

Parental Involvement in Mathematics: A Focus on Parents' Voices

Marta Civil (civil@math.arizona.edu)
Emily Bernier (etb@email.arizona.edu)
Beatriz Quintos (bquintos@email.arizona.edu)

The University of Arizona
Tucson, AZ

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In this paper we focus on parents' perceptions of and expectations for the teaching and learning of mathematics for their children. This research is part of a large parental involvement project in mathematics in several working class, Latino communities in the Southwest. Our work is grounded on the concept of dialogic learning (Flecha, 2000) by which we seek to establish a dialogue that breaks down the hierarchical and hegemonic practices that often characterize parental involvement efforts in communities such as ours (Henry, 1996; Valdés, 1996; Vincent, 1996). Parents in our project engage in mathematics activities as adult learners and eventually become facilitators themselves of workshops for other parents in the community.

Through focus groups, interviews, and classroom observations, we have documented parents' perceptions about mathematics instruction from three different perspectives: as learners themselves in a reform-oriented setting, as teachers / facilitators, and as parents (of children in a wide range of K-12 mathematics experiences). In this paper we address all three perspectives with a specific focus on classroom observations. These classroom visits and the follow-up debriefing conversation have shed some light on the diversity of views between the different players involved in children's mathematics education—parents, teachers, administrators and researchers. Although our focus is on parents' voices, to better understand some of these views, we will also bring in the teachers' voices to our general discussion.

As Epstein (2001) writes, “no topic about school improvement has created more rhetoric than ‘parent involvement.’ Everyone says that it is important.” (p. 3) But, we ask, what is meant by “parental involvement”? And more specifically, what forms does it take in schools located in ethnic / language minority, working class communities? We will begin by sharing a short story. One of our research collaborators, a Hispanic woman, vividly recalls attending her local school, which drew children from an upper income neighborhood and from a middle class one. She herself came from a middle class family and was one of the few Hispanics in that school. She often saw the parents of the upper income children, heart surgeons, lawyers, etc, coming to the school and talking about their careers. She also saw other parents, coming to the school and helping out with bulletin boards displays, filing papers, etc. Right there we can see two forms of parental involvement, those who come to share their knowledge about their profession, and those who come help with busy tasks that do need to be carried out, but do not reflect parents’ areas of expertise and knowledge.

In our local context, which consists of largely Hispanic, working class communities, we have seen parents actively involved in the schools. That involvement, however, has often been in the form of monitoring the cafeteria, selling refreshments for school fund-raising, and as a most extreme case, sharpening 200 pencils for a series of students’ assessment tasks. In this paper we argue for an approach to parental involvement that focuses on parents as intellectual resources. Our orientation to research on parental involvement is grounded on the work we have carried out during several years in projects such as Funds of Knowledge for Teaching (González, 1995; Moll, 1992; Moll, Amanti, Neff & González, 1992) and more recently in project Bridge (Civil & Andrade, 2002; in press). We explicitly reject the deficit view that positions the homes and communities at the root of students’ academic failure, without taking into account the institutional biases inherent in schools that have contributed to the mismatch between home and school. This deficit view on parenting is particularly pervasive when the parents are ethnic minority and working-class (Edwards, Pleasants, & Franklin, 1999; Vincent, 1996). In our work we argue for the need to establish a dialogue with the parents and between the parents and teachers. Our proposed model for parental involvement is based on the concept of egalitarian dialogue (Flecha, 2000):

A dialogue is egalitarian when it takes different contributions into consideration according to the validity of their reasoning, instead of according to the positions of power held by those who make the contributions. (p.2)

In establishing this dialogue we seek to transform the traditional structures of power between parents and schools, in which teachers and parents are often seen as “enemies” (Henry, 1996). As Abrams and Gibbs (2002) write, “strengthening ties between parents and schools is a complex task, as these relationships mirror the contexts and inequitable power arrangements of the larger society”(p. 385), but as they continue, “school reform and parent involvement strategies do indeed have the potential to transform traditional power relations between parents and schools and between ethnocultural and social class groups” (p. 403). Lareau (1989) and Henry (1996) have discussed the influences of culture and socio-economic factors on the nature of home-school relationships. Research indicates that working-class parents as well as parents from certain cultural groups have historically had an uphill battle in advocating for their children’s best interests in schools. Reay (1998), in her research on mothers’ involvement in their children’s schooling, points out the different roles and approaches among middle-class and working-class mothers:

[For the middle-class mothers] Educational problems, when they did arise, were due to deficits in schooling, rather than located in either themselves or their child.... In contrast many of the working-class women had learnt from their own experience of schooling that educational difficulties were due to failings in the individual, rather than the system. (p. 64)

Furthermore, Reay’s interviews with immigrant women underscored the difficulties that many of them encountered as they tried to build on their cultural capital for their children’s benefit. Their experiences with schooling were so different from what their children were experiencing in their new country that their cultural capital was of little use in their current situation.

Parental Involvement and Mathematics Education

There is small, yet growing, body of research that specifically focuses on parental involvement and mathematics education issues. Documents such as *Principles and Standards for School Mathematics* (NCTM, 2000) highlight the importance of working with parents as partners in our efforts to bring change to the mathematics education of all K-12 students.

Researchers such as Appelbaum (1999), Lehrer and Shumow (1997), and Peressini (1997, 1998) have looked at issues related to parental involvement in mathematics, particularly as they related to mathematics education reform. This research points to somehow mixed feelings among parents when it comes to reform mathematics. Many of the parents in those studies seemed supportive of certain practices such as children sharing their approaches to problems, and were impressed by the different kinds of mathematics that the children were exploring. Yet, many of them expressed some anxiety at the changes especially in relation to their frustration at not being able to help them with the homework (no textbooks, or not familiar with the content their children were studying), and in relation to the apparent switch to less practice of basic computational skills.

