

Parental engagement in a classroom community of practice: boundary practices as part of a culturally responsive pedagogy

Beatriz Quintos

The University of Arizona
Tucson, Arizona, USA
<bquintos@email.arizona.edu>

Marta Civil

The University of Arizona
Tucson, Arizona, USA
<civil@math.arizona.edu>

Abstract

This study addresses the pressing need to recognize and include disenfranchised students within mathematics education in a way that incorporates the voices of their communities. We use the concept of boundary practices to point to the multiple ways in which the mathematics learning practices in a classroom connect or disconnect, include or exclude, adults as a resource for a culturally responsive pedagogy. Case studies developed through ethnographic methods of data collection allow an in-depth analysis and exploration of emergent themes. Our data suggest that the nature of the community of practice plays a critical role in establishing relationships with parents. Parental involvement is distributed and influenced by the nature and history of the community, as well as by the identities of the participants. Finally, our data indicate that a culturally relevant pedagogy facilitates an egalitarian dialogue with parents and between parents and children.

Key words: parental involvement, culturally responsive education, communities of practice.

Introduction

Many minoritized students in the United States of America experience mathematics as a curricular gatekeeper and an irrelevant subject (Apple, 1992; Gutstein, 2003; Stinson, 2004). Furthermore, mathematics education is portrayed only as a product to address unemployment and to serve economic goals which support a market-driven economy (Moses & Cobb, 2001). This perspective ignores the possibility of transforming current unequal power structures as well as the goal of education to endorse human dignity (Olivares Alonso, 2006). These contradictions have critical implications that need to be addressed in order to improve the educational opportunities for minoritized communities, in particular, in our context of a predominantly low income Mexican American community in the Southwest United States of America.

An inclusive model of parental engagement is central to a culturally responsive mathematics education (Gay, 2000; Ladson-Billings, 1995). In the last decades, research, policies, and pedagogical models have announced the benefits of parental participation. Dominant views, however, often leave involvement or empowerment undefined (Lankshear, Gee, Knobel, & Searle, 1997; Vincent, 1996). This vagueness in the rhetoric of parental involvement tunes into a deficit view of low-income and ethnic- and language-minoritized communities. A deficit-driven model claims educational problems lie in inadequate socialization within families (Taylor, 1997). In addition, this perspective often narrows the definition of parental involvement. It fails to consider the diversity of the funds of knowledge of

students and their communities as well as the institutional role in perpetuating unequal opportunities.

A socio-historical view considers parental engagement to be a situated and dynamic activity system (Calabrese Barton, Drake, Perez, St. Louis, & George, 2004; Civil, 2007; Civil, Bratton, & Quintos, 2005). One of its main tenets is that the model of participation needs to be culturally responsive and consider the political and historical contexts that mediate power relations. This research study forwards this perspective through the analysis of the interaction of parents in their children's mathematics education and the school system using the framework of communities of practice (Wenger, 1998). In particular, we use the concept of boundary practices to address the particular moments of inclusion or exclusion of parents. This discussion describes multiple ways in which the mathematics learning practices in a classroom connect or disconnect, include or exclude, parents as a resource for a culturally responsive pedagogy.

Theoretical framework

Cultural-historical frameworks underscore that parental involvement is a process and a product of the historical and socio-political context of schools including its geographical location, culture, race, and income level of students' families; and it is influenced by educational policies, research, and teaching practices (Calabrese Barton, et al., 2004; Lareau & Horvat, 1999; Lareau & Shumar, 1996; Mapp, 2003; Taylor & Dorsey-Gaines, 1988; Valdés, 1996). Two concrete efforts grounded in this perspective are the projects of funds of knowledge and of learning communities.

There are multiple projects that illustrate the first – that is, how schools, teachers, and researchers may tap into households' funds of knowledge (Barton, 1996; González, Andrade, Civil, & Moll, 2001; González, Moll, & Amanti, 2005; Hammond, 2001; Moll & González, 2004; Patterson & Baldwin, 2001). In these projects, the teachers become learners and therefore encounter opportunities to reconceptualize students, their families and communities, as well as the curriculum. The specific resources in the community become evident as the teachers move away from the enclosed area of the classroom. A focus on the strengths and assets of the families and communities implies changing the focus from needs of the communities to the possibilities present within them (Delgado-Gaitan, 2001; Guajardo & Guajardo, 2002; Kincheloe & McLaren, 2002). Thus, the knowledge gained from a community can be used as a tool that further benefits members of that community.

