Undergraduate voices from an after-school field experience: Fostering critical and innovative approaches in mathematics education

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Abstract

This paper is based on research in an after-school setting in which undergraduate students from a local university participate as research assistants and facilitators in a mathematics club. The experiences of two undergraduates are described in the paper, one of which was a preservice teacher at the time. They are different culturally, linguistically, and/or in socioeconomic status from the Mexican or Mexican-American students who attend the club. This paper outlines how undergraduate students' ideas about teaching and learning mathematics, with diverse students in particular, changed through these after-school field experiences. We focus our analysis on their interactions with children, on their beliefs about pedagogy and their roles as facilitators. This study has implications for teacher education programs, demonstrating the value of a non-traditional field experience in an urban school for pre-service teachers.

Introduction

The achievement gap indicates that educational institutions marginalize students who are different culturally and linguistically from the mainstream (Moll and Ruiz, 2002; www.fairtest.org, Silver, Smith, & Nelson, 1995; Ladson-Billings, 1995; Gómez & Vargas, 2003; Bernstein, 1988; 1989). A contributing factor to this phenomenon is the disconnect that exists between the teaching population and public school students (Delpit, 1995). Statistics indicate that almost 90% of the teaching force is White, while numbers of minority students enrolling in teacher education programs are declining (NCES 1997, quoted in Cochran-Smith, 2004). At the same time, our nation's schoolchildren are increasingly diverse (US Department of Education) while educational opportunities and outcomes are increasingly polarized along socioeconomic and racial lines. In order to reverse this trend of marginalization, teachers should understand and utilize approaches

to education that are inclusive and empowering for all students (Carey, Fennema, Carpenter & Franke, 1995; Castells, Flecha, Freire, Giroux, Macedo & Willis, 1999; Flecha, 2000).

Literature indicates that in order to bridge the disconnect between teachers and students, preservice teachers should have field experiences that develop cultural understanding and responsiveness (Pohan, 1996). Cochran-Smith (2004) describes a model that is not one of a uniform "curriculum" for teacher preparation, but one in which inquiry and social justice are infused throughout different facets of the programs. One of the components she discusses is the need for community-based experiences, particularly in light of the make-up of the teaching force. Several studies (Aaronsohn, Carter & Howell, 1996; Bollin & Finkel, 1996; Dee & Henkin, 2002; Kelly, 2002) highlight the impact of field experiences for preservice teachers as the most influential part of their development in preparing to teach in multicultural schools, particularly when coupled with reflection in classrooms or in a journal. Although these studies provide initial indication of the importance of field experiences, it is clear from the findings that more research is needed to gain a better understanding of the impact of these field experiences.

The focus of this report is a field experience in an after-school mathematics club for elementary school Latino/a students in which four undergraduate research assistants, two of whom were pre-service teachers, participated. The after-school program is part of a research project emerging from a multi-university research center, CEMELA (Center for the Mathematics Education of Latino/as). We examine the impact that working in an inclusive out-of-school setting, in which experiences of all participants were valued, had on the beliefs of these undergraduates.

Theoretical Framework

Our research is grounded in sociocultural theory (Cobb & Hodge, 2002; Cole, 1996; Gutiérrez, Baquedano-López & Tejada, 1999; Ladson-Billings, 1995; Moll, 1992; Nasir & Hand, 2006; Vygotsky, 1978). It is based on the assumption that learning is a social and cultural activity. Accordingly, we have created the after-school club as a setting in which students and facilitators can draw on elements from their cultural backgrounds and everyday experiences in order to create a rich mathematics learning environment. We understand this learning environment to be constructed through shared practices of participants in a community of practice (Lave & Wenger, 1991). We also frame our research with the idea of learning communities, focusing on the dialogic nature of knowledge construction in the after-school environments as well as in the learning process of the undergraduates (Elboj, Puigdellívol, Soler, Valls, 2002).

Learning as a social activity

Our experience is grounded on the assumption that (meaningful) learning is a situated activity carried out in cultural and social contexts. We draw on the idea of community of practice because we understand learning to be a situated activity (Lave & Wenger, 1991), which involves individuals participating in activities and shared practices of a community. Through the lens of a community of practice, we examine how participants are building their collective identity though the sharing of respective knowledge bases and/or backgrounds as they become more central members of a community. The after-school setting became an environment where students and facilitators worked on culturally and socially relevant mathematics projects whose foci were elicited through dialogue (Flecha, 2000). The undergraduate facilitators became members of a community

of practice of mathematics learners along with students and other facilitators. Through looking at these participants in this mathematics learning environment as a community of practice, we are able to understand how the undergraduates changed and evolved through increased participation and through the development of shared practices. In particular, this paper outlines how undergraduate students' ideas about teaching and learning mathematics with diverse students changed through this after-school field experience.

