Community and Identity: A Tool for the Professional Development of Mathematics Teachers of African-American and Latino Children

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Introduction

Hegemonic views of mathematics learning distort the nature of the mathematics and hide its political nature. This perspective situates teachers and students in urban settings as objects (Freire, 1998), rather than agents of change. These views also conceal the root of the historical inequalities in the opportunities for quality education of marginalized students. The sense of education is the human beings and their dignity, or in Freire's (1998) conception, a critical consciousness. Freire's call is for an education that considers human beings as agents in their learning process and promotes the examination of structural barriers for equity. It is a proposal that calls for a critical inclusion of the identities of teachers and students.

In this research study we explore the constructs of identity and community as dialectic concepts and as heuristic tools for teachers' analysis and improvement of their classroom practice. This analysis is critical in particular in the case of the mathematics education. A comprehensive response that challenges students' "imposed" identities is key to address the prevalent inequities within and beyond mathematics education (Apple, 1992; Gutstein, 2003; Roth et al., 2004; Stinson, 2004).

Theoretical Framework

The current definition of learning as participation has called for a focus on identity as a critical dimension of mathematics education. This definition is grounded on the conceptual framework of situated learning; it argues mathematics learning is located in students' trajectories of participation. Conceptualizing identity as a dimension of learning implies that it is not parallel or peripheral to learning, as it has been traditionally being discussed in the research.

Through participation in a community, individual members transform their own identities. Learning, then, is defined as this process in which an individual's identities are constantly modified. Lave and Wenger (1991) explain, "Learning implies becoming a different person with respect to the possibilities enabled by these systems of relations" (p. 53). This definition counters the view of identity tied to an individual. The focus on identity can gain popularity in the cultural spaces in which learning continues to be seen as an individual endeavor. However, in this study identity is considered to be co-constituted by the individual and the community, not one that enters a community with the individual; in other words, identity is situated and distributed (Roth, et al., 2004; Wenger, 1998).

Ladson-Billings (1994) identifies that in some non-Western worldviews, identity is an integral component of learning in connection to the community, particularly some African peoples' perspectives, also have this dual understanding of self and community.

She describes this conception of self:

> [They] place a totally different emphasis on self, conceiving of the self as coming into being as a consequence of the group's being. . . . The African world view suggests that, "I am because we are and because we are, I am." In so emphasizing, this view makes no real distinction between the self and others. They are in a sense one and the same. . . . .One's self- identity is therefore, always a people identity, or what could be called an . . . extended self. (Ladson-Billings, 1994, p. 69)

This perspective rejects a dichotomy in which identity is purely individual or merely social. In contrast, they describe a dialectic perspective, a view of identity that is unique and personal, but at the same time constituted by the community in a historical and socio-cultural milieu. Wenger (1998) defines community as another dimension of learning which underscores its relation to a collective. In this view, learning is influenced and constituted by the changing community to which one belongs. This notion of identity, immersed in a community, being historical, social, and cultural becomes critical in the education of disenfranchised communities. The identities of the members are inevitably influenced by the value these communities are accorded in society and their access to power.

Efforts to improve the education of disenfranchised populations underscore the critical role of opening spaces for students' cultural identities to become part of school learning (Cobb & Hodge, 2002; Cummins, 1996; Delpit, 1995; Gutierrez & Rogoff, 2003; Ladson-Billings, 1994; Martin, 2000; Sfard & Prusak, 2005) For example, Cummins (1996) describes learning as the negotiation of identities and underscores the influence of power structures in broader society in the relations between educators and students, in particular, Latina/o students. He argues that for an empowering education, educators must reverse these asymmetrical power relations in their interactions with Latina/o students. Making a similar argument, Valenzuela (1999) endorses an additive education that considers students' cultural identities as an asset to their education. In the area of mathematics, Martin (2000) focuses on students' mathematical identity and considers it to be pivotal in their learning. He defines it as, "The participants' beliefs about (a) their ability to perform in mathematical contexts, (b) the instrumental importance of mathematical knowledge, (c) constraints and opportunities in mathematical contexts, and (d) the resulting motivations and strategies used to obtain mathematics knowledge" (Martin, 2000, p. 19).

A dialectic focus on community and identity draws attention to the notion that learning entails a process of change of individuals connected to communities. This vision includes the different communities to which individuals belong, such as the cultural communities and the historical social power ascribed to them. As a result, it highlights the oversight of defining learning as merely acquiring knowledge or developing competencies.

In this study we reflect with teachers about their teaching practice and goals, which shed light about their assumptions about students' identities and their classroom community. We argue that professional development about mathematics learning within classrooms can be challenged through spaces of reflection that include dialogue of the dimensions of learning, community and identity.