In relation to the second, an effort that includes the transformation of power relations beyond the classroom is the learning communities project led by the research group of Ramón Flecha in Spain and other parts of the world (Elboj, Puigdemívol, Soler, & Valls, 2002). These learning communities are projects of social and cultural transformation of an educational setting and its context. These communal projects' principle is that social change cannot be constrained within the classroom, but must include all the spaces in the community and its diverse participants. The learning communities use dialogic learning, through the active participation of the community, materialized in its different spaces including the classroom. Although parents enter the classroom to participate in school-like activities, their role is of collaboration with the teaching staff. There is a continuous praxis that counters dominant power structures. It is significant to mention that there is a dialectic relation of change between the educational practice and the relation with the community the school serves.

The strength of the two projects described above has been well documented (Elboj, et.al., 2002; González, et.al., 2005). However, there is a need to further understand the connections or disconnections between students' communities and their mathematics learning experiences. Many teachers are not working within schools that support a radical change in their relation to the community, as the project of learning communities requires. The concept of funds of knowledge, on the other hand, is an effort individual teachers can implement. However, establishing the connections between the cultural knowledge of the communities and the mathematics curriculum can be challenging (Civil, 2007). For over ten years mathematics educator Marta Civil has led research efforts on parental engagement and mathematics education in working class, Latino communities in the United States of America (Civil, 2002;

Civil, 2007; Civil & Andrade, 2003; Civil, Bratton, & Quintos, 2005; Civil, Planas, & Quintos, 2005; Civil & Quintos, 2006). This research agenda and outreach efforts are grounded on the Funds of Knowledge research projects, and on the concept of parents as intellectual resources (Civil & Andrade, 2003), as a means to emphasize parents' contributions to their children's mathematics education. In this research we use the concept of communities of practice; in particular, the concept of boundary practices, to describe the interconnections between the members of the classroom community and parents.

Boundary practices: parents' participation in mathematics education

The framework of communities of practice positions social relations at the centre of the learning process. Lave and Wenger (1991) state that communities of practice,

...imply participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities...A set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice. (p. 98).

These researchers describe ways in which groups of individuals co-participate in a practice, interact with each other, and as a result, learn. It is not their intention to describe necessarily collaborative or democratic settings. Moreover, they suggest that in order to understand these particular communities and the learning that occurs within them, it is necessary to consider the socio-historical, cultural, economic and political factors that shape them. Thus, in order to address the unequal opportunities for quality education of disenfranchised communities, the lenses of analysis must include a socio-historical and political perspective that addresses racism and biases in society that permeate the educational system.

Research that focuses on learning beyond official educational settings challenges a traditional understanding of learning, including the area of mathematics education (Abreu, 2002; Lave, 1988, 1996; Masingila, 1994; Masingila, Davidenko, & Prus-Wisniowska, 1996; Nunes, Schliemann, & Carraher, 1993). Lave & Wenger (1991) redefine learning as legitimate peripheral participation. The term legitimate emphasizes that the access to a practice and to the negotiation of meanings and membership to a community constitute part of the learning. The term peripheral suggests that there are transitions in learning constituted by different ways of participating in a practice, shifting forms of belonging to a community, changing ways of becoming part of a community, and developing ways of making sense of experiences (Wenger, 1998). The learning opportunities, then, are structured through social relations, artifacts and tools, roles and rules of interaction, negotiation of meanings, the activities and its goals, and the practice. In summary, learning as participation involves the individual's evolving trajectories of participation in a community of practice. These transformations necessarily include the identity and perspectives of the individual, the negotiation of meanings, forms of membership in a community, and the practice in itself (Wenger, 1998). In our case, the community of practice is the classroom participants, and mathematics learning is defined as students' trajectories of participation in the particular mathematical practices.

Although a 'community of practice' is the unit of analysis, its members are not isolated from other individuals or communities. In this study we explore the interaction between the classroom community of practice and boundary practices that occur around school mathematics learning involving family members. The term 'boundary practices' (Wenger, 1998) refers to the lines of connection and disconnection, inclusion or exclusion, between members of a community of practice and particular individuals, or between members of two or more communities of practice. Through this concept it is possible to explore the interactions that relate to the classroom community and that include members of other communities, such as the families of students. Wenger (1998) describes two ways in which boundaries are established. First, the nature of the community in itself creates boundaries between members and non-members. Second, there are boundary encounters that bridge a community to the outside world. This concept situates the connections with family members in the practices within the

community as well as in those practices in which one of the main goals is to connect students' mathematics learning with family members.