In taking a multilevel model of analysis as a reference (Ogbu, 1990; Engeström, Miettinen & Punamaki, 1999), we promoted the use of mathematics as a way to critically read the world (Freire, 1993; Gutstein, 2006). Students were encouraged to use mathematics to connect a macro level of analysis (the community context) to the micro level (their practices in the after-school). In doing this, they had opportunities to draw on their knowledge of mathematics to critically conceptualize the world around them. The after-school became a learning environment where students constituted a critical community of practice in which undergraduates played an active part. Our reflection highlights how the undergraduates conceptualized this focus of the after-school learning environment and how they began to develop a more sociocultural and/or critical perspective of mathematics education.

Research Setting

This research took place during the 2005-2006 school year in an after-school mathematics club (Math Club) for fourth and fifth graders at a majority-Latino school in the Southwest, near the Mexican border. The school is located in a primarily Mexican/Mexican-American neighborhood. Many of the Latino residents of the neighborhood are recent immigrants from Mexico, while others have lived here for

generations. The student body in the school is primarily Latino/a (90%); 97.1% of the students qualify for free or reduced lunch and 38.4% of the students are classified as English Language Learners (ELL) (District Statistics). The students in the Math Club were almost all Latino/a (some part-Native American), primarily Spanish-English bilingual, with some exceptions: a few students were Spanish monolingual, and a few spoke little Spanish. The Math Club met twice a week, on Mondays and Tuesdays, for two hours. On an average day, 8-10 students would attend, though the group consisted of approximately 15 students who attended more or less regularly.

The Math Club was facilitated by a team consisting of several graduate and post-doctoral researchers along with the four undergraduate research assistants (URAs), two of whom are the focus of the research. Our research team consists of a graduate student in Language, Reading and Culture, who is bilingual; a Fulbright post-doctoral fellow from Spain, and a post-doctoral fellow affiliated with the mathematics department at the University, who doesn't speak Spanish. In this paper, we will focus on Gloria and Jill[1]. Gloria was a mathematics major and a native Spanish speaker from Mexico; Jill is a preservice teacher in elementary education who has studied and speaks some Spanish. On most days two of the four undergraduates were present at the site. Their after-school duties included (but were not limited to) facilitating most of the activities with the students, writing field notes, attending weekly planning meetings and helping plan activities. Initially, the role of the undergraduates had been to facilitate the activities and the role of the researchers to plan the content and observe. It soon became clear that this arrangement was severely limited, and the undergraduates became increasingly involved in planning the content.

[1] We use real names of the undergraduate research assistants, with their permission.

During each Math Club session students had opportunities to pose and solve problems presented in real-life situations. Following the recommendation of Sonia Nieto (1999) and Gloria Ladson-Billings (1995) for creating a form of multiculturalism that moves beyond "getting along" or beyond designated holidays to one that becomes infused throughout our educational system with the critical element of social justice, our curriculum is based in our students' experiences. The students engage in projects that are embedded in the context of their everyday lives and whose objective is to solve problems utilizing mathematics. Often, the contexts, ideas or problems emerge through dialogue amongst all members of the Math Club. Our goal is for the students to make sense of formal mathematical ideas through these activities and potentially develop a sense of mathematical and socio-political agency. Because of our previously mentioned sociocultural and critical approach to learning in the context of a community of learners, we promote a collaborative relationship amongst students in the Math Club. The students often take an active part in creating content; they often learn and do mathematics through discussions; and they are all invited to take on the expert role.

An example of a Math Club project that would embody the above-mentioned learning environment is the immigration project we carried out in the spring of 2006. During the time of the national immigration debates, our students became interested in the issue, as it affected them personally; consequently, we constructed a project around this topic. The students chose different mathematical problems to solve: some answered how long a person would have to walk to from a nearby city in Mexico to where we live and how much food and water that person would need; some analyzed statistical data about immigrants; some created and analyzed a survey about people's attitudes toward

immigration laws. We had frequent whole-group discussions, during which the students shared personal stories and experiences and made sense of the mathematics they were doing in the project.

