

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

# **Using Parent Newsletters to Enhance Junior Primary School Mathematics**

A thesis presented in partial fulfilment  
of the requirements for the degree of  
Master of Educational Studies (Mathematics)  
at Massey University

Janice Robyn Savell

February 1998



## ABSTRACT

Parent Newsletters were investigated as a means of increasing home-school contact in the Junior Primary School mathematics classroom. An action research model using three cycles, was used to develop and trial the newsletter. The first newsletter was based on BSM activities and used by five teachers at a school sited in a military housing area. The second and third formats of the newsletters were written in consultation with one teacher to integrate with her topic based mathematics programme in a Palmerston North primary school.

A questionnaire was used to gather background information and invite parents to be interviewed for further comments. Teachers and responding parents were interviewed in a semi-structured format. Participants commented on a range of other home-school contact issues. A follow-up interview was conducted with the parents from the Palmerston North school three months after the newsletters had ceased.

Teachers and parents were positive about the benefits of the newsletters. Newsletters did increase parental awareness of the junior school mathematics programme. For one child with special needs an obvious improvement in classroom performance was directly attributable to the effect of the newsletters.

Interviews revealed a number of inconsistencies between parents and teacher views of their roles and responsibilities. Problems of parent-school communication were highlighted. Teachers supported the newsletters, but felt that heavy workloads did not allow time for teacher production.

The research tentatively confirms the value of mathematics newsletters as a means of helping children and as a means of keeping parents informed. additionally, the research gives rise to questions on the duality of information flow and equality of benefits accrued.



## ACKNOWLEDGMENTS

The successful completion of this thesis is due to the assistance of many people.

First, the guidance of my supervisor, Dr Glenda Anthony, is acknowledged. As a supervisor her expertise was evident throughout the planning, data gathering and reporting of the study. As a friend she constantly encouraged and reassured me when the task seemed too big. As a mentor she cheerfully gave her time, no matter when it was requested, and showed intense interest in my progress. I am very grateful to her.

Secondly, thanks are extended to the teachers and parents who made this study possible. Their cooperation and frankness enabled me to explore wider issues of home-school communication.

Appreciation is also extended to those who have been involved in different stages of my study, most especially to Dr Gordon Knight for his guidance in the planning; to Anne Burch and Susan Peacock for their help during the write up phase.

Lastly, but most importantly, I wish to express thanks to Alan, my husband, for his constant and loving support. I also wish to acknowledge the contribution of my children; Keri, Cazna, Lane and Erika, all of whom have given me the free time I needed to complete this thesis.

# CONTENTS

<b>ABSTRACT</b>	<b>iii</b>
<b>ACKNOWLEDGMENTS</b>	<b>iv</b>
<b>CHAPTER 1 INTRODUCTION</b>	<b>8</b>
1.1 Parental Involvement: Background.....	8
1.2 The Situation in Junior School Mathematics.....	9
1.3 Research Objectives .....	11
1.4 Definition of Terms .....	12
1.5 Overview.....	14
<b>CHAPTER 2 LITERATURE REVIEW</b>	<b>15</b>
2.1 Parental Involvement in Learning.....	15
2.2 Theories of Learning .....	17
2.3 Differences in Learning Environments .....	23
2.4 Targeted Intervention Programmes .....	28
2.5 Barriers to Parental Involvement .....	33
2.6 Junior School Mathematics.....	39
2.7 What Do Parents Want? .....	43
2.8 Summary.....	45
<b>CHAPTER 3 METHODOLOGY</b>	<b>46</b>
3.1 Introduction.....	46
3.2 The Action Research Plan .....	48
3.3 The Setting .....	52
3.4 Ethical Considerations .....	53
3.5 The Newsletters .....	53
3.6 Data Collection Strategies .....	59
3.7 Reliability, Validity and Associated Limitations .....	63
3.8 Summary.....	66
<b>CHAPTER 4 TEACHER RESPONSES</b>	<b>67</b>
4.1 Introduction.....	67
4.2 Newsletters Affected Reporting to Parents.....	70
4.3 Newsletters or Homework: Is Compulsion Beneficial? .....	71
4.4 Teacher's View of Parental Role .....	73
4.5 Summary.....	76

<b>CHAPTER 5</b>	<b>PARENT RESPONSES</b>	<b>77</b>
5.1	The Questionnaires .....	77
5.2	Interviews .....	80
5.3	Raising Awareness of Classroom Mathematics.....	87
5.4	Age Coverage of Newsletters .....	88
5.5	Individualising Activities and Providing Mathematics in Context.....	90
5.6	Home Environment.....	93
5.7	Alternative Format for Newsletter .....	96
5.8	Summary .....	97
<b>CHAPTER 6</b>	<b>ISSUES OF PARENTAL INVOLVEMENT</b>	<b>98</b>
6.1	Information .....	98
6.2	Parent and Teacher Role and Responsibilities .....	102
6.3	Sharing Information on Classroom Mathematics.....	105
6.4	Power Structures Inherent in School Communications .....	107
6.5	Summary .....	110
<b>CHAPTER 7</b>	<b>DISCUSSION and CONCLUSION</b>	<b>112</b>
7.1	Discrepancies in Perceived Roles and Responsibilities.....	112
7.2	The Mathematics Newsletter: Sharing the Information.....	116
7.3	Implications of the Study .....	120
7.4	Limitations of the Study .....	122
7.5	Implications for Further Research.....	122
7.6	Summary of Outcomes.....	124
<b>BIBLIOGRAPHY</b>		<b>125</b>
<b>APPENDICES</b>		<b>136</b>
1	Questionnaire Sent to Parents .....	137
2	Sample Newsletters Developed for Milland School (To match BSM cycles) .....	139
3	Sample Newsletters Developed for Pallace School First Format .....	141
4	Second Format .....	145

## List of Tables

Table 1:	Newsletter Coverage of Module One (BSM programme) .....	55
Table 2:	Questionnaire Responses from Milland School .....	78
Table 3:	Questionnaire Responses from Pallace School .....	79
Table 4:	Interview Responses from Milland School .....	83
Table 5:	Interview Responses from Pallace School .....	84
Table 6:	Differing Perceptions of Junior Mathematics (which are unhelpful to children's progress) .....	114
Table 7:	Differing Perspectives That Could be Utilised .....	115

## Tables of Figures

Figure 1:	Diagram of the Action Research Spiral (Kemmis and McTaggart) .....	48
Figure 2:	Diagram of the Action Research Cycle for this Study - Cycle 1 .....	49
Figure 3:	Diagram of the Action Research Cycle for this Study - Cycle 2 .....	50
Figure 4:	Diagram of the Action Research Cycle for this Study - Cycle 3 .....	51
Figure 5:	Cycle One Basic Newsletter Format .....	54
Figure 6:	Sample Objective Test from Cycle Three Newsletter ..	58

# CHAPTER 1

## INTRODUCTION

### 1.1 Parental Involvement: Background

In 1988 parental involvement was enshrined in New Zealand schools with the adoption of the collaborative model of school management outlined in *Tomorrow's Schools* (Lange, 1988). Even before this, parental involvement was seen as a key component of education in New Zealand: being acknowledged in the McCombs Report (Department of Education, 1976) and the Curriculum Review (Department of Education, 1987) before the endorsement by Picot, Ramsay, Rosemergy, Wereta & Wise (1988) and incorporation in Government policy later that year.

Research overwhelmingly endorses the benefits of increasing parental involvement (Coleman & Hoffer, 1987; Davies, 1996; Epstein, 1987; Hulsebosch, 1991). Ramsay, Harold, Hawk, Marriott and Poskitt (1992) summarise a review of international research, undertaken as part of the Curriculum Review Research In Schools Project (CRRISP), with the conclusion that *there are major gains for parents, teachers and above all else students if caregivers, teachers and the school community can enter into a meaningful relationship in terms of the children's education* (p.168).

The cornerstone for programmes aimed at increasing parental involvement is information. Parents need to be informed about the school and its programme before they can make a contribution (Ramsay et al., 1990). Ramsay et al. (1992) found a school "climate" that acknowledges parent contribution is crucial, and traditional ways of involving parents (eg parent teacher evenings) are not the most suitable. Overseas studies (Cattermole & Robinson, 1985; Mellor & Hayden, 1981) have

shown that a regular school newsletter is parents' preferred option for receiving information about the school.

## **1.2 The Situation in Junior School Mathematics**

The most recent international comparisons of New Zealand children's mathematics skills make disturbing reading (Garden, 1997). The Third International Mathematics and Science Study (TIMSS) compared the performance of 9-year-old children in 26 countries and found that *compared with their international counterparts, New Zealand students' performance was well below the international means. This below-average performance was particularly disappointing, particularly in relation to the achievement levels recorded in other English-speaking countries* (p.105).

If international differences in school systems are considered, the poor performance is even more significant.

*Of the more than 40 countries that took part in some aspects of TIMSS, most had a school entry age of six years, the next most common age of entry was seven, and New Zealand was one of a very few in which children began school below the age of six years. New Zealand nine-year-olds thus have at least one, and in some cases two, more years of schooling than children in most other countries. In addition, a relatively high proportion of our children (over 80%) experience some form of pre-school education, yet by the age of nine years their average performance in mathematics and sciences falls short of that of children in a majority of other TIMSS population 1 countries.*

(Garden, 1977, p.247)

This data questions the effectiveness of the mathematics education New Zealand children receive in junior primary school. The TIMSS study identifies many possible reasons for the poor performance of New Zealand children; including use of calculators, teacher expertise, and disruptive students. One contributing factor, which is the focus for this study, may be the difficulty children experience with mathematics in the classroom environment. Many studies document the difficulties young children have with the disembodied nature of schoolwork, particularly mathematics (Desforges, 1989; Hughes, 1986). Tizard and Hughes (1984), contrasting the learning environments of children at home and at school, concluded

that while many politicians and professionals believe that early childhood education is beneficial, there is *very little British research evidence to substantiate these claims ... this study suggests that children's intellectual and language needs are much more likely to be satisfied at home than at school* (p.256).

Tizard and Hughes (1984) argue that if children's school performance is to be improved, schools need to use parents' insights into their child's individual interests and past experiences. This has been demonstrated most effectively with reading instruction (Hewison & Tizard, 1980). Parental participation in a child's early literacy acquisition is now the norm in New Zealand (Office for Standards in Education, 1993).

In contrast, parents of junior primary school children know little about their classroom mathematics programmes. In a study of the implementation of the Beginning School Mathematics programme (BSM), Visser and Walker (1993) found almost a third of parents did not know enough about their child's mathematics programme to be able to comment on it:

*Children frequently take home reading books which parents are obliged to acknowledge; whereas, unless parents visit the classroom, they are much less likely to be aware of what is being taught in mathematics and of the progress being made by their child. It may, therefore, be necessary for schools to assist parents to become better informed about teaching and learning of mathematics in the junior school, perhaps by such means as a newsletter about mathematics.* (p.34, my emphasis)

Cooper, Whitehead and Patrick (1996) have also suggested newsletters as an appropriate way of initiating parental involvement in the junior school mathematics curriculum.

Young-Loveridge (1989c) used a case study methodology to explore the differences in home environment between children who were competent and those who scored poorly on mathematics assessment tasks upon entry to school and concluded:



*For too long the focus has been exclusively on literacy and the ways parents can help their children by looking at books and reading stories with them. It is time that numeracy also became the focus of attention and parents were given some guidance on ways of assisting children to acquire numeracy skills.*  
(p.57)

Wylie and Smith (1995) studied children's progress through the first three years of schooling in New Zealand and noted the value of regular informal contact between parent and child. They urge teachers to draw on the resources of the home; to discuss ideas and materials used in the contemporary curriculum with parents and family members, but note that no allowance has been made for such joint work in our school structure or in teacher workloads. Newsletters may be a less time consuming option for busy teachers who wish to provide a base knowledge for parents (Ramsay et al., 1992).

An added benefit of newsletters is that they may address another documented problem in mathematics: inability to transfer skills taught in the classroom to problems encountered in everyday living (Carragher, Carragher & Schliemann, 1985; Lave, 1988; McIntosh, Reys & Reys, 1992). Mathematics is sometimes so well embedded in everyday activities that it lacks visibility (Carr, 1992). Drawing parents' attention to the mathematical nature of routine household tasks may increase their awareness and result in a higher incidence of explicit role modelling. This tactic has previously been a component of mathematics intervention programmes (Young-Loveridge, 1993).

### **1.3 Research Objectives**

This study uses a newsletter to inform parents about the mathematics their child was learning in the junior primary school classroom. The newsletter makes explicit links between everyday activities (embedded home mathematics) and classroom objectives. The primary aim of the research is to see if a regular newsletter increases parents' ability to support their children in their efforts to integrate their school mathematics with normal daily life.



Specifically the following research questions are asked:

1. What effect does the newsletter have on home mathematics?

Do the newsletters make parents more aware of mathematics in the home? Do they improve parents' ability and motivation to assist their children in linking home and school mathematics? Do the newsletters increase parents' confidence in their own mathematics ability? If so, is this demonstrated by increased role modelling of mathematics use within the home?

2. Do the newsletters improve the children's ability to transfer mathematics learning between home and school?

The parent and teacher evaluations of the newsletters will also enable the researcher to explore wider issues of home-school communication and parental involvement. Specifically:

3. Do the newsletters have a beneficial effect on communication between parents and school?

Do the newsletters increase feelings of partnership? Presumably newsletters will affect school-to-home communication, but do they also affect home-to-school communication?

#### **1.4 Definition of Terms**

Community consultation is now an integral part of the philosophy of New Zealand schools. Over the years it has been identified variously as parental involvement, parent consultation, parent participation, school community relations, community involvement, community consultation or educational partnership. To make clear the distinctions between these labels CRRISP Report authors used the following

classifications for five levels of consultation, adapted from guidelines published by the Department of Education (Department of Education, 1988):

**Level One: *Being informed***

*Parents are informed about the school and its programme, and they are encouraged to give the school information. They are not asked for their views or opinions*

**Level Two: *Taking part in activities***

*Parents are involved in activities, but in a limited way; they may listen to speakers, attend social or sporting functions or respond to questionnaires.*

**Level Three: *Being involved through dialogue and exchange of views***

*Parents are invited to examine needs and goals, and to discuss these with teachers.*

**Level Four: *Helping to make decisions***

*Parents views are invited when decisions that affect their sons and daughters are being made. They help to decide on the content and emphasis of school programmes.*

**Level Five: *Having responsibility to act***

*Parents make decisions in partnership with the school; they are involved in both planning and evaluating school programmes.*

(Ramsay et al., 1990, p.39)

Ramsay et al. (1990) make it clear that it is not possible to classify all New Zealand schools as working at level five purely because of the existence of a functioning Board of Trustees. They stress that *these levels do not represent a continuum which schools move through in a linear fashion. Levels One and Two continued to be important as other levels were achieved* (p.40). There is evidence that practice lags behind theory when collaborative models such as New Zealand's are adopted. (Evans-Schilling, 1996; Henry, 1996; Mawson, 1996). The effectiveness with which Level One to Level Four consultation is carried out varies immensely. After reviewing research on home-school information flows Ramsay et al. conclude that Level One consultation remains crucial because *the more informed parents are about their schools the more likely they are to become involved in their schools* (p.40).

Within this study the term "parental involvement" will be used as a general term to cover all the labels of educational partnership, home school relations and so forth. Specifically this study concerns Level One consultation as defined above. The

information flow is primarily one-way (from school to parent) and is specific to the mathematics programme in the child's classroom.

Throughout this report the term "parent" has been used to refer to the adult(s) primarily responsible for the child. It is important to recognise that in many situations a child may not be living with his or her parent(s) (for instance grandparent, guardian, auntie etc). The terms "caregiver", "family" or "whanau" may be more appropriate in some circumstances. There was a predominance of mothers providing the educational support role within the families studied: although this is usually the situation, it is important to acknowledge that this is not always the case.

## **1.5 Overview**

Chapter Two reviews the literature on parental involvement: firstly from a theoretical perspective of how young children learn, then specifically in relation to the junior mathematics classroom. General issues such as intervention, teacher attitudes and sharing of roles are also presented. In Chapter Three the methodology for this study is discussed. Details of the setting and time frames are included.

The following three chapters report the results of the study. Chapter Four deals with the teachers' responses to the newsletters. Chapter Five narrates the responses of parents which are specific to the newsletter. Parent comments of a more general nature (highlighting other issues relevant to parental involvement) are contrasted with teacher responses in Chapter Six.

Chapter Seven discusses all these results and draws conclusions. Implications for primary school mathematics, and home-school communications are presented. Directions for further research and pertinent questions are suggested.

## CHAPTER 2

### LITERATURE REVIEW

A study on the effectiveness of parent newsletters must be based on an assumption that parents have an important role to play in the education of their children. This review of the literature first asks why parental involvement should be encouraged, in relation to general theories of learning. A comparison of the possible contributions of parents and teachers, and existing barriers to parental involvement are highlighted. Targeted intervention programmes and parental involvement in reading are discussed as separate issues before barriers to parental involvement are examined. Studies specific to the junior mathematics classroom are reviewed. The final section considers general issues of home-school communication and contact from the parents' point-of-view.

#### 2.1 Parental Involvement in Learning

There is a great deal of literature that extols the benefits of increasing parental involvement in schools (Cattermole & Robinson, 1985; Davies, 1996). Often the case is argued on common-sense grounds: *Since parents too are educators, schools should explain their aims and policies to parents and work closely with them* (Cooper, 1996, p.9).

Many overseas studies of effective schools have found that a high level of parental involvement is a critical factor in school success (Coleman & Hoffer, 1987; Mortimore & Sammons, 1987; Ramsay et al., 1990). Schleicher (1984) claims that school success depends more on parents than teachers. He found academic success corresponded to parents' psychological support of their children, which was strongly related to parent cooperation within the school.

A similar viewpoint is evident in New Zealand (Ramsay, Sneddon, Grenfell & Ford, 1983; Ramsay et al., 1992). The writers of the Curriculum Review Research in Schools Project (CRRISP) report (Ramsay et al., 1990) surveyed over 200 studies of parental involvement and drew the conclusion that increased parental involvement is positively related to learning gains and behaviour changes amongst children. They also found involvement can have considerable gains for the parents themselves: including attitudinal changes towards schooling; improved economic status; and stronger motivation for political participation or improvement of their own educational standards. Epstein (1987) found that teachers were able to get good results from all parents, not just those thought to be helpful (for example middle class two-parent families). She notes that when characteristics of educational background and socio-economic class were controlled, children in classes where parent involvement was evident, made larger gains (in reading achievement but not mathematics) than children in other classes. Increased interaction between parents and teachers also has positive attitudinal outcomes: *most parents express great satisfaction in being involved in this way by the schools, and teachers report that the children show an increased keenness for learning at school and are better behaved* (Tizard, Scholfield & Hewison, 1982, p.14).

Tizard et al. (1982) also found involvement benefits teachers. Teachers *found the work with parents worthwhile and they continued to involve parents with subsequent classes after the experiment was concluded* (p.14). Epstein (1987) reports that principals recognised those teachers who encouraged high parental involvement and gave higher ratings when they evaluated teachers' qualities and abilities. Teachers and parents rated each other more positively when the teacher used frequent parent involvement practices.

Wylie and Smith's (1995) study of children's progress through the first three years of school in New Zealand gives an insight into why the children of high-contact parents are advantaged. They found that all children encounter difficulties but teachers tended to

*put the onus on themselves to find ways to bring the children over the obstacles they were encountering. Or they would limit their expectations of the child. If there is regular informal contact with parents, and parents are seen as receptive by teachers, then such ordinary "humps" in learning paths can be discussed, and worked on co-operatively - as can possibilities of extension when a child reveals an interest in a topic, or way of working. But if the contact is irregular, then it is much harder to talk of a child's progress, and in talking between teacher and parent, alight upon the (often) small things which cumulatively can make a difference. (p.95)*

Tizard and Hughes (1984) identify five significant factors (lacking in the school environment) that enhance learning in a home situation: the extensive range of activities that take place within the home; the common life experiences shared by parent and child; low child to parent ratios; embedded learning; and the intense relationship between mother and child which *converts the potential advantages of the home into actual advantages* (p.252). They note that the learning potential is not the same in all homes: it may be reduced through family or economic circumstances, but it was obvious in all the homes they studied, even those where the children would normally be characterised as "educationally deprived".

Tizard and Hughes (1984) argue that the problem of under achieving students is a result of the discontinuities between home and school, rather than home background. Wylie and Smith (1995) make similar claims. To further understand the impact the different environments of home and school have upon a child's learning it is necessary to look more closely at how young children learn.

## **2.2 Theories of Learning**

### **Influence of Piaget**

Until the 1970's the Piagetian view of child development was widely accepted in schools and early childhood centres (Meadows & Cashdan, 1988). It forms the theoretical basis for the "free play" philosophy (Choat, 1978) adopted by the New Zealand Playcentre Association (Somerset, 1976), and to a lesser degree by New Zealand Free Kindergarten Association. During the development of the Beginning



School Mathematics (BSM) resource (introduced to the junior primary school classroom in 1986) *work reflecting the prevailing educational wisdom was incorporated, most particularly the Piagetian approach to learning* (Bennie, Henry & Ratcliff, 1990, p.17).

Piaget identified three major operations that were necessary for mathematical understanding: classification; seriation; and conservation. Progress in these operations defined four distinct sequential stages of development. The stages relevant to this study are preoperational (approximately 18 months to 7 years) and operational (approximately 6 to 11 years).

