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## **Redefining Parental Involvement: Parents as Learners of Mathematics**

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This paper draws on two research projects located in minority, working-class communities. Both projects have as a key component the engagement of parents as learners of mathematics. Through this engagement we seek to redefine the notion of parental involvement, by rejecting a deficit view of parents (and families) that portrays them as somehow lacking, as “the problem.” Instead we capitalize on the notion of parents as intellectual resources. Our goal is to establish a two-way conversation in which parents learn about the current mathematics reform efforts (by doing mathematics themselves) and we learn about their perceptions about their children’s education and about their beliefs about and uses of mathematics. The paper addresses three areas: 1) Parents as learners (affective and cognitive aspects); 2) Parents as Parents (how do their experiences as learners make their way into the home?); 3) Parents as Leaders (what are the implications of this kind of involvement for change at the school level?)

### **Our Context**

The research presented here is based on two projects located in minority and working-class communities in Tucson, AZ. Both projects have as a key component the involvement of parents as learners of mathematics. Though both projects share some similarities in terms of participant characteristics (ethnicity, backgrounds, levels of education, where they live) there are also differences that need to be highlighted. In project BRIDGE<sup>1</sup>, we work with a small group of Mexican mothers (6 to 8). That project has allowed us to develop a solid theoretical background because it builds on prior work through the Funds of Knowledge for Teaching project (Moll, 1992; Moll, Amanti, Neff, & González, 1992). The mothers that form the mathematics workshops attend primarily as ADULT LEARNERS, interested in

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<sup>1</sup> Project BRIDGE (Linking home and school: A bridge to the many faces of mathematics) is supported under the Education Research and Development Program, PR/Award No. R306A60001, the Center for Research on Education, Diversity & Excellence (CREDE), as administered by the Office of Educational Research and Improvement (OERI), National Institute on the Education of At-Risk Students (NIEARS), U.S. Department of Education (USDoE). The contents, findings and opinions expressed here are those of the author and do not necessarily represent the positions or policies of OERI, NIEARS, or the USDoE.

advancing their knowledge and experience in mathematics so that they may in turn assist their children in learning mathematics. For quite some time, this group of women has been getting together in a literature group that holds as its creed that all participants (including the facilitator) are equal and come together to learn from one another. We emphasize this approach in our work in mathematics too.

Project MAPPS<sup>2</sup> is more recent and its focus is on parental involvement in mathematics. It is larger in scope and works with several schools at the same time. One goal is to develop leadership teams (parents and teachers/administrators) that will help in the mathematics education outreach effort throughout the district. The parents participating are primarily there as PARENTS, that is seeking ways to help their children in mathematics, and learning about how the school system works. The project seeks to promote the leadership of parents in mathematics activities in home and school, through three components: a) Leadership training sessions in which parents and teachers 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; b) Mathematics Awareness Workshops that are currently led by teams for Leadership Team 1. These workshops are open to all the parents in the district and they range over key topics in mathematics in K-12 (e.g., one workshop explored multiplication and its different representations; another workshop looked at shapes in geometry and engaged parents and children in conversations on criteria for classification of shapes); these workshops also address the role of mathematics in career choices and equity and access issues; and c) Math for Parents courses through which parents have an opportunity to explore mathematical topics in more depth. To date, parents in the Leadership Teams 1 or 2 have taken a course in algebra, one in geometry and they are currently exploring numbers--arithmetic and number theory (See Civil, 1999; 2000a; 2000b; Civil, Andrade, & Anhalt, 2000 for more on MAPPS or BRIDGE).

### **Theoretical Framework**

Our work with adults in mathematics draws from three bodies of research: 1) socio-cultural and social constructivist perspectives (Cobb, 1990; Ernest, 1996; Rogoff, 1994; van Oers, 1996); 2) approaches to adult education grounded on critical pedagogy and on the

concept of ethnomathematics (Benn, 1997; Coben, 1998; Flecha, 2000; Frankenstein & Powell, 1994; Harris, 1991; Knijnik, 1996); 3) the literature on parental involvement, in particular that which critically examines issues of power and perceptions of parents (especially minority and working-class parents) (Henry, 1996; Vincent, 1996). Here I will only highlight Flecha's (2000) work as I have found his writing on dialogic learning very helpful in my thinking on establishing a two-way conversation between the parents and us.