In this learning environment where special attention is paid to student agency, the URAs were able to develop a similar sense of agency: they underwent a transformation in roles from replicating lesson plans that others developed for them to being active collaborators in the creative process, acting as experts and taking initiative. While in the beginning they were acting according to our directives, not taking initiative, sometimes even in difficult situations, they eventually embraced the project as their own and took a more active role in its organization.

Data Analysis

In order to understand the process of change in the undergraduates, we have analyzed their field notes over time, as well as our own participant researcher field notes and videotaped sessions of the undergraduates participating in mathematics activities with the students. Using a critical-communicative approach to research (Flecha & Gómez, 2004; Gómez, 2001), which entails opening up a dialogue amongst researchers and participants in a process of shared inquiry, the undergraduates were a part of the process of analysis: as a group we discussed the changes in their approach to pedagogy and in their roles as facilitators over time, as well as any impact this experience had on their future goals.

Our research focus emerged over the course of the semester as we reflected on the changing roles and attitudes of the URAs. We then decided to conduct a collaborative focus group to gain the URAs' perspectives on these changes. These discussions took

place in two hour-long focus groups. These collaborative focus groups offered a reflective session in which the undergraduates shared their own impressions of the changes they went through as facilitators and in their beliefs about the teaching and learning of mathematics.

We utilize a grounded theory approach (Glaser, Strauss, 1967) to data analysis. From this perspective of analysis, researchers first explore the data looking for topics that emerge, in order to build some substantive or formal theories grounded in the data collected. In this sense, our analysis was an inductive approach to the data. We looked at the data, paying attention to all aspects that spoke to or described the undergraduates' perceptions, feelings, beliefs and expectations regarding their participation as facilitators in the Math Club. Based on themes that emerged from analysis of undergraduate and our own field notes as well as the focus group, we categorized and analyzed the data. The primary locations for change in the undergraduates related to: their beliefs about teaching and mathematics, relationships with students, expectations, and future plans. We have decided to present our findings in the form of individual case studies of Gloria and Jill; in the end, however, we will also discuss these changes based on some cross-cutting themes.

Findings

Gloria

Gloria was a senior mathematics major with a minor in economics during the time she was involved in the after-school, and she is from Mexico. Of all the URAs, she formed the closest personal relationships with the students, often going beyond her required duties: baking chocolate cake for the students or going to cheer them on at a local mathematics competition. In the beginning, Gloria was quiet and unsure of her role

in the Math Club. She later commented, “At the beginning I felt like when I was going to do something I always asked Maura or Ksenija, ‘Should I do this?’ or, ‘What’s next?’ more like ‘Can I say this?’ And I was afraid of doing things, and now it’s more like- I feel like the environment- I feel free to give my opinion, to say something or to maybe change some activities.” In fact, Gloria became actively involved in planning the curriculum and created activities and materials on a number of occasions.

Her expectations in the beginning, like those of the other URAs, were that Math Club would be more like school. During the focus group, she said:

> I guess like in the beginning we were going to go there and teach like adding, like subtracting, helping with homework, pure math like, nothing else just getting there and 2+2, explain multiplication, help with homework but now it’s more like not just multiplication, not just purely mathematical, it’s also like get them to know something else and apply the math to that if it’s possible, well, it’s possible. Also with the kids to get to know them, in the beginning, for the first three weeks we used to go there and you wouldn't know the kids and you didn’t know what to expect, I was expecting just math, but then like, you get to know them and you try to find activities that are more suitable to them and then you start thinking about building activities that they may like and they may enjoy doing, something like that.

She had completely revised her idea of schooling and relating the learning of mathematics to the students’ lives and experiences, which she points out as directly related to being able to develop strong relationships with students.

Gloria also described her schooling as traditional and commented that she had enjoyed the structure that it provided. For this reason, it was all the more impressive to observe Gloria adopt a completely different approach in Math Club and with much success. In the beginning, she said, “I tended to give the kids the answer, like I didn’t let them think about it. I tried to guide them. I feel kind of good. I am more conscious about it and try to step back and give them clues and let them think first.” This comment

reflects a shift in her thinking from one of knowledge being transmitted to a more sociocultural approach to learning as a social activity.

