



Learning in Multiple Worlds: An Examination of the Intersection of Home and School Mathematics Practices

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School reformers concerned with persistent patterns of underachievement among students attending urban public schools have focused on issues of school conditions, including resources, curriculum, governance, and teacher preparation. When social influences outside school are mentioned, these are usually limited to factors such as whether the child comes from a single parent family, the socio-economic status of the family, mother's age and/or level of education, and other attributes which might be expected to have negative effects on learning.

However, we believe that these lines of thinking miss out on a whole range of potentially positive social influences that may come from a child's home experiences. Too often, teachers and schools fail to recognize or credit the knowledge, skills, and motivation that children bring with them from home – especially when a youngster comes from a family background that differs from the teacher's in social class, race, or ethnicity.

The purpose of this pilot study was to look at one such potentially constructive social influence – the ways in which numeracy activities and thinking are embedded in the social activities of children's homes and communities as well as in the classroom. In this study, we drew on the broader field of research that considers learning as situated social practice (Lave, 1992; Lave and Wenger, 1991; Walkerdine, 1988), as well as recent studies looking at the ways in which numeracy and mathematical thinking are embedded in the social life of the home and community as well as in classrooms (Lerman, 2000).

Mathematical activity, like literacy, is an unavoidable part of everyday life for members of all racial, ethnic and socio-economic groups. As Lerman so aptly explains, the field of mathematics education has turned to social learning theory because, “It [mathematics] appears all around when one chooses to apply a mathematical gaze” (1998, in Lerman, 2000, p.21). Our research has been informed by the work of Baker, Street, and Tomlin (2000), who have been conducting studies in England that build on the analysis of mathematics as “social.”

We argue that children do not forget their at-home numeracy experiences when they enter the schoolhouse door; they bring their orientations, beliefs, social constructs, and knowledge with them into the classroom. We have found, however, that imperatives teachers face, (for example, meeting assessment standards and socializing children into school behaviors) as well as teachers’ expectations about essential sequences for learning, often mask the mathematical knowledge and practices that children bring with them to school. Furthermore, assumptions about the lack of support for learning in low-income communities contribute to the tendency of school personnel to miss the mathematical practices children bring with them. Children, for their part, sometimes discern, and sometimes do not recognize, the connection between their out-of-school mathematical practices and the kinds of mathematical problems they are asked to do in school (e.g., see Baker, with Street and Tomlin, 2002). Nonetheless, mathematical practices do “travel” among the sites in which children live and learn (Anderson, 2003).

Our pilot study shows promising evidence that an expanded focus on the links between children’s numeracy experiences in and out of school can be of great benefit for the mathematics achievement of urban students. Teachers gain new pedagogical resources when they understand more about the mathematical/numeric practices that children bring to school. With this insight, teachers can understand better the overlap and divergence in the ways children are engaging with mathematical activity in the multiple contexts of home, community, and school contexts; this helps teachers become better prepared to build bridges between out-of-school practices and the kind of mathematics necessary for school success. Parents and other caregivers, with their knowledge of children’s use of numeracy in out-of-school contexts, can become a source of information and insight for teachers. This provides an opportunity to engage parents/caregivers in a more active and collaborative role in their children’s education.

Research Site and Methodology

Our one-year study was a pilot, intended to hone our research approach in preparation for a scaled-up study. We are one white and one African American researcher, who worked as a team throughout the full process of data collection and analysis, benefiting from the different perspectives we brought to bear on our interpretation of what we were observing and hearing. At various points along the way, our analysis of the data was informed by opportunities to share our findings with others, including professors who teach math education at the university level, teachers in the focal school, other Philadelphia teachers, and School District central office staff.

We carried out our research in an elementary school in Philadelphia, located in a low-income working class African American neighborhood. We selected a school which met

the following criteria: a principal interested in participating in the research; a faculty ready to address mathematics teaching and learning and open and curious about what might be learned by looking at mathematics in the home as well as in the classroom; a school with a feeder Head Start program so we could begin with children still close to their at-home experience; and a school where children were underachieving in mathematics, as measured by state assessments. (See Appendix A for a detailed description of the school and classroom.)