In one of Lehrer and Shumow's (1997) studies, parents watched videotapes of excerpts from reform mathematics classrooms. In doing so, parents were then able to contrast what they saw with their own experiences with and beliefs about teaching and learning mathematics. It provided them with concrete examples on which to ground the discussion. In our project (that will be described next), we took a different angle, yet also geared towards providing a specific example on which to ground the discussion: we conducted classroom observations with a small group of parents and then carried out a focus group discussion centered on the observation. But these classroom observations cannot be taken in isolation. They are part of a concerted effort to develop a dialogue between parents and university researchers and between parents and teachers—a egalitarian dialogue along the lines discussed earlier.

Few studies focus on the intersection of social class, parental involvement, ethnic / language minority communities, and mathematics education (De La Cruz, 1995; Martin, 2000; Weissglass & Becerra, n.d.). Our work is one more contribution to this body of research. In the next section we describe the program in which our research takes place, focusing on our specific approach to parental involvement, some of which has already been presented earlier in this paper.

Project MAPPS (Math and Parent Partnerships in the Southwest)¹

Project MAPPS is a four-year long project that focuses on parental involvement in mathematics. It is currently in place at four sites (Tucson, AZ; Chandler, AZ; San José, CA; Las Vegas, NM). The project started in Tucson in 1999 and at the other three sites in 2001. In Tucson we work within a school district that is largely Hispanic (72%) (mostly of Mexican origin) and with 81% children on free or reduced lunch. All but one of the other three districts where MAPPS has been implemented have large populations of Hispanics. Chandler, AZ. has the lowest number of Hispanics (23% Hispanic, 77% Anglo). Participating MAPPS schools in Chandler range from 13% to 81% receiving free or reduced lunch. San José, CA. has the most diverse population with approximately 34% Asian, 36% Hispanic and 35% Anglo students. The two schools where MAPPS is in place are predominately Hispanic (51% at the high school and 69% at the elementary school), with 84% of the elementary students receiving free or reduced lunch. Las Vegas, NM. has the largest population of Hispanic students (75%). Most of the population in Las Vegas is 3rd or 4th generation Hispanic Americans. The numbers of children receiving free or reduced lunch were not available.

The implementation at the different sites varies somewhat according to their local needs (e.g., in San José, all the sessions are given in Spanish to reach out specifically to the Spanish speaking families; in Chandler and in Tucson, sessions are conducted bilingually, while in Las Vegas, they are carried out in English). But overall we share some common goals. One such goal is to develop leadership teams (LT) (parents and teachers/administrators) that will help in the mathematics education outreach effort throughout the districts involved. We are currently in our last year of the project, in the leadership teams we have had approximately 80 parents and 30 teachers in Tucson, and approximately 90 parents and 30 teachers among the three other sites combined. The project seeks to promote the leadership of parents in mathematics activities in home and school, through three components²:

a) Leadership development sessions in which parents, teachers, and administrators come together to explore different learning styles, to learn how to facilitate workshops for the larger parent community, and to work on parent recruitment issues. Our goal in bringing

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together the different groups of people is to work towards establishing a dialogue that allows us to break the traditional power structures that are in place in schools.

b) Mathematics Awareness Workshops (MAWS) that are open to all the parents in a given district and range over key topics in mathematics in K-12 (e.g., one workshop explored multiplication and its different representations; another workshop centered on “discovering π ”). These workshops are self-contained and last about two hours. Children and parents are invited to attend with the children being dismissed at some point in the workshop to allow for the parents and other family members to engage as adult learners or to discuss and analyze their children’s thinking. After the first year in the program, parents and teachers become joint facilitators of these workshops. This puts them in a very different role, in which they work together to facilitate a learning experience for other parents. As one parent told us upon reflecting on this experience,

It was hard in the beginning to work with the teachers. “They are the best.” They don’t give you the opportunity that you may know more or bring other ideas. Now we are more equal. Before [with her hands she indicates parents in the team were at a lower level than teachers], but now [she indicates they are at the same level]. Now they rely on me, they check with me, they make you feel that you are important to them. One teacher once told me “you just hand out papers” and I was upset. [Then she goes on to explain how in a more recent MAW she took the lead of the presentation.] [Case study - Interview - March 2001]

Each team of facilitators has a mentor—a parent or a teacher who entered the project earlier (in Tucson we have four leadership teams in place, which allows for this structure). So, we have teams in which parents are in fact mentors for the teachers.

c) Math for Parents (MFP) courses in which parents in the Leadership Teams (and a few other guests) have an opportunity to explore mathematical topics in more depth. These courses meet for eight weeks in 2-hour-long sessions. We have developed five MFPs-- in algebra, geometry, fractions and decimals, numbers, and data. These courses are taught by experienced instructors (teachers, professors), some of whom are the authors of the MFP materials. We view these courses as arenas for professional development for parents, very much along the same lines as our work with teachers in the community. Parents work on tasks that are very similar to what one would see in mathematics classrooms that have adopted Standards-based curricula. Working in groups, sharing of ideas, using manipulative

² All four sites have these components. The description given here, however, is specific to our work in Tucson.

materials and calculators, encouraging different representations and solution approaches, and focusing on conceptual understanding are common characteristics of these courses (see Civil, 2001, for more on these courses). We believe that by engaging parents as learners of mathematics themselves, but more specifically of the kinds of mathematics that we see in Standards-based exemplary curricula, we are opening a door towards an informed discussion of what it means to teach and learn mathematics in a different way. As Morse and Wagner (1998) write, about their work on engaging parents in mathematics seminars using materials that were originally developed for teacher professional development,

If we invite parents to work with the case studies, to do the mathematics, and to write about what they were learning, will they also discover a deeper level of thinking in their children? If parents listen carefully to one another and engage one another in mathematical dialogue, will they come to discover themselves as mathematical thinkers? If so, how might these new perceptions affect their beliefs about what it means to learn, what it means to teach? And in turn, might we better understand what it takes to engage parents in an informed dialogue about mathematics teaching practice and the elementary school mathematics curriculum? (Morse & Wagner, 1998, 360-361)

For the rest of the paper, we will focus mostly on our work in Tucson and in particular we will draw on the activity of conducting classroom observations with a small group of parents from the Leadership Teams. The three components just described (leadership development, MAWS, and MFPs) provide the background to understand the experiences of these parents in MAPPS. We will be looking at three themes that have emerged from our overall research in MAPPS (Civil, Andrade, & Anhalt, 2000; Civil, 2001b; Civil & Quintos, 2002)--parents as learners, parents as teachers, and parents as parents. We will address these themes from the point of view of our analysis of classroom observations. In the last part of the paper, we will bring in the teachers' voices as they reflect on these themes too.

