Social Justice in a Mathematics Education Professional Development Program: Coach Growth Progressions

Dr. Diana B. Erchick
The Ohio State University at Newark
Hopewell Hall, 1179 University Drive, Newark, OH 43055
United States of America

Dr. Cynthia A. Tyson
The Ohio State University
Arps Hall, 1945 N. High Street, Columbus, OH 43210
United States of America

Abstract

In this paper we report on a research project where we study teacher growth around social justice pedagogy in a mathematics education professional development program. The program trained mathematics coaches to work in classrooms in grades kindergarten through eight. The goal of our research was to study the coaches' growth in understanding of and commitment to social justice pedagogy in the mathematics classroom after participation in the social justice component of the three-year professional development program. Findings reveal six progressions of coach growth.

Keywords: Social Justice, Professional Development, Teacher Growth, and Mathematics Education

1. Goals

Research, theory and practice around equity and diversity in mathematics education has grown to include more work in recent years that addresses liberatory education and social justice from both US and international perspectives (Burton, 2003; Chapman & Hobbel, 2010; de Freitas, 2008; Frankenstein, 1987; Gutstein, 2003, 2006, 2008; Gutstein & Peterson, 2006, Sriraman, 2008). Within the scholarship we also find a body of work addressing the concept of resistance in social justice work (Gutstein, 2006; Satterthwaite, Atkinson, & Martin, 2004; Filax, 1997). In this framework, social justice pedagogy defines the nature of our resistance to – and action against – the inequities, injustices, and oppressions in the world in which one lives.

In this paper we report on a research project conducted around social justice pedagogy (teaching that addresses diversity, equity, and societal injustices) as integrated into a professional development program training mathematics coaches to work in grades kindergarten through eight. The coaches are trained to provide support and professional development opportunities for the mathematics teachers in their school buildings. Most of the schools in the professional development program are low-scoring schools in terms of standardized assessments; and they represent a variety of student groups underrepresented among the successful in mathematics education – such as students living in poverty, or who are members of selected ethnic or racial groups. Because of this emphasis in the selection of schools in the professional development program, social justice is an appropriate component of the conceptual framework for the program, and is integrated into the training and support of the coaches (See Figure 1). The goal of our research project was to study the coaches' growth in understanding of and commitment to social justice pedagogy in the mathematics classroom after participation in the social justice component of a three-year mathematics coaching training program.