Boundary practices are embedded in activity systems, which are historical and multivoiced (Cole, Engestrom, & Vazquez, 1997). The structures of the school institution as well as the individual members influence these practices through their historical trajectories, beliefs, roles and power relations, instruments, and goals. The educational institution contributes with mediating tools, such as regulations of parental participation, adoption of textbooks, and norms for teachers; means that derive from particular belief systems and interests. As part of these systems, teachers make decisions in the everyday practice. Boundary practices exemplify the dynamic, historical, and situated nature of the interactions between the school system, through a particular community of practice, and students' families.

Fundamental to establishing a culturally responsive education are boundary practices that include the funds of knowledge of diverse communities as well as practices that contest the oppressive relations with minoritized communities (Civil, Bratton, Quintos, 2005; Ladson-Billings, 1995; Martin, 2006). The goal of this article is to contribute to efforts that propose a situated notion of parental engagement using the framework of communities of practice and connect these practices to the implications for adult learners. Parental engagement in mathematics education is a practice that can contribute to transforming current power structures that disenfranchise minoritized students and their communities.

Methods

This study takes place in a fifth-grade classroom at an urban elementary school in the Southwest United States of America, in which ninety percent of the students are labeled as of Latino background¹ and almost all of the students receive free or reduced lunch². All the participants have some understanding of English and Spanish, however several of them predominantly use just one of the two languages in the classroom. The parents of all the children in this classroom signed a waiver requesting bilingual education for their children as established by the state legislation, Proposition 203³. Many of the children were previously in English-only classrooms and some recent immigrants from Mexico, in Spanish ones. This classroom was chosen based on the researchers' personal respect for the teacher as well as the teacher's local and national recognition for her teaching practice (Recipient of the Presidential Award of Excellence in Mathematics Teaching at the Elementary level). She is a teacher-researcher and an analysis of her teaching is a prime opportunity to learn from a teacher with a profound understanding of mathematics and a pedagogical vision of transformative learning.

The participants in the study are: eighteen fifth-grade students, the parents of four of these students, and the classroom teacher, Patricia⁴. We developed in-depth case studies for four of the eighteen students. These students are Mexican immigrants or Mexican-Americans. The students were selected based on the teacher's knowledge to include diversity in gender, mathematical proficiency, and language fluency in English and in Spanish. In this paper we focus primarily on the case study of Yessenia, and her mother, Lorena. Yessenia immigrated with her mother and sister when she was an infant.

¹ Most of the students labeled by the school as Latino are of Mexican descent, a smaller number of students is from other countries in Latin America.

² Free or reduced lunch is used as an indicator of poverty level.

³ Proposition 203 is state legislation that was approved by Arizona voters in 2000 and is now part of the Arizona state statutes. It proposes to replace bilingual education with Structured English Immersion classes for a period of one academic year. It states, "Although teachers may use a minimal amount of the child's native language when necessary, no subject matter can be taught in a language other than English" (A.R.S. Section 15-751 [5]).

⁴ All names are pseudonyms.

Data collection and analysis

The year-long qualitative case studies (Dyson & Genishi, 2005) explore in detail the particular engagement of families in connection to their children's mathematics learning experiences. The use of multiple case studies bridge local particulars to the abstract social phenomenon of communities of practice. We used ethnographic tools for our data collection which took place in three sites: the classroom, students' households, and two after-school programs. A detailed review focus on those activities that, from these authors' perspective, are significant boundary practices. This in-depth analysis included the transcripts from the interviews with the teacher, students, and parents; as well as video transcripts and field notes of classroom observations. Through grounded theory (Charmaz, 2001) we explore emergent themes. The different sources were used to triangulate the information and build thick descriptions. The discussion focuses on different boundary practices and the implications for the learning of mathematics, including parents as adult learners.

Boundary practices: parents as legitimate peripheral participants

In this article we discuss some boundary practices of this classroom community towards students' family members. The first practices comprise the mathematics practices in the classroom, while the second set of practices involves those encounters that have the explicit purpose of bridging students' learning and parents.

