons between prospective teachers in different settings helped the authors make sense of social and cultural factors associated with cultural competency for social justice.

Studies like this can provide teacher educators interested in advancing the practice and curriculum of TMfSJ with a richer context of social justice curriculum in teacher education programs with predominantly White prospective teachers. The findings can provide teacher educators with concrete pedagogical ideas to implement in their classrooms as well as help prospective teachers develop appropriate social justice advocacy by overcoming cultural attitudes and biases.

## **THEORETICAL FRAMEWORK**

### **Critical Mathematics: Teaching Math for Social Justice**

Teachers need to be “a threat to inequity” wherever they are and whatever the form of inequity it may be, developing their critical literacy to be an advocate for access and equity, said Gorski (2016). Not only should mathematics be part of such critical literacy, the discipline does and should serve as a tool to tackle inequities. Called “a weapon in the struggle” by Gutstein (2012), mathematics education in the traditional framework may not achieve this goal of equipping people with the awareness and knowledge to reduce social and economic inequality. Our students as well as prospective teachers need access to critical mathematics (CM). Therefore, TMfSJ is an ethical and moral imperative (Stinson, 2014).

Prospective teachers and their future students have much to benefit from learning CM, which is equitable and socially empowering (Gutstein, 2003, 2006; Stinson and Wager, 2012). The aim of CM through TMfSJ is to empower students to read and re-write the world using mathematics (Gutstein, 2006)—especially those who have been traditionally underserved—to change the world and overcome rising inequities in society.

Such empowerment can be established in the minds of students only after they develop what Freire (1979/2000) calls “concientizacao” (critical consciousness). This connection of CM to *concientizacao* is important, as Frankstein (1983) articulated CM as a re-invention of Freire’s theory for mathematics education (Gutstein, 2013; Freire, 1979/2000).

While Critical Mathematics and Mathematics for Social Justice it is not a new idea in the States, it is for Uruguay. The literature in Latin America in regards to teaching Mathematics for Social Justice just starts to bloom. Authors throughout the continent are concerned with inequities in the mathematics classrooms and its consequences. They mostly talk about issues of gender and class, but they do not explore ways to address those while teaching mathematics. In conversations with Uruguayan Mathematics educators the authors found that they also find these ideas interesting and new. These educators also were eager to embrace and learn more, and were in the stages of experimenting with their students.

## **METHODS**

Participants of this study were prospective elementary teachers in the U.S. (n=20) and Uruguay (n=9). All participants were in their senior year and taking mathematics methods courses at the time of the study. The U.S. participants were students in a state university in the South of the U.S., and the Uruguayan participants were students of a public normal school located in a city 33 km from the capital, Montevideo.

This study collected lesson plans, reflections, notes from class discussions, and videotaped interactions and interview data at the end of the project, which were

analysed using discourse analysis (Gee, 2010). Participants were provided with the same readings (Education for liberation: towards a framework to teach mathematics for social justice -chapter 2 in Gutstein, 2006-, and Learning to teach mathematics for social justice: negotiating social justice and mathematical goals -Bartell, 2013-), lesson plan template, writing prompts for reflection, and instructions prior to the participants' "confession cams". The confession cams are videotaped interactions between a U.S. participant and a Uruguayan participant, where individual views on social justice issues are discussed confidentially with no access from the researchers or instructor until official course grades are decided.

## RESULTS

Our preliminary results show that prospective teachers in the U.S. were resistant to TMfSJ. The data from group discussions and reflective writings pointed to various reasons why U.S. participants believed social justice was "inappropriate" content in the mathematics classroom. For a couple, they were concerned that the teacher would unnecessarily be "introducing" children to hardship in life; second, students could misunderstand the teacher as being racist; third, it was not the teacher's responsibility to teach social justice at school but the parents' job to teach at home; finally, students were not mature enough to share their views of "justice" or "social justice". Some participants mentioned that they did not trust the instructor's intent to introduce social justice in mathematics teacher training. It was also found that the lesson plans provided by participants were evaluated as demonstrating little connection to TMfSJ.

The students who were concerned about "introducing" children to hardship in life thought that they would be "damaging" the innocence of children by talking about certain issues. For example one of them claimed: "I don't think talking about racism to children will help them understand anything at their age. They may just feel bad about it. Why would I do that to them?" (US female student 1, class discussion). Another one added: "It would be so sad to talk about these things knowing some of them have to endure them outside of school. Why also bring it to the class?" (US female student 2, class discussion). Examples provided to them about the knowledge children actually have and what they want to talk about, did not change these students minds.