In consultation with the lead Head Start teacher, we selected four children as subjects for case studies. We asked the teacher to suggest children who, in her mind, represented an academic and social range. We observed the children in the classroom and “at home” -- home being a variety of contexts in which the children spent their after-school hours, including parents’ home, father’s workplace, grandparents’ home, classroom where grandmother was an aide, going to the store, playing on the block, etc.

Our research approach borrowed from New Literacy Studies which promote the idea of looking at literacy within the broader social contexts which give reading, writing, and oral communication meaning. (see Gee, 1996; Gregory and Williams, 2000; Heath, 1983; Street, 1997). In observing activities that involved numeracy in either the classroom or the “home,” we were guided by the following questions: Who are the participants? What is the broad social context for the activity? What are the purposes of the activity from the perspectives of the different participants?

Our primary focus was on what Cole (1996) describes as the child in activity. We observed children in the course of their everyday lives in and out of school, and talked with adults who interact with the child, as well as the child, about his/her engagement in social activities. Because we were interested in social activity, we employed qualitative methods, observing and conducting interviews -- of parents and grandparents, teachers, principal, school counselors, and other school leaders -- in order to gather multiple perspectives on what we were observing. We also reviewed archival documents, including the School District of Philadelphia School Profile and school and classroom newsletters sent home to families.

In order to make visible the phenomena of children engaged in social activity, we created vignettes from our data. For these vignettes, we selected data which, in our judgment, showed “numeracy in practice.” Our vignettes were meant to capture “numeracy events,” defined as those “occasions in which a numeracy activity is integral to the nature of the participants’ interactions and their interpretative processes” (Baker, 1996 cited in Baker, 2002, p.3). The notion of a numeracy event again borrows from work done in the field of literacy, where a “literacy event” has been conceptualized as a social event in which reading, writing, and/or oral communication are central to the activity and where the cultural context gives meaning to the literacy activity (Heath, 1983).

In the remainder of this paper we present one such vignette, followed by a discussion of it. We then present some reflections on the material by educators to whom we presented the vignette in professional development sessions. We conclude the paper with general observations we have made from this pilot study and questions raised for further research.

A Vignette about Danny¹

Danny is a bright-eyed 3 ½ -year old child in his first year of Head Start. He has dramatic and changeable moods: sometimes energetic and engaged and at other times despondent and holding back, in need of comforting. When his teachers were asked to assess him academically and socially, they responded that he is “in the middle range.”

Most of the time Danny can be found with a small group of boys in the area with construction materials, such as blocks and legos. However, Danny also likes to play games and work in the art area. The following vignette describes three numeracy events that took place on one day in Danny’s class: Danny playing a game, Chutes and Ladders, with one of the researchers; Danny playing the same game with the teacher; and Danny responding to the teacher’s request to count the students and adults in the classroom. These three events occurred in close proximity, and each sheds light on the others. The vignette also reflects conversations between the researcher, the teacher, and Danny’s caretaker about Danny’s game-playing, as well as information learned through a home visit.

FROM FIELDNOTES

Classroom Visit

Danny is sitting at the small game table when we enter the classroom. I go over to the table and sit and Danny asks me to play *Chutes and Ladders*. Danny gets the game and sets it up, instructing me on where I should place my marker to start the game. He goes first, taking the dial and spinning it, landing on the number 5.

When he moves his marker he double counts on the first and second spaces, landing on the third space, which has a ladder so that he advances. I take my turn, spinning and moving in one-to-one correspondence with the number I land on the spinner. As the game progresses, Danny continues to be able to identify the numerals on the spinner and moves his marker to land on ladders and avoid chutes, double counting when necessary.

When Danny is sufficiently ahead of me, and there is no chute nearby, he moves in a one-to-one correspondence with the number he spins. The game of *Chutes and Ladders* “snakes” from left to right and then around from right to left and so forth. Danny does not follow this pattern but moves from left to right, beginning again at the left when he finishes a line. As we begin to play, the teacher walks past and comments to me that Danny likes to win, that he will “cheat.”