Despite of her expectations of Math Club to be structured more like school, Gloria was open to the philosophy of the Math Club from the beginning. Her personal reflections in the field notes were usually about the progress the students had made. Comments about discipline were rare, and she never expressed doubt about mathematical content or student abilities. Gloria was also very open to the idea of including social justice topics and the students' community knowledge in our curriculum. When we first attempted to implement social justice issues into the curriculum, our students expressed some resistance to the idea, stating the belief that "nobody would listen to kids anyway" and that there was no point in trying to make a change. The following week, Gloria prepared a PowerPoint presentation for the students in which she showed them examples of young people making a difference in the world; for example speaking out against sweatshops or participating in pro-immigration marches. This latter topic, being relevant to the students, galvanized them, and we soon embarked on the immigration project, in which Gloria played a prominent part.

Gloria also used Spanish with the students whenever possible and considered making cultural connections in the Math Club very important. When talking about the field trip that we took with the students into their community she said, "They were really proud of showing us […] the Mexican heritage and everything and […] they don't talk about it much, but when you start the topic they really talk about Mexico and the culture and everything." She also said that she felt a connection with the students when they

talked about Mexico, which perhaps contributed to her being able to develop such strong relationships with them.

One of the greatest changes that occurred during the year, in her opinion, was that her perception of low-income Latinos changed:

> Before entering I thought that the kids were really lost in math; they were low-income, Latinos, that they were lost. And there are some kids who are lost, but there are some that are really brilliant. Even though they aren't in a private school, they are in a public school that they have such potential to develop. That's like a change in my philosophy.

Through this experience with a differing approach to pedagogy in which student knowledge and experience becomes central to learning, her experience indicates there is potential for stereotypes and low expectations to be displaced. Although Gloria did not decide to become a teacher as a result of her Math Club experience, she stated that she would want to continue working with children and would like to find a way to apply economics to assist Latinos.

Jill

As an elementary pre-service teacher, Jill's reflections provide a wealth of insight into the impact of this learning experience. Jill had been involved in the Math Club from the very beginning (spring 2005) and is now completing her student teaching. We find Jill's case particularly insightful primarily because of her incredible ability to reflect critically on her experiences. We are also interested in Jill because of the changes she went through during the time she was involved in the Math Club. The most relevant change, in our opinion, is that by the end of the year, she had decided to become an elementary and not middle school teacher (she had previously wanted to teach middle

school mathematics) and to work with a student population similar to the one that we work with.

Like Gloria, Jill placed great emphasis on relationships with students. Yet, when talking about her initial expectations from Math Club, she said that she hadn't expected to get to know the kids as much. "Really, I was expecting more to have, you know like a leader, more of a teacher role and not really getting to kind of personally know the kids and so that, um… has been something that I didn't expect to happen." She shifted her thinking in terms of the relationship between students and teacher being one that is not personal, to one in which these close relationship are central to a learning environment.

Math Club was a significant experience for Jill also in terms of her attitude about how mathematics should be taught. During the time that she was a facilitator in the Math Club, she was also observing a second-grade class regularly. She remarked that the teacher she was observing used very standard teaching methods – few projects and many worksheets. This frustrated her, since through her Math Club experience she had started to believe that the entire mathematics curriculum could be based in projects, especially at the second grade level. When this teacher asked her to teach his mathematics class one day, she created a fraction lesson that included reading a book and hands-on activities. She said that the after-school experience had influenced her greatly and that without it she never would have been motivated to create a mathematical activity like this one.

She was also convinced that mathematics should be taught in connection with other subjects:

> …And also the connection of math to everything else and that just kind of as a general idea in teaching, keeping cross subject connections. I mean we [in the Math Club] don't get just plain arithmetic or just plain math you

> know, we incorporate it with what's going on around them in their community.

Jill described what the experience of working in the Math Club taught her about developing authentic relationships with students and talked about how the experience affected her plans as a teacher. She said she learned a great deal about the students because that was an explicit part of our pedagogy and she revealed her surprise at how different their lives are from her own. In her field notes, she wrote:

> Trying to get to know the students better has also been personally challenging for me. The process is bringing to my attention how much I really don't know about them, the lives they lead, and how different their lives are from what I am used to. […] I guess my point is that this experience is going to be an incredible learning experience for myself as well. (10/18/05)

She explicitly states how much she is open to learning from her students, highlighting the nature of more collaborative roles of teacher and student in this unique learning setting.