About the classroom observations

Our research draws on classroom observations held with a small group of mothers, (usually four) who are in one of the Leadership Teams. This work was started in the first year

of the project (Anhalt, Allexaht-Snyder, & Civil, 2002) and has evolved into a systematic approach that we describe next (Civil & Quintos, 2002).

Two of the authors participated in classroom observations with the mothers at an elementary school, a middle school, and a high school. After the mothers had done at least one observation with us, they went on their own to observe a mathematics lesson from at least one of their children. Directly following the classroom observations, we conducted semi-structured interviews where we engaged in a dialogue with the mothers about their impressions, inquiries, and connections to their children's schooling and to their own experiences with learning and teaching mathematics (within MAPPS or outside). These conversations, referred to as debriefings, lasted approximately an hour and a half. The key to these observations and subsequent debriefings was the fact that we had previously established rapport with the mothers who participated.

Once we coordinated our schedules, three or four mothers and one or two researchers, engaged in this learning experience. We met at the school site approximately half an hour prior to the observation in order to discuss the ethics of the observation, our role inside the classroom and the theme of the lesson. We gave the mothers ethnographic observation protocols to help guide them during the observation. Some of the protocol prompts included: "What do you see the students doing?", "Are the students talking with one another about math?", "Describe what the students are using in class to do mathematics", and "How is the instruction in this classroom driven (e.g., textbook, activity based, manipulatives, homework, the routine, etc.)?" We told the mothers that the purpose of the observations was to learn about how mathematics is taught in the district as well as for them to make connections with their MAPPS experiences.

The mathematics lessons usually lasted about an hour. Inside the classroom, researchers and mothers' roles varied according to the classroom dynamics and social norms already in place. For example, in some classrooms the role was primarily non-participatory in nature, where we were observed from the back of the room. In other classrooms, we were invited to walk around the room, talk to the students and exchange ideas with them as they worked in groups or individually.

As mentioned previously, we met directly following the observations to share our initial impressions. We adhered to the principles of an egalitarian dialogue (Flecha, 2000), where

the individual mothers and the researchers created a dialogue in order to exchange ideas and enrich our perceptions in a safe environment. All views were equally valued. The debriefings were conducted in both Spanish and English. To start the conversation, we asked general questions such as, “What were your impressions about the class?”, “What was important for you in the class?”, “Was the class what you expected or not, and why?”, and “What did you think of the math content?” The conversations usually flowed naturally and took us in a variety of often unexpected directions. That is to say that many of the comments and inquiries the mothers brought up surprised us as researchers. We will discuss this in detail below. All the conversations were video and audio taped. These were then transcribed and formed the core of our data. Furthermore, we took detailed field-notes of the classroom observation and the debriefings.

The transcripts proved to be rich in terms of possible themes to pursue. As of this writing, the two researchers who took part in the classroom observations have been the only ones to analyze the transcripts (first separately and then we came together to compare and contrast). Our intention was to capitalize on parents’ voices, though we acknowledge that this was done from our point of view, and not from the mothers’ perspective. A variety of topics such as standardized testing, adult learners versus children learners came up, however for this paper we made a selection of the themes based on frequency and our perceived relevance.

Parents as Learners, as Teachers, and as Parents

When sharing our project with others, most people assume that our main goal in MAPPS is to teach mathematics to parents so they can help their children. Although this may be one goal, it is not the primary goal shared by the authors of this paper. Our orientation, as described earlier, is grounded on the idea of parents as intellectual resources and as such, we learn as much from them as they may be learning from us. Thus, our intention is to engage in an egalitarian exchange rather than in a teaching by transmission model. Although most parents reported joining the project to learn mathematics in order to help their children with homework (hence, parents as parents), it soon became apparent that many of these parents continued to take part in the project for their own learning (parents as learners). In fact, several of them have since gone onto other forms of more “formal” education. For example, some of them have gone either to the community college or the Adult Education Center to

take mathematics classes. One mother shared how she now felt more confident registering for a mathematics course, whereas before she would not have done it.

As the parents continue in the project, most have taken yet another role—that of facilitators of workshops for other parents, hence becoming teachers to other community members (see Civil & Quintos, 2002) These three roles (as parents, as teachers, and as learners) are inextricably intertwined as the analysis of the classroom observations revealed. In the next sections we listen to the parents’ voices as they comment on each of those roles. We include comments that surprised us in that we were not expecting them. We do this to illustrate how parents and researchers often articulate different concerns in the classroom. We view this difference as key towards the development of a two-way dialogue. By paying attention to what parents say, we learn about their ideas concerning the teaching and learning of mathematics, what they value, and what their expectations are.

Parents as Learners

The group of mothers and the two researchers visited the classrooms as learners as we have mentioned in our goals. As we mentioned earlier, we were able to take on different roles within the classrooms we visited. We (the researchers) saw this as an opportunity for all of us to learn *about* mathematics instruction. One of the unexpected outcomes, however, was to see the mothers’ desire to learn *from* the mathematics instruction they were observing. That is, they particularly enjoyed observing in classes where they learned something new about mathematics. For example, they reported immensely enjoying a high school geometry class because they were introduced to topics that were new to them, while in the fourth grade classroom we observed, the material was too basic for them and they did not learn much. This desire to learn mathematics from the classroom observation is likely to color their impressions of the classroom and the observation itself. They viewed the experience of observing a classroom as an opportunity to further their own mathematical development. This thirst for learning more about mathematics has been a constant throughout our project. However, we were surprised that this is what they valued, too, in doing the classroom observations.

