PARENTAL ENGAGEMENT IN THEIR CHILDREN’S MATHEMATICAL EDUCATION: MOMENTS OF INCLUSION, MOMENTS OF EXCLUSION

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In this paper we use the framework of communities of practice (CoP) to analyze the interaction of low-income Latino parents and the school system. In particular we use the concept of boundary practices (Wenger, 1998) to address the moments of inclusion or exclusion of parents in their children’s mathematics education. The view of learning of mathematics as participation in particular communities brings to the forefront current power imbalances. There is an imminent need for mathematical practices that include mathematics as a cultural activity that draws on the resources of members of different communities, including parents.

INTRODUCTION

Parental engagement in children’s mathematics learning must be understood as a product of the historical and socio-political context of schools influenced by educational policies, research, and teaching practices, among other factors such as race or income level of students’ families (Calabrese Barton, Drake, Perez, St. Louis, & George, 2004). For over ten years we have conducted research on this topic in working-class Latino communities. The following quote is from an immigrant Mexican mother reflecting on her experiences with her children’s school in the U.S. She shared it with us during one of our mathematics get-togethers in which not only we explored mathematics but we also engaged in conversations with the parents about their children’s schooling with a particular focus on their mathematics teaching and learning.

Esperanza: You count but you don’t count, you are there but you are not, you symbolically go, but…

Her remark talks to her experience of parental involvement in which schools often control the form and aspects in which parents are invited to participate. It underscores the fact that parents’ presence does not mean they have access as legitimate participants, that is, opportunity to participate in defining the enterprise, creation of mutual relationships, and in the negotiation of meanings. This access is often an uphill battle for those from disenfranchised communities. In this paper we analyze the interaction of parents and the school system using the framework of communities of practice (CoP); in particular we use the concept of boundary practices (Wenger, 1998) to address particular moments of inclusion or exclusion in children’s mathematics education and their implications.

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THEORETICAL TOOLS

The use of the lens of legitimate peripheral participation (Lave & Wenger, 1991) considers central aspects of mathematics learning. It defines learning as participation which includes the whole individual in interaction with the world (Wenger, 1998). In our case, we define the community of practice as the classroom participants and mathematics learning as students’ trajectories of participation in the particular mathematical practices.

Communities of practice are continuously in connection with other individuals and communities. The term “boundary practices” refers to those relations of a community with the outside world (Wenger, 1998). These practices have the purpose of simultaneously establishing connections and boundaries of a CoP. Thus, they create contradictions of inclusion and exclusion to a particular community. A fundamental component of culturally relevant education (Ladson-Billings, 1995) is boundary practices that include the funds of knowledge of diverse communities and address power differentials. Opening the boundaries of mathematics learning has the potential to break its historical encapsulation and making schools democratic spaces. Boundary practices in disenfranchised communities may become “third spaces in which alternative and competing discourses and positionings transform conflict and difference into rich zones of collaboration and learning” (Gutierrez, Baquedano-Lopez, & Tejeda, 1999; pp. 286-287). Parental engagement in mathematics education can transform current power structures that disenfranchise Latino students and their communities.

CONTEXT AND METHOD

The research presented here is part of a larger study that took place in a fifth grade classroom at an urban elementary school in the southwest United States, in which ninety percent of the students are of Latino background and almost seventy percent of the students receive free or reduced lunch (an indicator of poverty level). All the students have some understanding of English and Spanish, however several of them predominantly use one of the two languages. The participants in the study were nineteen fifth-graders and the classroom teacher. We developed in-depth case studies for five of the students, and so the parents of these students are also participants in the study. All the case study participants are either Mexican immigrants or are of Mexican descent. The case-study students were selected based on the teacher’s knowledge to include diversity in gender (2 boys; 3 girls), mathematical proficiency, and language fluency in English and in Spanish. In this paper, we explore how boundary practices present contradictions of inclusion and exclusion of Latino parents from a legitimate peripheral participation in their children’s mathematics learning. We used ethnographic tools for the data collection which took place in three sites: the classroom, students’ households, and two after-school programs. We also include a classroom observation of some parents to a mathematics lesson. During this visit children reviewed an exploration of the surface area of rectangular prisms. All
these interactions were in English and Spanish. The investigation began with a connection to the everyday significance of surface area. Then the adults in collaboration with the children drew three-dimensional prisms, traced the faces, and described their observations. Some other activities were mathematics games and mathematics discussions around number equations. The classroom observation concluded with a discussion guided by the observations of the mothers and one grandmother about their children’s mathematical learning experiences. The data are the video transcripts, field notes of classroom observations, and interview transcripts. The analysis is based on grounded theory, a process that explores emergent themes (Charmaz, 2001). The different sources were used to triangulate the information and build thick descriptions.

ARE PARENTS LEGITIMATE PERIPHERAL PARTICIPANTS?

We present the case studies of two mothers, Lorena (her daughter Yessenia) and Monica (her daughter Maite), who share a similar view of their school experiences and attitude towards mathematics.

Lorena and Monica went to school in northern Mexico. After repeated retentions they both finished their elementary education in Special Education. Lorena mentions that the cause of her difficulties is her lack of memory, in other words, she soon forgets what she learns in school. This explanation was the teacher’s complaint and the reason given for her repeated retentions. Lorena has a strong view of learning as an individual endeavor, which is grounded on personal capabilities. Monica explains her struggles in school with similar arguments; she believes she is a slow learner. Mathematics especially tints Monica’s schooling experience with a grim tone. She describes her mathematics learning experiences as a headache throughout all her schooling years. The belief in her internal inability to learn and her memories in school kept Monica out of school as an adolescent and still keep her away from schools as an adult.

