UNDERSTANDING HOME SCHOOL RELATIONS IN NUMERACY.

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Abstract: *This is a discussion of research in the 'Schooled and Community numeracies' focus within the Leverhulme funded Low Educational Achievement in Numeracy Research Programme. The intentions of the research are to seek explanations for under-achievement in numeracy that derive from understandings of mathematics as social. We want to understand why some children engage easily with community numeracy practices yet struggle with schooled numeracies. We wish to investigate boundaries children face or which are constructed between home and schooled numeracy practices. The paper will consider some of the conceptual and methodological issues that have arisen in the research.*

1 Introduction

This paper is a discussion of one part of the Leverhulme Numeracy Research Programme (1997 – 2002) investigating Low educational achievement in numeracy in the UK. The paper concentrates on research into social factors which is part of the *'Schooled and Community Numeracies'* focus. Our intentions are to seek explanations for underachievement in numeracy that derive from understandings of mathematics as social. The reasoning behind this approach is that research on, and educational policy for, raising achievement in numeracy has recently focused on 'school effects' such as teacher subject knowledge, pedagogy, schools and educational structures. Consideration of 'home effects' and other social factors have been marginalised and even rejected despite serious research exposing their significance. For instance, macro visible social factors like poverty clearly do play a large role in educational achievement:

> "The data from the National Child Development Survey (1991) show that there is a strong relationship between children's performance in maths and reading tests between the ages of six and eight and their parents' earnings, with the children of higher earning parents performing better." (Machin, 1999 p 19).

We want to understand why some children apparently cope easily with formal numeracy practices whilst others struggle often in vain to handle those practices. We want to investigate boundaries and barriers children face between home and school numeracy practices and how these boundaries are constructed and maintained. The paper will initially unpack some of the conceptual and methodological issues that have arisen in the research so far. Field work from 1999 will be used to throw further light on these issues. Implications for research and for teaching will conclude the paper.

2 Conceptual issues

The objective of looking at mathematics as 'social' is to understand and describe different meanings that pupils bring to their encounters with schooled numeracy and thereby to contribute to understandings and explanations for the underachievement of many in schooled maths. The concepts we needed to clarify were: understandings of numeracy as social; the nature of community and schooled numeracies; and home/community/school relationships. A great deal of work in the field of 'social literacies' has addressed many of these issues (Street, 1996).

The first aspect we needed to clarify was the social in numeracy. A social perspective on maths does not entail simply privileging everyday or 'ethnic' maths or treating everything as 'social', which can be rather vacuous. Rather, it provides a vehicle for an exploratory inquiry into considering maths as social practice. In my recent research into this question (Baker, 1999), I found that the dominant understanding of the 'social' in maths was very narrow. It was limited to either interactions with others or to a functional or utilitarian role for numeracy. As an alternative I proposed a different, broader view, which sees the social in terms of ideology and discourse, power relations, values, beliefs, social relations and social institutions (Baker, 1999). Here, 'values and beliefs' feature in choices made and in contexts in which numeracy is sited. Home and school contexts are very different

and we need to understand the extent to which the numeracy practices sited within them are different. 'Social relations' refer to positions, roles and identities of individuals in relation to others in terms of numeracy. 'Social institutions' and procedures are to do with issues of control, legitimacy, status and the privileging of some practices over others in maths, as evidenced through accepted and dominant paradigms and procedures. The narrow view which is based on an autonomous model of numeracy as described by Baker and Street (1996), together with conventional pedagogy and curriculum, leads to blaming failure or underachievement in numeracy on the teacher, the child or the home and seeing them in some sense in deficit; the teacher in terms of her subject knowledge or her use of ineffective teaching practices; the child in her lack of skills, knowledge and understandings; and the home as lacking the schooled numeracy knowledge to support their children (Freebody and Ludwig, 1996). The broader social model, which makes the epistemological and ideological explicit (Baker and Street 1996), provides different ways of viewing and understanding underachievement and could lead to policies that go beyond access and empowerment towards transformations of curriculum and pedagogy. Instead of viewing underachievement in terms of deficit in dominant practices the model accepts social notions of difference and multiple practices and seeks to represent and build upon informal numeracy practices and funds of knowledge (Moll, 1992). As has been discussed elsewhere (Baker and Street, 1996 and Street, 1996), we see numeracy practices as more than behaviours that occur when people do maths. We propose that numeracy practices include the conceptualisations, the discourses, the values and beliefs and the social relations that surround these activities as well as the context in which they are sited.

Relationships between home/community numeracy and schooled numeracy practices are about ways the practices are the same or different, the boundaries between them and the ways they are viewed. Schools and educational policy privilege schooled numeracy over home practices, viewing relationships between them as unequal with the role of homes subservient to that of schools and the

boundaries between them clearly delineated. Homes are places where the numeracy practices of the school are to be practised and reinforced. Homework is set by the schools and it is hoped that 'the home' will assist the children's schooled numeracy activities. In a document on the National Numeracy Strategy the DfEE states:

> "An important part of the NNS is that parents are involved and well informed about their children's learning at school. Before parents can help their children effectively with mathematics, they need to understand something of how mathematics is taught in school". (DfEE 1999a).

Tasks set for the children to do at home are based on the needs of the school. These assume parental involvement which may not be appropriate for all homes or may even be rejected by some parents. For example, a parent on the project, when asked about homework said:

> "the Government has got it wrong. Children have other things to do at home. Maybe they should stay at school for 20 min and finish it off. Then go home and play. My dad used to ask me if I had any. I would say no so I could go out and play". (6 July 99)

An alternative view which sees the home as possible sites of rich educational resources are not seriously considered. Yet this might in the long term have much to offer as a strategy to raise achievement in mathematics.