Early in the game Danny began asking me questions. “Do you have children?” I respond, yes. “Do you play games?” I respond that my sons are grown, but we played this game when they were younger. “What color are your sons?” I ask Danny what color he thinks they are and he answers, “White.” I respond, “Yes, they are White, but they have Black friends, so I have played this game with White and Black children.” As the game progresses and Danny is winning, he stands in front of his seat dancing a little jig of excitement after each of his moves. The game is over and Danny has won in less than 8 minutes. When this game is finished, he asks me to

¹ We use pseudonyms throughout this paper for names of children, teachers, and the school.

play *Candyland*. *Candyland* goes much the same way as *Chutes and Ladders*, with Danny winning in even less time.

The teacher comes by as we are putting *Candyland* away and asks Danny how many children are in the classroom today. He walks around and touches each child and counts to three. Then she asks him how many grownups. He goes around and counts five and she asks him to go try again and this time, touching each as he counts, he gets 4. Then she asks how many children and adults. He touches each child and adult as he counts to 7, touching himself last.

The teacher gives him a high five for his good work, mentioning especially that he did not forget to count himself. He then asks her to play *Chutes and Ladders*. Instead of the game spinner, he wants to use a play clock for the spinner, saying it would be "new." The teacher warns Danny, "I won't let you be a 'cheater.'"

Nonetheless, he begins by counting in a similar manner as when he played with me, trying to ensure that he ends up on a ladder, but the teacher stops him and insists he count the spaces in one-to-one correspondence with the number he landed on the clock. Throughout the time they are playing the teacher monitors him, putting the emphasis on playing the game according to the rules and instructing him on how to follow the snake pathway around from left to right, right to left, and so forth. After about 10 minutes neither has progressed very far, having landed on chutes a number of times, and it is time to clean up to go outdoors. This time, Danny did not do any jigs.

Home Visit

On a home visit, I learn that Danny's grandparents are important caretakers and that they have the primary interaction with his teachers. I observe that Danny's grandparents provide him with many toys, including many games. Danny's grandmother is a volunteer at the local Catholic School down the street, where she previously worked for pay, and where she now keeps the records for the free lunch program. When asked in an interview about how she uses math in her life, she responded, "Everything, you can't do without math. I work in school here [keeping track of the lunch money] and do the paperwork. I do the budget for the home. The money goes in the bank and I keep up with it." She also told me, "Danny counts. He will count everything. Legos is his favorite, but he has 'football men' and he uses the carpet as the 'field.' He sets it up and counts the men. Sometimes he will have nine on this side and ten on the other. I'll tell him, 'You have too many men on the field. You better count them again.' Same with the legos, he'll say 'Nana, you take five and I'll take five' and he'll count them out. We have legos and ABCs on the refrigerator. He'll count ten and put some on this side and others on that side. Before he came to preschool, he played with legos at home. He plays with everything. He tells me he wants to take five cars outside and he counts them and takes out only five and he brings them all back."

Parent-Teacher Conference

At the parent-teacher conference the teacher first told the grandmother that she would like her to encourage Danny to look at books -- "to take books by himself to the couch and look at them." She also gave the grandmother 3 blocks of different sizes, urging her to help Danny learn small, smaller, smallest, comparisons that he needs to perform for the Head Start Core Assessment.

When the teacher finished talking to the grandmother, she asks me if I want to add anything. The grandmother turns to me and tells me “Danny is not really into numbers yet. [But] he can count.” The teacher comments that he can count up to 18, then it goes, “21, 23...” The grandmother explains how she tells him to slow down and then he can say “19, and if he pauses, 20.”

I ask the grandmother about games and she responds that *Chutes and Ladders* is his favorite. The teacher comments, “It [*Chutes and Ladders*] takes a long time.” The grandmother says, “He cheats. He has something where he has to win [even though] I tell him he has to lose sometimes.”