Flecha's work is based on the idea of engaging in a dialogue where each participant has a voice and where contributions are assessed in terms of their content and not in terms of the status of who makes them. As in our case, Flecha's work is with working-class adults that have often been marginalized and have encountered cultural, social and personal barriers in their journeys. Furthermore, as they tell us about their former experiences as learners of mathematics, we have seen many similarities with the narratives of other people who were excluded from the "in-group" as mathematical learners throughout years of schooling and led to believe that mathematics was not for them.

### **A Model for Parental Involvement**

In a sense our work is about redefining parental involvement in school mathematics, especially when the parents are working-class, minority mothers (we have some fathers but most of our Leadership Team members are mothers). Several of these mothers are Spanish dominant. In our local context "their involvement" in schools has often been limited to activities such as monitoring the cafeteria, sharpening pencils for upcoming standardized tests, or working on bulletin board displays. Our conversations with families over the years have shown that many parents do enjoy doing mathematics and that they want to gain a better understanding of current issues such as reform in mathematics education or high stakes tests to be better informed to help their children.

In our proposed model for parental involvement we address three areas: 1) Parents as Learners (affective and cognitive aspects); 2) Parents as Parents (how do their experiences as learners make their way into the home?); 3) Parents as Leaders (what are the implications of

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this kind of involvement for change at the school level?). In this paper I illustrate aspects from each of these areas.

### **Parents as Learners**

One salient aspect (interviews, written feedback, field notes) is the fact that these parents want to learn mathematics. Their questions and participation in the workshops and the Math for Parents courses often reveal a strong interest in understanding what is going on and not just in going through the motions.

For example, in one of the workshops in project BRIDGE, we were working on finding areas of shapes that had been cut out (as part of their sharing with me how do “papel picado” [punched paper], a traditional Mexican craft). Some of those shapes were circles. One of the participants who had recently graduated from high school, immediately started talking about “Pi”, “3.14..etc”, and gave the formula  $\pi * R^2$ . One of the women in the group said “wait, wait, wait.... what is this three point whatever...” Several other women joined in and said that they wanted to understand what  $\pi$  was and that they did not want to just use a formula that they did know where it was coming from.

As part of the Math for Parents course in geometry, participants also were engaged in learning about  $\pi$ . The instructor had a series of hands-on activities to introduce the concept. Participants went outside and made circles of radius 4 steps and then they had to walk the circle and count how many steps around; another activity had them measuring circular objects (C) and the diameter (D) and finding C/D. Participants started coming up with 3.1 for C/D. The instructor asked, “what does 3.1 represent?”; one woman answered “Pi”; the instructor then said, “before we name it, what does it represent?”

These two episodes from the two different projects show a common goal that we have for the mathematics learning experiences for these parents: we want them to see mathematics as something that makes sense to them, we emphasize meaning over remembering formulas. The parents bring to the workshops very different background experiences in terms of schooling. There will always be participants who “know.” But that knowledge is often colored by their previous experiences: they know that “3.1..” is  $\pi$ , or they know that the area of the circle is  $\pi * r^2$ . But do they know what  $\pi$  represents, or why the area is  $\pi * r^2$ ?

In project BRIDGE, maybe because the group is smaller, but I think that primarily because we have always emphasized a dialogic approach to learning, the mothers would be the ones demanding to understand.

[dialogic learning] leads to the transformation of education centers into learning communities where all the people and groups involved enter into relationships with each other. In this way, the environment is transformed, creating new cognitive development and greater social and educational equality. (Flecha, 2000, p. 24)

In project MAPPS, we start seeing some of this request for understanding, but if it does not come from the participants, the instructors try to bring it up, as in the case of the geometry instructor when he said “before we name it, what does it represent?” Our goal is to develop a questioning attitude among the parents-- do not accept mathematics as given, question, question, question. We want questions such as “Is  $\pi$  always going to be 3.1 or did it happen because of the objects you found?” [H., MAPPS, MFP, 11/21/00]

### **Parents as Parents**

Throughout the workshops and conversations with the participants, there is a constant reference to their children, and specifically to their children’s experiences in school. Most of the parents (in either project) said that their children were their primary motivation for them joining the project. Sure, they wanted to learn more about mathematics to be able to help their children with that subject:

I do the best I can to help my children in math. That’s why I’m here. I want to learn different ways to help my children. [MAPPS, Math autobiography]

But several of them also brought up the idea of being involved in an educational project to inspire and motivate their children to continue studying.