Mathematics practices in the classroom

The different components of a community of practice establish the boundaries of its membership (Wenger, 1998). In this article we focus on the boundaries established by the identities of the participants in interaction with the negotiation of meanings of a mathematics curriculum based on a culturally responsive pedagogy.

The evolving identities of the members of a community contribute to its boundaries; a guiding member of this community is the teacher. Patricia's cultural identity and belief system guides her teaching practices. She is a confident and experienced mathematics educator who has a sound understanding of the mathematics involved in teaching at the elementary level; she enjoys exploring issues about mathematics education and mathematics; and is devoted to the education of the Latino community in the United States, of which she is a member.

Patricia views mathematics as a sign system that allows her to describe, learn about, and be critical of the world. Her view of mathematics as a human activity implicitly opens the access to mathematics learning rather than assuming it as an innate skill of a few individuals. She explains her view about the importance of mathematics.

Beatriz (researcher): So, in which ways do you now believe math is important?

Patricia: Oh Gosh, [mathematics] is a way of life... If you start to think about it we live in a mathematical landscape and if you don't know the math, you know you can't appreciate the content, so the more we study math in real life, how is a human activity, and if it is a human activity then it has to, you have to understand it cause you are a human being and you function with it, so the more I see this world, the more I see the math in it, the more I want the kids to understand it; math is all around. (Interview, June 29, 2006)

Patricia's belief on the possibility of access by all of her students and its relevance in the everyday life is evident in her teaching practice. The mathematical practices are interconnected to the different content areas such as literacy and science as well as to students' everyday experiences. For instance, Patricia connected their science experiment to the introduction of a mathematics investigation. The students had been working on a science exploration of Owl Pellets. Students dissected this indigestible material regurgitated by an owl and searched for bones such as teeth, skulls, or claws. At this point the class discussed their conclusions based on the types and number of bones they found in each of the pellets. Patricia explained the meaning of the term conclusions, "You are trying to make sense of what you are seeing; they are based

on what you know.” In one of the pellets children found seven jaws, so the group of children concluded there were four rodents, since jaws come in pairs. Patricia wrote $7/2$ while a student spontaneously described it as an improper fraction. Yessenia explained, “It is four, seven divided by 2 is four rodents and one jaw missing.” This group’s conclusion, voiced by Yessenia’s explanation, highlights the marked interconnection of the numbers with their meaning in this classroom. In an isolated context four would be an incorrect answer; the answer expected would be three and one half. However, the students solve $8/2$ since the seventh jaw implies the existence of another rodent. This conversation included students’ sharing of personal stories that related to rodents. They also shared their theories about the gender and age of the rodents. The children deduced it was a family (a male, a female, and two babies); while Patricia theorized there were two female mice and some babies. In her experience raising mice she learned females are the ones who usually nurse the offspring. She concluded,

Do you see how experiences help us draw conclusions? Ustedes sacaron la conclusión de que había una hembra y un macho. Yo les digo, que pensé que eran dos hembras. Mi pensamiento fue que quizá la lechuza se comió las dos hembras y los bebés que tienen los ojos cerrados.... [You drew the conclusion that there was one female and one male. I am saying, I thought there were two females. My thought was that maybe the owl ate the two females and the babies who have their eyes closed.] We both used our experiences.

(field notes, January 11, 2006)

In this community children are expected to use their previous experiences. The previous discussion connects students’ ideas about conclusions to the upcoming mathematics investigation. Patricia told students they were going to switch to a mathematics investigation to make interpretations, conclusions, and generalizations. This connection to science makes the frontiers of school mathematics porous and contributes to the social-emotional investment of students. The connections with students’ previous experiences or others significant to them promote students’ participation as subjects in their learning. The identity of the individual includes the communities to which students belong outside of school. Belonging to the classroom community means bringing in their out-of-school life.

Patricia’s teaching follows the suggestions from the National Council of Teachers of Mathematics, Principles and Standards (2000) and a socio-constructivist perspective. In her teaching, she focuses on developing students’ communicative competency and mathematical reasoning. She promotes connected investigations that facilitate children’s active participation in mathematics discussions, visualizations of patterns, mathematization of their world, and connections of concrete and symbolic representations. The investigations frequently launch from a world context and are based on concrete experiences that promote students’ participation in the negotiation of mathematical meanings. Furthermore, they connect students’ communicative competency in everyday life to the academic discourses of mathematics. These inquiry projects give time for students to gain experience in the different practices. These expanded zones of development are the result of the nature of the activities, social interactions, and mediating tools.