In several of the observations the mothers joined in as just another student. One class in particular had the mothers interacting with the students in a one on one basis. This high school geometry class was taught by a member of the MAPPS leadership team (he had been

a Math for Parents instructor the semester before as well and had interacted with and taught some of these same mothers). He gave us copies of the worksheets the class was working on and invited us to participate. Two of the mothers were having trouble understanding one of the problems so one of the students in the class went over to help them out. This was the highlight of their experience. During the debriefing, they could not stop talking about how powerful it had been for them to have a student “teaching” them:

L.: Y yo también lo que me fijé es que uno de ellos (los alumnos) quería ayudarnos a nosotros, estaba participando con nosotros, porque nos ayudó, el muchacho que nos ayudó, trató de explicarnos, porque no entendíamos.

[And what I noticed is that one of them (of the students) wanted to help us, he was participating with us, because he helped us, the young man that helped us, he tried to explain it to us because we didn't understand]

Two other mothers chimed in:

G.: Pero lo más interesante fue lo del muchacho, fue a ayudarnos a nosotros, en vez de nosotros ayudarlo a él.

[But the most interesting was this thing about the young man; he came to help us, instead of us helping him]

L.: Supuestamente el maestro espera más de nosotros y el resultado final fueron ellos los que absorbieron más que nosotros.

[Supposedly, the teacher expects more from us, and yet in the end it was them who took more in than us]

JA.: ... when parents ask for help and kids can give it to you I can't tell you how that must make (the child) feel, that's a big deal. 'This is important math because these grown ups are going to ask me' I think that is really neat, they appreciate that, they look at us differently.

L. went on to comment on the interchangeable role between parents and children, in which sometimes they (parents) may be the teacher, and others, the learner:

L.: Y con el tema de los niños, que uno le está enseñando y uno está aprendiendo de ellos, es verdad porque cuando yo vengo a la escuela, la niña chiquita que tiene 5 años me dice, “mami tú vas a aprender para enseñarme”. “Sí, yo voy a aprender para enseñarte”, en cambio la niña más grande la que está en el cinco, me dice “mami te voy a explicar algo que tú no aprendiste en tu clase”.

[And with the topic of children, one is teaching them and one is learning from them. It is true because when I come to school, my youngest daughter who is 5 years old tells me, “mom, you are going to learn to then teach me.” Yes, I am going to learn to then teach you. but on the other hand my older daughter, the one who is 5th grade, she tells me, “mom, I am going to explain something to you that you did not learn in your class.]”

As we can see from the quotes above, positioning parents as learning from their children has been a powerful experience. This relates to another theme that emerged from the transcripts--how the family dynamic was altered when a parent became involved in learning mathematics. From the beginning of the project we have heard from parents in individual and focus group interviews about how their families have adjusted to having their mothers absent from the home to learn mathematics.

At home, all my family becomes involved in my MAPPS homework, from my husband to my youngest child [she has 3 children]. As soon as I take my notebook, they come to the table. [MAPPS, January 2000]

My son [he is in high school], I'd bring the material and he'll show me another way. It is another way to bring them together, a wonderful way to communicate. [MAPPS, focus group, May 2000]

In future research, we would like to explore further the impact of parents as learners on the family dynamics. Many of the mothers have expressed that they like learning from their children, that it makes them feel proud of them and that they, in turn, feel that pride. The role reversals are evident to the children as well. Some of the mothers have shared with us stories about how their children have reminded them, very succinctly, of what the parents do to them when they had a question. This has provided an opportunity for parents to view their children's learning through an experiential lens. They are now in their children's shoes:

Le: I ask him [her 8th grader], but then he just looks at me and says “mom, it's in there!” I hate when he says that to me because I told my kid that when he was in elementary. A lot of times our kids come to us and then, before you know, we are doing their work. He is sitting there, you're frustrated, and then you're giving out the answer without realizing it! When he was in elementary and he came (I was) all mad at him, because I have gone through the same thing over and over, finally I just said, ...”It's in there!” ...he remembers now when I came last year, with G. [the MFP instructor], and we were doing graphing and I went and I'd say, “I need you to help with this”, and he looked right to my eyes, and he goes, “Mom, it's in there!!” OH! So I can't go ask him...

Others shared how their children make sure that they, the parent, does their homework for the MFP course, in similar ways, we suspect, to how parents may have reminded the children about their class work:

D: he's very anxious about helping, he says, "mom don't you have to do that?" cause I said we don't have to do the rest just one question. Then he said, "you know you're supposed to do that." So now it's Monday and I haven't done it but I told him after school today, the high-school and my son are gonna help me.

Parents as Teachers

During the debriefings, parents and researchers created a space to learn about and from each other, exploring one another's views and understandings about mathematics education and reflecting on our beliefs. This was possible due to the fact that parents took the lead in choosing the discussion topic (Henry, 1996; Peressini, 1998). It created an environment where both parties listened and communicated with each other instead of at each other.

Our discussions often took us into the realm of "teaching the basics" and what we all mean by this. This school district we work in recently switched from using Standards-based curricula, such as Everyday Math and IMP, to a more "traditional" one (see Civil, Quintos, & Bernier, 2003, for more on this). Some schools, however, have chosen a curricula different from the district adoption. Two schools, one of which is a magnet Back-to-Basics school, have chosen to use a well-known traditional curriculum and a third school still uses Everyday Mathematics.

What is meant by "the basics" is far from clear. One mother mentioned the practicing of algorithms and different ways of solving problems as the basics. In the same conversation, another mother defined "the basics" as a foundation. This foundation was described as the need to start learning things that will be taught in the following grade levels so the child will be prepared. For example, she suggested that children be introduced to algebraic ideas in elementary school in order to be prepared for middle school. Middle school students in turn need to have a grasp of the basics to be prepared for high school.

Le.: I was gonna say something...about what is the basics? But I think when you look back to elementary, elementary is a main core of any child's education. So, when they leave elementary, they have to have a little bit of algebra, when they come to middle school.

D.: Like in elementary, you know multiplications, and the grouping, those are things they need in order to go on to higher math. You know when it first starts plus and

subtraction and then on to the mathematics ... under multiplication, division and in order for them to know what these students here know today in 8th grade, they need their basic math skills.