Piaget argued that the pre-operational child's acquisition of number concepts is constrained by egocentricity, reliance on perceptual features and inability to use transitive logic. However, once the child entered the operational stage they would demonstrate abilities: in classification (by using inclusive and consistent criteria); in seriation (by establishing ordering and transitive relationships); and in conservation (by regarding quantity as invariant despite changes in arrangement). Awareness of conservation was regarded as the crucial indicator of operational thought, for it enables children to use the number system with understanding to solve mathematical problems.

However, many researchers have criticised Piaget's design and conclusions (Gelman & Gallistel, 1978; Hughes, 1986; Young-Loveridge, 1987). His insistence on the egocentricity of the young child and the inability to demonstrate transitive logic (Donaldson, 1978) is no longer considered valid. Donaldson argues that the apparent difficulties exhibited on Piaget's classic tasks are more to do with the child's failure to understand the language used, rather than their egocentricity or inability to conserve number. She argues further that the tasks were "disembedded" and lacked "human sense" for the children. When similar cognitive demands are made within more realistic situations the success rates of even young children improves dramatically.

In response to these and other challenges, post-Piagetian constructivists acknowledge that children possess greater competencies than predicted by Piaget and the sequential stage of development may require modification. Siegler (1981) and Young-Loveridge (1987) have criticised Piaget's assumption that number skills must be preceded by competence in classification, seriation and conservation. There is *substantial evidence to show that children who fail on so-called "Piagetian" tasks such as conservation, classification and seriation, may nevertheless succeed on number tasks* (Young-Loveridge, 1989b, p.25).

Piaget's research is influential in the development of constructivism (Leder & Gunstone, 1990). The main premise, that knowledge is actively constructed in the mind of the learner, remains a key tenant of constructivism. Leder and Gunstone (p.112) define two basic principles of modern constructivism:

- (1) *Knowledge is actively constructed by the cognizing subject, not passively received from the environment.*
- (2) *Coming to know is an adaptive process that organizes one's experiential world; it does not discover an independent, pre-existing world outside the mind of the knower.*

These principles imply that (1) knowledge cannot be transmitted from teacher to child - it must be actively created in response to interaction with the environment and (2) that the mind organises knowledge so that it fits personal experiences. Post-Piagetian constructivists recognise that a child's knowledge is very domain-specific and competencies may vary from domain to domain. The acquired domain-specific knowledge serves as a constraint in solving problem; the existence of cognitive constraints is very clear in young children's development of number concepts (Gelman & Gallistel, 1978).

One implication of constructivism for educators is that formal mathematics education can start at an early age if it is within a familiar context. Depth in one domain allows the child to build principles at a higher level than would normally be possible. Inagaki (1992, p.126), writing about science education, suggests that early childhood educators should start by *elaborating children's theory-like knowledge they are*



*acquiring or have acquired through everyday activities* and encouraging children to know some topics of their own deeply. This carries the proviso that the teacher is aware that a child will have difficulty separating mathematical knowledge from the situation in which it was acquired. The teacher needs to ensure that mathematics is embedded within known situations and authentic activities (Aubrey, 1993).

Individualisation of instruction becomes problematic in a constructivist classroom. Von Glasersfeld (1990) makes it clear that in a constructivist mathematics classroom language does not necessarily transfer knowledge and the facts accepted as self evident by the teacher are not necessarily self evident to the students. He points out the impossibility of relying on a written text which all pupils move through at the same speed. At the early childhood level, even if an activity is designed to lead to the construction of mathematical knowledge, it is important to accept that some processes are not able to be directed. Pateman and Johnson (1990) describe the constructivist teacher as *an opportunist, and also an able elementary mathematician willing to continue to learn both about mathematics and children in the attempt to develop them as autonomous creators of their own mathematics* (p.351).

A constructivist theory of education also has curriculum implications. A curriculum prescribed in advance is difficult to reconcile with the constructivist view of children learning by actively constructing their own knowledge in contexts that are personally relevant. Content, methodology and assessment will need to be idiosyncratic both to the context and the individual child (Pateman & Johnson, 1990).

### **Socio cultural perspectives**

An alternate view of children's cognitive development is provided by Vygotsky and his followers. In contrast to Piaget, socio-cultural theorists argue that cognitive abilities and capacities are formed and built up by social phenomena. Vygotsky emphasised the presence of adult(s) who assists the child in the "guided reinvention" of the accumulation of knowledge acquired by preceding generations. This emphasis on the teacher has implications for formal education. Whereas Piaget would have

seen instruction as *at best irrelevant and at worst a distortion*; Vygotsky saw the instruction as a *facilitator of cognitive development* (Meadows, 1993, p.246).

Vygotsky used the term “zone of proximal development” (ZPD) to describe the difference between what a child can achieve on his own and what he can achieve with the help of an adult (Vygotsky, 1956, cited in Wertsch & Tulviste, 1992). More recently the term scaffolding has been used (Bruner, 1985) to describe an ideal process by which an adult provides decreasing cues to assist a child to achieve tasks of increasing complexity.

Implicit in Vygotsky’s view of education is the relationship between child and the adult tutor who is sensitive to the child’s ZPD. This adult does not need to be a trained teacher to be an effective tutor (Saxe, Guberman & Gearhart, 1987), but scaffolding does require concentration (especially if the adult is not familiar with the child’s background knowledge) and is difficult to achieve in a group situation. A key component is cooperation. *To be most effective the relationship between teacher and learner must, at every stage of development, be collaborative. Teaching thus seen, is not a didactic transmission of pre-formulated knowledge, but an attempt to negotiate shared meanings and understandings* (Wells, 1985, p.73).

This cooperation is emphasised by theorists wishing to reconcile the Piagetian and Vygotskian views of children’s learning. Rogoff (1987) promotes “guided participation” as an extension to the Vygotskian ZPD concept which includes the child as a partner. Schmittau (1993), arguing from a strong Vygotskian background, writes that *constructivism when removed from its “radical” interpretation, simply reflects the need for the learner to be active in his own learning, a basic premise which the Vygotskian school of psychology accepts as foundational* (p.198).

### Socio-constructivism - combining the two perspectives

Although constructivism and socio-cultural theories of learning have been presented as extremes; many interpretations allow for a merging of the key points of both theories. The current mathematics curriculum (Ministry of Education, 1992) acknowledges both theories of learning: constructivism is inherent in the statement that *new experiences cause students to redefine their existing knowledge and ideas, so they construct new knowledge*; and the importance of scaffolding in *the extent to which teachers are able to facilitate this process significantly affects how well students learn* (p.12).

Hatano (1993) offers four revising assumptions to extend the Vygotskian conception of knowledge acquisition: learners are active; learners almost always seek and often achieve understanding; learners' construction of knowledge is facilitated by horizontal as well as vertical interactions; and availability of multiple sources of information enhances knowledge construction. When these extensions are incorporated into the Vygotskian conception of knowledge acquisition there is an increased compatibility with constructivism.

In a similar way some constructivists have worked to extend their model to give culture a more prominent role. Resnick (1987a, p.47) suggests *the environment and the culture provide the "material" upon which constructive mental processes will work*. Cobb, Wood and Yackel (1993) describe how instructional settings in a second-grade mathematics classroom designed to be compatible with the constructivist theory of knowledge led the researchers to develop the view *that mathematics is a social activity ... as well as an individual constructive activity* (p.92). Later Cobb (1994, p.18) wrote that a

*coordination of perspectives leads to the view that learning is a process of both self-organization and a process of enculturation that occurs while participating in cultural practices, frequently while interacting with others ... [our study] indicates that sociocultural analyses involve implicit cognitive commitments, and vice versa. It is as if one perspective constitutes the background against which the other comes to the fore.*

Pateman and Johnson (1990) assert that children construct their mathematics in the environment where curricula is generated by *communicative interaction among classroom participants* (p.351). The curricula is abstracted by those participants (including the teacher), thus the resulting constructions are heavily context-dependent and, in part, socially determined. Context and social environment are very different at school and home and this has important implications for the way children learn in the two different environments. The differences and their relevance to theories of learning, are outlined in the next section.

### 2.3 Differences in Learning Environments

#### **Learning at home**

Carr (1992) uses analogy between language learning and mathematics development to draw attention to the importance of the home environment. At home mathematical knowledge is developed within a context where it serves a social purpose (in the same way as language [Wells, 1986]). Naturalistic studies of children's language at home show that:

*learning is often embedded in contexts of great meaning to the child. Making a shopping list, helping with the baby, writing to Granny, deciding how many cakes are needed for tea, playing card games, are activities that, because of their interest to the child, make it easy for her to learn. This principle is well understood in primary education, but it is much easier to put into effect in the home than in the school. (Tizard & Hughes, 1984, p.251)*

One of Donaldson's (1978) criticism of Piaget's experiments was that the activities made no human sense to the child. When encountered in the home, mathematics does make human sense because it is embedded within an activity for which both parties had a common purpose. Saxe et al. (1987) stress the need for joint activities between adult and child which provide a *context where cultural achievements are interwoven with children's developing cognitions* (p.113). In the home, parent-child "scaffolding" is very effective because

*parent and child share a common life, stretching back into the past, and forward into the future. This vast body of shared experience helps the mother to understand what her child is saying, or intending to say. It also facilitates a task essential for intellectual growth - helping the child to make sense of her present experiences by relating them to past experiences, as well as to her existing framework of knowledge. (Tizard & Hughes, 1984, p.250)*

In addition to sharing past experiences, parents also know their own children intimately. They will be familiar with their language idiosyncrasies, their facial expressions, the length of their pauses, and their personal interests. The advantage of such personal knowledge often enables parents to tutor their children as effectively as professionals (Saxe, Guberman & Gearhart, 1987).

In the home much of the “day-in day-out” learning is initiated by the child. Even activities that would not normally be classed as “educational” such as talking about the neighbours, recalling past events or planning and speculating about future ones, can lead to adult-child dialogue that encourages knowledge construction in a subject of their choosing (Tizard & Hughes, 1984). Wells (1986, p.61) observed many such examples of incidental learning; where a child is following their interest and the parent is prompted to offer extra information.

*It is in this way, of course, that the child gradually comes to take on the adult way of interpreting the world-not through deliberate and systematic instruction, but through shared interest and involvement in the events that make up everyday life.*

Tizard and Hughes (1984) coined the phrase “intellectual search” to describe the child’s persistent search to further her knowledge in a topic of her choosing. This is consistent with constructivist theories of learning (children will actively seek to extend their intellectual frameworks) and socio cultural perspectives (they will seek more experienced adults to learn from). Within the home environment children’s intellectual search is obvious. It is facilitated by shared experiences, wide ranging activities based in the home, and the child’s freedom to choose the topic. Parents share conversations with their children and encourage children to ask questions and put forward their own ideas.

*Our observations of children at home showed them displaying a range of interests and linguistic skills which enabled them to be powerful learners ... in the world of school, the child appears to be a much less active thinker than is the case at home. (Tizard & Hughes, 1984, p.264)*

### Children learning in school

The first difficulty children encounter upon entry to school is their lack of shared experience with the teacher. This problem can be exacerbated by children's poor language skills and, possibly, cultural differences between teachers and pupils (Parr, McNaughton, Timperley & Robinson, 1993). Failure to help the child make the necessary connections to link school learning with previous knowledge may result in schooling that is isolated from real problems (Resnick, 1987b). This is evinced in studies that reveal incidences of children exhibiting more sophisticated mathematics in the home or market place than they could reproduce in the classroom (Carraher et al., 1985; McIntosh et al., 1992; Saxe, 1989).

In contrast to the unstructured home environment, school teachers are constrained by a specified curriculum with prescribed content, methodology and assessment. The disembodied nature of the school-based mathematical tasks may contribute to the problem. For many children mathematics is about completing exercises and has no relevance other than for school (Desforbes & Cockburn<sup>1</sup>, 1987; Masingila, 1993) and attempts to introduce realistic contexts have not always been successful (Lave, 1988). Boaler (1993, p.15) suggests that *individual meaning will be achieved not through the presentation of "real world" contexts, but through the recognition of students' own cultural values in the mathematics classroom*. When teachers do attempt to introduce purposeful activity from the children's own experience into the classroom they are faced with the difficulty of making the activity relevant to thirty different individuals.

---

<sup>1</sup> See Desforbes and Cockburn (1987, p.98-102) for quotes that demonstrate the irrelevancy of mathematics to some children. My favourite is:

INTERVIEWER *Why do we need to draw the numbers?*

Lisa: *So we can copy them.*

INTERVIEWER *But why do we need the numbers at all?*

LISA: *So we can colour them in. (p. 100)*



*I went on a course where they talked about using real experiences and gave the example of the child who had helped his Dad build a chicken coop at the weekend and all the maths that could be got out of that. Now you cannot really expect the others to be interested in someone else's chicken coop.* (Desforges & Cockburn, 1987, p.35)

Unlike parents, teachers are not as familiar with individual children so teacher scaffolding is often not effective. Moreover, it is seldom observed in the classroom occurring through discussion between children of differing ability (Bennett, Desforges, Cockburn & Wilkinson, 1984; Desforges, 1989; Thomas, 1994). Thomas (1994, p.69) observed junior primary school classes in New Zealand and concluded that *young children may not substantially further their mathematical understanding through talk with their peers*. Higgins (1994) reported that the social, technical and procedural demands of BSM tasks dominated children's conversation unless the teacher takes a leading role in structuring the task. Tizard and Hughes (1984, p.254) found that for young children

*the kind of dialogue that seems to help the child is not that currently favoured by many teachers in which the adult poses a series of questions. It is rather one in which the adult listens to the child's questions and comments, helps to clarify her ideas, and feeds her the information she asks for.*

Yet the mathematics classroom is dominated by teacher questions, usually involving memory processes only (Watson and Young, 1986; Wood, Cobb & Yackel, 1990). Higher level skills are seldom observed being used in the junior mathematics classroom and limited time is devoted to discussion of the children's ideas (Desforges & Cockburn, 1987; Doyle, 1983).

Despite exhortations to take account of children's existing knowledge (Cockcroft, 1982; Ministry of Education, 1992) classroom mathematics teachers have little knowledge of a child's potential as represented by his or her ZPD. Desforges and Cockburn (1987, p.102) reported that about one-third of the work assigned in the observed junior mathematics classes was beyond the child's comprehension - although in about half of these cases the children could complete the exercises by some means or other.

*In terms of work completion there was a high level of success based in the main on familiarity with the task demands. The children did not indicate this familiarity to their teachers. This avoided the risk of making their lives unnecessarily difficult. The teachers did not find out about the degree of match between the tasks and children's attainments because they did not conduct any detailed diagnostic work. If a child could do a task all was well; if not, he was re-taught.*

This is consistent with New Zealand research on the BSM resource (Bennie et al., 1990). The same pattern of errors in assessment was found by Young-Loveridge (1989a). Teachers underestimated high achievers and to a lesser extent overestimated the knowledge of the low achievers. It is echoed in the results of Visser & Walker's (1993) study: where the most common concern expressed by parents of children in their second year was that their child was not being extended enough. Bennet et al. (1984) suggest the reason for teachers' failure to recognise tasks which are too easy is that the children appear to be working industriously, even with tasks which hold no challenge for them. Young-Loveridge (1987, 1989a) warns that early BSM activities are too easy for many of the children starting school and as such recommended BSM starting points provide no extension.

Many of the limiting factors mentioned are a result of the high child-to-adult ratios found in schools. Desforges and Cockburn (1987) argue that earlier research which found that class size does not affect learning, was concerned with standard tests of routine production. If we are to acknowledge a socio-constructivist model of learning, it is essential that teachers have the time to conduct individual interviews with children, rather than the following scenario reported by Desforges and Cockburn (p.135):

*More typically, the demands of management had the teachers attempting to hold conversations or discussions with six or seven children whilst monitoring the work of the rest. We have seen the effects of these factors on their line of thought as they attempted to make sense of children's responses, maintain the flow and other social dimensions of the conversation and sustain its intellectual import. The result was rather odd (in contrast to normal conversations), teacher-dominated exchanges.*



Tizard and Hughes (1984, p.259) stress that research showing the home as a powerful learning environment does not necessarily mean that children would be better off at home:

*Children have a variety of educational needs, some of which cannot be met within the home. They need to learn how to get on with other children, to be a member of a group, to separate from their families, and to relate to, and communicate with, strange adults.*

But we have only to look at the results of the TIMSS study (Garden, 1997) to question the value of the mathematics education children receive in the first four years of primary school *when it is presented in isolation from the home*. When compared with 9-year-old children from other countries who start formal schooling up to two years later, New Zealand children performed poorly. Tizard and Hughes (1984, p.265) argue that a “split” occurs between home and school learning. 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. Knowledge may be acquired in school for the purpose of passing examinations which is unlikely to be applied to real life problems away from school. Similarly, the child’s experience and knowledge of the world gained outside the classroom may not be seen as relevant to the academic learning taking place inside the classroom. At the nursery level, the gap could to some extent be bridged by a much greater involvement of parents in schools, and a much greater knowledge on the part of the school staff of the children’s out-of-school lives.*

## **2.4 Targeted Intervention Programmes**

### **Parent involvement**

Before considering parent involvement in more detail, it is important to make a distinction between programmes designed to increase parental involvement per se by providing universal coverage (eg the normal school reading programme where **every** child takes a book home to read), and those that aim to change long term outcomes for disadvantaged children through parental involvement. The second category can

In general, research on targeted intervention programmes has shown them to be fairly successful, especially if the intervention starts early (Royce et al., 1983, cited in Young-Loveridge, 1990). The argument for the efficacy of targeted intervention programmes is based on stability of achievement. While parental involvement is commonly touted as the key factor in the success of targeted intervention programmes, researchers suggest a need to critically examine the benefits of using parents as the agents for interventions (Toomey, 1989, 1996; White, Taylor & Moss, 1992).

For instance, one study (Tizard, Blatchford, Burke, Farquhar & Plewis, 1988) which encouraged parental involvement in children's reading found that improvements in competence were not related to parents' attempts to help their children at home, but related positively to the frequency of the parents' visits to school. Toomey (1996, p.61) warns of the "dark side of parental involvement": He argues that targeted intervention that requires parental involvement *may have the effect of advantaging those children whose parents are able to respond constructively to such programs and of relatively disadvantaging the children of parents who are not.*

In his study with Grade 1,2 and 3 children, Toomey (1996) gives examples of families who were unable to participate in a shared reading intervention because of illiteracy or poor English language skills. His method of targeted intervention, paired reading, required the adult to lead the child in reading a book, thus necessitating a relatively high level of reading expertise from the parent. Toomey compared the reading gains made by those families where the situation was conducive to the correct implementation of the shared reading programme with the whole group average. He noted the differential effect of success such targeted intervention had and warned that parental involvement "increases disadvantage" for those families who are already disadvantaged. He criticises other studies which show positive effects of parental involvement for ignoring those families who do not to participate.

While acknowledging the validity of Toomey's concerns, it is important to note that he does not denounce parental involvement per se: Rather, he warns about possible undesirable consequences if targeted intervention programmes are not implemented fairly. *What is needed is an approach to home-school relations which is careful and differentiated, adopting appropriate strategies for different kinds of need* (Toomey, 1989, p.295).

Young-Loveridge (1990) highlights the need for a mathematics targeted intervention in the junior primary school years. Her argument is based on the results of the EMI-5 study which found that the differences between high and low scoring students increased throughout the first years of schooling. When tested a year later, the lower quartile still scored more poorly than the upper quartile had upon entry to school. The progress of the low scorers was slower throughout the first three years of schooling. Other research (Newman, 1984) confirms the stability of mathematics achievement. Young-Loveridge (1989a) argues that teachers can accurately identify poor achievers upon entry to school: These children can be expected to make poor progress, therefore they should be targeted for a mathematics intervention.

Young-Loveridge (1990) trialed two targeted intervention programmes: one using purely school-based resources (modelled on New Zealand's successful Reading Recovery Programme); and the other a home-based one for parents to implement. The motivation for a parent-run targeted intervention came from her earlier case study research (Young-Loveridge, 1989c), which revealed significant differences in the family orientation towards numeracy of low- and high-achieving children. The families of low-achieving children were not "disinterested" in their children's progress; rather they put emphasis on literacy at the expense of numeracy and seemed to have basic misconceptions about numbers. Young-Loveridge called for efforts to be made to increase parents' awareness about the importance of numeracy and ways of using everyday experiences to help children learn number concepts.

When the two targeted mathematics intervention programmes (home- versus school-based) were compared, Young-Loveridge (1993) found similar differential results to

Toomey's (1996) targeted reading intervention programme. Both intervention programmes involved children listening to number stories and playing games, but children in the school-based intervention increased their score by an average of 29 points in the post-test, compared to the home-based intervention average increase of 16 points (control group mean increases were 15, 11.5 and 12 points).

Young-Loveridge (1993) identified differing levels of parental commitment as a contributing factor to the uneven results from the home intervention, but even when the amount of parental commitment to the programme was taken into consideration, the school-based intervention was still more effective. Even if the parents who demonstrated a low level of commitment were discounted, the average increase for the children from highly committed families was still less than those of the school-based intervention. While the time spent on the games was greater for the school-based intervention (and this could also be an important factor), the significant factor in that school-based group's success is the skill level of the teacher who was doing the intervention. Young-Loveridge (1990, p.9) concludes that

*While supporting and encouraging parents to interact more effectively with their children is highly desirable, total reliance on this form of intervention could lead to further disadvantage for those children whose families cannot, for one reason or another, participate in a special programme.*

This is in line with Toomey's (1996) cautions about parental involvement in reading, but in contrast to results of the reputable America Head Start programme of parental involvement: aimed at pre-school children from disadvantaged backgrounds. Head Start children gained and maintained an achievement advantage over the control group well into primary school and the effect was particularly marked for mathematics (Royce et al., 1983, cited in Young-Loveridge, 1990).