Mathematics learning in this community, however, goes beyond standards-based mathematics (NCTM, 2000). Patricia’s humanist vision of education goes beyond mathematics as a communicative competency or interconnected meanings and representations. It includes the identities of students as subjects of their learnings. A humanist perspective counters a so-called “banking education” that considers individuals as objects in the learning process and knowledge a commodity to be accumulated (Freire, 1998). This identity of members as subjects requires that individuals make sense of the mathematical tools and use them for their own purposes.

Personal stories are a habitual discourse in this community; they are both a way of participation and a means to negotiate meanings. Patricia and students share stories both in planned situations and in spontaneous spaces. The stories are tools to enrich their mathematical knowledge just as their academic investigations have the purpose of enhancing their life experiences. Not only do students learn the mathematics situated in familiar contexts, but participants learn their out of school experiences are a valuable part of their learning in school.

Throughout the year, the students established these connections between school mathematics and mathematics in everyday experiences. In the introduction of the investigation previously described, before Patricia continued her explanation of the mathematics investigation, Yessenia shared, “Miss, at soccer practice the captain made small groups, we were working with math.” Patricia smiled and replied, “We are always dealing with math.” Yessenia connects the activity of making groups from a specific number of players at her soccer practice with mathematics. She recognizes they are making groups and identifies this activity as doing mathematics. The meanings negotiated and practices in the classroom establish multiple boundaries that can be more or less inclusive or exclusionary. The use of students’ funds of knowledge is a boundary practice that opens access to students’ cultural identities.

The connection with children’s cultural experiences in this classroom involves a critical lens. Patricia not only asks students to use their previous experiences but to use a critical lens towards discriminatory and unjust practices. For instance, through the year-long topic of world-mindedness Patricia brings the world population closer to this classroom and promotes a caring and informed attitude towards others in the planet. This stance of world-mindedness means that students need to develop a critical stance to reflect on and act in their world. This attitude is not extraneous to mathematics; on the contrary, it is through mathematics, as well as the other content areas, that Patricia promotes her goal. Patricia encourages children to use the different domains of mathematics to make sense of their world. Therefore, in order to achieve this goal, children also have to make sense of mathematics. For instance, during the first week of classes Patricia read to the class the children’s book *If the world were a village* (Smith & Armstrong, 2002). The author invites the readers to consider the world as if it were the size of a village and includes topics such as world population, religions, nationalities, food distribution, schooling and literacy, money and possessions, electricity, among other topics. During the reading aloud Patricia highlighted some aspects for the children to consider as citizens of the world situated in their particular contexts. She read, “Sixty percent of the world population is hungry and of those, twenty six percent are severely undernourished and twenty four percent of the population always has enough food” (field notes, August 18, 2005). Then, she stopped and posed the question to the students, “Why does this happen?” Patricia was not searching for answers as much as highlighting a call for critical thinking. She continued reading about the languages most spoken in the world. Some of the languages listed were Chinese, Hindi, English, and Spanish. After Patricia read these data she said to the students, “If you speak Spanish, you are at a great advantage because it is one of the four most spoken languages in the world.” Patricia connects the meanings presented in this book to the identity of students as Latina/o and counters the demeaning view of Spanish –or any other languages different from English – in this particular geographical context which tries to eliminate its use as a linguistic resource in schools. She uses this information to highlight the value of students’ knowledge and identity. Furthermore, Patricia emphasizes the importance of them making informed decisions. She said, “Smith (the author) wants you to know you are the citizens of the future, you need to know the information to make the right decisions” (field notes, August 18, 2005). In this short event, Patricia emphasizes the way mathematics is a tool to make sense of their world and their own identities. This connection of mathematics and the world and a vision of social justice also permeate Patricia’s boundary encounters with parents. Two of them are explained in the following section.

Boundary encounters

The boundary encounters in this community exemplify the dynamic and situated nature of the interactions between the school system, through a particular community of practice, and students’ families. The educational institution contributes with tools that convey a particular belief system, such as regulations governing parental participation, adoption of textbooks, and norms for teachers. Also mediating these relations with families of minoritized communities are asymmetrical power relations. The teacher, then, makes the decisions in their everyday practice within these activity systems.