Closely related to the topic of what the basics are, are parents' perceptions on how mathematics should be taught. As we discussed in Civil, Quintos, & Bernier (2003), the parents in MAPPS bring three lenses to the classroom observations:

1. Their own experiences in MAPPS (which gives parents practice in standards-based mathematics)
2. Their prior experiences with school mathematics as learners themselves (which in some cases may include schooling in a country other than the US).
3. Their experiences with their own children's mathematics instruction.

MAPPS firmly believes in the use of standards-based mathematics as a vehicle for creating equity in mathematics education. Hence, during the debriefings we often brought up topics that may have seemed controversial to the mothers. Some of these topics were about who has a voice in the class? [participation issue], and questions related to the back to basics movement and its associated pedagogy.

Quintos: what would you say that we can do to learn the basics?

D.: to be presented to them and the repetition, the practice, using it and doing it in different ways. In 4th grade they were using the grouping thing, different ways to solve that problem, a multiplication problem.

In this excerpt, D. seems to indicate the importance of practice and repetition, especially in a topic such as multiplication. This actually confirms what Valdés (1996) found in her study of Mexican families in the borderlands,

Except for the memorization of the multiplication tables, rote learning was not considered to be "real" learning by the adults in the study (p. 134)

We have also found that for certain topics (e.g., multiplication), parents seem to lean towards practice and repetition. But in general, and in contrast to what Peressini (1997, 1998) found, even when some mothers' prior schooling had been largely traditional and sometimes in another country, their view of learning mathematics valued conceptual understanding, the use of manipulatives, and on inquiry-based pedagogy. An example of this was when some of

these mothers interacted in the classroom as aides, they mentioned how they went from group to group asking questions and letting the children figure out the answers rather than just showing them how to do the problems.

L.. Cuando nosotros lo aprendimos, era por el sistema repetitivo, porque no teníamos material didáctico para aprender.

[When we learned it, it was through repetition because we did not have the pedagogical material to learn.]

D. This so much better, using the manipulatives, tiles. Before they gave us the book, and said “read this, do this” and then they gave us papers to do. But now the kids are more open to talk, more artistic. I remember my teacher being strict, saying what we needed to do, and how.

D.: [referring to the fourth grade class we had just observed] At the beginning she [the teacher] wanted to make sure the kids understand what they were doing before she'd let them do it on their own. And I thought she was good at that, even when some of them got the wrong answer, she kept asking,

B.: [referring to that same fourth grade classroom]Lo que hizo la maestra de ponerlos a pensar me gusto porque yo lo hago con mis hijos, yo nunca les digo las respuestas, yo los hago pensar. Me gusto la forma de ella que nunca les dijo la respuesta, ella los hizo que pensarán.

[What the teacher did in that she made them think, I liked that, because that's what I do with my children, I never tell them the answers, I make them think. ... I liked the way in which she never gave them the answer, she made them think.]

In Civil & Quintos (2002), we address the concept of parents as teachers, which is grounded on their experiences as facilitators of workshops to other parents in the community. Through these experiences we get a direct view of the mothers beliefs in action. Because they have experienced some of what they are observing in classrooms, their comments are usually in reaction to something that they saw (or did not see) in these classrooms. This relates directly to their experiences as parents since they are observing in the schools (or in any case the district) that their children attend.

Parents as parents

In most, if not all of the conversations we had following the classroom observations, three concepts have emerged; mutual respect (as in teachers and students respecting each other), caring for one another, and family. It became clear to us how much these parents

value the affective component in the learning environment of the classroom. As parents, they want to make sure that their children are in nurturing environment. For example, one mother, in reference to an 8th grade ELL classroom in which the students have been with the same mathematics teacher for three years, commented

B.: que los muchachos estén tres años con la misma maestra es muy comfortable, es más confianza en la relación entre la maestra y alumno para cuando hay dudas y la participación en la clase me parece que es lo mejor.

[that the children are for three years with the same teacher is very comfortable, there is more trust in the relationship between teacher and student, for when they have questions and the participation in class, I think it's the best]

L.: Y se nota que ella los quiere mucho a los niños porque como se expresó de ellos, dijo: “son muy buenos niños, y yo los quiero mucho”. Se nota que ella está acostumbrada a ellos y los niños a ella. Porque me fijé yo que hasta bromean con ella, se ríen de ella y no le molesta a ella y ella también se ríe.

[And you can tell that she cares for them very much, for how she talked about them; she said, “they are very nice children, I really love them.” You can tell that she is used to them and they are used to her. Because I noticed that they even joke with her, they make fun of her, and it doesn't bother her, she also laughs along with them.]

The concept of “educación”, as authors such as Goldenberg and Gallimore (1995), Reese, Balzano, Gallimore, and Goldenberg (2000), and Valdés (1996), have indicated, cannot be directly translated into English as “education.” The English word has more of an academic connotation, related to schooling. While, the Spanish word relates more to behavior.

Whereas in English, someone who is “**well-educated**” is considered schooled, knowledgeable, and literate, in Spanish, “**bien educado**” has a different set of associations—respectful, dutiful, well-mannered. (Goldenberg & Gallimore, 1995, p. 197)

D: I thought like the students, she (the teacher) was in control of the class, and the students respected her, and they listened to her, they asked questions and she answered the questions.

L: Es importante ver que a un maestro realmente le gusta enseñar, o sea lo siente. A mí me gusto todo, sobre todo que tiene las fotos de sus alumnos y de sus ex-alumnos. Ahí se le nota que hace su trabajo de corazón y le gusta mucho, le pone atención a sus alumnos, hasta de los bebés de sus alumnos, es muy buen maestro, muy atento muy

simpático y sobre todo que ayuda mucho a los muchachos, no quiere que nadie sea menos, quiere que todos sean alguien.

Me gustó mucho porque sinceramente yo nunca había visto un maestro que estuviera tan enfocado con sus alumnos, que fuera como si fuera su familia, así los ve como si fuera su familia, como decimos echándole porras.