Homework as a Boundary Practice

Homework has been one boundary practice that connects the classroom community with these families. At home, these women feel limited in their ability to help their children directly. They often feel the limitation of their short educational history as well as the fact that most of the homework is in English. Monica explains she does not understand what Maite currently learns at school, even if the work is in Spanish. Monica does not help Maite with her homework anymore; she only checks it for completion when she arrives home from the after-school. She mentions her children in previous years would get upset because they wanted to solve it in the same way the school teaches them. She explains to the researcher:

Monica: Sometimes the girls get upset because I teach them my own way. “That’s not the way the teacher teaches me” and they get upset because I try to teach them, but it is the same, anyway you get the same answer, but they want to do it as they teach them in school

2 All names of the participants are pseudonyms.
Researcher: Do you remember a specific example when this happened or what were you doing?

Monica: Oh yeah, one day, Maite got really mad because I strongly wanted to teach them, she, because she wanted me to help her, and I was helping her but she was not happy the way I was teaching her, because she says, “I want you to teach me the way the teacher teaches us,” “that’s not possible,” I told her “because the teacher has some thoughts and I have others, and I learned in one way and she learned in another, and it’s not the same. But you get, it’s the same when it comes to the answer, it’s going to be the same.” But, then she got upset and so I better let her do it alone. (parent interview, February, 2006).

Maite was upset because she did not receive the help she needed from her mother. She felt more comfortable with the school’s method rather than her mother’s method. In this conflict, a learning opportunity that considers multiple ways to solve a problem is lost, in addition to ignoring families’ funds of knowledge. Although this difference in the algorithms is not uncommon, especially when their education was in a different country, children are frequently expected to mediate between the asymmetrical relations between home and the school’s knowledge (Civil & Andrade, 2002; Civil, Planas, & Quintos, 2005; Civil & Quintos, 2006). Based on these experiences with her children’s homework, as well as Monica’s educational history, she does not participate in these practices of mathematics learning with her children anymore. Nonetheless, she resists the exclusion from these school related practices. Monica uses her own experiences to alert her children about their opportunities and choices. She also tells them they do not have the right to steal her mother’s dream. She said, “I tell them that I am their mother and they do not have the right to steal my dreams” (parent interview, March, 2006).

Lorena is also proactive against exclusion. She encourages Yessenia to ask for help. She also believes her central means of support is to maintain a close relationship with her daughter and to hold high expectations. Next we present the microgenetic analysis of an interaction between Lorena and Yessenia. This mother and daughter attend an after-school program at the school site that focuses on mathematics. 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. The connection with the classroom curriculum is mainly sustained through Yessenia. She brought questions or shared topics discussed in class. 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.”

The place value blocks equivalencies with decimals established were the following: A small block (cube) represents one hundredth; a “long” (ten blocks) represents one tenth, and the flat (one hundred cubes) represents the ones. The tutor explained to Yessenia the decimals using place value, but the tutor was not familiar with the use of place-value blocks with decimals and was not using them 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 longs or two tenths she could not represent two-hundredthths 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 [long] 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, 2006).

In this interaction there are two central resources that 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 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 mathematical learning communities in school. 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. This practice evokes 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-hundredthths 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 of mathematics as a series of procedures or rules to be memorized or practiced. This position is radically different in that it empowers her over the mathematics. Yessenia’s approach to mathematics contests the relationship towards mathematics existent in many educational settings.

**Classroom Observation as a Boundary Practice**

We conclude with the analysis of a classroom observation that functions as a third space in which parents, teacher and children expanded their forms of interaction. In this activity the participants dialogue and share their perspectives. The hybrid linguistic practices and mathematical meanings allow parents to participate in this practice. This boundary practice impacts participants’ views on mathematics, the community, and themselves.
The bilingual community welcomes the mothers and grandmother as legitimate peripheral participants. While the teacher uses both languages, each child chooses the language to interact with their family. This language is based on an emphasis on a learning environment in which children feel safe and celebrate mistakes. The negotiation of mathematical meanings is based on experiences that underscore participants’ previous knowledge of surface area and supports it through a collaborative community and concrete tools. The teacher invites the adults and children to start thinking of surface area in their everyday experiences and then she connects the concrete prism, geometrical representations in two-dimensions, and the formula of surface area. In this way, mathematics in this classroom becomes a human practice that supports sense-making and opens the boundaries for them to be legitimate peripheral participants. In an interview after this experience, Lorena redefines her view of mathematics connecting to her conversations with the teacher about mathematics as a communicative competence to create meanings. Furthermore, she also reconsiders her ability as a learner. 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: 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 to you in a different way until you understand.

CONCLUSION

The data presented in these case studies suggest that the nature of the community of practice as well as the socio-historical development of its members play a critical role in the types of relationships established with parents. These examples of boundary practices decenter the notion of parental involvement and focus on the organization and history of the community, as well as the identities of the participants. Language practices and mathematics education practices play a defining role in these interactions. Mathematics practices do not negotiate meanings exclusively, but are element of boundary. They include elements of membership as well as elements of identity. Finally, our data indicate that a culturally relevant pedagogy includes an egalitarian dialogue with parents and between parents and children. The systematic exclusion of the funds of knowledge of Latino families, including bilingual mathematical communicative competencies, and mathematics as a knowledge base, will continue to exclude Latino students and their families.

References