Young-Loveridge (1990) points out that there is a fundamental difference between reading and mathematics intervention programmes. Whereas reading has an initial hurdle followed by smooth progress, mathematics has a threshold of mastery (except perhaps for arithmetic concepts) and significant leaps of understanding are made throughout the primary curriculum. For example, in the junior primary years skills

with small numbers are crucial, but their mastery does not prevent trouble over the next two years as place value and the decimal nature of the number system are introduced. She concludes that targeted intervention may be required at multiple key points throughout the mathematics curriculum.

In summary, while it is important to note that the literature suggests that parent involvement **did** have a beneficial effect (although not as large as comparable class-time interventions); using parents as the sole interveners for targeted mathematics intervention is not a defensible position given the evidence presented in this section. This study evaluates newsletters designed to increase *universal* parental involvement (presuming that all families are able to read them) rather than a targeted intervention programme.

### **Reading and parental involvement**

There is a scarcity of research into parental involvement in mathematics, compared to the abundance of literature supporting parental involvement in early literacy. The recent history of parental involvement in literacy acquisition makes interesting reading concerning the way parents were once seen as a threat: liable to do damage by teaching using the “wrong” method (Hannon & Cuckle, 1984). Nowadays parents are recognised as key ingredients in reading acquisition. Indeed studies (Hewison, 1988; Tizard, Scholfield & Hewison, 1982) have found that many parents teach reading more effectively than most teachers. In a review of the literature Raven (1989, p.53) concluded that unless children learn to read at home they rarely learn to read:

*Parents tend to embed reading with their children in a meaningful, on-going, joint, activity. They provide different kinds of assistance depending on the child's previous experience with particular words. They vary what they do with the child's expectation of the text and with the child's (and their own) beliefs about the purpose of the reading session. When they help children to clarify meanings, they take account of the particular context in which the word is used and its function in the sentence. They relate the material they read to the child's interests. They spend a lot of time thinking about children's specific difficulties and trying to invent ways of helping them to overcome them.*



These skills are in contrast to those teachers who tend to teach reading through a "single best method" and fail to individualise work to take account of children's interests (Raven, 1989).

Parents are now encouraged to be involved in all aspects of their children's early literacy development, and this is especially true if a child has special needs (Kirkby, 1992). New Zealand has a history of encouraging parental involvement in children's early literacy development (Office for Standards in Education, 1993). In addition to the normal classroom programme a nationwide Reading Recovery intervention operates (Clay, 1980, 1985). Parents of six-year-old children are consulted about their child's selection for the programme, invited into the school to observe a session, and kept informed of their child's progress, but the programme is designed to operate effectively without parent help. The difference between levels of parental involvement in reading and mathematics is striking. If parental involvement is beneficial, why does it not happen in mathematics?

## **2.5 Barriers to Parental Involvement**

### **Teacher attitudes**

Despite overwhelming evidence of the benefits of parent involvement there is a reluctance on the part of many teachers to involve parents (Davies, 1996). Hulsebosch (1991) and Mawson (1996) postulate that teachers' concepts of their own professionalism affect their attitudes to parental involvement. They found that for low-parent-contact teachers "being professional" meant having an authoritarian attitude towards mothers and maintaining a distance between themselves and the parents. Likewise, Goldring (1991, p.225) notes that low-parent-contact teachers

*consider themselves professionals in the field of education, and as such treat the parents solely as indirect clients, who lack any formal authority in their realm... [the teachers] felt no need to explain, influence, or 'sell' their work to their unprofessional clients, the parents.*

Scott and Morrison (1994, p.3, cited in Phtiaka, 1996) claim that the “partnership models of education” do not assume equality - rather *teachers seek, on all occasions to impose strategies, models and procedures on parents*. Some teachers express anxiety about increased parental involvement (Ramsay et al., 1992). In a recent Australian study Mawson (1996, p.99) found teachers perceived *parents as potential trouble makers who threaten their position*. She collected teacher comments which included *They like to make sure you are doing the right thing ... Especially when you're new, they want to check you out* (p.99).

Bastiani (1988) notes that when parental involvement increases from passive receivers of information to consultation with the teacher, the teacher may feel less secure. This phenomenon was also noted in New Zealand by Ramsay et al. (1992) (although the fears were found to be without foundation). Teacher insecurity leads to the well-documented view of parents as the problem (McDermott Murphy, 1997; Parr et al., 1993; Rasinski, 1989). In a study of 20 primary and 18 secondary schools in Auckland, Parr et al. (1993, p.40) found the predominant attitude (that parent contact should be mediated in some way) reflected *a view of parents as a party to be negotiated with and protected from, rather than a resource to be tapped*. Even New Entrant primary teachers (who as a group, consistently have the highest levels of direct contact with parents) did not demonstrate a view of parents as partners. While the vast majority of teachers saw the parent's role as providing support for the child or the school, only 7 out of the 139 professionals interviewed saw parents in an active teaching role<sup>2</sup>.

The stereotype of the “interfering parent” is noted by McDermott Murphy (1997) and Rasinski (1989). This theme is also identified by Goldring (1991, p.225) who finds, in contrast to teachers' view of themselves, parents do not see teachers as true professionals. They reject the notion of a teacher as an impartial professional who

---

<sup>2</sup> Many parents also accept the view of their non-teaching role as defined by the professionals. Parr et al. (1993) report that comments like “to be there for the child” or “take an interest” were common when they asked parents about their role in their child's education.

will render services of a uniform quality to all students. Parents assume *that their involvement in the classroom, and their support of the teacher can increase the teacher's motivation to invest greater efforts in teaching on the whole, and raise his/her level of interaction with their own child.*

Schleichler (1984) believes that some of the tension may be the result of the difference between the way home and school view the child as an individual or part of the team unit. In school the emphasis is on the individual intellectual achievement of the child, whereas at home task completion commonly depends on people working cooperatively as a unit. Schleichler highlights other inconsistencies: the way schools' communication to parents emphasises individual achievement, but teachers expect parents helping in the classroom to be impartial. Instead of recognising parents' desire to see their son or daughter succeed as legitimate; a parent who helps only his or her own child, is seen as a problem.

Greenberg (1989) suggests that the problem may lie with the school, not the parents. She says that schools make "difficult" parents act the way they do by limiting their channels for communication. Often a parent's only legitimate channel for communication is the parent-teacher interview. However the purpose and result of the interview may be perceived differently for parents and teachers. Parr et al. (1993, p.39) found teachers reporting they valued the contact as a way of finding out about the child, while parents felt that they received information rather than gave it. This was demonstrated by the relative spheres of influence. Teachers asked about 40% of the parents to make changes, particularly in relation to their child management. In contrast, *only a small percentage of Year 1 parents (15%) felt that they asked for some form of change and the teachers agreed that requests were at about this level.*

Scott and Morrison (1994, cited in Phtiaka, 1996, p.50) note similar results and conclude that parent-teacher interviews reveal a physical and psychological border between home and school:



*Parents are not allowed inside the border, while at the same time their assistance and supervision in educational matters at home is considered essential. Furthermore, they are perceived to be as much in need of guidance and instruction as their children are. On the contrary, teachers are seen as the experts who not only determine what happens in school, but also directly influence what takes place at home.*

### **Parent attitudes**

The other pervasive stereotype is the disinterested parent (Bastiani, 1988; Ramsay et al., 1992; Toomey, 1996). I could find no literature to support this stereotype: but the converse is well documented, even amongst low socio-economic or minority cultural groups who are under-represented in traditional parental involvement programmes (Phtiaka, 1996; Toomey, 1993). Using gross measures to ascertain the interest or focus of parents is often culturally inappropriate. For instance, the number of books in the home is often used to assess literacy orientation, but

*Asian refugee children observed by Bambi Schieffelin were able to make good use of school instruction without having many books or writing materials in their homes, and some inner-city black families observed by Joan McLane engaged in intensive reading and writing activities with a relatively restricted range of materials. (Brooks McLane & Dowley McNamee, 1990, p.90)*

In New Zealand, Cooper (1996) alludes to this widespread belief in disinterested parents in the Parent Education in Relation to Mathematics (PERM) report. He reports that teachers' initial scepticism was unfounded. Similarly, Ramsay et al. (1992) found no evidence of disinterest amongst 100 parents who were not overtly involved in their child's schooling. A broad range of reasons kept parents from becoming involved: not feeling welcome; lacking self esteem and confidence; being unfamiliar with the school administration system and being afraid to give offence; language difficulties; and a range of other reasons relating to personal circumstances of the parents. Ramsay et al. (p.174) note that *greater knowledge led to greater understanding and once this understanding was achieved the gains on both sides were considerable* but in the early stages parents expressed doubts that their contributions would be welcomed:

*As one parent commented:*

*"School's not my scene ..... because I'm cynical about the value of parent opinion ....."*

*Another parent was overheard to say:*

*"No matter what we decide you lot [teachers] will go and change it."*

*Other parents felt that they lacked adequate information to become fully involved and the teachers (at times) were partly responsible for that lack of information:*

*"Teachers cover things up, they are not open with us. They keep information from us - then they expect us to take over when things get out of hand." (p.174)*

In a stinging attack on "[ap]parent involvement" Fine (1993) argues that questions of power, authority and control are a central issue to the question of so-called "disinterested parents". She includes a quote from an involved parent; mother of three and school council member:

*The biggest thing is that the schools are not working, they haven't figured out how to motivate my sons ... I'll tell you, the motivation is not lacking at [her home address]. I been through blaming myself. It's not here. I'm sick and tired when administrators and teachers don't have an answer, they blame the parents. Motivate him! They dump that back on us when they can't figure it out. (p.697-8)*

Fine concludes that calls for parental involvement are about *blaming the victim* and there is a need for recognition that parents may not have the resources to become involved. Other researchers (Phtiaka, 1996; Vincent, 1996) point out that for *some* parents, involvement in their child's schooling is an unreasonable request given the other more pressing demands on their time and energy.

Lack of overt involvement does not equate to disinterest (Toomey, 1989). Despite differences within school populations, all parents are concerned to see that their children reach their potential (Tizard & Hughes, 1984). If parents are aware their child is having difficulties in school they will often seek help (from the teacher or outside sources) to ensure that their child has every opportunity to achieve. However, low-contact parents are often not advised that their children are low-achievers. Often they are not given the opportunity to discuss the problem and seek help.

*The teachers of these [low-achieving] children generally thought their parents meant well, but could not support their children's learning in the same way as other parents. Sometimes this was a matter of material resources; sometimes (as with some parents of children making faster progress) it was a perception that if parents attempted to teach children, they would do it in ways which would thwart the child's school learning, or their enthusiasm and confidence, and which would be based on performance goals rather than learning goals. So while parents often left it to teachers to tell them if their child was having difficulties, teachers - often from a desire to protect a child - would put the onus on themselves to find ways to bring the child over the obstacles they were encountering. Or they would limit their expectations of the child. (Wylie and Smith, 1995, p.95, emphasis added)*

The *desire to protect a child* from their parents can arise from the commonly held belief by teachers that parents will teach their children "the wrong method" and thereby create confusion. This attitude used to be prevalent in reading prior to the 1960's<sup>3</sup> (Hannon & Cuckle, 1984) and is still very much in evidence in mathematics classrooms today. Yet research in mathematics has failed to find evidence that children will suffer from exposure to different methods. In contrast, many studies have shown that increased exposure to different methods (including incorrect ones) which create conflict for the children to reconcile, result in larger gains in understanding (Cobb, Wood & Yackel, 1993) and many constructivists are suggesting that children should be encouraged to invent and use their own procedures (Carraher & Schliemann, 1985; Kamii & De Clark, 1985; Kamii, Lewis & Jones Livingstone, 1993; Madell, 1985). Wood, Cobb and Yackel (1990, p.498) recommend teachers

*alter their current practice to provide learning opportunities that encourage students to reorganize their conceptual understandings by reflecting on their activity. At a more specific level in mathematics education, the implications are that teachers should provide instructional activities that will give rise to problematic situations for children.*

Goldstein and Campbell (1991, p.25) stress the need for parents to be contacted as individuals if parent involvement is to be fruitful. They point out that *not every pupil will need extra practice in mathematics*. Workman and Gage (1997) suggest

---

<sup>3</sup> Such attitudes are slow to disappear. A 1984 British survey found 15% of the Head Teachers preferred reading books not to go home because *parents' efforts would hinder rather than help the teaching of reading in school*. (Hannon and Cuckle, 1984, p.10)

offering families a “menu” of possible services which allows each family to choose the type of involvement that best suits their situation.

## **2.6 Junior School Mathematics**

### **Entry skills and standards of numeracy**

The level of mathematical understanding of children upon entry to school varies considerably (Aubrey, 1993; Wright, 1994). Young-Loveridge (1989b), testing the mathematics skills of 81 new entrants in Christchurch, found the highest scorer could produce a rote-count sequence to 100; in contrast, the lowest scorer only produced a rote-count sequence to 8. Teachers can identify poor achievers at the new entrant level (Young-Loveridge, 1989a) and their lack of basic numeracy skills has important implications when it is combined with the literature on stability of performance. Young-Loveridge (1989a, p.59) found that after one year at school *the lowest scorers (i.e. those in the bottom quartile) still had not reached the level of performance attained by the highest scorers (i.e. those in the top quartile) on entry to school*. Newman (1984) found that levels of mathematics achievement at fifteen could be predicted just as accurately from performance at seven as at ten years of age. In mathematics it seems that early competence is crucial to later success, yet teachers are reluctant to report to parents that their child is having difficulties (Wylie & Smith, 1995).

Hughes (1981) found a strong correlation between socio-economic background and mathematics achievement (with middle class children as young as three performing as well as working class children a year older). In New Zealand Young-Loveridge (1989c) used case studies to more carefully examine the differences between high and low scorers. She found that irrespective of socio-economic background, or mothers' educational levels, children who scored highly came from home environments where a parent (or another adult) had confidently set out to teach their children counting skills and used counting in a meaningful way (eg in card games) with their children. Families of the low-scoring children were *clearly trying to do their best for their*

*children and had a strong orientation towards literacy. However they did not have a corresponding orientation towards numeracy (p.55-56).*

The TIMSS study (Garden, 1997, p.250), commenting on New Zealand children's commendable performance on international assessments of reading literacy and comprehension, also notes an emphasis on reading:

*Mean time allocated for reading instruction added to that for writing, literature, and other language activities takes up more than 50 percent of the school week. In comparison mathematics lessons, on average, take up 14 percent and science lessons about half of that. While teaching reading and writing are of prime concern at this level, the imbalance of time allocations seems to be greater than desirable if achievement in mathematics and science is to be improved.*

Visser and Walker (1993) recommended an increased emphasis on numeracy after reviewing the implementation of BSM in New Zealand. They found that parents' knowledge of mathematics was very low. When asked to comment on whether they were happy with what their child was learning in mathematics after two years at school, 29% of the parents felt that they did not have sufficient knowledge to say whether they were happy or not (compared with only 0.6% who felt the same about their child's reading).

Visser and Walker's (1993) reported examples of mathematics activities show little familiarity with the emphasis of the school mathematics curriculum. Parents who "write equations", or "do addition and subtraction" at home are probably unaware of the BSM scheme's delayed introduction of formal arithmetic skills. It is most likely that some of the 62% of parents who said they were happy with what their child was learning in mathematics had little awareness of the classroom programme. In fact nearly two thirds of the parents said they did not know enough about the BSM resource to comment on it. The researchers concluded that parents needed assistance to become better informed about mathematics and suggested a newsletter. This comment is echoed in the recommendations of the most recent New Zealand research into parental involvement in mathematics programmes, the PERM report: *A good*



*starting point is to send home information about class programme and suggest ways parents can support the learning* (Cooper, 1996, p.29).

### **Making mathematics visible**

Compared to reading, mathematics suffers from a lack of visibility in the home. The mathematics in normal family activities may be so well embedded that parents and children alike do not recognise its presence. When Visser and Walker (1993) asked parents about their involvement in their children's mathematics a third said they helped with homework<sup>4</sup> and a further 21 % identified mathematical activities that they did at home with their children. Respondents mentioned mathematics-based board games, computer games and puzzles in addition to formal written mathematics homework-type activities. Parents spontaneously mentioned specific mathematical activities rather than the mathematics that is embedded in daily life. For instance, time measurement could include reading the time from clocks, using the calendar to look forward to key events, talking about the days of the week or months of the year, setting the timer on the microwave, allowing children to choose their own TV programmes within a set time limitation, talking about who is faster or slower at completing an activity and so on. In the junior primary school the curriculum for mathematics covers a wide range of contextualized activities (Ministry of Education, 1992) but parents many still see junior mathematics as arithmetic (Visser & Walker, 1993).

Carr (1992) calls for the principle of "reading for meaning" to be extended to "mathematics for meaning". She argues that early mathematics develops within particular contexts with a specific social purpose and educators need to take a closer look at "purposeful mathematics". One such programme for parental involvement that specifically included aspects of "mathematics for meaning" was carried out in England (Dye, 1989). Mathematics skills were assessed within a comprehensive

---

<sup>4</sup> Some 7% of the respondents also pointed out that mathematics homework is seldom given at this junior primary level (Visser and Walker, 1993).



programme which included: parent meetings at school, visitor input to the class, and parent and child activities outside the school in a wide range of subject areas. A group with parental involvement made significantly greater gains on all mathematical assessments. Children showed understanding of a wide range of mathematical ideas and a greater awareness of the uses of mathematics in everyday life. It is postulated that these gains could have long term consequences. *The parents enjoyed these activities ... Some parents were like those mentioned in the Cockcroft Report (1982) who had not enjoyed mathematics at school themselves, so were pleased to help their child to a happy beginning* (Dye, 1989, p.26).

Another mathematics programme that seeks to reach out to parents is Family Maths. Originating in America, Family Maths was introduced in New Zealand in 1987. The aims of Family Maths include:

- *to maximise the benefits of the family unit as a base for learning,*
- *to enable children and parents to achieve a better common understanding of mathematics,*
- *to improve attitudes towards mathematics by demonstrating that learning maths can be interesting and fun ...* (Cooper, 1997, p.4)

Schools participate in the Family Maths programme by running a series of workshops (usually in the evening) for parents and children to attend together. The format can vary but usually a number of “fun” mathematical activities and games are played. There may also be some explanation of how these activities fit into the mathematics curriculum. Family Maths has now been developed in many countries and has been shown to dramatically change parental perceptions regarding the nature of mathematics.

*Most parents interviewed regarded mathematics as a very difficult study made up of drill, practice and memorization. After attending 12-16 hours of FAMILY MATH classes parents perceptions changed.*

*... parents were surprised that the classes were not only interesting but fun ... they were surprised at the learning that took place during the cooperative activities and games ... [and] that problems can be approached in a variety of ways rather than in just one correct way.* (Ernest, 1996, p.794)

Homework is a key focus for parent contact. It has been shown to play an important role in children's school achievement (Coleman & Hoffer, 1987; Keith, Reimers, Fehrmann, Pottebaum & Aubery, 1986). Parents report considerable concern about children's mathematics homework and interest in assisting them as much as possible (Pratt, Green, MacVicar & Bountrogianni, 1992). The IMPACT programme, which is used throughout Britain, is similar to Family Maths in that it seeks to portray mathematics as a family activity. It differs in that it uses mathematics homework as the vehicle for reaching parents. Each week joint mathematics tasks are sent home and the results are followed up in the classroom as part of the normal mathematics programme (as opposed to the Family Maths variety of fun activities that may never be repeated in the classroom). Merttens and Vass (1990) report that IMPACT is very successful; parent response rates are consistently high (and not affected by socio-economic level) and teachers are enthusiastic about the results, however detailed data concerning its long term effects is lacking (Ernest, 1996).

## **2.7 What Do Parents Want?**

Increased parental involvement begins with information flow between parents and communities. Ramsay et al. (1989, p.3-4) found that *even in districts where a very high communication flow existed, parents asked for more information ... [and] that the schools and teachers who communicated well with parents have the appreciation of those parents.*

In a survey of 3700 teachers and over 1200 parents of children in American classes from grade one to five, Epstein (1987, p.124) found that large numbers of parents did not benefit from traditional communications from the school or traditional invitations to help in the classroom. *More than one-third of the parents had no conference with the teacher during the year. Almost two-thirds never talked with a teacher by phone.* Traditionally parental involvement in schools has also meant parents assisting in the classroom, on class trips, fundraising and so on but Epstein

found that only 4% of parents were highly active in this way. *Over 70% of the parents in our study were never involved in any activities assisting the teacher or staff at the school* (p.125). In contrast, almost all parents were involved with learning activities at home:

*More than 85% of the parents spent 15 minutes or more helping their child at home when asked to do so by the teacher. The parents said that they could spend more time (over 40 minutes on the average) if they were told how to help. Most parents (over 90%) became involved with homework activities once in a while, but fewer than 25% received frequent and systematic requests and directions from teachers to assist children with specific skills.* (p.127)

Mellor & Hayden (1981) reported that the most preferred method of finding out what is happening at school was by weekly circular. Cattermole & Robinson (1985) found that school newsletters, information received *directly from your child* and *your child's report card* were identified by parents as the preferred modes of receiving information from the school. Parents wanted to be informed on discipline, homework and curriculum (in order of preference). In New Zealand, Cooper et al. (1996) found that parents wanted to know about classroom mathematics programmes. Parents' main concerns were to understand what their child was learning and how they could help. Overall the parents' favoured method of receiving information was a regular written newsletter.

## **2.8 Summary**

There is strong evidence parental involvement benefits children, parents and teachers. Mathematics is an area that suffers from the same myth that literacy did thirty years ago: that parents are best to “leave teaching to the professionals”; yet there is no tenable foundation for this belief. Parents are effective tutors; and when it comes to teaching their own child, they have many advantages that teachers lack. The difficulty for many parents seeking to help their child with mathematics, is that they currently have little knowledge of the curriculum objectives or the classroom activities.