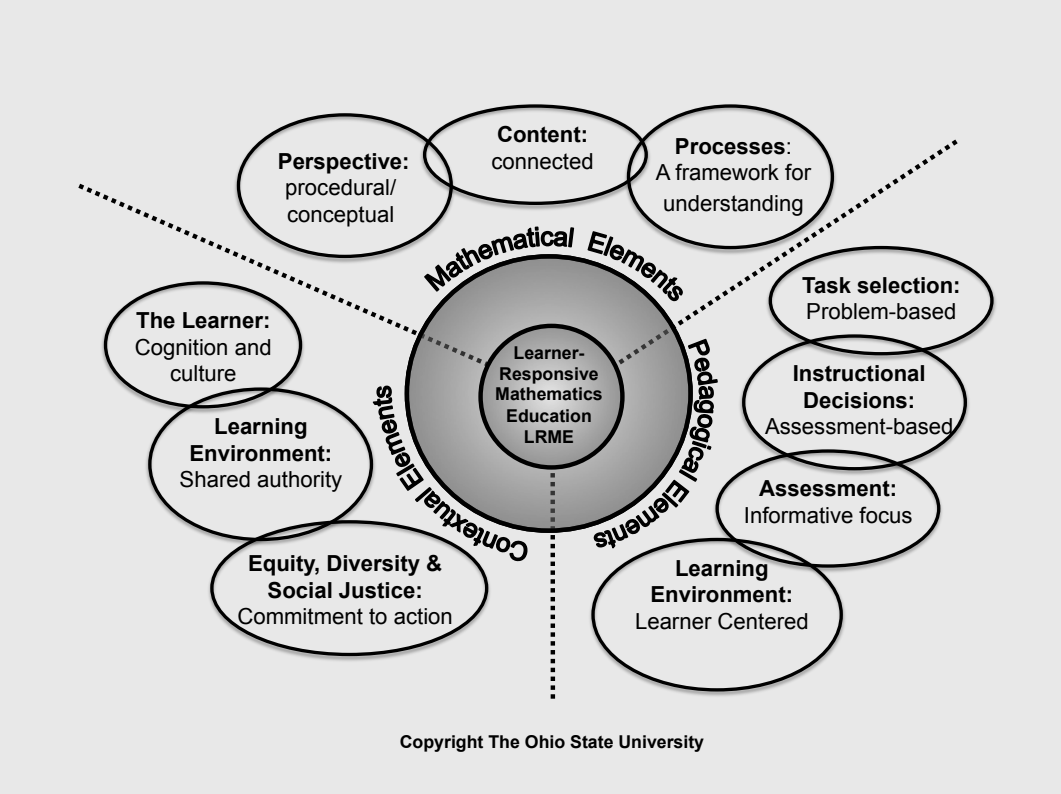

Figure 1: Conceptual Framework

In the following pages we put forth the theoretical framework for our study; explain the research project, its methods and findings; and discuss the findings and their implications for mathematics education professional development around social justice.

2. Theoretical Framework

The goal of social justice education is to enable people to develop the critical analytical tools necessary to understand oppression and their own socialization within oppressive systems, and to develop a sense of agency and capacity to interrupt and change oppressive patterns and behaviors in themselves and in the institutions and communities of which they are a part. (Adams, Bell, & Griffin, 2007, p. 2).

The first topic we have to acknowledge in this discussion is that there is such a phenomenon as social justice, and conversely, that social injustice exists. A claim that we are teaching for social justice positions us at a point of recognizing sites of social injustice and teaching toward a goal of social justice. Given society's dynamic nature and the obscure manifestations of injustice, a condition of social justice is not easily obtainable; nor does working for social justice have a fixed end. Thus our goal is not necessarily to reach a state of social justice. Rather it is to develop the ability to identify social injustice, address it within school and community settings, and take actions to create change leading toward social justice. When we talk about developing ourselves as socially conscious catalysts for change, we acknowledge that we have a responsibility to play an active role in working toward social justice (DeVries & Zan, 1996; Green, 1971; Tom, 1984).

The second acknowledgement we make is that the nature of injustice in our society results in school-age students facing "persistent and profound barriers to educational opportunity" (Darling-Hammond, 1995, p. 465). Social injustice means that children are denied opportunities to learn and grow. When we work toward social justice, we acknowledge these barriers and make a commitment to transform the educational fabric toward a more fair and inclusive educational setting. "Without acknowledgment that students experience very different educational realities, policies will continue to be based on the presumption that it is the students, not their schools or classroom circumstances, that are the sources of unequal educational attainment" (p. 465).

According to Bell (2007), "The goal of social justice is full and equal participation of all groups in a society that is mutually shaped to meet their needs" (p. 1). Teaching for social justice means that in addition to using "good teaching strategies," we use these strategies within a context of working toward social justice. When we talk about socially just teaching, the focus is on pedagogical practices to help all students succeed.

In mathematics education, identifying issues of social injustice with links to curriculum topics is not necessarily difficult for the informed professional. However, for the teacher in development, moving social justice perspectives into practice can be a challenge. In the content disciplines, mathematics among them, content traditionally takes center stage and becomes the focus of pedagogy and the unit of analysis in assessing student learning. Thus, for teachers, attention to social justice is often interpreted as a shift away from the content, an uncomfortable position when one is accountable for student mathematics learning. These challenges for teachers to identify, explore and understand social injustices, to apply the practices of socially just teaching, and to see themselves as agents of change to address injustices in their world(s) was an influence in the development and implementation of the coaching program.