Social interactions are powerful agents of change. These interactions can be motivating, stimulating, enhancing, encouraging but can also be destructive. Without careful attention to the physical, and social/emotional development of students, a social culture of the classroom can impede the intellectual development of students.
A student's sense of self-worth or competency is determined by what he/she feels capable of doing and what he/she is able to contribute to the collective enterprise of learning. In planning curriculum and instruction, teachers need to confront and identify the necessary skills, knowledge, values, and dispositions toward learning necessary for students to be active and critical participants in the democratic process. Cummins (1996) suggests the curriculum and the pedagogy reflect an identity in which students see themselves.

Context

This study takes place in a metropolitan area located in the Mid-Atlantic U.S. The participants are 14 teachers in a graduate program with a focus on middle school mathematics education. The program includes 18-credits of coursework in mathematics and mathematics education. Most of the participants are elementary or middle grades teachers (not necessarily mathematics teachers) who seek to teach in middle school mathematics. The participants have a diverse background in mathematics. We selected five teachers to include diversity in gender, mathematics coursework, and their experience in teaching.

Data Collection and Analysis

This three-year long study explores in detail the participation of mathematics teachers of minoritized students, especially African-American students, within their classroom community of practice (Martin, 2000). We use an ethnographic approach for the data collection in two sites: the classrooms where the participants teach; and the classrooms where the participants take their own courses for the outreach program. Our approach to research is a critical communicative methodology (Flecha & Gómez, 2004), which includes participants' voices within the research through dialogue. The analysis of field notes of classroom observations and interview transcripts is based on grounded theory (Glaser & Strauss, 1967), a process that explores iteratively emergent themes about our conversations around the teaching and learning of mathematics.

Findings

Students' trajectories of participation and non-participation shape their identities as mathematics learners. This analysis brings to the fore issues of power as enacted in the everyday practices during the mathematics lessons and in many cases in their long-term trajectory of school participation. Students' participation relates to their access to shape the meanings that define the mathematics community.
Identity formation strongly influences how content is experienced and valued (Badertscher, 2007). Our analysis suggests it is necessary to problematize the dichotomy of identities of participation and non-participation. Children and teachers adopt different positions within a mathematics lesson. We use one example from a fourth-grade classroom. The teacher used an area model to represent fractions drawing on children's

sense making. She then connected these numbers to units of capacity using a "catchy" story. She narrated a story of a giant (gallon) who had four queens (quart), each queen had two puppies (pints), and each puppy two cupcakes (cups). For each connection of the story with a unit of capacity, the teacher connects the first letter of the words: Q for Queen and Quart and she emphasizes the fact that there are four queens with the fact that a quart is one-fourth of a gallon. In this lesson we described children's identities of participation as: engaged in an amusing activity, collaborative relations (they work in a small group, everyone answers at least once, they help each other cut paper), and teacher makes explicit connections to previous lessons. At the same time, children are expected to remember the story and the units of capacity; therefore, students' identity is shaped by their marginalization in the engagement of conceptual understanding or higher order thinking. The nature of the lesson is evident in the nature of the community and the negotiation of meanings, therefore mirrored in students' identities.

This classroom practice connects to teachers' trajectories with school mathematics. In our analysis of their teaching statement, teachers refer to mathematics as a universal language and as an object, oftentimes with negative connotations. Also, their racial identities were used as key in their views about their teaching. For example, one teacher said, "I worked with the National Society of Black Engineers and began confronting the scarcity of students in the "pipeline" for mathematics and scientific related fields of study". These identities include the identities that students form when they face marginalization, e.g., within Special Education or ESOL classes. Also during their reflection, they were able to connect some of their practices directly to the identities of students. For example, OT said, "I realized that the reason I displayed many of my student work was for the purpose of identity...and in celebration of diversity. But, most importantly because I wanted them to know that what they had engaged in and made a personal contribution to was a worthy endeavor meaningful to us as much as to others."

The social interactions and one's sense of belonging in a community, that is one's access to the negotiation of meanings can be motivating, stimulating, enhancing, encouraging but can also be marginalizing, limiting, or detrimental. Without careful attention to the physical, and social/emotional development of students, a social culture of the classroom can impede the intellectual development of students. A student's sense of self-worth or competency is determined by what he/she feels capable of doing and what he/she is able to contribute to the collective enterprise of learning. Conditions that encourage risk-taking, access to meaningful mathematical practices, and self-worth are key in students' mathematics learning trajectories. Students' participation in the classroom community needs to include interconnections with their lived-culture (Gutierrez & Rogoff, 2003; Moll, 2000) and a critical lens embracing diversity as a resource for students' to develop a sense of ownership in the negotiation of mathematical meanings. Teachers reflection on these lenses brings to light significant spaces for growth. We suggest that a dialectic focus on identity and community is a robust tool for the professional development of mathematics teachers.

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