They 'Did the Sheet' but didn't 'Feed the Mind'

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This study describes the effect mathematics newsletters had on the home learning environment of two six-year-old boys with low achievement in mathematics. One boy's mother maintained a high level of contact with the school, the other a low level. The mothers of the low achievers appeared to use the newsletter as a means of assessing progress rather than a stimulus for mathematics experiences in the home. These results are contrasted with an earlier study undertaken with high-contact parents.

Rationale

In 1999, recognising the role the critical role of parents, the New Zealand Ministry of Education launched a large scale public information campaign targeted at low income Maori and Pacific Island families. The children of these families are over-represented in the lowest achievers, and parents often have low levels of contact with schools (Wylie, Thompson & Lythe, 1999). The "Feed the Mind" message of the campaign sought to involve parents in simple activities at home which would support the development of early literacy and numeracy skills. The campaign was reported as successful, according to measures of increased awareness of numeracy and literacy activities amongst the target audience (Gerritsen, 2000), but whether it had an *effect* on school achievement or activities inside the home remains unknown. The beneficial effect that home–school contact has on academic achievement has been widely documented (Davies, 1996; Epstein 1987; Ramsay, Harold, Hawk, Marriott, & Poskitt, 1992). In the context of mathematics, Merttens summarizes the situation with the comment that: *We know from the evidence of both research and practice that the single biggest factor in children's educational success is their parents.* (1999, p79).

Researchers have identified a number of factors which may contribute to create increased academic achievement of children of high contact parents. Teachers may be more motivated to spend their time and energy on the children of parents with whom they have frequent contact (Goldring, 1991); and there is some evidence that teachers limit their expectations for children whose parents have little contact with the school (Wylie & Smith, 1995; Wylie, Thompson & Lythe, 1999). Wylie and Smith (1995) also hypothesized that being able to discuss early indications of future difficulty, before a real problem arose, enabled parents to more effectively support their children's learning.

Parent's ability to support their child's learning was the focus of Tizard and Hughes (1984) research which contrasted support for language development at home and in pre-school. They argued that the problem of low achievement was not due to a lack of motivation or resources in the home environment, but a lack of familiarity with the culture and content of the formal educational programme. They discuss a "split" between home and school learning that prevents home learning from being utilized by the child at school. This split is less extreme for middle-class children, but when the home culture is significantly different from the dominant culture in the school *"School learning" may become increasingly separated from any learning which takes place outside the classroom.* (Tizard & Hughes, 1984, p. 265).

Homework is often the only link between home and school for mathematics learning and the "right kind" of homework has many benefits (Anthony & Knight, 1999). However, Merttens cautions that:

> *how* it is done is more important than *that* it is done, because the "how" will make the difference between supporting children's learning and facilitating the collaboration of their parents, or it becoming yet another element in an education system in which the benefits are differentially available, according to socio-economic class, gender or ethnicity. (Merttens, 1999, p. 79)

Responding to reports that parents preferred a newsletter as a means of finding out about school activities (Cattermole & Robinson, 1985) and suggestions that newsletters were the best first step in increasing parental involvement in mathematics (Cooper, 1996); Savell (1998a) developed and trialled a regular newsletter in the junior primary school. The newsletter informed parents about the mathematics being taught in the classroom and suggested related activities that could be done at home. After interviewing parents to determine the effect of such a newsletter Savell (1998b) questioned the value of traditional mathematics homework. She found that parents were able to individualize mathematical activities within a context that was personally meaningful to their child in a way impossible for a teacher to achieve within the constraints of the classroom. The newsletters also generated increased levels of "maths talk" which benefited siblings, and parents kept newsletters for future reference. Parents welcomed the opportunity to share in their child's mathematics education, and believed that the support they could provide (given the information in the newsletter) would enhance their child's school performance.

Savell (1998b) suggested that giving parents information about school mathematics in newsletters was an effective way of decreasing the "split" for low-contact parents. However, respondents to Savell's study were all parents with relatively high levels of contact with the school (and their children were above average in their mathematics achievement). There is a clear need to find out more about how such mathematics information is used in the homes of low-contact parents.

In this paper two case studies are used to contrast the reactions to mathematics newsletters within the home environments of two children who have difficulty with school mathematics. Qualitative research allows the researcher to gather more detail about a situation than would be possible from quantitative methods (Rogoff, 1987). When case studies are used and subjects are selected who differ markedly on a particular dimension, the researcher is often able to understand the significance of unique events rather than having to generalize norms to predict future behaviour (Liebert & Wicks-Nelson, 1981). This technique has been particularly illuminating when considering the relationship between home environment and mathematical competence in young children (Young-Loveridge, 1989; Leder, 1992).