[It is important to see that a teacher really likes to teach, that he feels it. I liked it all, especially that he has the pictures of his students and his former students. That's where you notice that he does his work from his heart and that he likes it a lot, he cares about his students, even about the babies of his students, he is a very good teacher, very attentive, enjoyable and especially that he helps these young people a lot, he doesn't want anyone to be less, he wants everybody to be someone [to make something out of him/herself].

I liked it a lot because to be honest, I had never seen a teacher that was so focused on his students. It was like his family, that's how he sees them, like his family, how we say, cheering them up.]

Ge: The teacher-student interaction was great, it was very comfortable, confident. The students respected his comments and his advice. The students were not intimidated,

Even if there were less girls than boys, but the girls were very confident doing the work on the board and then ... they did what they had to do...

From the several comments such as the ones in this section, it was evident that for these mothers the relationship the teacher had established with their students was one of the aspects they most valued. Respect, attention, and high-expectations were different ways our mothers saw the teachers express care and concern for the students. As Valdés (1996) said, these values are part of some families' integral view of what education entails. In this sense, the educators were fulfilling the role of "educación" in a broad sense, where more than academic content is included.

Teachers' voices in MAPPS

In this project, our research focus has been largely on the parents voices and experiences. This grows out of our theoretical orientation through which we see families, and in particular working-class, ethnic and language minority families as powerful resources that often go unrecognized in their children's schooling. This invisibility, we claim, is largely due to the power structures that exist in the school system, that often make it difficult if not impossible for parents' voices to be heard. In the previous section of this paper, we have provided some examples of these parents' voices with the goal of sharing what their views and beliefs are

about teaching and learning mathematics. MAPPS also actively involves teachers in the leadership teams.

Teachers and parents in fact come together as facilitators of workshops for other parents in the community. What we have not yet done is to engage parents and teachers in joint focus group discussions. In this section, we bring in the teachers' voices as they relate to the three themes we discussed earlier—parents as learners, parents as teachers and parents as parents. We think it is important to hear what the teachers have to say about these three themes. As Merttens (1993) points out about the approach to parents and teachers in a similar project the emphasis is on teacher discourse, and “into the rationalizations and accounts which teachers provide for parents and the wider community. It requires that teachers move away from a deficit model of parenting, that they question prevailing assumptions about the necessary skills base for 'quality' support in the home” (p. 30). We do acknowledge, though, that a next step is to bring teachers and parents together to talk about these issues as they directly relate to the mathematics education of their children/students.

Method

The data for this section comes from interviews conducted by one of the authors with teacher leaders from all four sites. Nineteen (43%) out of a total of 44 teachers were interviewed. Each of the teachers was interviewed separately and all the interviews were audio taped. Of the 19 interviews, 13 were transcribed, coded and analyzed for thematic content. The questions asked covered a wide range of topics, some focused on their own experiences as learners and observers of mathematics within the MAPPS project while others focused more on their impressions of working with parents in a collaborative environment. There were also specific questions about their thoughts and feelings on parents as learners and teachers of mathematics (see Bernier & Allexaht-Snyder, 2003 for a comprehensive write-up of these themes).

Most of the teacher interviews were extremely rich. As an interviewer it appeared that the teachers were being honest about what they had experienced, both good and bad. The quotes we have chosen to highlight represent topics that more than one teacher mentioned. While the parent section of this paper utilized information from only the Tucson AZ. site, we have chosen to use information from all four sites for the teacher interviews. The reason for this is

because the role of the teacher has been conceptualized differently at all four sites. We wanted to hear from teachers who are new to the project as well. The majority of these teachers are found in Chandler, AZ and Las Vegas, NM.

Teachers' roles within the project

The teachers' role within MAPPS was at first conceptualized as a co-leadership role. Teachers were placed on teams according to the year they joined MAPPS. On these teams were parents, teachers and administrators from different schools within the districts. Sub-groups, often school-based, were formed within the larger leadership team. Parents and teachers from the same school, or several schools, were grouped together. These were the facilitation teams. Each team had a mentor, and in the case of Tucson, a coordinator as well.

As we described in the earlier section on MAPPS, the project has been in Tucson for 4 years. This has allowed for more leadership "layers" to develop. Year 1 parents and teachers now serve as coordinators and planners for the entire project. They aid their teams' mentors in teaching the modules to the facilitators and providing logistical help. Parents and teachers from year 2 are what we have called mentors. They are in charge of planning, training, providing support and feedback to the facilitation teams and keeping in contact with the district liaison. The year 3 parents and teachers are the actual facilitators this year. Year 4 parents and teachers must attend at least 3 workshops per semester as well as the 2 or 3 leadership development sessions each year. Year 4 parents (as well as some from previous years) attend two MFPs per year.

We will highlight the major differences between the teachers' role in Tucson and at the other sites. San José has only one teacher on their team. She stays in close contact with the two participating schools' parent liaisons in order to recruit for the MFP course and the MAWs. Over 14 of her students' families in the past two years have participated in MAPPS San José. Chandler is structured very similar to Tucson. Their year 1 parents and teachers are now presenting MAWS, which are open to the public. Their year 2 participants attend leadership development sessions and a specific number of MAWS throughout the year in the same manner as Tucson's year 4 participants. Chandler parents also attend two MFP courses throughout the year.

Las Vegas has the most unique set up in that all of the parents and teachers attend every session together. The teachers from year 1 have been going to the MFP courses as well as the MAWS and the leadership development sessions. The parents and teachers from year 2 are following the same pattern. This has allowed for the teachers and parents to become inextricably involved in each other's learning and teaching processes.

Hearing from all four sites allows us, as researchers, to share the different visions MAPPS has been able to take as well as the lessons and experiences from each site. For example, many of the Las Vegas teachers have told us how beneficial it has been to be involved in the MFP course with the parents, even though that means more time away from home after the school day has ended. Many have viewed it as a professional development opportunity within the realm of reform mathematics. By becoming learners themselves, they have an experiential base from which to draw ideas for their own classrooms (Neuman & Mohr, 2001).