The perspective of the teacher on parental involvement is a key mediator of her interactions with parents. In the following excerpt Patricia describes her role in supporting parents instead of supplying a list of pre-established tasks that parents need to complete.

Beatriz: What do you expect from parents as a teacher?

Patricia: Is not what I expect from parents, as much as what I expect from myself for parents. I have learned that parents trust a teacher considerably and that's scary. But for me the parents are already doing what they are supposed to do, send their kids to school and my job is to try to teach children in such a way that they [children] talk about what they are learning when they go home, and also to try to have the evidence so parents believe in their children so they can be advocates for their children.

(teacher interview, June 29, 2006)

Patricia dialogues with parents in ways that they can become informed advocates for their children. In her everyday practice she includes tools such as the students' agenda to inform parents about their mathematics learning. Children record personal statements, based on state standards, about their mathematics learning. She also acknowledges that often parents are not comfortable with mathematics and feel foreign to their children's experiences in school. The following is a description of two boundary encounters, one in the school and one after-school. These encounters exemplify some of the contradictions that abound in parental involvement activity systems.

Immersion: classroom observation

The family members of all the students in this fifth grade classroom were invited to observe and participate in a mathematics lesson. All these interactions were in English and Spanish. During this visit, one of the activities consisted of revisiting an exploration of the surface area of rectangular prisms. The investigation began with a discussion of the importance of the surface area of leaves, with a focus on the vegetation of the desert where they live, and the role of surface area in the packaging industry and therefore the environment. The mothers, in collaboration with their children, then drew three-dimensional prisms, traced the faces, and described their observations. When the children left for lunch, the classroom observation concluded with a discussion guided by the observations of the mothers and one grandmother about their children's mathematical learning experiences. In what follows we discuss Lorena's participation in this classroom observation.

In this context the bilingual community welcomes these adults as legitimate peripheral participants. The teacher and Yessenia use both languages allowing Lorena to participate in the conversations. Throughout the school-year children had the choice of either language, but Yessenia oftentimes chose to do the classroom tasks in both languages. Lorena values English highly and wants to preempt her daughters from the limitations she experiences as an emergent English speaker. Her desire for her daughters to know English, however, does not counter her value of Spanish. Most of their family still lives in Mexico, and even the ones in the United States mostly speak Spanish. Lorena is also proud of their Mexican identity and tells her daughters that they should also take pride in their nationality. In this way, she connects Spanish with their identities and this community of practice supports her goal.

The use of Spanish is not sufficient to include these mothers whose dominant language is Spanish; relevant mathematical concepts also need to be addressed. The negotiation of mathematical meanings departs from concrete experiences that underscore participants' previous knowledge of surface area and supports it through a collaborative community and concrete tools. Lorena and others are invited to connect the concrete prism, geometrical representations in two-dimensions, and the formula of surface area. In this way, Lorena first visualizes the surface area and then connects it to the formula. Mathematics as a human practice that supports sense-making allows her to be a legitimate peripheral participant. The connections between the different representations add to the transparency of the mathematical meanings. In an interview after this experience, Lorena redefines her view of mathematics, making reference to her conversations with Patricia about mathematics as a communicative competence with

which to create meanings. Furthermore, she also reconsiders her ability as a learner. For a moment, she shifts from a deficit view of herself to a critical analysis of her learning experiences. She describes herself using a new lens that included the analysis of the educational system in which she participated.

Lorena: *Yo sé que soy inteligente porque ahora me doy cuenta, pero antes, no sé que me pasaba a lo mejor decía, 'no voy a aprender, no voy aprender' entonces eso a lo mejor también por eso no aprendía, a lo mejor podía haber llegado más lejos, más lejos de la primaria. ...Sí, se las enseñan diferente también. Se las enseñan diferentes porque yo pues nomás estudié las tablas... yo estudiaba, no, y ya con eso, pero no te explicaban y ahorita ya te explican, sí no entiendes de una forma, te explican de otra hasta que ya le entiendes.*
(parent interview, May 10, 2006).