Students also thought children could misunderstand the teacher as being racist. This was a big concern for students who were doing their field experience in higher grade levels. One commented: "They [the children] will wonder who am I, the white teacher, to tell them what is fair and teach them about justice? That can cause more resentment." (US female student 3, class discussion). To this, an older classmate added: Exactly! What good can come from it? If you keep scratching and scratching the surface... what will you find?" (US male student 1, class discussion).

Social justice was for most of the participants something they would be teaching to the children. Even though they recognized this was problematic, and it was discussed in class, going back to the readings, that this was not the process to teach for social

justice, they kept going back to this idea. This is also clear in the quote shared above by US female student 3. Because participants thought about teaching for social justice as a way to “convince” students of a certain view, they thought this should be dealt by parents at home. This was particularly clear when we discussed examples connected to gender identity and religion. “These are not things that we should talk at school. Teachers are there to teach about math and reading. Parents can take care of the rest at home” (US female student 4, class discussion).

The reflection and lesson plan data showed that prospective teachers in Uruguay did not demonstrate resistance. However, like their U.S. peers, their lessons plans were evaluated as demonstrating little connection to support TMfSJ. We found that the Uruguayan participants were interested in social justice as a tool to teach mathematics and expressed a high degree of willingness to learn more about TMfSJ and the work of Gutstein in the future. The participants found it interesting that Freire’s theory could influence U.S. classroom practice.

All but one of the Uruguayan students said in their reflection that the topic was “interesting”. After the experiment was over, some students approached their instructor and asked her to continue with this relationship and work the next semester (personal communication with Uruguayan instructor). They also thanked the authors of this paper for “...the opportunity to learn about something new that we can use in our classrooms.” (UY female student 1, reflection).

Students in Uruguay also claimed being interested in eventually trying teaching for social justice in their classrooms. After completing the readings they prepared questions for the authors of this paper. A good amount of those questions showed curiosity as to why US authors would be interested in Freire. For that reason they wanted to know more in particular about Gutstein and what took him to do this kind of work based on the Brazilian pedagogue. They also mentioned both in the direct conversation with the authors and in their reflections, that they needed to see more examples that they can adapt to begin with, so later they could come up with more original ideas.

## **DISCUSSION**

Our findings underscore the challenges for teacher educators in the U.S. in introducing social justice to prospective mathematics teachers, who have difficulty viewing racism, oppression, or injustice as a structural and cultural barrier to student success. The fact that most White prospective teachers in the study were concerned about being called racist for discussing race, class, or privilege in the classroom is a telling sign that the prospective teacher feels vulnerable in the classroom and lacks certainty in seeing social justice as a moral imperative and foundation of student success. This, in contrast with the reaction of Uruguayan students, also uncovers that these future teachers see their future students as “others” with whom, it seemed, finding middle ground and things in common was hard.

On the other hand Uruguayan students brought up (in conversation) themes that they would use for their social justice lessons that made sense for their students and for themselves. They in particular focused on class and violence against women. Sadly none of these ideas made it to the lesson plan. The authors believe that working with the students for longer time, and providing them with examples so they built their confidence, would have been useful. Yet the authors would like to highlight that in conversation or reflection, the Uruguayan students did not position themselves or their potential students as “others”. The author believes this is key to the introduction of teaching for social justice.

We note that some U.S. prospective teachers mentioned that they considered their instructor as someone from “a socialist country” with “unrealistic agendas”, while their peers in Uruguay took pride in Freire’s (a South American like them) support of the social justice framework to teach mathematics in a new way. With that said, perhaps prospective teachers who will be introduced to TMfSJ for the first time need to connect with the instructors in trust and respect, especially when the teacher educator and prospective teachers do not have similar social or cultural backgrounds.

On the other hand, it was noteworthy that the U.S. participants believed they would “teach” their students what is “just”. Despite the readings and conversations in class, the participants related social justice as a skill set to be taught, rather than recognizing the importance of teacher effort in getting to know the students and their cultures, building relationship with students and family, and preparing students to use mathematics to understand and analyse social and economic inequalities while challenging them to overcome structural barriers to have a better future.

## **RATIONAL TO THE CONFERENCE THEME**

Preparing prospective teachers for cultural competency for social justice in today’s classroom means creating learning opportunities in various contexts that culminate in a change in attitude and growth in enlightenment. Teachers need training must have opportunities to examine their privilege, especially their conception of social justice. For one, prospective teachers can benefit from interacting with peers from other countries or with different cultural backgrounds and grappling with integrating social justice into their mathematics teaching. Critical mathematics may be one answer to mathematics education in times of crisis. For this reason, discussing effective and affective ways for mathematics teacher educators to encourage prospective teachers in learning about CM, as well as attempting to write a lesson plan integrating social justice into the curriculum, is crucial.

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