Teachers' thoughts on parents as learners

Three major themes emerged from the interviews relating to how teachers in the project viewed parents as learners: 1) parents as role models for their children, 2) parents as students who need to be taught, rather than as autonomous learners, and 3) parents as providing a different view point or learning style. The first theme is woven throughout many of the interviews. Some teachers have been inspired to see how a different vision of parental involvement can still have positive outcomes for students. This is evident from comments focused on the perceived impacts on children of seeing their parents take a class in mathematics. This is particularly important to note for our group of parents-- a demographic group who is often held to extremely low standards (Valdés 1996).

L: I think it is important, particularly with the students that we work with, I think they look at some of their parents, I don't want to say they don't know the answers but maybe they don't have the time. So if they do spend the time it enlightens the kids and lets them be aware that, Wow, mom and dad really do know what I am doing and do understand the stuff I am doing. I think it is important for them to talk about it.
(Tucson 4th grade, teaching for 30+ years)

C: I think if parents feel more confident in what their capabilities are, then they won't lower the standards for their children.
(Tucson, 4th grade, teaching for 4 years)

D: (A) mother has watched her daughter struggle a bit and she felt like math wasn't always her thing either. She said, “math is not my thing in school, I really didn't like it, I try not to put that on my children but I know it comes through. I just need to learn.”
(Chandler 5th grade, 25 + years teaching)

A second theme that arose was the view that parents as learners means they are students. In our view, there is a difference between these two terms; “learner” seems to indicate that there is a sense of direction and self regulation while “student” positions the person in a less powerful role. One teacher seemed to think it was wonderful working with parents, but she still saw her role as a teacher when it came to giving presentations and how schools work,

M: I think that now, I still kind of like, I'm the teacher and they are the students at times because I know how the school runs and I know where we can make copies, you know those little clerical things that I do everyday and it's no big deal, I'll show them how to do it.
(Chandler 5th grade, 5 years teaching experience)

This comment speaks to the reality of the situation in MAPPS. Yes, parent and teachers are working together to present workshops, however there are many issues that come up in giving a workshop and in working together in general. Some of these issues are perhaps exacerbated when there is a power differential. We will return to this theme and look more in depth at problems which arose, according to the teachers, when having parents as teachers.

The final theme which the interviews suggested was important to the teachers was having parents to learn *from* and not just *with*. Many of the parents and teachers are from extremely different backgrounds. Many of the parents were educated in Mexico and thus learned different ways to solve problems than the traditional U.S. methods. The teachers indicated that they appreciated having the opportunity to learn from and with these parents.

L: A lot of them are parents and not teachers. We get to have a lot of fun with that too. Usually they bring in a whole other way (of learning), usually the way they learned it, so we get to see a whole other way.
(Las Vegas 5th grade, teaching for 7 years)

Teachers' thoughts on parents as teachers

This may be the most controversial topic in our work, especially in terms of the climate which has been created by acts such as No Child Left Behind which call for more rigorous teaching mandates. Teachers have attended college / university in order to be able to teach

and sharing that place of prestige proved to be difficult for some teachers. Others were excited to see parents challenge themselves, face fears and persevere. Once again, several teachers pointed out how important they felt it was for children to see their parents try to do something they may talk about being scared or intimidated by. Finally, the comments centered on teachers being appreciative to have parents “walk in their shoes” for a minute. Having swapped roles for even a night provided a space where parents and teachers could talk about the intricacies of presenting lessons, specifically mathematics lessons. Creating this space was a major goal for this project—

One of the questions we, the researchers, find ourselves grappling with is, “is it realistic to expect parents with practically no formal training in education or in mathematics to ‘teach’ a workshop?” We value parents as intellectual resources, we value what they have to say about their learning, their children’s learning and what is going on in schools today, but does that automatically mean they can teach with the somewhat minimal “training” that even an intensive project such as MAPPS provides? Some of our teachers had strong opinions concerning this matter:

R: I don't know how they're split up or how they do it, but if you have 3 parents together who haven't been “trained” to teach, sometimes theirs can just hit the wall. There were times when we were just sitting there, especially that first semester, falling asleep and nodding off because we were bored.

(...)

A lot of times when they are just reading through the script, it's just drone and boring. It's not teaching it's reading through.

(Tucson, 6th grade, 1st year teacher)

A more positive side to this same issue was presented as well. During one interview a teacher expressed her apprehension about having parents teach the math workshops,

So I went very slowly and read and re-read the module with them. I now wish I had given them a bigger picture earlier. Also, it is extremely important for them to have been to and seen the MAWS that they are going to present at least once before hand. I think in the future I should try and give them more of the teacher and organizational skills that I take for granted.

(San José, 1st grade, teaching for 11 years).

Another teacher compared the parents’ role as teachers to that of a first year teacher,

I shouldn't say (having parents teach) is a problem, but the lack of training as a teacher. I mean we have really fine parents... In order to take the leadership role you

must be able to be up there in charge. They'll get used to it, after they do it two or three times. They get used to it; it's like a first year teacher. It's not a problem; it's just a matter of experience.

(Tucson, K, teaching for 15 years)

Presenting the workshops to other people in the community, often friends and family of the presenters, created a dialogue about comfort levels and intimidation. Some groups preferred to present at their own schools as they felt like they could be more of themselves. Others, such as the quote below suggests, wanted to present to strangers so they wouldn't be so nervous:

L: I don't want it to make it feel like I'm better than them. I think if I'm at another school. I know I'm still teaching to an audience and to parents but it's just a different feeling. I know (a mother in her leadership team) said the same thing, she was more at ease, that she wasn't being watched by her peers and people that knew her.

Having this shared experience allowed for reflection on the part of many teachers. They were appreciative to have parents walk in their shoes to better understand some of the pressures teachers feel. It seemed like some of the comments from teachers were about their remembering how difficult they used to find, and sometimes still find, being in the spotlight.