Lorena: I know that I am intelligent because now I can see it, but before, I don't know what happened to me, maybe I said to myself, 'I'm not going to learn, I'm not going to learn' and maybe because of that I didn't learn, maybe I could have gone further, further than elementary school. ...Yes, they teach [mathematics] differently too. They teach them differently because I only studied the times tables... I studied them and that was all, but they didn't explain and now they do explain, if you don't understand in one way they explain you in a different way until you understand.

[Authors' translation]

Homework: At home and in an after-school

Homework is a good example of a school-related practice that for the case study families is situated and distributed, that is, depends on multiple agents. The four students in these case studies attend after-school programs. Yessenia's support focuses on mathematics, while the other programs help with homework from all content areas. Lorena relies heavily on this program's capacity to help her children with their homework. While she checks her children's homework completion, other parents trust that their children do their homework. Yessenia, as well as other children, uses her sister's help as an important resource.

The analysis of parents' historical narratives in relation to homework practices also bring to light that school staff often fail to share their assumptions and decision making with parents. When Yessenia was in fourth grade Lorena was concerned that her daughter did not talk about her learning of mathematics and did not receive much homework. Lorena interprets this silence as a lack of emphasis placed on this subject in the classroom. She ignores the underlying reasons of Yessenia's behavior since Lorena did not share her concern with the teacher at the time.

This year Yessenia and Lorena attend an after-school program that focuses on mathematics at the school site. While the overt purpose of the program is to help children with their mathematics homework, Lorena's personal purpose for attending is to reinforce her close relationship with Yessenia. This is one space Lorena creates to spend time with her daughter.

In this context the connection with the classroom curriculum was mainly sustained through Yessenia. She brought questions or shared topics discussed in class. The following segment is a description of a time in which Yessenia asked for help with her mathematics homework. Yessenia brought the following question from her textbook: "Can you show 0.02 using only tenths place-value blocks? Explain." (Charles, Barnett, Briars, et al., 1999).

For those not familiar with the place value blocks and their uses with decimals, the equivalencies established were the following: one small square unit represents one hundredth, a line of ten square units represents one tenth, and the flat of a hundred square units represents one. In her homework, Yessenia wrote the following response, "No, you can't use tenths place value blocks." Yessenia's answer was correct but the teacher revised it and said her solution was not clear since she did not explain the reason why one could not use tenths place value blocks. The tutor explained to Yessenia the decimals using place value labels, but the tutor was unfamiliar with the use of place-value blocks with decimals and was not using this means to explain the question. Yessenia built on her classroom learning experiences and shared her knowledge of these representations using drawings of the blocks with the tutor. She drew base

ten blocks trying to make sense of the decimals. She explained to the tutor that with two lines or two tenths she could not represent two-hundredths because they were smaller. Yessenia was unsure of her statement so she also represented the decimals drawing money. This time she explained to the tutor “I have two pennies and that [line] is two dimes.” During this interaction, Lorena’s participation consisted of watching Yessenia’s efforts and the non-verbal cues of the tutor to evaluate Yessenia’s explanation (field notes, February 9, 2006).

In this encounter two central resources set the elements of boundary for Lorena; the language of interaction and the mathematical meanings in negotiation. Lorena becomes an outsider as soon as Yessenia reads the question in English. Although Yessenia is now in a bilingual classroom, her educational history did not support her development of academic Spanish. In this way the history of a practice that included only English situates Lorena as an outsider when she tries to participate in Yessenia’s mathematics learning. This position is especially contradictory when Lorena’s goal for participating in the after-school program is to reinforce her close relationship with Yessenia. In this manner, the language choice for homework and instruction influences the access of parents to their children’s mathematical learning.

The second structuring resource in these interactions connects to the negotiation of mathematical meanings. Lorena’s schooling experiences taught her that only some children are innately good in mathematics while others are not born to become members of learning communities in school (parent interview, July 19, 2006). While attending school in Mexico, she was retained (i.e., kept back) in elementary school for several years and, eventually, referred to a Special Education school. Since then, she had defined herself as an outsider to mathematics because she could not memorize facts and algorithms. In the example discussed above, Lorena is situated as an outsider, not only due to language issues but also because she did not remember learning decimals at school and views school mathematics as a subject matter disconnected from her common experience. She evoked her personal history of exclusion in her mathematics education experiences. In contrast, Yessenia’s experience with learning mathematics is one that focuses on creating meaning (e.g., from the abstract numbers of two-hundredths and two-tenths to the place value blocks and her experiences with money). In her classroom, mathematics is treated as a language or tool to create meaning. Yessenia turned to these connections with world experiences (e.g., money) and was able to make sense of the decimal numbers. Yessenia, therefore, did not conceive mathematics as a series of procedures or rules to be memorized or practiced. This position is radically different in that it empowers her with respect to the mathematics. It is not the mathematics that tells the individual its rules to be followed blindly, but it is the individual who gives numbers meaning and then manipulates them. Yessenia’s approach to mathematics contests the hegemonic relationship towards mathematics existent in many educational settings.