3 Methodological Issues

In seeking to investigate differences between schooled and home numeracies we need to study events in classrooms and in schools in some depth. Thus we are basing our work on detailed case studies. This throws up two key methodological issues: firstly, selection of schools and individual children; and secondly, accessing home numeracy practices. The sites for the case studies have been chosen as contrastive, 'telling' cases (Mitchell 1984). The criteria for selection enable us to cover, where possible, the main dimensions of suspected heterogeneity in the

population. We selected three schools according to social features frequently cited as significant for achievement in schools. These were location (Freebody et al 1996), ethnicity (Jones, 1998), and relative affluence (Machin, 1999). One of the schools is in a mainly 'white', affluent suburb, the second has a ‘white’ socially deprived catchment area, and the third is in a mixed urban area attended by predominantly ‘black’ children. Four children were chosen initially from one class in each of the three schools. The 12 children were be recruited from reception classes, as nearest in social influence to the home environment, and followed through key stage1. To suit our contrastive methodology we sought children with the greatest differences in home/school relationships. Data include: field notes from observations of school lessons, home numeracy activities and 'community' numeracy practices and events amongst pupils from these schools; collections of work and texts used in those contexts, official curriculum documents, 'homework', teacher feedback materials; documents regarding home/school links; audio-recorded interviews with teachers, parents and pupils.

4 Fieldwork.

The purpose of the research is to investigate relationships between home and schooled numeracy practices. What I describe below are some initial data that arose fieldwork in classrooms and homes drawn from the reception class of children at one of our schools in a ‘white’ socially deprived housing estate with high unemployment and social deprivation.

In one instance of this kind I worked with a group on a literacy activity using an game on a number track, like ‘Snakes and Ladders’. The track was in the form of a winding snake marked out in square-like sections with a letter in each section. The game involved the children taking turns rolling a die, moving their pieces along the track, and stating the name of an object beginning with the letter in the section. The winner was the first player to get to the end of the track. The children hardly

engaged with the literacy aspects of the game at all. They found the activity hard not because the literacy demands were difficult for them but because they struggled with gaming and numeracy practices contained in the activity such as turn taking, ways of relating the sign on the die to amount of movement along the track, where to move from, which parts of the track counted as a unit. The relationships between different representations of numbers - dots, numerals and moves along the track - were not obvious to them. The numeracy practices that the teacher wanted to draw on for this task included those associated with game playing and with number tracks. One could represent this as a lack of skills and the children as in deficit. An alternative perspective could be to question whether game playing was in fact part of these children's home experiences and whether unfamiliarity with cultural activities like game playing may help explain the children's difficulties or even 'under-achievement'.

We decided to investigate the use of games on number tracks during a home visit. It was clear that the child had never played number track games. This is not to say that he did not play other games. In fact on one visit he spent over an hour playing a fantasy game which used numeracy concepts. When I offered to play snakes and ladders with him at home he showed no interest. His numeracy practices at home were different from those at school. His practices were not necessarily less valid, less interesting or less powerful. They were simply different. However, the assumptions of schooling are that children are exposed to game and number track numeracy practices at home and that homes where children do not meet such activities are in deficit. In this case it meant that this child from was unable to engage fully in the literacy task set for him because for him home and school practices were clearly different. We argue that boundaries between practices are more substantial for some children than for others.

Some initial interpretations suggest that issues about home/school relationships may revolve around teachers' expectations and images of homes. Teachers' views of homes vary. At times they are very positive seeing homes as contributing to the

development of “these three delightful lively and beautiful children” (teacher report comment, 6 Jan 2000). Yet at others they can be dismissive seeing the same homes as in deficit and not providing appropriate support for the children’s learning, that is, schools must compensate for the deficiencies of homes. They do not see the potential for building on ‘funds of knowledge’ from homes. Similarly, parents’ expectations of schooling are that children will learn formal numeracy practices at school and that children's informal or non-schooled numeracy practices will not be of value in the classroom. The differences between these views of what counts as numeracy and the practices associated with it may go some way to explaining difficulties some children have in moving from home to school. The fieldwork so far has confirmed and extended our concepts of numeracy practices as contextually defined and supported our models of many different numeracy practices. It also confirmed our view that relationships between homes and schooling are asymmetric with schooled numeracy having a high status and home practices being marginalised.

5 Implications

We are in the middle of our research. There are however, some initial implications relating to teaching; research and policy. For researchers, there are different ways of seeing achievement and underachievement in numeracy. A different social perspective provides understanding of social aspects of numeracies and multiple numeracy practices, the importance of context, social relations and ideology, and social factors in schooled and home numeracies. Instead of the dominance of deficit and hierarchical models of numeracy practices this perspective proposes notions of difference, multiple practices and of funds of knowledge.

The pedagogical and curricular implications for teaching from a broad view of the social in maths remain a complex question. Our reading of research literature suggests that a move to acceptance of maths as social does not necessarily result in

changes in ways of teaching maths. There is not a 1-1 causal relationship between epistemological models and pedagogy. We are, however, suggesting that broader views of the social in maths can lead to greater understandings of classroom interactions and through such understandings to changes in classroom practices. What our data do tell us is that relationships between home and school are complex and the extension of schooled numeracy into homes through homework or parent evenings, though encouraged in official policy statements, may be problematic. Instead a commitment to making use of the funds of knowledge in homes, acceptance of the value of home numeracy practices, investing resources and energy into identifying and understanding such funds of knowledge, in and out of school, may have more to offer curricula, teachers and schools than has previously been accepted.

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