In addition, Jill was sensitive to cultural and linguistic issues as they relate to learning and teaching. In her field notes, she would include comments students made about their family or background. After our second field trip into the community, when the students took pictures of things they were proud of or wanted to change, she wrote the following in her field notes:

> Today was a difficult day. The beginning conversation about the violence the children are aware of in their neighborhood was shocking and depressing. It was hard for me to think about everything these kids are up against in their daily lives. They seemed to talk about it nonchalantly too, as if it were a normal occurrence. It saddens me to think that anyone has to consider those events normal and not have a strong motivation to want to see change. […] Once we got into the math of the day – the firefighter division problem – again, difficulty. With the barriers these kids face in their lives on my mind, my level of frustration rose greatly that these fifth graders had such little understanding of long division. It became apparent

> the inequality of education these kids are receiving when long division presents problems that it did. (03/14/06)

Here, Jill reflects on how her experience with students whose lives are very different from her own is helping her to be critical of an inequitable educational system that is setting up the students for failure.

During the focus group, when we inquired about how the experience may have affected future plans, she stated:

> I originally came in wanting to do middle school math […] cause I just wanted to do math and I thought it would be the more interesting math. That was all I wanted to do and now that has changed I would like to do elementary. I think the way the after school contributed to that was you know seeing math at that level can be really interesting and enriching and provide a strong foundation for the kids like it's still important at that level, cause if the foundation is there they can build off of you know in the future. And also I think the- I don't know how you would really say this, I mean the demographic of the kids that I want to work with has changed, or just developed. I didn't really have a previous plan of what type of kids or neighborhood or kind of school but now I definitely know- do know where I want to work. And so this has definitely influenced that.

We think this quote demonstrates the powerful implications of how a community-based experience can help a future teacher decide to work in schools that serve marginalized students. Reflection in field notes and in weekly planning meetings facilitated Jill's ability to understand educational inequity and changed her path as a teacher.

Common themes

The four undergraduates we worked with differed vastly in approaches, goals and teaching philosophies, yet they all demonstrated shifts in expectations and beliefs, in particular with respect to: mathematics and pedagogy, roles, the Math Club and the students, and future plans.

Whereas in the beginning they expected the Math Club to be a school-like environment in which they would be transferring knowledge to the students or disciplining them, by the end they understood Math Club to be a space that all participants (students, facilitators and researchers) had ownership of, one with the sharing of knowledge among all participants and in which learning took place by all involved.

As for content, at the start of the school year, some of the URAs only considered content mathematical if it was meticulously organized and with clear outcomes related to a specific concept. By the end, "messier" real-life mathematics with concrete applications became acceptable and in some cases even preferable. For Jill in particular it became imperative to teach using projects, especially if based on students' experiences rather than through lecturing and worksheets. Furthermore, they quickly moved away from the direct instruction model of teaching and instead utilized questioning techniques and communication amongst participants that became more sophisticated as the semester went by.

Whereas initially the undergraduates saw their roles as those of instructors whose job was only to teach the students mathematical concepts, or disciplinarians who were to make sure that students stayed on task, by the end of the year they became intellectual and emotional resources for the students, role models, collaborators, and partners in learning, to name but a few roles they took on. In fact, they all found that their roles were rather dynamic and could not be clearly defined, both with respect to the students and with respect to the structure of the Math Club itself. With respect to the latter, the participation of the URAs in the coordination of the Math Club also shifted from passively enacting lesson plans to actively planning content. Gloria, for example, took the

initiative for making the slide show about student activism, and Jill often brought children's books with mathematical content, which she read with the students and posed problems from. During the focus group, they all expressed satisfaction with being able to contribute in this way.

According to Jill's statement, the undergraduates expected to be more "removed" from the students, but by the end they became invested in the students' lives in various ways by ensuring that they had access to high-quality mathematics (example: providing additional materials), allowing their voices to be heard and respected (example: the immigration project), or by expressing interest in the students' stories about their home and community (example: a community walk that all URAs participated in).

Initial field notes indicate the URAs expressed concerns about the students' mathematical knowledge, but over the course of the school year they developed greater respect for, and the ability to draw upon the expertise the students brought to the Math Club, especially when discussing topics that were relevant to them. They developed a better understanding of the strategies that the students were using to solve problems. The undergraduates were occasionally frustrated with the education that the students were receiving, but not with the students themselves. They were proud of what the students knew and understood, as Gloria said, "even though they aren't in a private school, […] they have such potential to develop." Based on these new understandings, the potential exists to further nurture the undergraduates' critical reflection on educational inequity as well as the potential to understand how to encourage students to use mathematics as a tool to read and write their worlds.