Conclusions and implications

A comprehensive review of the opportunities for culturally and linguistically minoritized students demands an imminent response to the prevalent inequities within and beyond mathematics education (Apple, 1992; Gutstein, 2003; Martin, 2000; Stinson, 2004). As Martin (2000) suggests equity goals call for a vision that includes the socio-historical context of classrooms and schools. Practices of parental engagement that disrupt oppressive power structures can open spaces of egalitarian participation in education for and by disenfranchised communities.

In this article we focus on mathematics education as a practice of particular communities, most importantly, we examine the boundaries around these communities. School mathematics has evolved as an exclusionary practice with boundaries that often leave students and families from marginalized groups outside (Civil, 2007; Martin, 2006; Stinson, 2004). The concept of boundary practices situates the notion of parental involvement; it focuses on the organization and history of the community, roles and power relations, as well as the identities of the participants. It is an analytical tool to examine the ways in which these practices include or

exclude students' cultural resources, embracing their connections with their families, as they reproduce or disrupt current power relations.

The inclusion of students' funds of knowledge opens the boundaries of school mathematics for their legitimate participation. These pedagogical practices make explicit that mathematics is a cultural practice. Moreover, the inclusion of students' funds of knowledge from disenfranchised communities validates their knowledge and counters asymmetrical power relations. It promotes their engagement and their identity as subjects in their education (Freire, 1998). In this way their cultural resources, namely their families, are symbolically included. Parents' knowledge becomes a resource. The identity of the individual includes the communities to which they belong outside of school. In this case, belonging to the classroom community means bringing in their out-of-school life and supporting the transformation of those disenfranchising situations. Furthermore, when parents are invited as participants, as in the case of the classroom observation, it renegotiates the boundaries of membership. Parents as agents of transmission of cultural and historical legacy are an indispensable tool for learning.

Students' linguistic competencies are important funds of knowledge. Language use in a community is not only a tool to negotiate meanings but is an element of boundary, which is often marked by the historical discrimination towards minoritized linguistic communities. Thus, the nature of school mathematics practices goes beyond the realm of negotiation of meanings. Pedagogical practices function as boundary practices; therefore, they need to become central to efforts of parental engagement. A culturally relevant pedagogy promotes the inclusion of parents in their children's education and an egalitarian dialogue between parents and teachers. Adults from minoritized communities are overrepresented in groups with histories of exclusion from school mathematics. Parental engagement efforts have the potential to disrupt these histories. For example, teachers identified Lorena as an outsider to school mathematics, and consequently she identified herself as such. The boundary practice of immersion or classroom observation is significant for Lorena as a parent as well as a learner. In this practice she engaged in an experience that redefined mathematics as a language and a tool for sense making. Surface area was discussed not only as curricular goal but as a way to understand better her everyday context (e.g., the vegetation in the desert). A culturally responsive education requires that learners are subjects of their learning, in other words, that they make sense and stay in control of their experiences (Freire, 1998). Dewey (1938) asserts that, for an experience to be educational, learners need to continue to be curious and see themselves as legitimate members of these communities. These experiences have a significant potential not only in the educational trajectories of children but of adults.

There are significant implications for both teachers and decision makers from Patricia's pedagogy as well as from the concept of boundary practices. A teacher's stance on parental involvement is a key mediator of her interactions with parents. In this case, Patricia's vision of social justice assists children's families in their role as advocates for their children. She hopes to support their effort in countering racist and biased policies, relations, and practices with professionals. This role is particularly critical but hard to assume when parents are not recognized as and they themselves do not feel they are legitimate peripheral members of school mathematics. Educators, policy makers, and researchers need to explore ways to systematically include the funds of knowledge of minoritized families, including bilingual or multilingual mathematical communicative competencies, and dialogues that counter current asymmetrical power relations with minoritized students and their families.

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