In this study, although both children are boys from similar socio-economic backgrounds who have difficulty with mathematics; their mothers have opposite levels of home-school contact. One boy's mother maintains a high level of contact with the school, and the other boy is from a home with a low level of home-school contact. The findings from these two case studies are compared with the results of Savell's (1998a) research involving high-contact parents with above-average to high-achieving children.

Method

Mathematics newsletters for parents, describing classroom Beginning School Mathematics (BSM) activities (Savell, 1999) were distributed semi-regularly to all the children in three junior primary school classrooms for a period of nine months. After this, teachers were interviewed about the effect of the newsletter and asked to classify children according to their mathematics achievement and the level of contact teachers had with the parents. Two boys from a single class were identified as being at opposite extremes in terms of the amount of contact their parents had with the school.

The researcher interviewed the mothers of these two children in their own homes. Interviews were semi-structured to ensure coverage of key points, but also allow parents to comment freely on the aspects of the school mathematics programme or home support that most interested them. The interviews took between 40 and 50 minutes and were transcribed by the researcher.

The two boys, Tony and Simon, were both described by their teacher as "weak in mathematics". Tony is the elder of two children. His mother was classified as "high contact" both by her own evaluation and by the teacher's. The teacher reported that Tony appears to be achieving at a level "not too far under average", but *only because of the level of interest his Mum has*. Simon was the youngest of three children. His mother was classified as "low contact" both by herself and Simon's teacher.

Results and Discussion

Irrespective of levels of school contact, both mothers appeared to view the newsletter in a similar way to a sample of work that their child might have brought home. They talked about going over the work and seemed to see the sending home of either newsletter or completed worksheets as a method the teacher chose to communicate with them about their child's mathematical competence. Simon's mother talked about using the newsletters in a similar way to the work samples: *They would come out of his book bag and I would always look at them. We went through them and he showed me what he did. I asked him about them and he showed me what he did.*" When asked about the latest newsletter, Tony's mother confused the newsletter with a sample of work: *"I just pulled out of his book bag and he had got them all right actually. I said " Wow! You did really well on these.*"

This was in contrast to the reaction of the parents in the previous study. The parents of high achieving children had interpreted the newsletter as general information for them, rather than something specific to "work through" with their child. All the parents in the previous study had kept the newsletters, and mention was made about them being useful for younger siblings. In the homes of these low achieving children, only Tony's mother had kept the newsletter, and she did not anticipate referring to it with his younger sister. "[I kept it] *just for ongoing education for him. So that I can see whether he is up to speed on his maths and that sort of thing.*"

These differing perceptions of the purpose of the newsletter were reflected in the way the parents had used the newsletter. In the previous study most parents said they had tried specific activities from *Maths News*, and adapted suggestions to suit their resources and personal interests of their children. However they reported the greatest effect of the newsletter had been to increase the visibility of mathematics in their daily lives. All parents in the previous study reported an increase in their "maths talk" as a result of the newsletter.

In the homes of Tony and Simon, the effect of the newsletters was limited to the discussion of their content as they were removed from the book bag. When Tony's mother was asked how she supported his mathematics at home, it was clear that she viewed her support as limited to checking up on his progress.

> Well I guess I am the sort of person that unless I get something like the Maths News that I wouldn't really have any ideas. Going just by those Maths News he seemed to be just keeping up with it ...
> *Did you actually try out some of the activities?*
> Yes and he seemed to know the answers and he seemed to get them right so ...

Similarly, Simon's mother reported that, other than "going through" the newsletters as they came out of the book bag, they had not affected what she did at home with Simon in any way. She hadn't tried any of the suggested activities.

In contrast to the parents in the previous study, neither of the low achievers' parents mentioned any increased awareness of the classroom mathematics programme as a result of the newsletters. Given that Tony's mother was classed as high-contact it is perhaps surprising that her answer to the question "What do you think you might see if you went into the mathematics classroom?" showed a view of mathematics which was limited to early number work: *"Probably just counting with beads and things. I'm not too sure really. I'd guess just any sort of small object that they might be putting into sets"*. In contrast, Simon's (low-contact) mother was more confident in her answer and demonstrated a broader view of junior mathematics:

> I would see rods, those coloured rods. They would be counting, measuring ...measuring with feet and then a tape measuring tape ... worksheets; ones like a picture of a cat and another cat equals two cats. I'm not sure what else. I think it would be that picture sort of maths.