3. Methods

3.1 Participants, Context, and Data Sources

The participants in our research project were twenty mathematics coaches who participated in the study across three years of their involvement in a federally-funded mathematics coaching professional development program. All are licensed or certified teachers who are hired by school districts to serve as full time mathematics coaches, one per building, for the duration of the coaching training. Seventeen of the coaches were white females, two were white males, and one was an African American female. Schools enrolled in the coaching program were primary, elementary, intermediate or middle schools, and the professional development program supports coaches across all of grades kindergarten through grade eight. Not all coaches continued in the program for all three years of available training, with funding issues being the primary reason schools dropped out of the program.

During the three years of the study, in addition to the mathematics education sessions in the coaching program, the coaches also engaged in nine two-three hour professional development sessions focused on equity, diversity and social justice. The conceptual framework for the professional development program includes pedagogical elements, mathematics content elements, and contextual elements. It is within the contextual elements that the equity, diversity and social justice component of the program rests. The goal of the social justice curriculum in the program is to teach the coaches about social justice, and to motivate them to bring social justice perspectives to bear on their daily work with teachers. Our research study was conducted across all three years of the participants' involvement in the professional development program.

It is important to note three particular factors of the professional development program in terms their impact on the reliability of our data. Throughout the research project, the coaches were open and honest in revealing the limits of their knowledge of social justice in mathematics education. Given the potentially sensitive nature of the discussions, discomforts of revelations of non-awareness and acknowledgements of racism, we might have questioned the degree of honesty. But we trust the honesty and credit their openness to three factors:

- The nature of the professionals enrolled in the coaching program,
- The nature of the professional development program as a whole, and
- The style of pedagogy practiced in the social justice lessons.

Below are elaborations on each of these factors.

The professionals who participate in the coaching program are teachers who have chosen to leave classroom teaching to enter a new field in its early stages of development in mathematics education. Taking a risk in leaving their classroom positions them to embark on this professional growth opportunity and suggests a strength of mind that distinguishes them from many of their peers. Additionally, the coaching program in which they are being trained is an intensive internship model where the coaches are working as coaches from the first day of their training. Participation includes a three-year expectation of training, involves whole group meetings for two days monthly, and small group meetings for two additional days monthly. The coaches come to know each other well, and bond to each other early in the program over the challenges of the work and the steep learning curve they experience.

Finally, the social justice pedagogy responded at all times to the participants' needs and emerging growth, never judging, always understanding of the lack of awareness, the fears, and the resistances. Together these three factors made for group dynamics that resulted in trustworthy data.

Rousseau and Tate (2003) speak to the value of teacher reflection on equity in mathematics education to "improve the educational experiences of poor students and students of color in our schools" (p. 211). They also reference the social reconstructionist tradition (Tate, 1994), and the political act that teacher reflection can be (Zeichner, 1996; Zeichner & Liston, 1996). The reflective nature of the work of the coaches participating in our study aligns with these perspectives. Further alignment with the literature on professional development in mathematics, rests in the on-going nature of the coaches' professional development experiences around equity, diversity and social justice (Smith, 2001). Adding this foundation to the grounding of our research methodology in qualitative practices of prolonged engagement, it may be no surprise that the reflective quality of our data was as rigorous as it was. Our participants were able to reflect over summers between academic years of the program, and for the month between each session during the academic year, providing room for growth by the third year of the program. Coaches' self reports included language and stories of having time to go away and think about our discussions. They reported the value of opportunities to go home or back to their schools and talk to family members, colleagues, and the parents of their students; and they reported that they found it beneficial to have time to think about our work together. The prolonged engagement provided more than a simple opportunity to go away and think: it provided the opportunity to develop rigorous reflections and critical self-analyses the coaches were able to bring back to our professional development sessions together.

Our data sources included open response survey instruments administered prior to the research project, part way through the project, and after the last lesson. Data also were in the form of coach work products from sessions, consisting, for example, of items such as table group responses to discussion prompts or group or individual reactions to lessons. Data also consisted of coach and researcher reflections on curriculum and instruction. One particular discussion session was documented with verbatim notes because there was no other product from the session to capture the coaches' understandings. See Table 1. for all data sources. Near the end of year one in the program, coaches participated in a lesson introducing equity and diversity in mathematics education and were asked at that time for their feedback on equity and diversity efforts in their schools. Once the group started in year two of the professional development program, they began a six-session series intended to teach them about social justice, and to motivate them to integrate social justice into their work with teachers and students in their schools. In year three of the research project, the coaches participated in two follow-up lessons addressing their own struggles and reflections upon their growth.