I tell the teacher and grandmother my observation of Danny manipulating his counting to win and the teacher comments, “I didn’t see that!” I share my thought that Danny, in his desire to win, has developed strategies that show arithmetic awareness. The grandmother comments, “He is very smart, but he has to win.”

Discussion of “The Danny Vignette”

We describe Danny playing the game *Chutes and Ladders* in two different social contexts, although both occur in his classroom. The first time, he is playing with a researcher who allows the game to be child-directed, and who is not concerned with whether Danny is following the rules. Danny shows confidence and familiarity with *Chutes and Ladders*, setting up the game and instructing the researcher where to put her piece to play. Danny’s objective in playing the game is to win, made obvious by his jig of delight after each of his moves that put him ahead in the game. When playing with the researcher, Danny employs strategies he has developed for winning, which include manipulating his counting in order to land on symbols (ladders) that advance him and avoid symbols (chutes) which might set him back and cause him to lose. Watching him “count” makes it clear that he is not following a random process, but is able to predict how many times he must double count in order to either land on a ladder or avoid a chute. It is also clear that he can count in a one-to-one correspondence to the number he spins, since he does that when he is well in advance of the researcher and in no danger of landing on a chute. It seems to the researcher that Danny’s questions about her previous experience playing this game indicate that he is curious about an adult who is not interfering with his strategies of “miscounting.”²

When Danny plays the same game with the teacher, it is teacher-directed, even though Danny attempts to establish control by selecting the “clock” to be the spinner. The teacher’s purpose for playing the game differs from Danny’s; while he plays to win, she plays to reinforce the value of following rules (i.e., not being a “cheater”) and practicing skills such as counting and learning to follow the snake pattern of the path on the board. For the teacher, the game is an instructional tool. In this context, when Danny tries to employ his strategy to win, the teacher short-circuits his effort, leaving invisible the strategies he has developed in contexts where the game is played for pleasure.

² The research team included a White and African American researcher. The African American researcher had an alternative explanation. She thought that because Danny was only 3 years of age and from an African American community, this might have been one of the few times he has had an opportunity to informally talk with a White adult, who was not a teacher and focused on behavior or academics. Being a very social youngster, in her opinion, he was simply engaging the white researcher in conversation.

From both the way in which he counts the children and adults in the class, employing the touch and count method familiar to him from counting moves on the game board, and from the researcher's interview with his Grandmother, it is clear that Danny knows how to count; in fact, he can count well beyond the value of the 1-12 numerals that are either on the spinner or the clock he uses the second time he plays the game.

Danny's home had games and his grandmother talked about his love of *Chutes and Ladders*. At home, where the game was used for pleasure, Danny's objective of winning was permitted to override a requirement to follow the rules of the game precisely. We therefore presume that Danny developed his strategies for winning, which involved arithmetic concepts at home. Danny, however, brought these practices to school, but they were not seen there because of the focus on counting and rule following. His mathematical capacities were invisible at best, and negated at worst. While both the teacher and grandmother shared the perception that Danny has a "cheating" problem, the grandmother saw a bigger picture; she framed the problem by commenting that Danny was "smart," but needed to learn to lose.

Presentation of the Vignette and Audience Responses

In the fall 2002 and spring of 2003, we made presentations about the pilot project to several audiences; vignettes developed from our data, including the Danny vignette, were included in these presentations. Our audiences included: 1) the pilot school's principal and teachers from Head Start, kindergarten, and first grade classes (two feedback sessions with a mixed white and African American group); 13 African American, Latino, and white school district teachers who taught grades ranging from first to fifth (a Saturday professional development session); and a group of key Philadelphia School District central office staff (African American, Latino, and white) who represent a range of content disciplines and coordinate curricula for the School District. In each session, we facilitated a discussion with the following guiding questions: What stood out for you in each of the vignettes? What numeracy/math activities did you hear described in the vignette? and How would you describe the home/school connection?

We found that using the vignettes as source material for professional development sessions often led to provocative discussions. In the case of the Danny vignette, two major areas of focus emerged from the educators' discourse. The first focus was judging Danny's preparation for success in school and in the future more generally; the second focus was on judging the caregivers' approach to raising and instructing Danny.