In answering this question, Simon's mother may be drawing on her previous experiences helping in the classroom with Simon's older brothers. Although she readily identified herself as low-contact, she indicted that she had been more involved with older siblings.

> The homework sort of slacks off when you get to your third, you know. Like with your first you are really into everything. With your second you are a bit more relaxed and with your third you feel like you just don't do anything. It is a time thing now. It really is with homework.

During the interview she contrasted the welcome that was extended to parents in the school that her eldest son had attended with Simon's current school where she felt less welcome.

> It is made quite clear that you are not allowed to waltz in and out of the classroom ... [The teacher] doesn't even want you sitting on the seat outside waiting. ...She says that if the child sees you that distracts them and she doesn't want that happening. To the children she is wonderful ...[but] you certainly don't feel you can go in there and raise any concerns.

In fact both parents were quick to compare the culture and content of the current mathematics classroom with others that (for Simon) had been experienced, or (for Tony) had been described by close friends. Each of these parents felt that there was something not-quite-right as far as the mathematics programme was concerned. They were concerned that the faults (as they saw them) with the current school's system were affecting their child's mathematics performance, but neither had discussed their concerns with their child's teacher.

> [At another School] They seem to do a lot more maths. More maths and more variety too. From what [my friend] is saying, this child is about six months older, and she can count backwards from twenty and that sort of thing. She has a lot of skills which he doesn't seem to have or be learning... I guess it depends on the individual teacher doesn't it? I do think that communication with this teacher isn't the best.
> *The communication you get from her or the communication she gets from you?*
> It is both really, because she is not always approachable.

> I've often wondered when they start doing things like maths. Because in the juniors it is always the reading that comes home...and then all of a sudden when they are in Year 4 or 5 they have maths they've got to learn in Year 4 and 5. The earlier they bring in the maths the easier it is. ...[In junior school they should] just make a few additions, sort of everyday homework, and it will pay off by the time they reach Year 6. Maybe if it was just something. Like they have to draw a triangle, a square and a circle and just draw them into their notebook. Measure the sides of it or something. Simon loves his homework.

The above quotes (from Tony and Simon's mothers respectively) hint at the difference in the perceptions of their role between the parents of these two low-achieving children and the parents of the previous study. Simon and Tony's mothers clearly put the responsibility for the

mathematics learning of their children onto the shoulders of the classroom teacher. In the previous study, parents of the high achieving children believed their children would benefit if they took an active role and were eager to share an educational partnership with the teacher.

Conclusion

While no suggestion is made that the findings of two case studies are generalisable to the homes of all low-achieving children, there appear to be some significant and interesting findings that are worthy of future research. Perhaps the most surprising thing about these two case studies involving parents at opposite ends of the spectrum for home-school contact was their similarities. The research evidence would have led us to expect marked differences between the environments of the high-contact and low-contact parents, yet none were found. The lack of distinction may be because both boys come from similar middle-class European homes. In addition, although Simon's mother was classified as low-contact by the teacher, she reported that she had been more involved with earlier children.

Yet these case studies of the homes of low-achievers did reveal a very different reaction to the newsletter than the earlier research. Consequently the study provides a valuable insight into the differential in the effect of the newsletter for these high and low achieving children and their parents.

- The parents of the two low-achieving children seemed to believe that the place for mathematics teaching was the school. The home contribution to their child's mathematics learning was limited to positive encouragement and interest. Parents of high-achievers were also interested and positive, but they saw value in reinforcing school learning with related activities that they personalized for their child's interests and abilities.
- In the families where the children experienced difficulty with mathematics the newsletters were seen as a 'test' of the child's progress or an exercise to be worked through. In the high achieving homes the newsletter was interpreted as a prompt for the development of mathematical activities and discussion of mathematics in the family's shared daily lives.
- Newsletters generated "maths talk" and greater visibility of mathematics in the homes of high achievers. No effect was reported in the homes of low achievers.
- In the homes of high achievers newsletters were kept for future reference and valued as a guide for assisting younger siblings. In the homes of low achievers, no reference was made to the newsletters after their initial reading.