Curriculum	**Work products**	**Feedback/Survey Tools**
Introduction to equity and diversity		Equity and diversity in the schools
Introduction to Social Justice	What does social justice mean to you? Documentation of group discussion.	Pre-SJ: Does Social Justice belong in the coaching program conceptual framework?
Video: "The House We Life In" (Pounder, Adelman, Cheng, Herbees-Sommers, & Strain, 2003)	Reflective Writing on "The House We live In" Pounder et al., 2003)	Post-SJ: Does Social Justice belong in the coaching program conceptual framework?
We are the World and We Are Hungry lesson.	We Are the World And We Are Hungry activity sheet.	Final year descriptive narrative on growth in terms of growth regarding social justice in mathematics education.
Video: *The Color of Fear*		
The Color of Fear Follow-up Discussion	Assistant's notes from *The Color of Fear* discussion	

Table 1: Data Sources

3.2 Data Analysis

Our data analysis focused on document analysis (Bowen, 2009) in reviews of the curriculum, coach responses on multiple surveys, observation captured in a transcript of a discussion, coach work products, and researcher field notes that included our reflections, notes from the sessions, and planning discussions.

We should note here how every session included from four- to six observers from the program, providing a kind of reliability check (Schwandt, Lincoln, & Guba, 2007) on our interpretations of the events. Follow-up discussion with these observers became a part of our researcher reflections. To begin analysis we progressed through all documents that were coach work products, survey responses, and transcripts and researcher notes. We reviewed each coach's documents chronologically through all lessons. We compared coach perspectives, language, and quality of work products progressively coach-by-coach, looking for indications of the coaches' understanding of and commitment to social justice pedagogy, allowing themes to emerge (Strauss & Corbin, 1994). As is customary in qualitative research, successive readings across the data allowed the coaches' growth patterns to emerge.

4. Results

Our analysis allowed us to identify the initial positions of the twenty participants and six different progressions in the coaches' growth. We found that the coaches were clear about what they did not know from the first days of the research project. Reflecting back to the methodological note about the reliability of the data, we believe coach revelations to be honest. As a whole, the group started with varying degrees of naiveté, some believing they were attentive to equity and diversity in their work, only to realize later how far they needed to come. However, there were four particular cases that were distinctive within the group. One coach, Viola*, who we discuss later, was the most informed at the outset, and credited that to her lived experience of injustices. Another coach, Margaret, began the research project as a disconnected spectator and was one of only two coaches from whom we saw no growth. A second from whom we saw no growth was Mitch, who also started with an articulation of a connection to mathematics that suggested a potential and particular barrier to accepting social justice pedagogy. Mitch wrote early in the project "Honestly, I don't know how it will impact me as a math coach. I teach all children who make up a classroom, so I am not consciously aware of social justice per se, while teaching mathematics or working with a fellow teachers." At the end of his experience with us, he wrote that the social justice work did not belong in the coaching program because it "took a lot of our time away from the [coaching] material." Nadine, whose growth is clear in the data we discuss below, started with the following perspective:

> I don't believe the mathematics classroom is the place to have this debate. The study of mathematics supersedes socio-political, cultural conditions. For me it explains and uncovers the wonders of the universe, the responses of humankind, the nature of mankind and the predictions of the future. It confirms the idea of intelligent design.