Overall, the educators' responses tended to raise concerns about Danny's "cheating" and his socialization, more generally; responses were definitely mixed, but the majority of teachers, regardless of race or ethnicity, tended to be critical of Danny and his caregivers, blaming them for not teaching him the rules of the game. Although we observed overlap in the responses of teachers and central office staff, the teachers tended to have more negative views of the child and family. This raises interesting questions about how the differing positions of educators may affect their attitudes. Central office staff do not face the same daily pressure as classroom teachers in terms of maintaining order and meeting school and state requirements. Perhaps their distance from the classroom is connected to their more positive view of Danny and his caregivers.

Comments about Danny

A large majority of teachers' responses to the vignette focused squarely on the "unsocial" and "unschooled" aspects of Danny's game playing. These teachers focused more on issues of socialization and less on mathematics. From their interpretations of the vignette, it was clear that some teachers worried that Danny was not well socialized. One teacher's comment even went so far as to allude to future criminal activity if his behavior persisted. An example of the preponderant response was, "He has to win all the time. He has to learn you can't win all the time. There are rules. Things are set up in certain ways for a reason; he should be taught that right from the start." On the other hand, a small number of respondents praised Danny's game playing as showing intelligence and creativity. One of these teachers remarked, "The child is clever. He knew he had to do certain things to win. ..." "He has number recognition and good problem-solving strategies. He could explain how to play to win the game [which shows] he can sequence verbally."

Some in the group worried that Danny's failure to follow the rules of the game in *Chutes and Ladders* predicted failure in the District's newly mandated Everyday Math curriculum. For example, one teacher commented, "With Everyday Math students have to work in cooperative groups of two or three, like [for] rolling dice. He will not always be the one to control the game. He will not always win." On the other hand, a small number of teachers thought he would easily adapt to the new curriculum since he displayed a good command of numbers. "He has a good number sense; he liked to manipulate. He will love Everyday Math; he will get to roll the dice."

Comments about Danny's Caregivers

Although Danny's caregivers received praise for providing learning opportunities at home, the majority of teachers were critical of the manner in which the caregivers provided instruction. Several participants did make positive comments about the caregivers' efforts to engage Danny in school-like activities at home and provide games from which he could learn. One school district staff member remarked, "It's obvious he gets to play at home. He's confident; there's trust, love and support at home." At the same time both groups of teachers tended to blame the caregivers for deficiencies in socializing the child while involved in those activities. Some teachers believed that caregivers' failure to instruct children to "follow directions" makes their jobs more difficult; they made statements like the following: "I wonder if his parents go by the guidelines and have him follow directions. He should learn that events lead up to things; there are rules." "The parent/caretaker deal[s] with the child on one level and forget[s] he is one of many in school. It's important for him to follow the rules." In addition, in the case of Danny, some respondents spoke about the caregiver's limited knowledge of the different facets of the game that strengthen mathematical thinking, presuming she only saw the activity as recreational. "There's not a connection to the grandmother's numeracy math understanding [of the game]. It's limited with what else is understood more than numbers and counting. [It] reflects her understanding of what math is."

A minority of alternative voices did not worry about the child's future success because they found his behavior "on par" with other children his age: "Home and school [both] are teaching him the right way to do things. Kids are egocentric and want to win. He is a good thinker." "[What stood out to me was] how competitive kids are at this age. How he wanted to stand out."

Reflections on Teaching Practices

Central office staff focused on the teacher's approach to instructing Danny through the game playing. They noted that she stressed socialization and following rules and therefore failed to recognize how to develop Danny's mathematical skills from where he was already, given the mathematical abilities that he had developed and brought from his home. One school district staff commented, "The teacher lost the numeracy lesson in the process of playing the game. She was concerned with 'the rules are this or that' and she lost the component of the kids' ability."