Conclusions

As a group of researchers (graduate, post-graduate and undergraduate) we formed an inquiry community of the sort described by Cochran-Smith (2004). We all struggled with what it means to teach mathematics for social justice and with issues of equity as we co-constructed the after-school learning space alongside our students. Through this process, it was revealed that unlearning stereotypes, such as that by Gloria mentioned above about low-income Latino students, was a necessary part of the process. Even more meaningful would be to connect what they learn in these local situations to larger societal and institutional structures of power and oppression, something that we did not explicitly do in our inquiry community with the undergraduate researchers. However, Jill did demonstrate an initial realization of these issues. In considering Cochran-Smith's model for inquiry-based teacher preparation programs, reflective and supported field experiences such as this could greatly enhance teachers' preparation for diverse classrooms.

Initial analysis reveals that participation in these field experiences along with critical reflection allowed the undergraduates to expand their understanding of the teaching and learning of mathematics to include a sociocultural approach to pedagogy. The undergraduates revealed that making connections to real life, developing strong relationships with students, creating student-centered learning activities, as well as having high expectations for all students creates a rich and engaging mathematics learning environment. Through this approach to pedagogy student knowledge and experience becomes central to learning, displacing the dominant mainstream ideology that marginalizes students.

After reflecting on our work together with these undergraduates in the Math Club for a year, we can conclude that their participation in building a supportive and student-centered environment, and by using activities connected to the community (in social and cultural terms), engaged the undergraduates in a process of change. These changes were primarily in terms of a more meaningful and inclusive way to teach mathematics, even if each of the undergraduates had a different interpretation of "meaningful" and "inclusive," and went through varying degrees of change. In addition, this perspective on education connects with a vision of critical mathematics education in which mathematics can be a tool to read and write the world (Freire, 1993), which is particularly important in working with traditionally marginalized students.

Implications

This study has implications for teacher education programs, demonstrating the impact of a non-traditional field experience in an urban setting on pre-service teachers because of its potential to bridge the cultural, linguistic and socioeconomic gap most teachers have with their students in classrooms today. Although many of the themes that emerged for the undergraduate research assistants while participating in Math Club are similar to those encountered by other pre-service teachers in field experiences, we argue that the transformations that occurred for them are more relevant in the context of working with a low-income, Latino/a student population. Validating student communities and their everyday experiences and approaches they use to make sense of mathematics carries more weight in the context of populations that are marginalized, that typically feel alienated from the U.S. culture of schooling, and whose knowledge bases are often seen as deficient. It is especially relevant for the students in

our Math Club that the URAs felt the need to make mathematics learning happen, that they gained an appreciation of student strategies and unique contributions to Math Club, or that they understood the need for a more engaging mathematics curriculum, since interactive, inclusive learning experiences are much less common for minoritized students. Furthermore, because this was a non-traditional field experience, some themes emerged that otherwise would not. For example, all four undergraduates considered getting to know the students' neighborhood very important, as they felt that it gave them a better insight into the students' lives. They were able to recognize the inequity in the education that these students are receiving (Jill) and the potential that the students have despite of this (Gloria). They also recognized as an asset, not deficit, the unique knowledge that students possess about their community and their heritage (Gloria).

Although this particular field experience was in an after-school setting, where content, relationships, and impact of policies and dominant language ideologies are different from those in a regular classroom; we nevertheless argue that the experience is applicable to the classroom. If pre-service teacher preparation programs contained such a field experience along with critical reflection, as well as in settings that differ from traditional mathematics classrooms, the next generation of teachers might see the potential of culturally inclusive, student-centered and empowering learning communities. It is becoming increasingly obvious that teachers must be prepared for the diverse classrooms they might encounter and this research indicates one way in which teachers can have meaningful field experiences to begin to interrogate their own and society's beliefs. In addition, this experience offers a lens into how teachers might be prepared to teach mathematics for social justice, although this was not our intention or an ultimate

outcome of the work. Taking this research and expanding it to studies that explicitly follow up on this lingering and important question is imperative. As we continue our work, we seek to connect the creation of a location where teaching mathematics for social justice is becoming more and more of a focus to the important piece of teacher preparation.

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