Aside from the particular cases of Viola, Margaret, Mitch and Nadine, the overall results in terms of coach growth were encouraging to say the least, as all but two of the coaches demonstrated growth. That growth was individualized per coach, both in terms of the amount of growth and the nature of it. Through our analysis, we identified the following six growth progressions, where data reflected movement as follows:

- Content to context
- Pivoting Center (from self-to-student to student-within-the-context)
- Spectator to Participant
- Naiveté to Deeper Understanding
- Expanding Social Justice boundaries
- From Self-Validation to Integration into Mathematics Education

4.1 Growth Progressions Representing A Shift in Paradigm

The first three examples of movement:

- Content to context
- Pivoting Center (from self-to-student to student-within-the-context)
- Spectator to Participant

collectively represent a shift in paradigm for each participant. For one coach, Jessie, the shift was one that moved her focus from the content to context, from mathematics to students and teachers and eventually to consideration of the context. She wrote,

> To be honest, social justice and mathematics education wasn't even on my radar when we first began this discussion… I was more concerned about treating all students with respect and trying to meet their academic and social needs… I now look at students and teachers and try to understand where they have come from and where they are now…. Although I knew about social justice or thought about it in the past, I didn't think about how it plays a part in mathematics education.

Another coach, Valerie, represents the case of a Pivoting Center. Hers is an example of paradigm shift representing a change in her pedagogical center from herself as a person and teacher to the student in context.

> I always thought I was helping children be all that they can be, but it was in my eyes, not in each child's eyes. I am … more aware of children's backgrounds and what they bring socially and educationally… I believe I got here by our discussions and being able to see others' point of view.

Susan, another coach, examples a shift from Spectator to Participant. She revealed her spectator status when she wrote "I have always thought that everyone regardless of background, race, economics etc. should have an equal opportunity to education. I never really thought (I know this now) how that was going to happen." She then wrote that she also did not know "how to make it make it happen. It just should" suggesting a shift to her role as a participant. Finally, she writes "Where I am now, there are so many things to learn about with regards to where people come from, background, economics, and to learn and know how to help provide this equal opportunity."

4.2 Growth Progressions Representing Deeper/Broader Understanding

The last three examples of movement:

- Naiveté to Deeper Understanding
- Expanding Social Justice Boundaries
- From Self-Validation to Integration into Mathematics

collectively represent movement to a deeper or broader understanding on the part of each participant.

For example, in her writing, Nadine characterizes a change from Naiveté to Deeper Understanding, progressing from starting with a naïve belief that she was aware to knowing how she has much to learn. She wrote:

> My definition for equity on the first day was 'equity means every child gets what he or she needs.' I was so proud thinking 'I really nailed this' and I was surprised when I shared my answer with the group that Cynthia didn't jump right up and say, 'Yes yes. That is a great answer.' Instead, she said 'Hmmmm' and without another word moved on to the next person… It was the movie about the group of men who came together to confront the issue of race that had the most significant impact on me (Mun Wah, 1994) I was embarrassed for the Caucasian man and ashamed to see a little of myself in his naiveté about the disparity that exists even today between races, and how that disparity continues to live today in part because of ignorance that it exists at all. Today, at least I am aware that it exists to a greater degree than I fully understood and it is something I need to work on.

Rita's data examples a case of Expanding Social Justice Boundaries. She began at a position of seeing herself as an individual actor within a social justice context. She grew to seeing herself as a collaborator in a broader world of social justice understanding. She wrote,

> When we first began this discussion of social justice I considered myself to have already begun a self-reflective process prior to our start. Even knowing at that time I still had much growing to do, I had no idea how much growth that would entail… Discussions we have had … have overflowed to discussions with Nadine and Viola outside of [the coaching program]… I appreciate the discussions greatly and feel I have gained a broader sense of humanity and equity, as my current beliefs are challenged by new information. I appreciate the fact that awareness of social justice has been heightened as I feel it has impacted my own perceptions of my self.

Rita's major growth was from a place of comfort in her definitions and the process. She became "much more analytical of actions, beliefs, etc., not only in the educational setting but in all areas of my life."

Finally, Viola was a special case of a coach whose broadening and deepening change included a move from Self-Validation to Integration into Mathematics Education as a context.

Viola was the only coach who actually was comfortable taking her learning into her role of a coach. She found the social justice readings and pedagogy validating from the start.