L: I'm sure parents get real nervous having to get up in front of teachers and do it too. They're probably thinking, 'oh she does this all day long and I'm going to mess up' and all this stuff. I think everybody kind of has the same feeling but we don't express it as well in the classroom or parent teacher conferences
(Las Vegas 5th grade, 7 years teaching)

Teachers' thoughts on parents as parents

MAPPs challenges deficit notions about parents, schooling and teaching. It is our desire to give members of a school community the chance to see one another in a different light while learning reform oriented mathematics. The majority of teachers have had extremely valuable experiences working with parents in this project. In fact, their participation may have helped change some of their perceptions towards parental involvement – perceptions largely based on a deficit view—towards a view of parents as resources for their children's education. The quotes below are purposely arranged to show these admittedly tenuous changes in teachers' perceptions towards parental involvement.

In this district, parental involvement is at a very minimal if any, level. That's one of the reasons I joined. I feel that the student achievement in our district, which is

abysmal, probably could be improved if we could get parents involved in their mathematics education
(Tucson, high school, 18 years teaching experience)

I've learned during that period of time that it is a slow, sometimes frustrating process to get parents to participate in some of these activities. Even when you pay them or entice them with other things it is very very difficult to get them involved, especially at the higher grade levels. This, I feel, is probably some of the reasons why some of the problems in our district exist
(Tucson, high school, 18 years teaching experience))

I've never had the chance to work with parents like this before. It's always been kind of the parent on the other end of the phone line and the parent at the other end of the table, you know just somebody on the other side, not necessarily somebody who you really felt like you worked with.
(Chandler, 8th grade, 7 years teaching experience)

I thought about it last night, you know, not only are we teaching mathematics, not only are we bringing parents and children together, and if they didn't even get one thing mathematically, they got to come together and the kid got to see, wow my mom and dad cares enough about me to come to school and learn what I am learning.
(Tucson, 4th grade, 3 years teaching experience)

(In MAPSS we have) 4 or 5 people getting together to try and teach two different areas or activities and I think that's a really good thing. Also because it teaches teamwork. There are teachers and parents, and grandparents all involved in the process, so you get a bunch of different views and ideas from it.
(Las Vegas, 5th grade, 7 years teaching experience)

Our hope is that through continued participation in projects such as MAPSS, teachers will shift from a deficit view of parental involvement to one in which they see parents not only as intellectual resources for their children's education but also as leaders within the school at large.

What does it mean to be a leader?

All of the themes we explored here relate directly or indirectly to leadership, but what does this mean in parental involvement programs? If the parents are to be leaders, does that then relegate teachers to the side lines? Can teachers and parents be both leaders and partners? We return to the voices of our participants.

Parents' voices

Many of the mothers in MAPPS are involved in the school as volunteers or teacher aids, which, one would expect, situates them in a position where they can gain more knowledge about the system of the school (i.e. teachers, curriculum). Indeed one such mother (JA) managed to have her children assigned to whom she viewed as the best teacher in the elementary school. Yet, when this same mother shared a curriculum that she considered to be quite progressive to an administrator with decision power in the upcoming textbook adoption, her voice was not heard. She never heard back from the administrator on her suggestions. This situation illustrates the need of legitimate spaces for families who have been marginalized, to make their voices heard. As Abrams and Gibbs (2002) suggest, one of the goals of MAPPS (at least from the authors' point of view) is that of promoting the role of parents as active decision makers and advocates for their children's education. As Rhonda says,

The good things about MAPPS is that it [opens] our awareness in math, you know the workshops, it just opens up the doors that we thought that were closed specially for me...I think that it is important that I learned that, our kids aren't really being taught what they are supposed to be taught and that's one big thing and that parents have a lot of power that we don't know that we have it, that's what MAPPS taught me.

Teachers' voices

The teachers who saw parents as leaders explained, eloquently, how they saw this happening. Some focused on the present roles that parents are "taking over" or "taking back from teachers"

The three (parents) who said, "you know we're going to be on [a] leadership [team] next year" I thought that really said a lot that they are getting excited about it and that they want to be leaders and help the other parents, and not just rely on teachers to do that job.

While others found it more exciting to think how this experience might affect their futures:

The experience and the confidence that is being built by these parents is awesome to see them get up there and put on a mic and see them speak in front of a crowd, it's true community effort and growth. I just think it's wonderful. Who knows what effects that will have on people that are in the program. Once they see, wow, I never thought I could get up in front of a group and teach mathematics, that would have been my worst nightmare, and I did it and I survived and I wonder what else I can do? I can see that thought created in some of the parents minds.

Even though we are looking at the voices of parents and teachers separately, we cannot forget that they are not working in separate spheres, they are together, trying to work through mathematics problems and helping their children/students at the same time.

I think a lot of parents view teachers as role models and leaders for their children. In MAPPS it is totally different because we're all equal. We all come in with the same fears and the same confidence, whatever. We're all kind of evened out.
[Teacher, Las Vegas]

Teachers from all four sites have shared with us how important it has been to see parents becoming role models and teachers for their children. In a very powerful interview, one teacher talked about how MAPPS had changed how she viewed school, learning and parental involvement. When we asked her what she thought the most unique aspect of MAPPS had been for her she responded,

The kids are seeing their parents and are saying, "my mom or dad is taking a math class, wow, my parent is doing this for me!" and they are seeing it. I think the parents' role as a leader, for the parents that come (to MAPPS), is really progressing. Parents are becoming leaders again where a lot of times they haven't been. Kids concentrated more on teachers and their friends as leaders. The kids I know in my classroom who have their parents here, (in MAPPS), their parents are their role models. I just did an activity that asks, "who do you admire?" (Lately) it's always mom and dad, instead of Michael Jordan or whoever. Or who are you proud of? "I'm proud of my mom because she's in MAPPS." I hear a lot of this stuff and it's really really interesting because the parents have taken over their role again, it's in a totally different way, but the kids are saying, "My mom is the teacher also now. My mom isn't afraid to say she's afraid of math so I can be more confident." That's really unique. [Teacher, Las Vegas]

Giving parents and teachers a place to come together to learn and teach mathematics has been extremely valuable for both parties. Modeling reform oriented mathematics for teachers has given them ideas that they have taken back into their own classrooms as well as, in many cases, much needed practice in using an inquiry-based teaching approach. Providing opportunities for parents to teach other parents has helped many of them regain confidence in their own mathematical knowledge, which they are then able to bring back to their homes and children.

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