Parents like to receive information from the school, preferably via personal contact, or in the form of a regular newsletter. In New Zealand the demands on teachers’ time are heavy and there is no mandatory time allowance given for parent contact. If parental involvement is to be encouraged, it will have to be easy for teachers to implement. For this reason a newsletter is the logical method of communication. Other New Zealand researchers have recommended a mathematics newsletter.

The content of the newsletter should seek to maximise the advantages that parents already have over teachers: the ability to embed mathematics in a realistic context, and the ability to individualise instruction through shared memories and experiences within a wide range of varied activities. The tone of the newsletter must recognise that one mathematics activity will not be suitable or appropriate for all families or children. The literature suggests that parents will be appreciative of a school that is making an effort to communicate with them about their child’s mathematics.

## CHAPTER 3

### METHODOLOGY

#### 3.1 Introduction

Many small scale programmes designed to encourage parental involvement are being developed and used by individual teachers (Ford & Crew, 1991; Franklin & Krebill, 1993; Orman, 1993). Most rely on anecdotal feedback data for assessment of effectiveness (Goldstein & Campbell, 1991; O'Connell, 1992). Bastiani (1988) contends that it is difficult to assess parent involvement programmes on narrow academic criteria. Part of the difficulty for researchers wishing to evaluate parental involvement practices arises from the complexity of the situation and the large number of different groups of participants who are affected by it.

*"We think our Parents' Evenings work very well. We generally get an 85% turnout..."*

*(Headteacher)*

*"A load of rubbish ... a total waste of time."*

*(A Parent. One of the 85 percent).*

*(Bastiani, 1988, p.211)*

Often evaluation is undertaken by teachers (Cooper et al., 1996) but Bastiani (1988) argues that it is also important to evaluate the extent to which needs and wishes of parents and pupils are being met. This includes special needs of particular groups of parents (eg ethnic minorities, one parent families, families with children with disabilities).

Although it is possible to use quantitative methods to research the effectiveness of a mathematics newsletter, such an approach would oversimplify the situation and neglect the myriad of other implications that arise from the use of newsletters. *Qualitative research has made educators realise that reality should never be taken for*

*granted, given that attention must be paid to the multiple realities and socially constructed meanings that exist within every social context* (Burns, 1994, p.12).

The decision to use qualitative methods is not without its costs. Problems of ensuring adequate validity and reliability are a major concern for all researchers; those using qualitative methods cannot match their counterparts using quantitative research methods for scientific rigour. However, Burns (1994, p.13) contends that *the richness, individuality and subjective nature of a participant's perspective and understanding is not amenable to the usual scientific criteria.*

In this study the researcher aimed to capture the “richness” of parent and teacher opinions about the newsletters while investigating the effectiveness of newsletters as a means of improving children's mathematics. An action research design was selected to allow the research to change focus and more fully explore subtleties and complexities of the reactions to the newsletter as directed by partial emergent findings.

Elliot (1991, p.69) defines action research as a *study of a social situation with a view to improving the quality of action within it.* Burns (1994, p.294) amplifies Elliot's definition with his explanation that action research is a total process *in which a 'problem situation' is diagnosed, remedial action planned and implemented, and its effects monitored, ... It is both an approach to problem solving and a problem-solving process.* As such, educational action research begins with the practical questions that arise from everyday classroom activity and it is carried out by the people concerned with the situation that is being researched. In this study action research provided a framework to address the researcher's concern with the lack of school-to-home communication about mathematics in the junior school.

The term action research was used by Lewin (1946) to describe the cyclic model of research where those directly affected have responsibility for deciding future action. There are four fundamental ‘moments’ of the action research cycle:



- to develop a plan of action to improve what is already happening,
- to act to implement the plan,
- to observe the effects of action in the context in which it occurs, and
- to reflect on those effects as a basis for further planning, subsequent action and so on, through a succession of cycles.

(Kemmis & McTaggart, 1982, p.7)

Elliot (1991) revises Lewin's model to allow the general idea of the research to shift and to include reconnaissance at the start of each *spiral* of activities rather than only at the beginning. Elliot also requires action researchers to acknowledge that implementation is not always straight-forward and cautions that the research should not proceed to evaluation until the researcher has monitored the extent to which the action has been implemented.

### **3.2 The Action Research Plan**

The basic outline for action research as given by Kemmis and McTaggart (1982, p.8) is included in figure one (below) and a summary of each cycle undertaken in this study is provided in figures two, three and four respectively.

**Figure 1: Diagram of the Action Research Spiral**

(Kemmis & McTaggart, 1982, p.8)

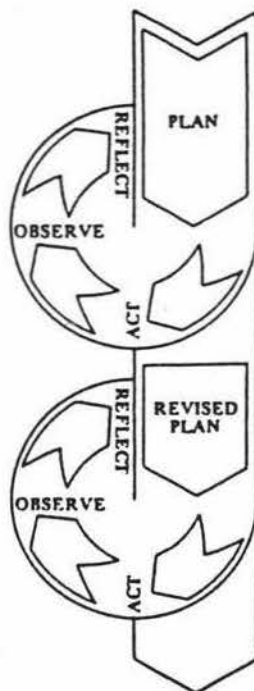
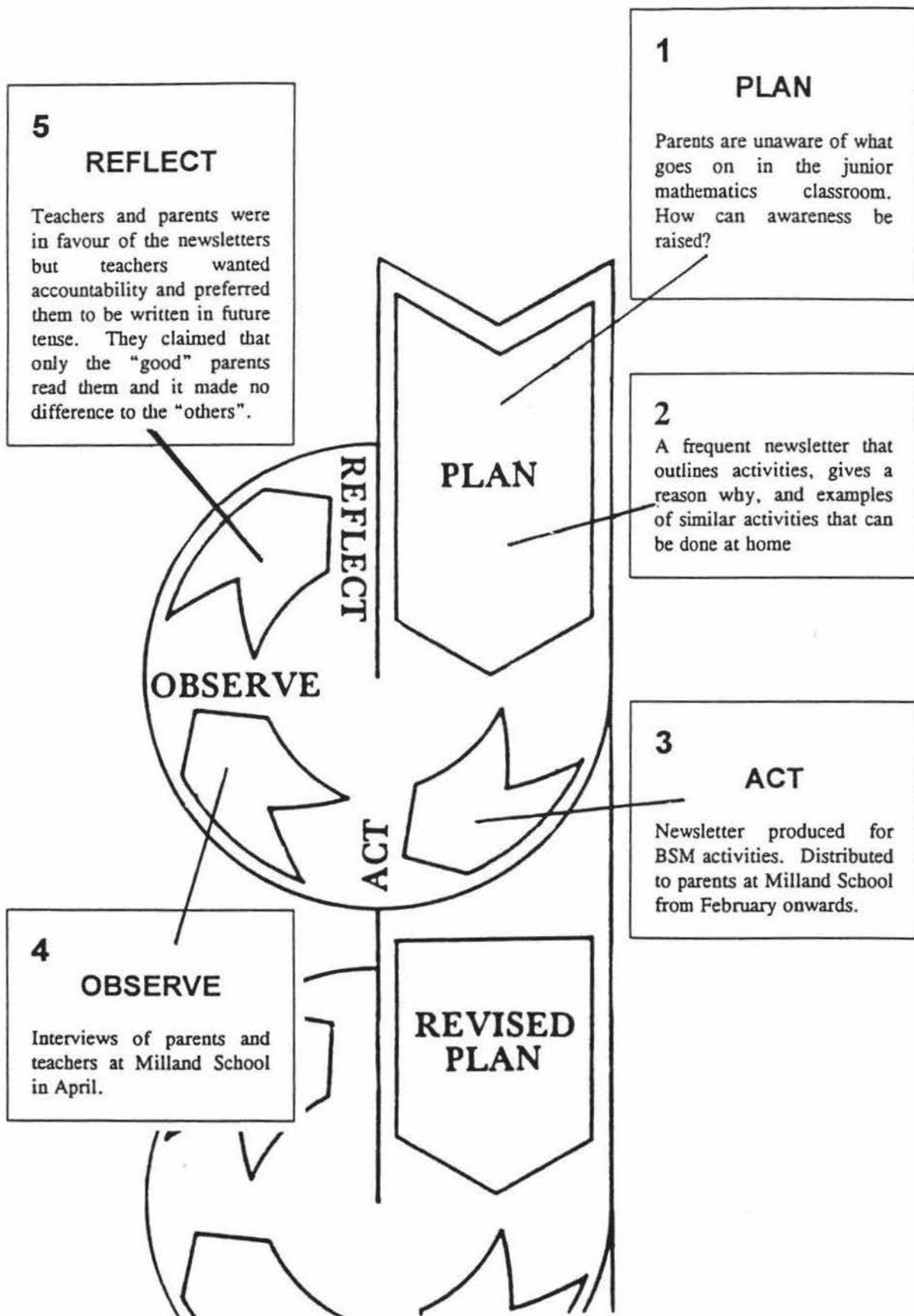


Figure 2: Diagram of the Action Research Cycle for this Study - Cycle 1



**Figure 3: Diagram of the Action Research Cycle for this Study - Cycle 2**

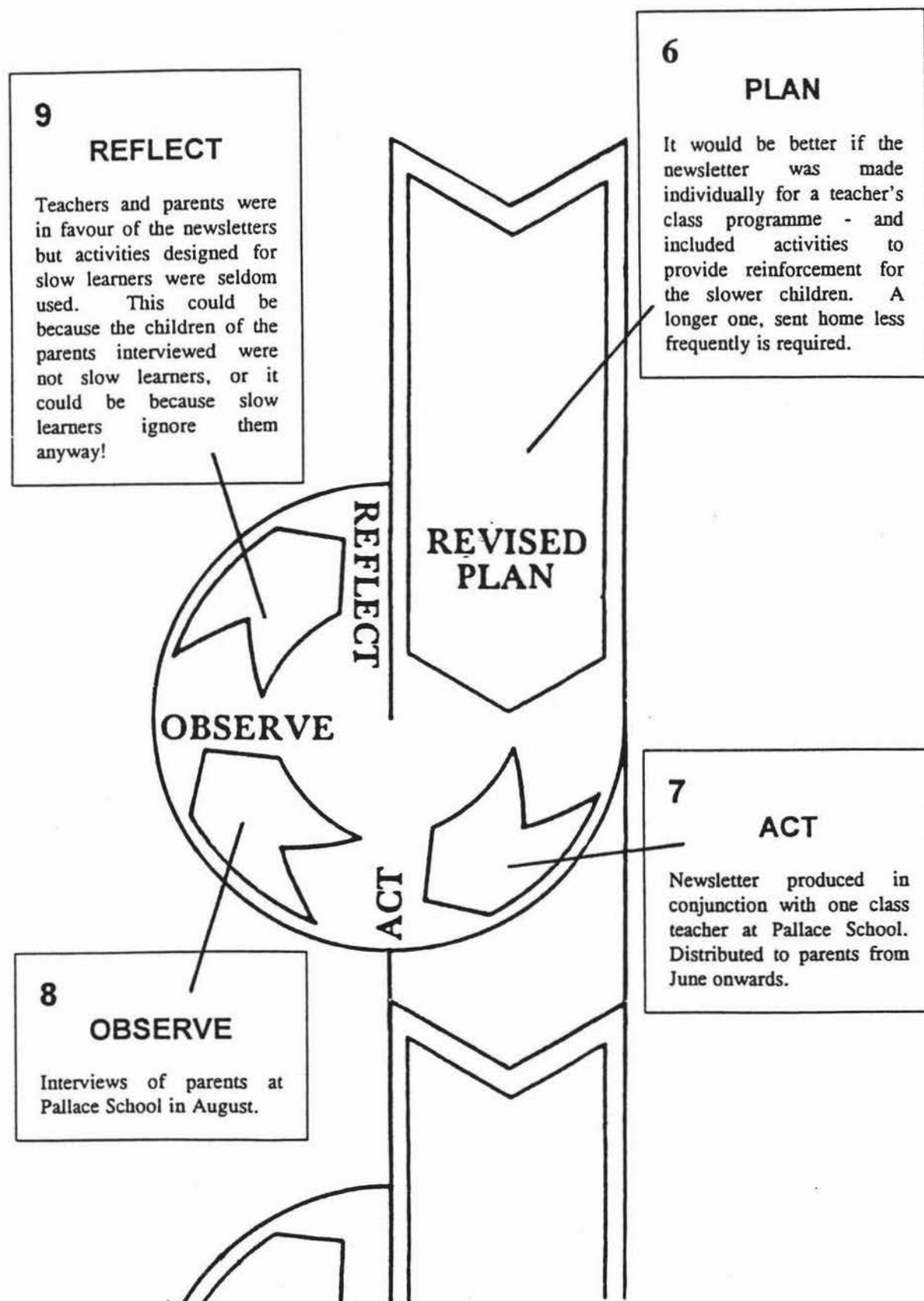
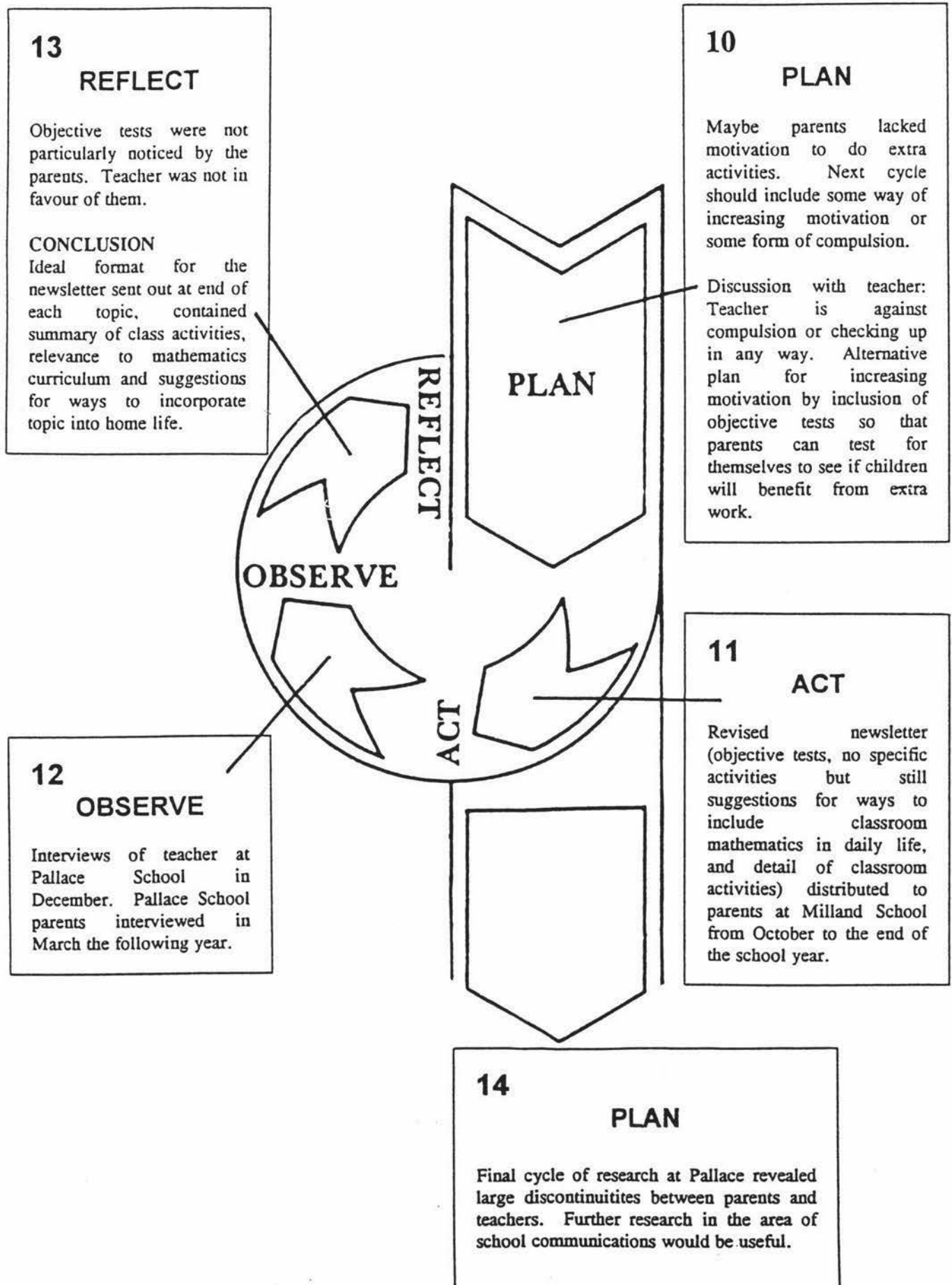


Figure 4: Diagram of the Action Research Cycle for this Study - Cycle 3



As predicted by Elliot (1991), the focus did shift during the study as it became obvious that parents wished to express their feelings on general issues of home-school communication. Reconnaissance was carried out at the start of each spiral, often in negotiations about the proposed implementation of the next cycle. For instance, after the second cycle the researcher wished to trial some sort of compulsory feedback (similar to a reading folder that parents sign and write comments in) but the teacher would not support this. An alternative plan was agreed upon after discussion of the teacher's personal view, the school policy on homework and the rationale behind the policy. Objective tests were added to the newsletter format to enable parents to make informed decisions about whether their children would benefit from the activities presented. Sample newsletters were produced and critiqued by the teacher before the action phase of the third cycle could begin.

### **3.3 The Setting**

This research was carried out in two Primary Schools over the 1996 school year with a follow up interview in one school in 1997. Five classrooms were involved in the initial research at Milland School before the study focused on one classroom at Pallace School.

Milland School is a large Primary School (roll approx 500, decile eight) located in a military housing area. Five teachers used the BSM resource for their junior mathematics programme. Two classes were new entrants, one was Year 1, and two Year 1/2 composites. All agreed to participate in the study by distributing newsletters to the children, but subsequently only three teachers made themselves available for interviews.

Pallace School is a smaller primary school (roll approximately 200) in Palmerston North. Its decile ranking was revised from six to eight while the study was being conducted. In consultation with the Principal, one classroom (a Y2/3 composite) was selected for the research.

### **3.4 Ethical Considerations**

In the first instance permission to undertake the study was obtained from the Principal and the Board of Trustees for both Milland and Pallace Schools. At Milland one teacher known to the researcher was asked to participate. Her enthusiasm led to the other junior school teachers wanting to be involved. At Pallace the Principal recommended the teacher who participated. All teachers were given an information sheet and signed consent forms.

All students in participating classes received Maths News throughout the study. Children were never directly observed or questioned by the researcher. Questionnaires which included brief information about the study were distributed to all children for their families. See Appendix 1 for a copy of the questionnaire. The questionnaires invited parents to make themselves available for interviews. Parents who responded positively were given a more detailed information sheet and then they signed consent forms before the interviews began.

Interviews were taped and transcribed by the researcher. Security and confidentiality of records were maintained. Participants were assured of anonymity in the written research report and were given the opportunity to speak “off the record” if they preferred.

### **3.5 The Newsletters**

#### **Cycle one newsletter**

The researcher produced newsletters (A5 size) which matched the activities listed in the BSM scheme (Department of Education, 1985, 1992). Samples are included in Appendix 2. The basic format was: a description of the class activities, a comment on how the activities contribute to mathematical understanding, and a list of suggested activities that may be undertaken at home to support the classroom learning. The tone was friendly; the aim being to inform parents without directing



them. Each newsletter included a range of suggestions but parents' own ability to choose appropriate activities was also endorsed. Figure 5 shows the key words (common to each newsletter) in bold:

**Figure 5: Cycle One Basic Newsletter Format**  
(with examples from BSM Cycle Two, Module One, Activities 1,2 and 3)

Maths News
<p><b>This week we have been ....</b> (<i>eg matching groups of items</i>) At this point any specific vocabulary is explained and sometimes the reason why this topic is important is included.</p>
<p><b>For instance we ...</b> (<i>eg looked at 6 cups and 8 saucers and found that we needed more cups</i>) A list of specific activities carried out in the classroom as detailed in the BSM programme.</p>
<p><b>If you would like to support our classroom mathematics with activities at home you could ...</b> (<i>eg look for examples of matched items and comment on them</i>) General description of the topic being covered in class.</p>
<p><b>You will probably have better ideas but to help you get started we've made this list of items we thought of ...</b> (<i>eg going swimming: do we have enough towels for everyone?</i>) At least four different suggestions to illustrate a variety ways of embedding the mathematics in normal household activities)</p>

Newsletters were produced to cover all the activities in Modules One and Three from Cycle Two to Cycle Eight. Where possible the newsletters were designed to group together two to four activities with similar objectives (approximately one week's work) but there was wide variation, as shown in the Module One newsletter coverage outlined in Table 1.

**TABLE 1: Newsletter Coverage of Module One (BSM Programme)**  
(each row in the table represents one newsletter)

Cycle	Activities	Comment
2	1, 2, 3	1-1 matching
2	8, 9, 10	long, longer, longest, tall, taller, tallest
3	2, 3, 5, 6	counting to 9, enumerating to 4
3	9, 10, 11	same/not same - length, height, weight
4	3, 4, 5	enumerate to 5
4	1, 7, 8, 9	length, height, weight including shorter, lighter
4	6	study of two
5	1, 2	relationships - pictographs
5	6	numerals, numbers and number words
5	3, 4, 5, 8	counting to 30, enumerate to 7
5	7	study of 4
6	1, 2	relationships - piles and pictographs
6	5, 6, 7, 8	rote counting to 20 backwards, six study
7	1, 2, 3	writing numerals
7	5, 6	study of 8
8	1, 2	relationships "is wearing"
8	4	counting to 100, what comes after, before <, =, > introduced

In consultation with the teachers, it was agreed that a copy of each newsletter would be kept with the activities, so that when the last activity relating to the newsletter was reached, the teacher would photocopy the newsletter and send it home with the group of children. As all five teachers taught mathematics in three ability groupings, the newsletters were not distributed to the whole class on the same day nor on a regular schedule. Children were given newsletters as they progressed through the work; possibly two in a week for some groups.