Summary of Responses

The sessions with educators demonstrated that classroom teachers often believe that children's learning experiences at home should reinforce school practices. The discussions of the Danny vignette show that when learning at home is regarded through a school lens, purposes for at-home activities can become lost and the home as a learning environment that brings its own strengths and contributions can be overlooked. When this occurs, not only is the home often cast as deficient, but teachers miss opportunities to work with parents to create bridges between the ways in which numeracy and mathematics are learned out of school and in the school context. These sessions also showed, however, that when teachers have opportunities to reflect on their practices as a group, alternative points of view surface and begin to challenge otherwise taken-for-granted assumptions.

Implications of this Pilot Study

This pilot study supports two of our initial theses: 1) there is much to learn from paying attention to the influence of complex social effects on children's mathematics achievement (or underachievement) and 2) information about these influences can be obtained through gathering data in natural settings using qualitative methods. Our data suggest that mathematics achievement or underachievement have their roots early in schooling and are shaped by social factors, often unobserved, that cannot be summed up through simple categories of class or race.

This pilot study draws attention to several issues and raises questions for further investigation. Our key areas of observation are the following: 1) children carry their numeracy practices in and out of the multiple contexts of their lives; 2) parents and teachers may or may not interact with each other about children's home and school numeracy practices and learning experiences; and 3) this research can form the basis for a powerful form of professional development when data is shared, in the form of vignettes, with teachers and administrators.

In concluding this paper, we will highlight our key observations in these three main areas and also offer some lessons we learned about what it takes to conduct this kind of study.

1. We believe the Danny vignette illustrates the way in which children learn within a complex web of contexts, each influencing the other, even when there is minimal, ritualized, or largely unilateral forms of interaction among these contexts. The Danny vignette shows him embedded in sites of learning that are both distinct and overlapping. His at-home practices of playing games to win, regardless of the rules are largely invisible in school, and therefore his teacher does not see his evolving use of mathematics. Furthermore, she focuses on the skill of counting, even though he shows himself able to use counting in activity, aptly illustrated in his home practices.

We also see the “travel” of practices across activities. In the vignette, we see him counting students and adults in the classroom at the teacher’s request. He employs a technique analogous to counting spaces on a game board-- touch and count. Our British colleagues have pointed out how this is a form of “switching,”—that is taking a practice developed in one domain, in this case game playing, and using it in another, such as counting people in the classroom. They have posited that youngsters who are adept at switching – who recognize that a “problem” in one context is analogous to one in another – may be more successful in school than children who do not use this strategy.

2. By observing in the classroom and listening to the voices of teachers, we see the depth to which classroom practices are shaped by the school imperatives of meeting assessment requirements and socializing children into school behavior. We found that these imperatives can have the effect of focusing teacher attention on a narrow range of skills, knowledge, and behaviors; this narrow focus may limit approaches to learning numeracy/mathematics in the classroom. Despite the strong influence of testing regimes and the premium placed on classroom management, those influences and how they focus the teacher’s attention may or may not be apparent to the teacher herself or to others who work in schools.
3. In interviews, teachers often stated assumptions about necessary sequences for learning; these assumptions are often reinforced by testing regimes, which “test” isolated skills detached from activity and by curricula which focus on scope and sequence. In the case of Danny’s story, the Head Start curriculum and core assessments have a focus on numeral recognition, counting, and one-to-one correspondence between numerals and counting. When mathematics learning is seen as “sequential,” i.e., a child must develop skills in a specific order, those skills are decontextualized from the use of mathematics or “numeracy in practice.” In Danny’s story, the teacher’s concern about Danny’s presumed lack of “basic” counting skills, along with the focus on learning rules, contributed to making her unable to see his manipulation of number value. In actuality, Danny’s game-playing

illustrates how a child's self-directed activity can show mathematical strengths beyond the curriculum and assessments in use.

4. Teachers' concerns often dominate parent-teacher interaction, in both formal conferences and informal exchanges that may occur when parents bring their children to school or pick them up. Our observation was that parents are rarely asked about how they see their children as learners. Our interviews and observations showed us that when the school view dominates to the exclusion of the parents', teachers may miss out on resources that could help them understand and engage with the child. Families have "funds of knowledge" (Moll, et al., 1992) that are useful to teachers. Teachers might be in a better position to support mathematics learning if they understood teaching and learning as building upon the knowledge that children bring to school rather than as imparting a prescribed curriculum.