As an African American woman teaching in a racially diverse urban school district, Viola found the videos, readings, and discussion validating. She wrote:

> The film was very informative and served to validate my experiences and the experiences of other people of color (Pounder, Adelman, Cheng, Herbees-Sommers, & Strain, 2003). I have been in conversation about racism and its effects for as long can remember. My career has been impacted by my choices to work with inner city youth and their instructors…Raising 3 African American young men with the help of my husband, and experiencing the difficulties of racism as it tried to hinder our success, makes me very sensitive to the issues… I thought and reflected on the film when I read chapter 3 of Eric Gutstein… As I work with my teachers I encourage them to reflect on their treatment/reaction to various students. I also try model respect and relationship-building with them.

5. Discussion

Each mathematics education professional development provider designs and delivers programs to meet the needs of their constituents. Those programs often include combinations of experiences with mathematics, viewing videos, and engaging in activities, readings and discussions. Our research project was no different in that regard. But the growth found in this project does suggest the value of three contextual elements:

- Researcher on-going review of data and revision of curriculum
- Participant and researcher prolonged engagement
- A "critical friends" environment

One contextual element was the researchers' on-going review of the data, and the revised curriculum that resulted from that. Significant to the change process was the risk-taking that was necessary on the part of the research project, to push discussions in very uncomfortable directions, especially in the context of mathematics, which many believed to be value free and socioculturally neutral. As we analyzed the curriculum and reflected upon the results of each session, we made changes to support movement. For example when we recognized participants' resisted recognizing that race mattered in this work, we chose to present the film *Color of Fear* (1994) to help us facilitate an open discussion around diverse perspectives.

A second contextual element contributing to the growth in this project was the intensive, prolonged (over three consecutive years), and community-like engagement of the coaches described earlier. That context provided us the opportunity to integrate our project over a longer period of time than we would have had in typical professional development projects or university coursework. With the growth we found taking all of the three years to become realized by the coaches, it is clear that seasonal and holiday breaks way from their work, time between social justice lessons, and a project that is sustained and coherent provided space and time for reflection and growth in nearly all of our coaches.

A "critical friends" environment emerged as a third contextual element. The coaches had assignments to talk to someone outside of our sessions about some element of our work together. One group of coaches took that a little further, suggesting the third contextual element contributing to growth. Three coaches, Rita, Nadine and Viola worked in the same urban school district, spent time together as colleagues outside of their schools, and became friends. On the long, monthly drives to and from the coaching program trainings, and in their additional sessions two more days each month, they talked to and challenged each other regarding social justice pedagogy. They became critical friends (Nieto, 2000; Zeichner & Hoeft, 1996), referencing in written reflections those drives to and from the project and the friendship that developed over their discussions, experiences, and growth around social justice pedagogy in mathematics.

We close with comment on one final growth element that relates the social justice work to the coaches' role as professional development leaders in their schools. As the coaches entered the third year of the project, Viola was the only one showing any evidence of taking her social justice learning into her role as a coach.

Since that application of their learning was a goal in our teaching, we made an assignment to the group that would require them to implement some of our topics in the school context, as a part of their coaching work. The coaches stopped us; they could not do what we were asking them to do, and clearly articulated the ways in which they were not ready for it, as well as what they needed to do before they could apply their understanding to their coaching work.

They revealed self-regulatory and self-directed behaviors, an aspect of growth we had hoped for, had not seen, and had not planned for. They needed from us only the space to reflect upon, synthesize, and name what they found to be incredible personal growth. The coaches individually and collectively grew by leaps and bounds in their own respective social justice pedagogy learning curves; and the teaching and research methodologies supported this growth. The data revealed however they were not ready to become the social justice professional development pedagogues that each of their coaching contexts would demand of them. They needed more time, more space, more deliberation, more support. They believe that only then could they – and would they – take their growth into their work as coaches. This work helped participants transition into varying forms of awareness. Moving forward, future research can focus on development from awareness to transformative knowledge and action (Banks, 1996), and to do so in the context of mathematics education.

6. Endnotes

[*] All names used in this paper are pseudonyms.

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