As part of the evaluation procedure, teachers were interviewed in April. The feedback from this is reported in Chapter Four. Parents who agreed were interviewed in May, after receiving the questionnaire in April. Results are detailed in Chapter Five.

### **Cycle two newsletters**

On the basis of the feedback from teachers and parents the focus shifted to a single class for the second cycle of the study. In this cycle the teacher, Sally, worked more closely with the researcher in the production of each newsletter. At the beginning of each topic (based on the Waikato scheme [Wright, Tichbon & Shephard, 1994]) Sally would give a copy of the objectives to the researcher. A draft copy of the newsletter would be produced by the researcher and evaluated by Sally. Only one copy was accepted without revision. Sally remained highly motivated throughout the study, checking the newsletters closely for relevance to the topic and nuance.

Appendix 3 contains samples of the cycle two newsletters. The friendly tone was retained but the newsletter was lengthened to include the specific objectives for that topic. Each newsletter contained a section giving more detailed explanation about the classroom work: explanation of classroom equipment, procedures, philosophy or vocabulary. For example the newsletter which dealt with addition and subtraction of two digit numbers included an explanation of why and how children used an abacus or place value blocks as an aid in the classroom. In addition to the list of suggestions for parents to embed mathematics into normal routines (found in the cycle one format), each newsletter contained other suggestions for activities not normally carried out in the home. These were similar to tasks the child may try in the classroom but were included because a low child-to-adult ratio would greatly enhance their effectiveness; for example, specific card games, tangram puzzles or a measuring activity. Each newsletter was printed on both sides of an A4 sheet in a folded newsletter format.

Distribution of newsletters to children began at the start of Term 2 with the intention that they would be sent home at the start of the topic. Unfortunately this was not consistent. Sometimes there were delays in the preparation, so the newsletters were occasionally distributed during the topic. Distribution was irregular, approximately every three weeks. In August feedback was sought from the participating parents at Pallace School. Details of the questionnaire responses and interviews are discussed in Chapter Five and Six.

### **Cycle three newsletters**

Following the interviews the newsletter format was modified for a final cycle of newsletters. Samples are included in Appendix 4. These were distributed in the same Pallace classroom during October and November. The newsletters also stressed that distribution was at the **start** of the topic (and the researcher took care that this did happen). The overall “look” and tone of the newsletter was retained, but the section with specific activities to reinforce the classroom mathematics (that had been trialed in cycle two) was deleted. It was replaced with an objective test which parents could give their child to determine how well they had mastered the concepts. Figure 6 is an example; it is the test from the “problem solving” issue of Maths News. These tests were identical in difficulty and question format to those used by the teacher to pre- and post-test each topic.

In early December the Pallace School teacher was formally interviewed about the newsletters for the first time. Her comments from this interview and the second one conducted in March, are included with those of the Milland School teachers in Chapter Four. It was intended that participating parents at Pallace School would also be interviewed in December, but these interviews were delayed until March the following year<sup>1</sup>. The results of these interviews are discussed in Chapter Six.

---

<sup>1</sup> Interviews during the final week of the primary school year were delayed by the early arrival of the researcher’s fourth child!

**Figure 6: Sample Objective Test from Cycle Three Newsletter**  
(The topic for the newsletter was problem solving)

At the **END** of this unit your child will be tested with questions similar to those below. Most children will not be able to answer all the questions correctly but we hope that they will give each one a go. Beans, blocks, even calculators are great tools to use. Instead of answers some possible strategies for solving the problems are listed at the end of the test.

Please see \*\*\*\*\* if you are concerned or you have questions.

### SAMPLE TEST

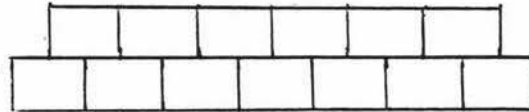
- (1) Mrs Sally lined up six children from Pallace School. To the first child she gave \$1, to the second child she gave \$2, the third got \$3 and so on until she gave the last one \$6.

How much money did she give out all together?

- (2) Mrs Sally is building a fence down one side of her paddock. The fenceposts need to be 1 metre apart and the side of the paddock is 6 metres long. How many fenceposts does she need?

- (3) Mrs Sally has built a tower out of matchboxes like this:

There are 7 matchboxes in the bottom row  
and she stopped with 3 matchboxes  
in the top row.



How many matchboxes did she use?

- (4) Mrs Sally lives on the "even" side of the street. The houses are numbered 2,4,6 etc. One day her neighbour said to Mrs Sally "Your house number is greater than mine. When you add your house number to my house number you get fourteen." What number is Mrs Sally's house?

- (5) Mrs Sally likes to decorate the corners of her pages when she writes letters. She draws a small ☺ in each corner of every page. If she wrote a letter with 5 pages how many ☺ would she have drawn?

- (6) For another letter she drew 40 ☺'s. How many pages had she written?

Find the pattern and draw in the next three figures

- (7) ☺☺☺☺ ☺☺☺☺ ☺☺☺☺ ☺☺ \_\_\_\_\_

- (8) 15, 13, 11, 9, \_\_\_\_, \_\_\_\_, \_\_\_\_

**Possible strategies:** (1) Act out the problem (2) Draw a picture (3) Make a model (4) Trial and error (5&6) Solve a simpler problem ie how many ☺ 's on one page? So how many on 5 pages? (7&8) Look for a pattern.

### **3.6 Data Collection**

Cohen and Manion (1984) define triangulation as the use of two or more methods of data collection. Triangulation is used in qualitative research to increase validity and reliability, and to provide as “rich” data as possible. The researcher interviewed both teachers and selected parents. All parents were asked to return questionnaires in an effort to further increase the validity of the study. In addition, “space triangulation” was incorporated through involvement of two schools with very different philosophies and histories of parental involvement. The researcher also attempted to collect data from copies of the school documents made available to parents; but subsequent document analysis proved to be of little practical import because there was no mention of mathematics in any written communications to parents; before or during the study<sup>2</sup>.

#### **Research Memos**

During the observation phases of the cycle the researcher must make decisions concerning the best techniques for data collection. Elliot (1991) recommends keeping a diary because research questions often evolve as the study progresses. This researcher did make brief notes during the course of the research; more particularly during the reflection phases, which served to clarify thoughts and reflect on past actions. The diary entries are more in line with the concept of an analytic memo (Elliot, 1991) and do not appear in this report on the research.

#### **Interviews**

In response to the primary research question, (Did the newsletters increase children’s ability to link home and school mathematics?) direct observation of children doing

---

<sup>2</sup> The study did appear to change this. At Milland School the teachers undertook to make changes to their “Beginning School” handbook to include mathematics (in line with the existing inclusion of reading, writing and ‘becoming independent’) after being interviewed by the researcher. At Pallace School, following a change in home-school policy, a general newsletter about classroom activities (which includes mathematics) is now distributed to parents twice a term.



their mathematics, either at home or at school may have been an appropriate method of gathering data. Ethical and practical constraints on this study prevented the researcher from having direct access to the children in the mathematics classroom or home. Instead, interviews were used to explore teachers' and parents' observations of the children. There were two main advantages accrued from the decision to use interviews rather than observation: Firstly, interviews uncovered a wide range of issues not originally considered by the researcher; particularly those of importance to parents. Secondly, interviews enabled the researcher to study changes in parents' perceptions rather than studying the children directly. Often benefits from interventions which aim to improve transfer or increase higher-order skills are not immediately visible. Young-Loveridge (1993, p.2) reported differential gains made for the home-based intervention in the EMI-5 study. *It was interesting to note that the effects of intervention for low SES children was not initially significant, but six months after the intervention sessions themselves had ceased, the effects became larger ... and reached statistical significance.* Data gathering by interviews allowed the researcher direct access to information on changes in parental perceptions caused by the newsletter. Presumably parental changes will eventually affect the children; but it is possible that classroom or home observation within the research time-frame would have revealed little effect, given that the desired changes are of a long term nature.

This study used semi-structured interviews to ensure that certain pre-set questions were asked while allowing informants freedom to digress. Semi-structured interviews allow the researcher to remain as open as possible to what information is relevant (Elliott, 1991). Every interview was tape recorded (with the permission of the informants) and notes were taken by the interviewer during the interview. The tapes were transcribed by the researcher, with the notes providing clarification when points were unclear (eg both parents spoke at once, one parent interjecting from another room which was not picked up by the tape recorder).

At the conclusion of the interview (when the tape recorder had been turned off) the interviewer would endeavour to spend some time talking in an unstructured way with

the parent about general school issues. This gave parents the opportunity to raise issues about their child's mathematics education that were important to them, without the possibly inhibiting presence of the tape recorder. Often this unstructured portion of the interview followed a line of thought not foreseen by the researcher. Cohen & Manion (1984) warn that with a semi- or unstructured interview there is a greater chance for the introduction of bias. This was especially so because usually the researcher recorded the comments of informants from memory. Although less rigorous, this technique is accepted because of the richness of the information that an experienced interviewer can gain (Minichiello, Aroni, Timewell & Alexander, 1990). To minimise the problems of bias, the researcher wrote an account of the non-taped portion immediately after each interview.

Measor (1985) emphasises the importance of building a positive relationship between participants. It is assumed that more information will be gained if the interviewer and the informant "hit it off" since the informant will talk more freely. Quantitative researchers may argue that researchers should be more wooden during interviews because reliability decreases when the interviewer allows personal feelings to show. But an interview where the interviewer gives the impression of homogeneity with the informant, provides a much greater amount of information, and this compensates for any decrease in the reliability (Cohen & Manion, 1984; Measor, 1985). Minichiello et al. (1990, p.245) suggest that establishing rapport can be done effectively *by matching the perceptual language, the images of the world, the speech patterns, pitch, tone, speed, the overall posture and the breathing patterns of the informant.*

The researcher's position as an outsider (neither the children's teacher nor a parent receiving newsletters) with links to both groups (a teaching background and a parent of children in other classes at the school) strengthened her ability to "hit it off" with the informants. By posing as a parent, or a teacher, the researcher was able to establish rapport with both groups of informants. However this may also have increased the subjectivity of the data obtained. Cohen and Manion (1994) propose a reciprocal relationship between reliability and validity in interviewing:

*In proportion to the extent to which 'reliability' is enhanced by rationalisation, 'validity' would decrease. .... the distinctively human element in the interview is necessary to its 'validity'. The more the interviewer becomes rational, calculating, and detached, the less likely the interview is to be perceived as a friendly transaction, and the more calculated the response also is likely to be. (Kitwood, 1977 cited in Cohen & Manion, 1994, p.282)*

In the report on the EMI-5 study of early mathematics intervention, Young-Loveridge (1993, p.62) notes that the interviews themselves may have affected the research outcomes. *It is interesting to speculate on what the effect of interviewing the parents might have been on the children's progress. Very few parents seemed to know that their children had been involved in a special programme until they met the interviewer.* Young-Loveridge reports that parents took pride in their child's selection for the programme and the certificate they received upon completion. *It is possible that this led to the child receiving further support and encouragement in mathematics. Certainly the interview probes seemed to give some parents ideas for activities that their children had not previously been involved in* (p.63). A similar "interview effect" may have influenced the results of this study.

Interviews also have a number of other disadvantages (Bell, 1993; Hopkins, 1993): They are subjective, time consuming and access to informants is always a major issue (Burgess, 1985; Delamont, 1992). This study was no exception; parents appeared reluctant to be interviewed about mathematics and this led to bias in the choice of informants. It is also important to remember that any data obtained from interviews is not necessarily reliable: just because the informant says something, it does not follow that it is necessarily true.

### Questionnaires

Questionnaires were used to provide an initial overview of reaction to the newsletter. A secondary, but important objective of the questionnaires was to invite respondents to make themselves available for interview. From approximately 100 families with children attending school in the five classes involved at Milland School, 11

questionnaires were returned: Five of these respondents agreed to be interviewed. At Pallace school 24 children received questionnaires, 11 were returned and six of these parents agreed to be interviewed. In effect, because the non-response rate was so high, the principle effect of the newsletter was to provide background information useful for probes in later interviews, rather than to gather quantitative data on the effectiveness of newsletters.

### **3.7 Reliability, Validity and Associated Limitations**

#### **Reliability and validity in action research**

Whereas the quality of quantitative research can be judged on its reliability and validity, Burns (1997, p.353) argues that these concepts need to be revised for action research. Since action research involves *a one-off intervention in a specific context. These results, findings and recommendations can only have relevance for that unique setting.* Burns argues further that replicability is doubtful and validity can only be judged on the extent to which *the author demonstrates that the changes indicated by the analysis of a problem situation constitute an improvement to it.* Merriam (1998) contends that while reliability is problematic in the social sciences, an equivalent but more appropriate concept for action research is “dependability” or “consistency” of the results. *The question then is not whether findings will be found again but whether the results are consistent with the data collected* (p.206, emphasis in original). She argues that the investigator can use triangulation, an audit trail and state their position to improve the dependability of the results.

On the subject of validity, Merriam (1998, p.218) states that internal validity is improved *by using triangulation, checking interpretations with individuals interviewed or observed, staying on-site over a period of time, asking peers to comment on emerging findings, involving participants in all phases of the research and clarifying researcher bias and assumptions.* As discussed earlier this study utilised triangulation. In addition, the unplanned delay with the final interviews at Pallace School (being conducted the following year) allowed the researcher to benefit

from the increased period of time. As planned, the second interview with the parents from Pallace also allowed checking of interpretations from transcripts of the first interview. Emergent findings were discussed with the research supervisor and interested colleagues. Participating teachers, particularly Sally at Pallace School, were thoroughly involved in the cycles of action research pertinent to them. However, confidentiality and anonymity prevented the researcher from directly discussing results from parents' interviews with the teacher(s) involved.

### **Researcher as an instrument**

In qualitative research the researcher is the instrument; it is always important to describe the basic assumptions and background of the researcher because they can impact upon the study (Merriam, 1998; Patton, 1980). This is particularly true of this study where the researcher conducted and interpreted the interviews. Spradley (1980) has cautioned that the more one knows about a cultural setting as an ordinary participant, the more difficult it is to study it. As both a parent and a teacher (although not actively either in relation to the study) the researcher was familiar with the situation. The best way to improve the reliability of qualitative research is for the researcher to give details of her background, experiences and possible expectations and the influences she brought to the research which may have impacted on the results.

Throughout this study the researcher has been employed at the secondary school level as a mathematics teacher. For 30 months before the study commenced the researcher worked as a newspaper correspondent; gaining experience in both conducting and reporting interviews.

When her eldest child started school in 1994 the researcher was dissatisfied with the amount of information she received about her daughter's progress in mathematics. She offered to be a "parent-help" in the classroom but was politely declined. In contrast to this, at the kindergarten level the researcher had run workshops for



parents (also attended by the kindergarten teachers) on “how to prepare your child to enjoy school mathematics”<sup>3</sup>.

The researcher brought the following assumptions to the research:

- most parents know little of what goes on during mathematics lessons in the junior primary school,
- all parents, even those with comparatively low levels of education, can help their children with mathematics at junior primary school level,
- the home environment offers more opportunities for mathematics learning in context than the classroom, and
- teachers are busy so that any method of improving communication will need to be “easy” for them to operate.

McNiff, Lomax and Whitehead (1996, p.9-10) note that action research is often undertaken by researchers who are *committed and often impassioned about what they are doing*. ... *Action researchers tend to be working intentionally towards the implementation of ideas that come from deep-seated values that motivate them to intervene*. Elliot (1991) also makes the distinction that, in contrast to traditional research, action research is about improving practice rather than producing knowledge. However, while an impassioned researcher may be an acceptable feature of action research, it is important that possible researcher bias is acknowledged.

### **Limitations due to sample selection**

A key area for concern in this study is the selection procedure of parents to be interviewed. Parlett & Hamilton (1972) contend that in any research non-respondents may be the most important people to contact and, as discussed in the literature review, non-respondents are of particular concern in studies of parental involvement. There is a danger of accepting positive comments from involved

---

<sup>3</sup> This is alluded to by Belle, one of the teachers at Milland School when she says that her class seemed to pick up one-to-one correspondence faster than previous years but she wasn't sure if this was due to the newsletter or the greater awareness of mathematics at kindergarten level.



parents as a justification for parental involvement. Contact with the hard-to-reach parents is desirable when judging the effectiveness of such a programme (Toomey, 1989).

The questionnaires invited parents to be interviewed, but poor response rates meant that the parents being interviewed, rather than being selected randomly, formed a self-selected sample. This may have led to a homogeneity, and will have decreased the validity of the study. Goetz & Le Compte (1984, p.66) argue that it is still valid to study a homogeneous sub-group within the population providing that the researcher reports

*the number of participants, the way they were selected, the size of the subset selected, and the characteristics of the original population. ... the investigator's initial task is to identify the populations or phenomena relevant to the group under examination and to the research focus being proposed or developed.*

### **3.8 Summary**

An action research methodology was adopted to explore the complexity of issues related to parental involvement in Junior School Mathematics. Three cycles were carried out in two schools, with the newsletter being modified as a result of both teacher and parent feedback. The primary limitation of the study was caused by the homogeneous, self-selected nature of the sample parents interviewed. The researcher's unique position, with affinity for both parents and teachers, enabled her to gain a richness of information from interviews. The results of these interviews are presented in the next three chapters.

## CHAPTER 4

### TEACHER RESPONSES

#### 4.1 Introduction

This chapter combines the information received from teachers in all three cycles of the action research. A total of four teachers made themselves available to be interviewed after having used the maths newsletters in their classroom. A summary of the teacher details is listed below:

Name	Class Level	Years Experience	School
Belle	New Entrant	12 years	Milland
Wilma	New Entrant	35 years	Milland
Hannah	Year 1	9 years fulltime 7 years part-time	Milland
Sally	Composite Y2/Y3	First year teacher	Pallace

#### Milland School responses

In general teachers were in favour of the newsletters<sup>1</sup>, although Milland teachers felt they needed more time to decide whether the newsletter had made a difference to the children's understanding of mathematics<sup>2</sup>. Wilma was sure that a particular child had benefited directly from the newsletters, but was more cautious about attributing

---

<sup>1</sup> The level of enthusiasm was demonstrated more clearly in their actions than their comments at the interview. For instance, at the end of 1995 draft copies of some of the Module One newsletters were sent to one teacher involved in the study for her to make comment on before the complete set was produced. A week later three of the Junior School teachers had already used the newsletters in their classroom. This was before the research was started!

<sup>2</sup> While the teachers were guarded in their comments on the effectiveness of the newsletters in terms of mathematics achievement, they were totally in favour of the newsletters as a means of communicating to parents what they were doing in the classroom. The newsletters produced for the study were gifted to the school and they continue to be used even now (although the three teachers interviewed have all since left).

other improvements to the newsletters. She noted that the children appeared to pick up one-to-one correspondence faster than previous years, but she was unable to decide if this was because of the newsletter.

*I know that the ones who've picked up sets and they're using good language, I don't know whether that's because of the newsletters or whether they have done it already at Kindy. I'd need a lot longer to actually figure that one out.*  
(Belle, Milland)

Hannah felt that the newsletters were being read and used by her “good” parents but ignored by the others. She saw this as being of little value since the “good” parents were doing mathematics with their children anyway. She felt parental input was very important, but what she wanted was a newsletter that encouraged the parents of the low achievers (whom she believed did not take an interest in their child’s schoolwork).

*You can always pick the ones that get it from parents because they're the ones that are way ahead - my 8-2 ones [the top mathematics group in the J2 class]. I know the parents have put a lot into them before they even came to school and continue to do so. And that's why they are way up on 8-2. I don't think the [early childhood] centre is anything to do with it.*  
(Hannah, Milland)

During the study Milland teachers chose appropriate newsletters from a large “bank” of pre-written newsletters matching specific BSM activities. At the conclusion of the trial they made the following suggestions for improving the newsletters:

1. Newsletter should be distributed before each topic and written from that perspective (eg We are going to be counting and matching cups and saucers). The pre-printed newsletters had caused problems when written in the past tense because sometimes teachers used different activities to illustrate the same points.
2. A homework component should be incorporated into the newsletter to increase accountability.
3. Take-home activities (such as games) with ‘bits’ were definitely not wanted: Pieces that could get lost or broken caused organisational difficulties. They preferred a worksheet format similar to the existing homework.

### Pallace School response

As a response to feedback from cycle one the Pallace newsletters were written in conjunction with the teacher's classroom programme. The teacher always checked the newsletters before they were reproduced for the class and often suggested changes, resulting in overall increased teacher satisfaction.

*I haven't found anything [wrong]. I guess one of the major disadvantages would be if I had to do it myself. If I had to find the time to sit down and produce a newsletter myself then I guess that would be a consideration. It would be my family time that I would be losing to do that.<sup>3</sup>*

(Sally, Pallace)

As a first year teacher, Sally was unable to decide objectively if the newsletter had improved the children's understanding of mathematics but she did report specific feedback from the parent teacher interviews: *they liked them because they had an idea of what their child was actually doing in maths and they could follow it.* There had been several other indications that parents had been reading the newsletter and using the ideas: Parents frequently asked her about specific skills that their children were having difficulty with, and children provided frequent feedback about the newsletter activities: *they used to say they had done these activities. Particularly the recipe one. A lot of children came and said they'd done that.* However, Sally was reluctant to say whether or not the newsletter had increased the incidence of parents talking about mathematics in context with their children.