We also noted that caregivers and teachers can interpret a "problem" differently. In Danny's case, for instance, both saw that Danny was cheating. The teacher viewed the cheating as a potential behavior problem; she wanted to stop his cheating by teaching him rules. However, his grandmother framed his cheating as needing to learn how to lose.

5. The vignettes we wrote based upon data gathered during this pilot study have generated interest from a broad range of constituencies. In the school in which this study took place, we discovered that the vignettes have served as powerful aids to professional development when we share them with teachers and administrators. The vignettes stimulated provocative discussions and led to small adjustments in practice, especially for the focal teacher. (This teacher concluded an e-mail response to the vignettes with the following statement: "Thank you for doing this study...it has already helped me to become a better teacher through evaluating myself and making changes.")

The principal, who strongly supported this research, believed the process of staff reflecting on the vignettes reinforced a culture of teachers' learning from their practice—a culture he is trying to develop in his school within a larger District climate that is increasing regulated and assessment-driven. The vignettes also triggered provocative discussion at the level of the central office, where we brought together lead staff from the areas of literacy, mathematics and community outreach. It is rare for such an interdisciplinary group to sit together, and their different perspectives contributed to a rich discussion. Several of these staff think they may want us to present within their disciplinary areas as well. We also shared the vignettes with a group of individuals who teach math education at the university level, two of whom invited us to speak to their classes of masters and Ph.D. candidates. We feel this work not only can enrich discussion about mathematics education, but can also bring more substance and meaning to current discourse around "parent involvement."

Finally, RFA has worked with a number of community-based education groups, and several of these have expressed an interest in this research. Presenting to these groups would provide opportunities for exploring the issues we learned about with an audience of parents and community members.

6. In conclusion, we share a few of the lessons we learned about what it takes to conduct a study of this nature.

➤ The support of the principal of our focal school was critical to establishing the legitimacy of the study within the school. He set the tone for establishing that the purpose of the research was to benefit the teachers – that the school community could learn from the study in an area in which they were struggling and that it was not being used for evaluation. This clarity helped to build rapport and trust between researchers and school staff.

➤ A major task we had was to connect with teachers, caregivers, and children. In the first months of the project this meant being a regular presence in the school and showing respect and appreciation for the time of all concerned, as well as genuine interest in their perspectives. Even when good rapport has been built with teachers, however, scheduling group feedback was a challenge. The constant churn of activity in schools – changing schedules, need to cover for absent teachers, new levels of paperwork etc. – worked against this process. Furthermore, we noticed that lead teachers tended to participate in orientations and feedback, but classroom aides did not. This is a significant issue, because we believe aides provide an important perspective. They often live in the community and come to the data from a different set of experiences than professionals.

Parents, for their part, were very busy – often working more than one job and/or working as well as going to school. Our impression was that the request for home visits often created an additional stress for them. On the other hand, we found it easier to arrange visits with grandparents, who seemed to be under less strain. We found it necessary to adapt and “catch” parents at school to talk about their child’s home experiences, as well as redefining “home” to include a parent’s workplace or wherever else it was possible to fit into the life of the family.

➤ As researchers, we learned the importance of being resilient, responsive and above all flexible to the needs of both schools and families. We learned to take advantage of spontaneous moments of interaction and not be disappointed when times we had arranged for visits were forgotten or cancelled. We also found that taking the risk of sharing data – even early on – with a range of interested audiences added to the interpretive process by inviting in perspectives from differently positioned education stakeholders.

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Research for Action (RFA) is a non-profit organization engaged in education research and reform. Founded in 1992, RFA works with educators, students, parents, and community members to improve educational opportunities and outcomes for all students. RFA work falls along a continuum of highly participatory research and evaluation to more traditional policy studies.