It is worth noting that a "high-contact" classification by the teacher did not necessarily equate to familiarity with the mathematics programme. Even parents who have a high level of contact with the junior primary school may never inquire or observe *mathematics* teaching. Similarly, this case study revealed that the "low-contact" parent is not necessarily out-of-touch with the classroom.

As with earlier case study research, the parents of low achievers did not appear unmotivated, both mentioned the emphasis that they felt the school (rightly) placed on reading rather than mathematics. Nor were they uninterested in their children's mathematics, rather they had a different view of their role.

The findings of this study suggest the possibility that it may *not* be the level of school contact that determines the quality of the support children receive from their parents. Rather parents' perceptions of the role they have in their child's mathematics education may be the critical factor; and this could cause the positive correlation between home-school contact and achievement. Parents who believe they have a valuable role to play in their child's mathematics education, and confidently assume a "teaching" role, are positively affecting their children's mathematics achievement in school. Generally such parental beliefs are associated with high levels of school contact, hence the correlation between parent-school contact and school achievement. On the other hand, parents who presume that teaching

mathematics is the sole prerogative of the school give their child no such advantage, so their children are often amongst the low achievers. These parents would often have lower levels of contact with the school in general, and would see little value in discussing mathematics content or activities with the teacher or their children.

Implications

This study has important implications for schools seeking to improve mathematics achievement. The parents of these two low-achievers reported that they did not feel comfortable "dropping in" to chat with the teacher about their child. In fact the low-contact mother reported that she had been told that the presence of parents outside the classroom was considered a disruptive influence. Lower levels of school contact result when school policies restrict parental access to teachers to pre-arranged appointments after school hours. Such regulation of parent-teacher contact sets up barriers to communication. While allowing the teacher to work more "efficiently" without the "interruption" of parents, the policy sends a clear signal to parents about the relative importance of teacher and parent's roles in educating their children. Parents may respond to this signal by assuming they are not expected or encouraged to take an active part in their children's mathematics learning. Yet in this study it was the assumption that what they do is important and worthwhile that appeared to be a critical difference between the parents of the high and low achieving children.

Perhaps if the teacher encouraged informal contact, there would be more opportunity for the sharing of anecdotes of mathematics progress. The joint discussion and subsequent elimination of small problems, before they become large hurdles, has already been identified as a possible reason for the advantages high-contact parents enjoy. However, this study suggests that the beneficial effect of such discussions may actually be attributed to the unspoken message they send to parents, rather than the solutions discussed. When a parent is welcomed into the classroom, and the teacher shares a child's minor problems with them, the parent receives the message that the teacher values their input and believes they have an important part to play in their child's mathematics education.

Although a newsletter is preferred by parents and is often recommended to schools as a first step, it seems that its effect in the homes of low-achieving children may be limited. It was not that they were unmotivated or disinterested. It was not that the language or format of the newsletter that made it difficult to access the necessary information. These parents both read through the newsletter with their child and questioned them to assess their competence in the skills described. What they were unaware of was the critical teaching role that parents play in their child's educational success. The parents of these two low-achievers saw mathematics learning as the domain of the school, so the newsletter alone did not prompt them to increase the visibility of mathematics in the home or create personalized activities for their child.

For these two low achieving children, the "Feed the Mind" slogan (with its associated messages that parents have an important role to play in their child's education and anyone is capable of assisting their child with literacy and numeracy) appears to be the component that is missing from their homes environment.

In the previous study Savell (1998b) argued that newsletters (which enabled parents to individualize mathematics in meaningful contexts for their children) may be more effective than "homework" exercises or tasks that are essentially the same as "schoolwork". This study suggests that parents of low-achieving children may not be able to gain such advantages from a newsletter. It is possible that rather than leveling the playing field (so that high- and low-contact parents can all be informed about classroom programmes) the mathematics newsletters may have a differential effect: They may be advantaging some children and not others, thereby actively widening the gap between high and low achieving children.

Priority must be given to investigating the effect of the "Feed the Mind" campaign in the low-income homes and schools that it was targeted at. Did the extensive advertising have the desired result? Or are parents still failing to comprehend the power they have to affect their child's school performance? This study suggests that the next question for further research into parental involvement seems to be not "How can we get low-contact parents more involved in their mathematics learning?" but "How can we demonstrate to the parents of low-achieving children that the mathematics learning is not something that happens only at school?" "How can we convince parents of the value in the mathematics they share out-of-school with their children?"

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