*I definitely had parents come and see me and I would think it was probably activated by the newsletter because otherwise they wouldn't have known that you would expect them to be doing at that stage ...*

*I couldn't say what parents did at home. I think it provided the environment where they could do more. It made them realize that just the simple things that you are doing at home is how you consolidate what the child is learning at school.*

(Sally, Pallace)

---

<sup>3</sup> Time to produce the newsletter was also a limiting factor for the Milland teachers. Pressure was put on the researcher to produce newsletters for BSM Module 2, because teachers wanted newsletter coverage for the entire junior primary school mathematics. Teachers obviously valued the newsletters, but when the researcher would not comply with their repeated requests, the teachers did not produce their own newsletters because "they didn't have the time".

## **4.2 Newsletters Affected Reporting to Parents**

All the teachers felt that the newsletter had changed the way they discussed mathematics at parent interviews. Hannah explained that parents are not normally familiar with the junior school mathematics programmes:

*Parents think of maths as numbers and when they don't hit numbers straight away they get knocked. I regularly have parents say, "When are they going to have a book?" or "When are they going to start adding up?"*

Hannah noted parents showed more interest in mathematics: *I got 20 out of 24 and probably 50 percent of them asked about maths and that's unusual. They don't usually ask about maths.* However, on reflection, she was unsure as to whether this was related to the newsletters or the rescheduling of the parent interviews for the third week of the first term. It is possible that these interviews were more curriculum-content oriented because it was too soon for teachers to be able to talk about the progress of individual children.

Sally also reported that the information she gave to parents was more detailed and she attributed this directly to the newsletters. *I had the newsletters with me for the [report] evening and I would say, "This is what we have covered and ... your child is coping well with this, this and this and they are struggling in this area".*

### **Parental interest in individual progress reports**

As well as content coverage, parents wanted to find out about their children's progress, often in relation to other pupils.

BELLE: *Parents' [of new entrants] first question is "How are they going?" Without actually saying it; that is what they are wanting to know. Whether their child is smart, or dumb, or average, or whatever.*

INT: *Do you tell them?*

BELLE: *No. If there are glaring omissions then you tell them. Like if they need more help with their colours or if they need more help with their shapes then you tell them.*

SALLY *I never tell them where their child is in the class anyway.*

INT *Why?*

SALLY *Well, it is fine if your child is in the top quarter but if your child is not then you probably feel that they should be or whatever. I tell them if there is a problem that they are not coping with some objectives but you can't always assess a child and say they are going to be in a certain place ...*

Despite this reluctance to inform parents about class ranking all the teachers were comfortable with parents being aware of the *rate* of progress (for example, by noticing the level headings on the newsletters used at Milland). Teachers were used to parents following their child's reading progress by noticing when they had gone up a reading level. This was considered a positive aspect of the reading programme.

#### **4.3 Newsletters or Homework: Is compulsion beneficial?**

Compelling parents to read and act on the newsletter, either by having homework activities included or a feedback sheet, did not find favour with Sally. This was in contrast to her reading and spelling programmes where parents were asked to sign and complete a written record of what was done each night.

*You only get half of the class that are going to do it anyway so therefore it seems a bit of a waste of time ... although you do get the children who do it bringing it back and you do get a comment [ie feedback from parents]. I prefer to have [the parents] thinking "This is a good thing" rather than "Oh. Here comes another newsletter and I've got to do such and such."*

(Sally, Pallace)

In contrast, the Milland teachers suggested that the newsletter be incorporated into some form or worksheet so that they could see evidence that parents had "done maths" with their child.

*Something physical. If it was just 'count pegs with your child', [the parents] would just think "it's an easy part of homework and I haven't got enough time" and it would never eventuate.*

(Belle, Milland)

*Accountability is important. A worksheet is easiest. Parents are used to homework.*

(Wilma, Milland)



This difference was reflected in the different stances on homework of the two schools. At Milland, in addition to a daily reading book, all children are given a printed sheet of homework. This starts from their first day at school. In the Junior School the homework would be an activity similar to 'colour all the things that start with "b" in this picture'. In the Senior School a more comprehensive sheet is given out at the start of each week. Children must complete all of tasks listed by Friday; mathematics is seldom included: *The trouble with maths is that it takes up too much room on the worksheet* (Hannah, Milland).

In contrast Pallace School has an official "no homework" policy (although reading books were exempt). The rationale for this is that children would be tired and need time-out from school work at the end of the day if they had worked hard and been fully engaged during school-time. In the third cycle of newsletters the researcher wished to trial some form of compulsion, or at least a way of noting who was carrying out the activities. This did not find favour with Sally. After some discussion it was decided to include copies of the objective tests used by Sally to pre- and post-test each unit. The premise was that whether parents should complete suggested activities with their children depended on whether there was a need to do so. Including objective tests would enable parents to determine for themselves whether their children had a need to catch up or consolidate a particular topic. Sally was comfortable with the parents being given the tests to administer individually, because it did not allow parents to compare their child with others, but disliked them being identified as "tests". In the final interview she said that she preferred the format of the third cycle to the second cycle but wanted to change the section to "progress checks" or something similar, rather than using the word "test".

#### **4.4 Teacher's View of Parental Role**

When teachers were asked what they expected the parents to do for their children, the universal answer was "support". When asked to specify how a parent supported their child Sally answered:

*I like to see a role model of somebody who values education and values what the child does ... who knows what their child is doing at school, supports what's happening and keeps a constant contact with the teacher but not to the stage where they are pushing their child for recognition in all sorts of things. Sometimes you get a parent who gets a bit heavy and that is a bit hard to cope with at times. I think that a good parent is one that is in and out of the classroom. They pop in to see how things are going and their child welcomes them and comes to show them work that they've done.*

The amount of contact with parents was generally much lower at Milland and teachers classified the high contact parents as supportive or "good" parents. Hannah explained that this year most of the mothers worked, whereas in previous years the mothers had been mainly full-time homemakers. This resulted in a much smaller pool of "good parents" upon whom they could rely. If the belief that high contact parents support their child's education and, conversely, low contact parents do not, then the growing trend towards working mothers has important implications. Sally expressed personal concerns about the numbers of working mothers:

*You often find that children from a family who are working constantly or often not home (where the children go to daycare), that their children are quite often unsettled in class. I do find that they are not always the children that are easy to settle down and the children that are self motivated. A lot of them seem to have quite short concentration spans.*

Likewise, her evaluation of "unsupportive" parents was largely related to school contact:

*A parent who is maybe not quite so supportive educationally would be one that you never see at school so it is as if they don't value education, but you can't always blame the parents for that because they may be insecure with their own education and so therefore don't feel they can just pop in comfortably into the classroom. There are some who just don't really want to know and don't particularly care but I think on the whole most parents want whatever is best for their own children.*

### Teachers' Views on Parents - Stereotypes

Other parent behaviours that were identified by the teachers as being unhelpful to the child were direct teaching (eg teaching the child a particular algorithm for subtraction) and/or having unrealistic expectations. The parents with unrealistic expectations were broadly grouped into "over anxious parents" and "pushy parents".

Sally described a "pushy parent" as one who *doesn't listen to where you think the child is at and keeps on demanding that you provide for a need that you don't see as being terribly pressing*. She said that pushy parents were unable to see the child from the teacher's perspective.

*Some parents only ever see their own child (which is understandable) but you have to consider that there are 31 kids in the class and the teacher has to try and consider all of them. Some people have unrealistic expectations of their children and they don't really give the children time to consolidate the knowledge that they are learning.*

Time to consolidate was the key argument used by the teachers to refute parents desire to see their child moved through the curriculum at a faster rate. Sally, working at a school where parental expectations were high, was particularly aware of this pressure. She stressed that she could only counteract pushy parents by having assessment results that showed that the child needed to do more work at the level she was teaching.

*I've had a parent who has told me that their child is very advanced in maths but on my assessment I showed that, sure he was advanced at basic facts, but not when it came to things like problem solving or showing initiative ... I sat down and talked to his parents and showed them where and why I was doing that .... I suppose at this stage they're reasonably happy*

Over anxious parents were classified in a similar way; in that the problem resulted from their failure to see the big picture. Sally felt that too often they compared their child with an older brother or sister, or a friend with better mathematics results; when the comparison was not valid given the natural range of mathematics ability expected in any age group.

*As long as they are not putting pressure on the child to achieve and to be sort of up in the top group etc. To me that is a bit worrying. Children have to be able to be children as well.*

Over anxious parents would believe their child had a problem when they were actually performing at a level that the teacher was quite comfortable with. These parents caused teachers trouble when their anxiety was communicated to the child. Sally described the case history of one student, (Adele's history is detailed in Chapter Six) where she felt that the child was manipulating her over-anxious parents by saying she was "no good at maths" (when there was no problem) in order to gain more attention.

### **Parents as teachers**

Teachers perceived direct teaching as an activity best left to the professionals. They believed the parent was likely to cause damage by teaching the "wrong" method to the child. Yet the teachers were resigned to the fact that some parents would attempt to teach their children. The newsletter was seen as a way of minimising the damage caused by parents who "taught" their children by ensuring that parents were aware of the "correct" methods. This was one of the effects of the newsletter that the Milland teachers particularly liked. Wilma was especially pleased with the results achieved through using the newsletter with an identified "special needs" child. She gave the newsletters to the mother of the girl before the work was introduced to the class. The mother was able to teach the language and concepts in advance of the teacher. *Her child is about average. She probably wouldn't be if Mum wasn't doing the work beforehand. The Mum is really thrilled with them [the newsletters].*

Sally also recognised that parents had the opportunity to be effective teachers, but she was against them teaching work that had not been covered in class, or teaching in a different way from the classroom. When questioned about the ideal intervention for students who were falling behind in mathematics Sally replied: *One-to-one for each child with a trained teacher.... I'd prefer to see a trained teacher but sure, a teacher aide can help.*

She explained that it was important that the children were “taught” as opposed to given more examples and practice. Sally endorsed real life situations and mathematics in context as the optimal teaching situation, but said that it wasn’t always practical for her to teach like that in the classroom: *that sort of thing is just so time and people resource hungry. It is like teaching in context. I’d like to teach more in context but the planning is just so extreme and you’ve got to fit in everything else as well.* While Sally said that parents could be a valuable resource, her comments indicated that she saw their effectiveness as helpers being restricted to being present in the classroom.

*Parents are an ideal resource to do it [practice of skills in context] but we don’t use them because I think they are just too busy. It is just too hard. I’m sure that a lot of that is because parents are busy and they find it hard to find an extra hour to fit in there.* (Sally, Pallace)

When asked about parents helping in the classroom all the teachers were in favour of it - but cautiously pointed out that some parents were better helpers than others. It seemed that the key to being a successful parent help (from the teacher’s point of view) was to be willing to work with all the children in the classroom. “Difficult” parents were the ones that focussed exclusively on their own child. They were not welcomed in the classroom unless they were willing to help as directed.

#### **4.5 Summary**

After modification of the newsletter through each cycle, teachers were happy with the format and content of the newsletter. They reported that the newsletter appeared to increase interaction between home and school for mathematics. This was demonstrated in parent interviews, parental comments and children’s feedback. In terms of improvement to the children’s attitudes and understanding of mathematics the teachers felt positive, but empirical evidence was difficult to establish within the research time-frame. The overriding feeling of the teachers was that if the newsletters were available they continue to use them because of their positive effects for parents and children.

## CHAPTER 5

### PARENT RESPONSES

#### 5.1 The Questionnaires

In May (after six weeks of newsletters) an initial questionnaire was sent to parents of children at Milland School (Appendix A). The questionnaire was designed to probe gently and invite parents for a more in-depth face-to-face interview. Approximately 100 families received the questionnaires but only 11 parents returned them; five of these agreed to be interviewed. In each case the mother filled in the questionnaire and was the only parent present in the interview. The location of Milland (in a military camp) led to a similarity in the socio-economic status of all respondents. Table 2 details the questionnaire responses.

The second questionnaire was distributed to the children in a classroom from Pallace School. Eleven forms were returned from the Year 2/3 composite class of 24 students. Of these six agreed to be interviewed. Results of the questionnaire are detailed in Table 3.

The questionnaire elicited a positive response from both schools. When asked "What was your reaction to the Maths News?", 73% of the respondents reported that they *really liked them* and the remaining 27% also liked them but *with some reservations*. The reservations of four parents followed up in interviews included: the amount of reading required (wanted more pictures and/or shorter newsletters); the information was largely known (by parents who were educational professionals); and samples of individual children's work would be more helpful.



TABLE 2: Questionnaire Responses from Milland School

	How many received?	What was your reaction to them?	Did you try any of the suggested activities?	Did the Maths News increase your awareness of school mathematics?	Should they continue?	Class
SB, (J2) male	1 or 2	Really liked them	Yes, tried one or more	We hadn't realised what was going on before the newsletters	Don't feel strongly	Rm 25
EO, (NE) female	3-5	Really liked them	Yes, tried one or more	A little bit - but we already knew most of what we read	Yes	Rm 21
MA, (J2) female	3-5	Liked them with some reservations	Yes, tried one or more	A little bit - but we already knew most of what we read	Yes	Rm 25
MR, (NE) male	3-5	Really liked them	Yes, and made us some	Gave us information about what was being done each week	Yes	Rm 23
JA, (J2) female	1 or 2	Really liked them	Yes, tried one or more	We hadn't realised what was going on before the newsletters	Yes	Rm 25
MD, (J1) male	1 or 2	Really liked them	No but made up some of our own	We hadn't realised what was going on before the newsletters	Yes	Rm 24
DN,* (NE) male	3 - 5	Really liked them	Yes, tried one or more	No. Already familiar with school maths	Yes	Rm 23
RS,* (NE) female	3 - 5	Really liked them	Yes, tried one or more	A little bit but already knew most	Yes	Rm 23
LR,* (J2) female	1 or 2	Really liked them	Yes, tried one or more	Gave us info each week	Yes	Rm 25
SM,* (J2) male	1 or 2	Really liked them	Yes, tried one or more	Gave us info each week	Yes	Rm 25
NE,* (J2) female	1 or 2	Really liked them	Yes, and made up some	We hadn't realised what was going on before the newsletters	Yes	Rm 25

\* agreed to be interviewed

TABLE 3: Questionnaire Responses from Pallace School

	How many received?	What was your reaction to them?	Did you try any of the suggested activities?	Did the Maths News increase your awareness of school maths?	Would you like it to continue?
Grace‡	2	Liked them	Didn't do anything	We hadn't realised what was going on before the newsletters	Don't feel strongly
Rachel	2	Really liked them	Yes, and made up some of our own	We hadn't realised what was going on before the newsletters	Yes
Carey	3	Really liked them	Yes, tried one or more	We hadn't realised what was going on before the newsletters	Yes
Anon	3	Really liked them	Yes, tried one or more	Gave us information about what was being done each week	Yes
Helga*	3	Liked them with some reservations	No, but made up some of our own	We hadn't realised what was going on before the newsletters	Yes
Leah*	3	Liked them with some reservations	Didn't do anything from Maths News	We already knew most of what we read in newsletters	Don't feel strongly
Tristan*	4	Really liked them	Yes, and made up some of our own	Gave us information	Yes
Linda*	3	Liked them with some reservations	Yes, tried one or more	Gave us information	Yes
Jack*	3 or 4	Really liked them	Yes, tried one or more	Gave us information	Yes
Adele*	4	Liked them with some reservations	Yes, and made up some of our own	We already knew most of what we read in newsletters	Yes
Kimberley	3	Really liked them	Didn't do anything from Maths News	We already knew most of what we read in newsletters	Yes

\* agreed to be interviewed

‡(Grace's mother's added an extra comment detailed in Chapter Six)

Overall the parents were positive about the newsletters. When asked if the newsletters should continue, the response was a resounding *YES* (86%)<sup>1</sup>.

## **5.2 Interviews**

### **Milland School**

In the first cycle there were five parents who agreed to be interviewed. They all came from similar socio-economic backgrounds (three fathers in the defence service, two others working in defence support roles). Only one of the mothers worked part-time; one day a week teaching in a Principal Release position. The other mothers had no paid work. In each family the target child was the eldest and the only one at school.

### **Summary of parents interviewed at Milland School**

**Liz's** mother had received only three newsletters and "really liked them". They prompted her to ask about mathematics at the parent interview. Liz already knows her two-times-tables and is in the top group for mathematics in her J2 class. Her mother has consciously undertaken educational activities with her and her four-year-old sister; buying extra books and putting aside some time each day for "schoolwork" before they started school. Schooling ended for Liz's mother when she turned 15 and she says she wants her children to do better than she did. The teacher characterises Liz's mother as "high contact".

**Rebecca's** mother is also "high contact". She says that she left school as soon as she could and later regretted it. She is already teaching her new entrant child how to make equations using fridge magnet numbers and signs. She believes it is important

---

<sup>1</sup> At least one parent who did not respond to the questionnaire also liked getting the maths newsletters: The following year the Principal of Pallace School was visited by a parent demanding to know why she was no longer receiving a maths newsletter. Her child's new teacher had explained that he wouldn't be producing one but she wanted them to continue so she approached the Principal with a request for maths newsletters in all classrooms!

to support her children's schoolwork and expects to continue to help her children with schoolwork right up to high school. She thought that the Maths News would enable her to learn the new mathematics alongside her children so she would always understand what they were doing in school.

**Joe's** mother is already familiar with the Maths News content because she is a primary school teacher herself. She is working part-time and has three young children. She is aware that she *should be* drawing Joe's attention to mathematics in normal routines and found that the Maths News was a good reminder. It also helped her keep in touch with what Joe was doing in class. She suggested that more pictures and a more inviting format were needed to give the newsletter wider appeal. She liked the daily routine suggestions but thought that the specific activities seemed too much like what the teacher should be doing.

**Donald's** mother completed two years of a three year kindergarten training course before leaving to be a full-time mother. Donald in J2 is one of three children. She finds it difficult to get into the classroom because of her pre-school children. She said she was *totally unaware* of what mathematics Donald was doing, although she did know that it was not formal equations because she had purchased a book for him *to do at home* and he had not recognised the = symbol. This surprised her because she thought *they should have started by now*. Maths News gave her an insight into what was going on in the classroom and it also increased her curiosity: When would the children start real mathematics? How did the teacher cater for mixed abilities? She questioned the researcher but had not talked to the teacher about her concerns.

**Natasha's** mother does not visit the classroom very much. She completed school to form six and enjoyed most subjects - although she remembers that mathematics suddenly became very hard in the fifth form. Natasha's mother would not usually think of sitting down to do something "educational" with her three children although she spends a lot of time with them. She found the maths news very helpful and adapted suggested activities from each one to suit her children's interests.

Overall the parents interviewed were in favour of the newsletters. Joe's mother was the only one who suggested any changes. Table 4 summarises their interview responses.

### **Pallace School**

The second and third cycles were undertaken in one class at Pallace School. Six parents agreed to be interviewed. All were characterised by the teacher as "good" high-contact parents who could be relied upon to take an interest in their children's progress and be present at school functions on a regular basis. The class was a composite J2/J3; three of the respondent's children were from J2, three from J3. In contrast to Milland, only Tony and Jack were the eldest children in the family. These parents were all interviewed twice. Table 5 summarises the first interview.

### **Summary of families interviewed at Pallace School: J3 children**

**Helga's** mother found the Maths News reassuring because she had been worried that her children did not seem to be doing any mathematics at all. She compared the New Zealand system with what she would have expected in her home country, Germany, and felt that the children were slipping further and further behind. In Germany the children had brought their books home regularly and she had been able to follow progress - in NZ she had no idea what they were doing! Helga is the youngest of three children.

**Adele's** parents were both present. Her mother quickly said that Dad was the mathematician but she enjoyed being able to work with Adele on activities from the newsletter. Adele's mother felt that even without the Maths News she had a good idea of what was going on in the classroom. She was often in school and frequently talked about mathematics with Adele. At the time of the interview Adele was attending a local coaching school for help with mathematics. Adele's older brother had brought a similar mathematics newsletter home two years earlier and a copy remained on the kitchen noticeboard because Adele's mother had found it so useful.

TABLE 4: Interview Responses from Milland School

	<b>Liz</b>	<b>Rebecca</b>	<b>Joe</b>	<b>Donald</b>	<b>Natasha</b>
<b>What mathematics were you doing at home already?</b>	Books eg 4+1 with blank. Which is bigger? etc	Magnetic numbers on fridge, making equations	Similar activities to maths news	Maths books that he works on at home - writing numbers give stickers and prizes	Maybe doing maths but not seen as educational
<b>Were the newsletter suggestions things you were doing anyway?</b>	Yes	Ordinary things but you don't know what to do until you go in to school for parent help	Served as a reminder	No	Didn't realise it was educational - now actively seeking maths experiences
<b>Had you discussed maths with teacher</b>	No, not aware until news came home	No	No - because I already know he is OK.	No	No
<b>Will you use it for other children</b>	Already using it with 4 year old	Already using it now		Yes. Hannah listens now	Yes, using it now
<b>Did it increase anxiety?</b>	No, would see teacher	No, didn't have any difficulty		Made me wonder how they teach all levels.	No. Just realise I didn't know what they're doing.
<b>Difficulty level of newsletter</b>	Surprise - thought she'd be doing that anyway	Some children can't do things you take for granted		No idea - knew he wasn't doing 1+1	Some - oh she can do that easily, pretty simple
<b>News should keep on until? Start when?</b>	Don't know	Keep on to high school	To Std 4	Don't know	Should start J1 and keep going until they get maths homework.
<b>Is it putting the responsibility onto parents?</b>	Can't expect teacher to do it all	No, don't think the teacher can give what I can	Shouldn't have specific activities - otherwise parents doing teacher's job	No. I expect homework.	Teacher is still teaching - we're just checking for them.