Appendix A

The School and its Neighborhood

Potts Elementary School is a Head Start to grade 5 school located in a low-income working class African American neighborhood; 99% of the school population is African American. The school is considered a “large” elementary school, with approximately 600 students. It is among the School District’s 100 low-performing schools, based upon results from the Pennsylvania Standardized Student Assessments (PSSAs).

Potts, a 1909 stone facility of several stories, is located on a corner in a mixed residential/commercial area. The school area shows signs of the economic deterioration of the neighborhood; the street in front of the school is often trash strewn and there are boarded up buildings nearby. The play yard surrounding the building is concrete. The front doors of the school are made of heavy metal, which adds to the severity of the exterior of the building. Inside, the building has a worn appearance; the halls are dark brown and green with chipping paint. There is a short flight of steps ascending to the first floor hall where a banner with the school’s name greets you, along with photographs of children draped in kente cloth scarves, a reminder that school is about children and that these children are African Americans.

Another set of heavy doors opens to the first floor hallway. The floors are always shining clean. There is a desk and security guard. The drabness of the first floor halls contrasts with the work of children hanging immediately outside every classroom and bulletin boards recording accomplishments of the students and notices for parents. A trophy cabinet shows awards that faculty, the principal, or school teams have won.

The Focal Classroom (Floor plan attached)

Room A is situated across the hallway from the principal’s office clustered with two other Head Start classrooms. The teachers include a Caucasian lead teacher, who lives outside of the community, but has taught for four years in this neighborhood, and her assistant, an African American woman who lives in the community with her three children and who previous to this year had been a volunteer Head Start parent.

The classroom is spacious, tidy and calm. It is abundantly supplied, containing blocks, puzzles, books, an area for dramatic play, a sand table, science materials (seeds, chick eggs, shells, etc.), a computer, a writing center with paper, pencils and magic markers, games, etc. The room is divided into three sections and within those sections are different activity “centers.”

Along the left wall is a “message center,” consisting of plastic pouches for each child that hold letters and/or small activities for the parents to take home. There is a Parent News Bulletin Board with a newsletter called *The Home and School Connection*. Also posted is a list titled “*How Parents Can Help*,” with about 32 items, three of which relate to numeracy/math. Two of these are about counting and one is about measuring, e.g., “show how to use a yardstick” and “show your child how to count change.” The middle

section has shelves with materials such as puzzles, legos, beads, and blocks. The windowsills often display student-made art projects. The third section has an area for dramatic play. The room has a round blue rug with multiple colored shapes where children sit for whole group instruction. A black board across one wall displays a permanent calendar with days of the week and weather information.

Daily Routine in the Classroom

When children first arrive, they eat breakfast and play independently or with one another. The daily schedule affords two times – a 20 minute period early in the day and a 45 minute period later on – during which students can choose an activity from among activity centers with a variety of games, puzzles, manipulatives, reading and writing materials, and toys.

The teacher led “instructional” time is around midmorning and lasts about 45 minutes; this focuses on taking attendance, calendar and weather activities, as well as group discussion. Students sit on the rug and the teacher sits on her rocking chair when instructing.

Before lunch, students go outside with the teacher when the weather permits. After lunch, children nap for about an hour. They complete the day with group activity such as dancing to movement-oriented songs, e.g., the “Hokey Pokey,” “Pop Goes the Weasel,” or “Skip to My Lou.”

Danny’s Grandparents’ Home and Neighborhood

Danny’s grandparents live in a row house on a small, quiet one-way street in the neighborhood near the school. The houses on the block are well-kept and the street is clean, with minimal litter. There are no street trees or front yards.

To enter Danny’s house, one opens an iron-work gate and walks up several cement steps to reach the front door. Inside, the home is warm and inviting. The researcher was entertained in the living room, a neat, clean and well-furnished room. Family photos hang on the walls and the room is decorated with knick-knacks. The researcher did not enter other rooms in the house; however, she was aware that Danny had a room of his own where he kept toys and games.

ROOM 1: MAP OF CLASSROOM - 2002