For me it was like a challenge and it has helped me quite a bit to better myself, to feel more sure of myself and so that my children see that studying is important. [MAPPS, focus group, May 2000]

[to the question what made you decide that you wanted to continue to be involved]

My children. I think there is an energizer that this can contribute to helping them....

At least they see I'm not giving up and that I want to continue to support them in education in any way I can. [MAPPS, focus group, May 2000]

Through case studies and more focused interviews, we hope to get a better understanding of how these projects, BRIDGE and MAPPS make their way into the home. To date, we have some evidence that dialogue around mathematics is taking place at home:

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]

I am so happy with all these mathematics workshops because I realize how to help my children understand mathematics in a different way, from a fun approach, all together as a family. [BRIDGE, February 2000]

The following was written by a participant's 15 year-old son:

Now that she [his mother] is attending the mathematical workshops, she can teach me other ways of learning mathematics....She shares it with the entire family and we all get involved in a mathematical reunion that is fun. We are all teachers and students at the same time, there is no difference and that there be much respect and "confianza" [trust] is most important. [BRIDGE, Spring 2000 newsletter]

This dialogue about mathematics is also opening up other links and ways to communicate-- a communication between parents and children around an academic topic:

This [MAPPS] is a priority; they [her children] can't understand "because my mom has never done it." It provides another link. Now, I can join in the conversation. [MAPPS, focus group, May 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]

### **Parents as Leaders**

Leadership is going to mean something different for each parent in any of the two projects. MAPPS focuses on leadership development and this means that, after their first year in the project, teams of parents and teachers become facilitators of Math Awareness Workshops (MAW) for other parents in the district. We are now finishing our second year in the project and thus our first round of workshop presentations by Leadership Team 1 parents and teachers (most of them did 2 workshops in the fall and 2 in the spring). I have certainly noticed an increase in the mothers' confidence and a feeling of being more at ease, as the teams become used to working with each other and are more familiar with the routines of a MAW. Where may this take us in terms of action beyond their home?... It is too soon to tell. It is clear that some of them are more vocal than others and are expressing concern, for example, on the recent district textbook adoption that reflects a back to a more traditional approach to mathematics instruction. It is also clear that a recent requirement for a very controversial graduation exam has prompted many parents to express their concerns, especially when in a trial run of this exam not a single high school student (in the district) passed the mathematics portion of the test. We are aware that MAPPS is going to have to address these two issues-- the new textbook adoption and the graduation exam. In the workshops and Math for Parents Sessions, parents are constantly making connections to their children's educational experiences. We can see their frustration, for example, with their using the graphing calculators in the algebra for parents course, yet knowing that their children's high school graduation exam does not allow the use of calculators. As the parents become more informed about mathematics education issues and more exposed to sound approaches to mathematics teaching and learning, will they become more active as advocates for a quality mathematics education for all children?

One way in which we hope these projects can have some effect is at the level of improving the dialogue between teachers and parents. For example, the mothers in project

BRIDGE suggested that they would like to start visiting their children's mathematics classroom and be able to ask questions while in the class (that is, participate in the mathematics lesson), to model for their children that they have a right to ask questions:

E: Children have to ask questions always so that they realize that they don't have to be left without [doesn't finish]

G: I never asked questions and I was left with doubts.

E: This would be interesting; that way they [the students] would see that one asks questions and more questions, and that they also have to ask questions.

One of the mothers in MAPPS, perhaps the participant who has embraced the project with most passion (she is in two teams for the MAWS; she is already planning how to adapt the model of MAPPS to her child's school so that the project can continue beyond the duration of the grant, she is always willing to help out with the project) also reflects on the relationship with the teachers:

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]

Upon reflection, I think that we have not done enough to develop a dialogue between parents and teachers. Building this dialogue and sense of cooperation may be a first step towards the development of leadership.

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