TABLE 5: Interview Responses from Pallace School

	<b>Helga</b>	<b>Adele</b>	<b>Linda</b>	<b>Leah</b>	<b>Tony</b>	<b>Jack</b>
<b>Any info before?</b>	No, didn't talk about maths at interview	Yes, with older child - still kept. Info at intro evening if you turn up	No, only when big brother had to learn times-tables	No. At interview here's the book, she's fine	No, but talked about maths at parent interviews from NE onwards	Not about maths until J1. Newsletters encouraged us.
<b>Did you do specific activities?</b>	No	Yes	Yes	Ones that fitted in	Yes	Yes
<b>Did you incorporate activities?</b>	Yes	Yes	Yes	Already doing it	Yes, much more likely to do these - time a factor	Yes
<b>Were you doing it at home anyway</b>	Made me more aware you were doing something educational	Dad yes, Mum No (but Mum asked about problem solving)	Made you more aware - made us talk about it	Jogs your memory	Not new activities just encouraged us to talk about it a bit more	Fairly common sense sort of things. Good to have written. Talked about it more
<b>Before newsletters?</b>	Mathematical games	Kip McGrath, preschool books	Play games, brought books (+x)	Always done sums up to 10+10	Time, times-tables by chanting	Already counting to 20-30 before started school - drilled by parents
<b>Level surprising?</b>	Thought they doing kindergarten play - glad they do maths!	Already bringing extra work home	Thought times-tables much earlier	Thought it must apply to some one	Knew he was confident - Montessori background	As teacher aide amazed at range in the class
<b>Where in class is your child?</b>	Don't know, like to know if middle or bottom	Somewhere in the middle, not sure	Don't know	Don't know	Montessori gives good start in maths	Between two groups

TABLE 5 (cont): Interview Responses from Pallace School

	<b>Helga</b>	<b>Adele</b>	<b>Linda</b>	<b>Leah</b>	<b>Tony</b>	<b>Jack</b>
<b>Are you concerned about maths progress?</b>	Yes but the children aren't	Not a problem now. Child's comfort is best indicator	As long as they're happy	Not as long as she is doing well	No. He is happy but slow to finish work	Maths a breeze. It was confidence building for him.
<b>Newsletters increased anxiety?</b>	No - she had an answer	Only your own anxiety if you can't do them!	Aroused interest	No - important for parent to know early that help is needed	No - recognise two different levels in class	Parents have been concerned but not from newsletter
<b>Is it putting the responsibility onto parents?</b>	No. I wouldn't explain it properly anyway	No. Parents accept help from anyone	Partnership, same with reading	No, but there is some validity in that	No. Good that we could help in some way parents often feel pushed out	You take out of it what you want
<b>Parents role</b>	Support	Teaching, helping with times-tables, contextual	Direct teaching as required, help with rote learning tables	Give them environment that supports school	Support them and keep in contact with school	Give them 1-1 that the teacher can't
<b>Newsletter would be useful earlier?</b>	All the time	No. Would have increased anxiety - real fear that child is pressured	One at the beginning of teach year from 2nd year onwards - right up to std 4	Yes. General newsletter helpful. Later you'd see progression of maths	No, but good to carry on	Yes. Don't know what to expect when first start school
<b>Do you think there should be compulsion ?</b>	Only for children - should be given regular homework.	Could be - not necessary though.	No - so much for parents to do already	No - frustrating to think I had to sign	No, puts parents off - can't have him doing it all day long	No. Sometimes he's too tired after school.
<b>Did it increase guilt?</b>	No. Would like to be more involved.	No. Really like to keep in touch with school.	Not really. The tone of newsletter was supportive.	Something else I'm supposed to do - but at least it kept you up to date	Yes and no because at times .. but I knew that we were busy	No.

**Linda's** parents were both present. Mother said she had been put off the newsletter because there was too much reading (but had still tried specific activities, like the tangram, with the children). As a consequence of the newsletter Father had "taught" the concept of multiplication as repeated addition when they found Linda did not understand it. The parents had little previous knowledge of school mathematics (although Linda had an older brother) but were unconcerned as the children were happy. They suggested that the newsletter should be aimed at the children as opposed to the parents. They were disappointed to have a newsletter about things the children did not know (eg multiplication as repeated addition) because they felt that the children should be taught the subjects in class. They wanted children to be competent before the parents are informed.

#### **Summary of families interviewed at Pallace School: J2 children**

**Leah's** mother is a kindergarten teacher and she saw little personal value in the newsletter as it gave information that she already knew. While it made her more aware of mathematics, she found that she did not have time for specific activities. Additionally, she had concerns that a newsletter for parents was the thin end of the wedge when it comes to schools abdicating responsibility for teaching their pupils. She characterised Leah (her second child) as very bright and was unconcerned that the content of Maths News was well below her ability.

**Tony's** parents were also both in paid work and his mother said that time was a limiting factor in their involvement in Tony's mathematics. They appreciated the newsletter because it let them know what was going on in the classroom. They were worried, in general, about the pressure on Tony; being only six and a half in a composite class. Tony's mother felt that his Montessori pre-school training had been a big factor in his current success.

**Jack's** parents were both present but generally his mother spoke in the interview. She said she was responsible for his education. She is a teacher aide at the school and has occasionally worked in Jack's classroom. Both parents were concerned that Jack may have missed essential work by being accelerated into the composite class.

He oscillates between the middle and lowest mathematics groups and mother is very aware of his progress. Jack talks about his schoolwork a great deal with his mother.

### 5.3 Raising Awareness of Classroom Mathematics

When the interviewed parents were asked what they liked about the Maths News the responses varied but had a common theme. Some parents had no previous knowledge of the junior school mathematics curriculum and found the newsletters gave them a great deal of information: *I never thought of doing anything like that before. I mean I would have done it when I was at school but I certainly didn't think of doing it* (Donald's mother, Milland). Others were "doing that anyway" without realising their home activities supported the classroom mathematics.

*They were fairly common-sense sort of things that you would do, but it was good to have ideas written down. Especially mentioning cutting the toast different ways, ... just little things like that ... We would have talked about fractions but it made you talk about it even more. You realise the importance that they've got to get to know this and instead of just talking about it casually, you talk about it more often.* (Jack's mother, Pallace)

*.. things like bigger than, smaller than. You don't realize how much you talk to your children about maths until it is brought to your attention.... because I got the Maths News.* (Liz's mother, Milland)

In contrast, well-informed parents who had experience working in the education system, were confident that they knew about their children's mathematics progress. In these cases, parents felt the newsletter was valuable for letting them know the specific topics children were working on:

*Even for me it served as a reminder that every now and then these are the sort of things that I need to be talking about. Remembering when you go to the supermarket to talk about the money and how many and the sizes. It was a good reminder.* (Joe's mother, a teacher)

*And the helpful suggestions ... to know those sort of things [activities that support the classwork]. It jogs your memory to think about cutting the sandwiches in half because you know you probably do that. I know I cut them in half sometimes or quarters and triangles, but maybe I don't go over those concepts with them.* (Leah's mother, kindergarten teacher)

For four of the parents the content was surprising:

*Father: I thought they would have done some times-tables much earlier. When we were doing it there was none of this applied maths, which is certainly a lot easier to learn.*

*Mother: I thought that once you read [Maths News] you realised what they were learning was what we used to learn; but it was done in such a way that it was more enjoyable, rather than that constant repetitiveness and sort of "moan groan" times-tables being pumped into you. It is a lot more exciting. I mean homemade muesli bars! Just using the basic environment as part of your learning. ... For parents as well, you can make learning a lot more enjoyable than sort of sitting and constantly nagging at them or going over and over that concept of times-tables, so that for both parties it becomes no fun at all.* (Linda's parents, Pallace)

*I just didn't know because when I asked her at the very beginning she said "We are not doing any maths, any proper maths. We are just doing kindergarten play." So when I got the newsletters, that made me aware that they did some sort of maths. Even if at first she didn't realise it. It had a calming effect for myself.* (Helga's mother, Pallace)

Given that the respondents were the high-contact parents it can reasonably be presumed that other parents were even less aware of the classroom mathematics programme. This is supported by the written questionnaire results - for both schools 36% were ticked with the category "We hadn't realised what was going on before the newsletters".

#### **5.4 Age Coverage of Newsletters**

An additional bonus of the newsletter was the flow-on effect to younger siblings. Six of the parents said that the newsletters were proving useful for other children.

*You can teach them so easily if you know what it is they can't do. I was in class helping out and the children had to put pictures in order of size. It was amazing how many couldn't do it. And that is so easy to teach them if you know that they will be doing that at school. I'm keeping all these [newsletters] and I'll know what Jessie needs when she goes to school.*

(Rachael's mother, Milland)



*We are talking about things with [4-year-old sister]. She may not remember everything down to the last "T", but when she hears that word "fraction" or "quarter" or "third", she's going to think "Ah", and there's going to be an alarm bell that rings and she's going to recognise a lot more than he would have done.*

(Jack's mother, Pallace)

All of the interviewed parents wanted the newsletters to continue after this year. Two recalled past experiences of themselves as students bringing home mathematics in Secondary School and finding their parents unable to help them, because they were out-of-touch with the methods being used or the style of teaching.

*I have memories of my parents trying to do some of my mathematical problems at school and having these ridiculous arguments. "Oh you don't do it that way. Give me the pen. That's the old fashioned way. You should do it this way. And the answer's wrong" ... so in a lot of ways it actually helps with the communication and brings the parents up to a level where they're talking modern science and mathematics.*

(Adele's father, Pallace)

*If these continued right through their schooling you'd be keeping up with what they're doing. My Mum sent me down the road to a neighbour to get help with my maths. She couldn't help me once I got to College - just didn't even want to try. If we got these [newsletters] right through, then we'd be learning with our children and we'd never have that sort of problem.*

(Rachael's mother, Milland)

These two parents seemed to feel that it would be advantageous to be able to continue to help their children right up to Secondary School but felt that it would probably not be possible in mathematics unless they received support. This idea, that high school mathematics would be too difficult for parents, was shared by other parents.

*I have this feeling that [mathematics] does change. Whether it's by the time we get to [older sister in Year 6], or whether it's further on I'm not sure. I just have this sort of feeling that there's a rumour going around.*

(Leah's mother, Pallace)

*It could be worth doing right through to standard four actually. Because that is when the parents have the level of confusion over what methods are being taught, and if you could clarify that in some way it would be very good.*

(Joe's mother, Milland)



### **5.5 Individualising Activities and Providing Mathematics in Context**

The majority of parents who returned questionnaires said that they had either tried one or more of the activities or they had made up some of their own. Only three questionnaires (15%) said that they did not do anything from Maths News. At Milland the Maths News concentrated more on activities that were part of normal daily routines: It seems parents found this useful. All interviewed parents gave examples of including mathematical concepts or vocabulary in usual family activities. The following quotes from Natasha's mother demonstrate the way parents adapted activities to fit the personal interests of their children (including younger siblings).

Int: *Did you try the first one. About patterns?*

Mother: *Yeah. With cars. I did like ... we have a set way that the toys go away. So I was putting things up like two cars and then a puzzle and she carried it on. I said "Oh let's put them this way" and she followed my patterns.*

Int: *Newsletter number four was about counting to 100.*

Mother: *That's right. The kids were into the checkers and counters at that stage. We mucked around with the checkers. Groups and sets of them and that sort of stuff. And dominoes actually....*

*Distance. Yes. That was good actually. Cause [4-year-old brother] is right into dinosaurs at the moment and they say how many feet long they are. So we've been talking about how long it is, you know ... Telling him that the dinosaurs would be from our garage over to the school gate and how long that is ... And Daddy standing on top of Daddy standing on top of Daddy sort of thing to get the length and things. That sort of stuff. I keep meaning to tell her to measure it out to the letterbox but I forgot. [reference to a specific activity in the measurement newsletter] ...*

*Yeah, well the pegs idea was on the other one [pattern newsletter]. I thought "Oh, that's good" because the kids are always out there helping me do the washing. But then it rained for weeks on end and I haven't hung washing out for so the pegs haven't been seen.*

The willingness of parent to adapt content to their own child, the available resources and the environment was demonstrated by the range of strategies used by parents to teach mathematics: Natasha's mother talked about dinosaurs; Tony's parents counted deciduous trees in twos and fives; Jack's mother talked with her daughter about

cutting sandwiches into quarters and halves. This flexibility appeared to result from being aware of what was being studied in the classroom. Perhaps the best example was given by Linda's parents - and it related to homework rather than a direct activity in the Maths News. Linda had been slow finishing work so had brought home an activity sheet on Roman Numerals. Her father had "learnt roman numerals" as a child but her mother was unfamiliar with them. Discussion of their uses resulted in a "Family Roman Numeral Hunt" through the house; finding a watch with a roman numeral dial and a book that used them for chapter headings. They also spotted roman numerals screened on TV at the end of British programmes. Linda then gave her mother a formal lesson - and even devised a test which was sat (and passed) by both parents! The learning was twofold; not only did Linda's mother learn something new, but also Linda's experience of being the teacher has ensured that she will remember far more about roman numerals than would have been expected from the single classroom activity.

### **Mathematics in context most popular activities**

As detailed in Chapter 3, the Maths News trialed in the second cycle at Pallace contained two types of suggested activities; those that were part of normal routines; and activities specifically created to practise the mathematics done in class. Parents were first asked if they tried any of the specific activities. Many (73%) said they had; however all reported that they were more likely to talk about mathematics in daily routines. Talking more about fractions within usual daily routines was most commonly mentioned as an example of something that they had started doing after receiving the newsletter.

*It was just nice to know what the children were looking at at a particular time because they [the children] may have told us about it but it may not have been clear exactly what it was that they were getting at. [With the newsletters] you had it there in front of you and that was good. Especially I found with the fractions. That was an easy one to be thinking about all the time.*

Int: *The fractions newsletter was the first one?*

*Yes. We did a lot of fraction work. And our four year old as well. He was busy eating "one quarter of my toast". That was exactly what he said!*

(Jack's mother, Pallace)

Father: *Routine things are easy because it is just remembering to say it, but occasionally we'd do homework and it would be part of that. But you've got to actually sit down ... and it is the time ... It is the little things that became a habit.*

Int: *Would you have been doing that anyway?*

Mother: *Now we talked about it [mathematics]. It made you more aware of what you were doing. Normally you just have the shape in front of you but you wouldn't particularly notice anything about it.*

(Linda's parents, Pallace)

Adele's mother was the only parent who provided direct feedback on the transfer of classroom mathematics skills to the home environment. After the tape had been turned off in the second interview, she said that she had noticed that her children's mathematics competence in the classroom was not demonstrated in the home. She said that the children both knew their tables *and all that* but they seemed to lack common sense. They could not solve even very simple practical problems. She asked the interviewer why it was that neither of the children *can use the maths that I know they've learned?* This was surprising given her husband's comments (which she supported) during the first interview.

Mother: *We didn't try much baking. It was more with the questions. Like "Is that more than half?" or you know. It just makes your everyday thinking more aware. Like setting the table: "If two of us are going to be away tonight then how many knives will we need?" and things like that because when you are not mathematically minded it is helpful to have reminders about what you could be doing.*

Int: *Things you do anyway?*

Father: *Yes. We've just been having [a mathematics conversation] a few seconds ago. What is the temperature tomorrow? 16 degrees and I said to [Adele] that it is going to be a low of 9....So is that half of what is going to be the high or what? And she just sort of worked it out and in fact it is a bit more than half. That sort of thing we do all the time. But I must admit that this is only since ....*

Mother: *The newsletters sort of made us more aware..*

Father: *The newsletters probably started us off down that track.*

(Adele's parents, Pallace)

It would be expected that an increase in the number of mathematical conversations similar to those outlined above (due to the newsletter) would lead to an increased

ability to use mathematics outside the classroom. Yet this study found no direct evidence to support the view that the newsletter increased transfer of skills or improved flexibility in the children's use of mathematics. This does not mean it did not happen, or that it will not happen in the future; but when asked for anecdotal accounts of children using their school mathematics at home (or home mathematics at school) neither parents nor teachers could recall any. The questions Adele's mother asked, about her children's lack of common sense, emphasise the absence of evidence of improved skill transfer<sup>2</sup>.

### 5.6 Home Environment

It is important to realize that Maths News did not go home into a vacuum. Most of the interviewed parents reported earlier interest in their child's mathematics. Many had purchased books, magnetic numbers and mathematics games before the children had started school. With the older children all the parents had undertaken some form of mathematics coaching: two had bought books, two had mathematical games and three had questioned their children on basic facts.

*We play games and we bought those books. We bought them about the second term of school. I notice they do them in spits and spats. They might see them on the shelves, so they get them out and go at them for a couple of nights and then put them away again for a while.*

(Linda's mother, Pallace)

*Leah has always done sums. Since she started school. It used to be quite a game to her. She used to do adding. We quite often used to play a game with adding between the lower numbers. She could add up to about 10+10. She would just look up at the ceiling and the next minute the answer would pop out. It just used to be a bit of a game.* (Leah's mother, Pallace)

All parents reported that their children enjoyed doing the mathematics at home; presumably because they were getting success with lots of positive reinforcement.

---

<sup>2</sup> Although it could be argued that the question itself indicates that the newsletter has raised her awareness of the lack of transfer, and this is an important first step in the long term process of increasing home-school transfer in mathematics.

### Parental role

The parents who were unaware of what the children were doing in the classroom expected that their child would soon bring written mathematics work home. At that point they anticipated helping them with mathematics. Many talked about helping them learn their times-tables. This supports the perception of the Milland teachers that parents saw mathematics as times-tables. Nine parents said they were already helping their children to learn times-tables. The norm was to drill the children in the same way that the parents remembered being drilled, but there was recognition of an increased emphasis on understanding.

*We learnt it how I learnt it. We used to start with "two ones are two, two two's are four..." calling out loud. And we talked about it because I think at that stage I was in his class as well and I heard them talking about two groups of three and two groups of four so we talked about it like that.*

(Jack's mother, Pallace)

However, there was an expectation that their ability to be effective helpers would be limited to the rote learning tasks because they would be unfamiliar with the taught methods. They expected the children would reject their help at some point when their methods were in conflict with those taught in the classroom and indeed some parents were already finding this happening.

Mother: *He doesn't like being told by me and there have been times ...*

Father: *And that's actually more so in maths than in other things because it is the maths that he doesn't understand as well as his reading or ...*

Mother: *Spelling or things like that. Maths is probably a little bit harder for him than those and he just doesn't like me telling hints on how to do the say ten times table the easy way of doing that.*

Father: *He doesn't like me saying it either.*

Mother: *No. He doesn't like you either but then a week later he'll come home and say "Oh [the teacher] has told us this neat way of doing the ten times-tables" and it is exactly what we've told him but its fine when she says it.*

(Jack's parents, Pallace)

Parents were also concerned they may confuse children by teaching wrong methods. Helga's mother was proud of the mathematics education she had received in Germany but would be very reluctant to teach her children:



*I don't know whether I would explain it properly. I can do simple things but I don't know whether I still would ... perhaps I would use other words and then confuse them. I don't know.*

*Int: So you would be hesitant to teach?*

*Yes, because I think if you confused ... Getting information from all sorts of sides that can make things worse. Especially in maths.*

Although others were confident teaching their children more advanced concepts. In general the parents expected the teacher to set the programme and they saw their role as supporting this.

*Mother: We had a bit of discussion on the subtracting didn't we?*

*Father: She'd forgotten how to carry over but once we reminded her she was all right.*

*(Linda's Parents, Pallace)*

For some, the newsletter showed that teaching methods have changed since they were at school. The emphasis these parents placed on the early introduction of formal symbolic mathematics is in direct contrast to school where initiatives like the BSM programme have delayed the introduction of formal symbols. All but one of the parents welcomed changes that they characterised as making learning more fun.

*It is good that maths is fun orientated and not heavy. But I'm surprised that they haven't started the pluses. In the back of my mind I always knew they'd get on to it sooner or late.*

*(Donald's mother, Milland)*

Helga's mother was the exception. She compared the New Zealand system of *kindergarten games* with the more rigorous written mathematics expected in Germany. She worried that her children were slipping behind.

*I also had the feeling that in Germany, in the maths classes, things were more systematically built up on each other. For the first year they had only the numbers between one and twenty, and they did that very thoroughly and they had an understanding in the end of what that means. With Helga I have the feeling that after a year she is still floundering all over the place. She has no understanding of the adding of numbers between one and twenty and what that means. I felt a bit sad. She has no system in her head which she can build up on.*

*(Helga's mother, Pallace)*



### **5.7 Alternative Format for Newsletter**

The follow-up interviews at Pallace School were held in March. All but one of the children had been allocated to new classes and had spent eight weeks with their new teachers when they were re-interviewed. During the latter part of the previous year a slightly different format had been trialed for the newsletters. There was a long break between receiving the second newsletter (cycle three) and the interview, so recall was predictably poor. Of the six parents interviewed only three were confident that they had noticed the differences in format between the first (cycle two) and second (cycle three) newsletter. Two said they preferred the second format, which included test items that parents could give their children, (although neither could remember using the test) and three said they think they preferred the original newsletter. Linda's parents were the only ones who recalled the differences without prompting and had definitely used the objective tests. They had no preference either way for the format of future newsletters.

While the second interviews were too late to provide valuable feedback on the two different formats; they were valuable for the insight they provide into what happened when the Maths News was discontinued. The parents' comments on more general issues of parental involvement are considered in the following chapter.

### **5.8 Summary**

Parents were very positive about the newsletters as a means of bridging the gap between home and school. All the interviewed parents were characterised by the teachers as “good” high-contact parents who supported their child’s education. This support was also evident from the interest they had demonstrated prior to the newsletter. All had purchased commercial books or games for the express purpose of helping their child with mathematics (although the activities did not match the objectives of the junior school mathematics curriculum).

The newsletter was effective in raising awareness of the mathematics being studied at school. As a result parents were able to individualise examples and provide opportunities for the child to explore concepts within meaningful home contexts. Parents saw their role as supporting the teacher with mathematics teaching; they acknowledged that the newsletters assisted them in doing this. There was also considerable flow-on effect to younger siblings and parents wanted the newsletters to continue throughout the primary school.

## CHAPTER 6

### ISSUES OF PARENTAL INVOLVEMENT

Studying the effects of newsletters highlighted a number of mis-matches between parent and teacher perceptions of their relationship and roles. This chapter looks at issues which, while not directly related to the implementation of Maths News, are obviously important to the parents; and therefore worthy of consideration in a discussion of parental involvement in junior school mathematics. Discussion centres on parents' desire for accurate and comprehensive information about their child; their role and responsibility in regard to their child's education, the need for schools to share information with parents about mathematics, and issues of power sharing inherent in parent-school communication. The absence of a newsletter is used to highlight what happens when home-school relations are not harmonious.

#### 6.1 Information

##### **Information on progress in mathematics**

All of the parents interviewed felt that they had a right to information about their child's progress and trusted the teacher to contact them if their child's progress differed from expected norms. However, in both schools, parents lacked specific knowledge of the children's mathematical progress. This lack of knowledge was in sharp contrast to the parents' awareness of their child's progress in other subject areas. Leah's mother said that Leah was a very bright child, that both her daughters were gifted; but when asked "Do you know how is she going?"

*With her maths no. I know she is probably adequate but I couldn't be more specific.*

Int: *Does that worry you?*

*You get more information on the reading side of it and the literature and the language. I know in the parent teacher interview there was more focus on the fact that she could read extremely well and write stories extremely well and I don't remember the maths being mentioned.*

(Leah's mother, Pallace)

*I presume that Natasha is doing fine in her maths but I don't actually know how she's doing with her maths. You never really know. They bring their reading home so you know here they are with that. You tend to get an idea of what they're doing in social studies. ... I can't think of their other subjects ...*

Int: *Handwriting you see?*

*Yeah. Printing is fine.*

Int: *Storywriting?*

*I know what she's doing with storywriting.*

Int: *Art?*

*I see her artwork.*

Int: *Phys Ed?*

*She's doing gymnastics at the moment and I see her ball skills and things like that at home all the time.*

Int: *So it's just mathematics?*

*Yeah. Mathematics is the big mystery one really. Because actually before I knew what they were doing a little bit (in New Entrants). You tend to be in there and taking a lot more notice. But now that they're getting on with their schoolwork and they seem to be doing fine, you sort of step back. Yeah. I had no idea of what they were doing and I don't really know how well she is going. I never think to ask her what she's doing in maths and she never tells me anything that she's doing. In fact it could be the forgotten subject as far as school subjects go.*

*(Natasha's mother, Milland, emphasis added)*

When parents asked the question "How are they going?", the teachers interpreted this as "Where is he or she within the class?". In both schools, the teachers were reluctant to give parents that information. Parents had little access to comprehensive information on their child's mathematics achievement. Their most commonly used method was asking their child which mathematics group they were in and using their perception of the other member's ability to guess the ranking of the group. One parent expressed eagerness to find out where her child stood in relation to others. Jack's mother is a teacher aide at the school so she was aware of PAT testing being done earlier in the year.

*We've got parent teacher interviews coming up near the end of this term. I would like to think that we are told that they are given these tests that are across the school and I'd like to know. I'd like to think that we will be told about these and sort of where the children are. It is just that I happen to know that they do these tests because I'm part of the school.*

Int: *Will you ask what his results were if you are not told?*

*I think I will. When I've known these tests are going on I've said "How's he gone?" Maybe the parents should all be aware that this sort of testing goes on. The results are obviously available to them if they ask because that is their right to know. But do they know that this testing goes on?*

Int: *Why do you want to know?*

*I'd feel happy that he was taking in what he should be taking in for his age I suppose. I presume we would know if he was not up to standard. I would hope we would know if he's not up to standard. Maybe there is some help that we could give him if he wasn't doing as well as he should be but hopefully we would know about it.*

(Jack's mother, Pallace)

Leah's mother also talked about PAT testing and questioned the school's tendency to keep parents *in the dark* about the results of assessments.

*I think that most parents don't know that those tests are being done. They don't tell parents that information because they feel that it then puts expectations on the child. I can understand that but I think that most parents are fully aware of what their children.... and anyway shouldn't they have a right to know?... It is like "Don't you have a right to that information?" and then you can do something about it.*

(Leah's mother, Pallace)

### **Parents used children's feelings to indicate a need for action**

Without a way of monitoring mathematics progress parents assumed that "everything was fine" unless they were told otherwise. Parents did not actively pursue the issue unless they felt there was a problem. Parents seemed particularly concerned about their child enjoying the subject; rather than attainment.

*We ask at the parent interviews. We would ask about maths. "How she was doing?"*

Int: *And what information would you expect?*

*Unless there is a specific area that [the teacher is] concerned with they just generally say "They are doing well" and they understand it and that's it. If she was having problems then I'd expect them to tell us and I also expect them to tell if she is doing well and enjoys it on the same par.*

(Linda's mother, Pallace)

Mother: *At times Adele was reluctant to go to school. Sometimes she was last year. We tried to find out and it seemed that maths was the problem so we tried to do things at home. We cut out circles and divided them into halves and all that sort of thing but she still felt that in a group situation that she wasn't able to participate ... that they would ask her to give something she wasn't able to do ...*

Int: *When there was a problem you saw the teacher and you were given extra work?*

Mother: *Yes, it was just work that had already been done in class earlier that day but it wasn't everyday ...*

Father: *But also the comment was "not a problem". She doesn't have a problem. She's operating at the level that she should be operating at for this particular class, which was J2 so the comment was that she was quite OK at this level. Our reaction was "OK. Fine. Thank you very much but we don't believe that sort of thing .... (laughing)*

Int: *Your concern wasn't that she couldn't do the maths but that Adele felt that she couldn't do it?*

Mother: *She felt that she couldn't do it. She felt that it was too hard and everyone else could do it and she couldn't. And she was avoiding it; trying to avoid it by having headaches and not wanting to go to school in the morning.*  
(Adele's parents, Pallace)

Adele's parents felt her attitude was more important than her class ranking. They sought outside help for her mathematics despite reassurances that she did not have a problem. Adele had finished attending a local tutoring school for three terms when the interviews took place. Her parents were confident that the problem had been solved, not because they knew her classwork had improved, but because Adele was now happy in the classroom.

Father: *She's somewhere in the middle of the group. We're not sure. We haven't checked that lately. The fact that Adele is comfortable doing maths is the most important indicator.*

Mother: *Adele thinks that maths is not a problem.*

Int: *You are not sure but you go on Adele rather than the teacher. Is this OK?*

Mother: *I think...*

Father: *There can be a real danger in stating that at this age they should be at this level. Though it is nice to know what those points should be because I feel that if they don't get it together at Primary School then ... If they leave that Standard 4 Stage without the basics, then for the rest of their lives they're doomed to ...*

Mother: *And then they will avoid maths for the rest of their lives...*

(Adele's parents, Pallace)



The views reported by parents contrast strongly with the teacher's perception of the parents. Wylie and Smith (1995) also noted this schism:

*The "pushy" or well-meaning but undermining parent, concerned with linear, comparison-based, performance-goal-based success rather than consolidation and learning-goal-based achievement, remained the dominant motif in the comments of the third-year teachers. (p.32)*

*There was certainly more of the linear and performance-goal model of progress to be found in parents' comments, but few of these parents gave us the feeling that they had entered their children in a race against time or other children. (p.52)*

## **6.2 Parent and Teacher Role and Responsibilities**

### **Parents motivated to identify and remediate problems early**

Parents believed that it was crucial to iron out difficulties early. Five out of the six families interviewed had approached a teacher in the preceding two years with concerns about their children's mathematics. In none of these cases had contact been initiated by the teacher: In each case it was the child's feelings that prompted parents' concern. Only Adele's parents had remained dissatisfied - and had chosen to send Adele to a local tutoring school. Parents talked about using people outside the family to help with mathematics. There seemed to be a general acceptance that schools were limited in their resources and some children may need extra help.

*She is my daughter and I want her to excel as best as I can and you can't expect the teachers to do it all. She's one of 23 or 30 or maybe even 40 at other schools so you can't expect the teacher to spend 6 hours a day teaching 40 children and give one-on-one. And I think all children need one-on-one and they need a certain length of time of it. (Liz's mother, Milland)*

*There is so many people out there that can help if we weren't able to help. I think it is really important to get a lot of this basic knowledge now, so that when they go on it is just going to make their lives so much easier than, all of a sudden getting to Standard Four and, gosh it's Intermediate next year and you should know this, this and this. (Jack's father, Pallace)*

When asked what they would do if the newsletter work caused concern (either from being too hard or too easy) all the interviewed parents said that they would approach the teacher in the first instance. In the absence of information on mathematics progress the interviewed parents said they trusted the teachers to contact them if there were any problems.

*I would hope we would know if he's not up to standard. Maybe there is some help that we could give him if he wasn't doing as well as he should be but hopefully we would know about it.*

Int: *And you would expect the teacher to let you know?*

*Yes. Well I would hope that they would say but if the teacher said "Look, things are fine" I would probably take that for gospel.*

(Jack's mother, Pallace)

Linda's parents said they would consult the teacher if the child reported difficulties and they placed greater emphasis on the teacher's interpretation of the situation than their child's:

Int: *If there were problems?*

*My reaction would be to go and see [the teacher] and find out whether they are or not because sometimes your child's perception of something is not accurate. Just because they think they're not coping. It is not always how the teacher sees it."*

(Linda's mother, Pallace)

### Parents' perception of teachers' responsibility

The parents were asked if they felt that the mathematics newsletter was abdicating responsibility: if the school's job was being pushed on to the parents. The two parents who were also teachers were the most guarded in their responses.

*No, although I think there is some validity in that. I think parents are becoming very wary of how much they're being expected to do nowadays and there is a general feeling that because of overburdening on teachers that more is being pushed back onto the parent. This could be the thin edge of the bigger wedge for maths. But I think you have to take [the Maths News] as I took them to be. They were supposed to be information to the parent and helpful and extending and giving that information that maybe you didn't know what was going on at school.*

(Leah's mother, Pallace)

*I think [the newsletter] was good. It wasn't too heavy. If you have specific activities I think some parents would be put off ... if they thought they were doing what the teacher should be doing.*

(Joe's mother, Milland)

The other respondents were less likely to put the responsibility for their child's learning wholly on the teacher. They welcomed the newsletter as a way of making it possible for them to be more involved in their children's learning.

Father: *I don't agree [that it should be the school's responsibility to teach mathematics]. I think it is a partnership - school and parent. It's the same with reading, with everything.*

Mother: *You can't just rely on the school environment to do all the teaching. I agree with what he says. You can't just expect the school to do everything.*  
(Linda's parents, Pallace)

*I was really pleased to get [the newsletter]. Parents don't have much input when they go to school, apart from reading. But reading [Maths News], I knew what to do to help him. I felt like I was having lots of input. Like I said before, I like being involved.*  
(Donald's mother, Milland)

### Compulsion in home activity

However, involvement was tempered with constraints. One of the questionnaires from Pallace (Grace's) was returned with the following comment:

*I liked the Maths News, to see what my child was learning about. I didn't try any of the activities, some I thought she would have met before - at school and at home. Then there is the usual story of being 'too busy' with work, household, and other children. Perhaps if there had been a comment page to send back after each sheet, I would have made more effort to try some of the activities with my child.*

However, none of the interviewed parents were in favour of any sort of compulsion or comment page. Some parents, while positive about the newsletter, felt guilty that they were not spending more time with their children. They claimed a lack of available free time; both for themselves and for their children.

*We do a little bit but as I say it is not on a regular basis or anything. I sort of feel they've spent all day at school. They've got their reading to do. Their spelling to do but when the time is right I try and fit a bit in.*

(Jack's mother, Pallace)

*I thought it was good that we could actually help in some ways. You can only teach them so much in school and quite often parents feel that they are pushed out in the way they are not encouraged to help. Guilt? Yes and no I guess .... Because at times ... but I didn't feel bad because I knew that we were busy...* (Tony's mother, Pallace)

When the parents were interviewed for a second time, three families were receiving a general "team newsletter" which mentioned briefly the mathematics topics as part of the information on the whole class programme. All these parents had just received the second one at the time of the interviews, but they were unimpressed with the amount of information given<sup>1</sup>. Two of them said they resented the tone of it. Jack's mother's explained why she felt the team newsletter was different:

[the mathematics part of the general newsletter] *is more "you should be working on basic facts. You should be doing times-tables. You should be .." but I think that should be happening at school as well. You know I go past [Sally's] class and I hear them singing times-tables to a tape. Why isn't Jack doing that any more?*

Int: *You see this year's team newsletters as abdicating responsibility?*

*Yes, well in a way I feel it is saying "You should be doing this".*

Int: *But you didn't think that last year [with Maths News]?*

*No. Not really because that was saying "We're doing this at school" and you were given suggestions of how you can extend what they were doing. It was happening in the classroom and it can happen at home as well. These newsletters are more like homework. It is a different tone.* (Jack's mother, Pallace)

### **6.3 Sharing Information on Classroom Mathematics**

The change in attitude was most obvious with Leah's mother, a parent who was least pleased with the Maths News initially. On the questionnaire she had indicated that

---

<sup>1</sup> The following extract from the general newsletter issued to parents in June 1997 is typical for the length and depth of information included in the mathematics section: *Our maths goals will be telling TIME of the year and day, as well as knowing the points of the compass and being able to follow directions on maps, and reading grid charts.*

she did not feel strongly either way about whether Maths News should continue. Yet the following year:

*I've been in [to school] a couple of times this year and that is probably because there are no newsletters. A lack of information is perhaps actually leading me to the classroom now.*

*Int: Because you are concerned?*

*Because there is no feedback.*

*Int: What are you concerned about?*

*Just a general concern this year. Although if you are looking at the maths I have no idea of what she is doing. Although there probably is that little team newsletter that comes out [reference to the Pallace School Newsletter] but it is very fleeting and I must admit I probably skim it. "Oh yes. They're doing tessellations at the moment" but that's it. That's a simple statement and I don't know whether they're doing times-tables or something... but the newsletter [Maths News from previous year] probably didn't have that either, but you just had that feeling that there was maths ongoing. Whereas I just don't get that sort of feedback now.*

*(Leah's mother, Pallace)*

Leah's mother said in retrospect, the newsletters were valuable for the feedback they gave her, about what was happening in the classroom, and how well her child was coping. Her attitude was in direct contrast to the preceding year when she had been apparently unconcerned that the level of mathematics work described in the newsletters was beneath Leah's operating level.

### **Information gives power**

It appears that giving parents information about classroom mathematics in a newsletter had wider implications than simply improving communication. Sharing information empowers parents. They can also have input to the education process; they feel that they are part of the system; they are working with the teacher to do the best for their children.

*Mother: The newsletters have helped...*

*Father: It has encouraged him a bit more.*

*Mother: It has encouraged us! Well, we know exactly what is happening ...*

*Father: You have more input. I think it is good and it does let you know exactly the topics that are being talked about and how far because you don't know really what stage of learning the children are at or should be at. I mean you don't want to go too far ...*

*(Jack's parents, Pallace)*

*In Germany they bring home their books and you see how far they are. You see what they do. You can have control yourself, but here it seems to be all in the classroom and nothing at home. So what can you do? No control. No watch over what they do or how far they go.* (Helga's mother, Pallace)

#### **6.4 Power Structures Inherent in School Communication**

If opening communication empowers the parents to take an active part in educating their children outside the classroom; then the absence of newsletters closed down or limited these channels of communication; effectively cutting parents off, by separating the home and school environments. Giving no information results in the teacher retaining control of what is taught to the children. It also puts parents at a disadvantage when they want to talk to the teacher about their concerns.

When Sally talked about dealing with pushy parents she said that they *hadn't been a problem* for her because she had always been able to back up her actions with her assessments. This may be true. However, "off the record" comments indicated that although the teacher may effectively silence a "difficult" parent using their superior information base; the silenced parent may remain dissatisfied and frustrated.

The parents who were unhappy at the second interview were all reluctant to communicate their dissatisfaction to the school. Although the teacher is acknowledged as the first point of contact when a problem is recognised, in this study of high-contact parents, it was evident that if the teacher appeared unable or unwilling to rectify the problem, most choose to remain silent rather than be labelled as "pushy".

*Parents are afraid to interfere or ask what is going on. It's like we don't really have the right to know. If you interfere you are made to feel that you are being a pushy parent. ... You can get into such a mountain of difficulty by pursuing things through schools. The more they resist the more you do become pushy because you do get angry.* (Leah's mother, Pallace)



### When parents are not heard

For the parents of Leah, Jack and Tony, dissatisfaction was largely due to the placement of their children in composite classes. Parents felt that the range of abilities and the large size of the composite classes (30-32) made it impossible for the teacher to cater for the needs of their child. Whether their concerns were reasonable and valid or not, the problem remained. The major issue for the parents became that their concerns were not being heard.

*I didn't go to the Principal at the beginning of the year. A number of parents that I am close to did and they were less than satisfied with what they got back, no matter how many times they approached him ... it was just another job off. They are not prepared to listen. A lot of parents weren't happy with the composite classes but they were basically told that that was that. There is a hard wall that you come up against, and if you don't like it, you lump it. I think what people did was either choose to shut up and put up, or wait like I did, or to move. I know one parent who took their child out.*

(Leah's mother, Pallace)

In the following year the lack of Maths News was mentioned by all parents as a contributing factor in their feelings of dissatisfaction.

*I feel sad in some ways because [Maths News] was so helpful for the teachers. With the newsletter we could relate to the class. We were familiar with the work and happy to help there. It was education for us as well ... Probably I feel a bit cut off at the moment. He brings home the reading and he has spelling chart that we do each week. Tony knew to do that step by step but a lot didn't ...*

(Tony's mother, Pallace)

The parents of the three children not placed in the composite classes also had concerns they felt were not being heard. Helga's mother (and to a lesser degree her father) was worried that the work her children are doing in New Zealand is below the equivalent German standard. Maths News had not eliminated her concerns but it had lessened her anxiety. During the first interview she was asked if the Maths News would have been useful earlier.

*Yes. All the time. If you are really interested in what your children do then you want the newsletter all the time. What I really would like also to see is a year's writing [on mathematics topics] because then I would be satisfied. I would be quite happy to relax if I had had in the beginning "That's what we do in this year." I mean when they do it; that's up to the teacher and they can organise that. You know what is expected of your child. I would just relax and I'd know "Yes, that's what they do".*

(Helga's mother, Pallace)

The following year the level of concern expressed by Helga's mother was extreme. She got out copies of German workbooks to demonstrate the difference in standards. She showed her elder daughter's work and compared that with the work she had been doing in Germany years earlier. When asked if her perception of the classroom mathematics had changed without Maths News she replied with emphasis:

*There is just no perception at all. Children just don't talk about their work. They don't give you any idea of what you do. I mean you can ask them: "Oh, they do nothing at school. They don't have to do anything." There's nothing coming out. You can squeeze them as long as you like but they just don't tell you. For all of the girls I don't know what is going on.*

(Helga's mother, Pallace)

Her worries about the international discrepancies in mathematics education were shared by other German parents. A group with children from Pallace School had begun teaching mathematics in Saturday morning German classes because they believed their children were getting "left behind" in New Zealand. Despite the evidence that Helga's mother was not the only parent with the problem; despite the fact that she was a "high contact" parent (according to both her own assessment and the teacher's); Helga's mother was still reluctant to approach the teacher directly: *I don't know whether I should go and inquire all the time, but I don't want to get on the teacher's nerves - "Oh, here she comes again"*. All the interviewed parents were cautious about *getting on the teacher's nerves* with excessive concern, only Leah's mother felt she had actually "overstepped the invisible line" of acceptable parental involvement to be labelled as a pushy parent when her daughter had been at a different school.

### **6.5 Summary**

It appears that parents can provide a valuable “early warning” when their children encounter difficulties with mathematics at school. Parents recognise the value of early intervention and are keen to ensure their children are given every opportunity to master the skills necessary for literacy and numeracy. In mathematics parents are quick to acknowledge that they may not have the expertise necessary to perform this intervention. They will seek help; initially the teacher but also from friends, relatives or outside agencies (if their financial situation permits), to make up for any perceived lack of resources within the school.

Often the difficulty for parents is that they do this without access to information. This is particularly true for junior primary school mathematics. Comprehensive and detailed assessments are not routinely available (although some parents familiar with the system may demand them), primarily because schools wish to discourage the view that children are in competition with one another. Teachers are also concerned that parents may have unrealistic expectations; yet the parents who took part in this study appeared to make their diagnosis on the basis of their children’s feelings and attitude towards mathematics<sup>2</sup>.

Off-the-record discussions revealed significant discrepancies between teacher and parent views of their children’s ability and potential. At present, parents are more likely to question and act upon a lack of achievement in reading because the evidence of progress is more readily available to them. Mathematics progress, or lack of it, is not so easy for parents to detect. In the absence of newsletters most parents use times-tables as their yardstick but the rote-learning of multiplication facts is only a small part of the mathematics curriculum that students are expected to master, and it is largely irrelevant at the junior mathematics level.

---

<sup>2</sup> This could be a consequence of the lack of information. Perhaps if parents did have access to all the information that teachers routinely collect, they would use this in preference to relying on children’s perceptions.

Above all else, issues of power emerge as being central to any discussion of parental involvement. The newsletters gave parents a share in a knowledge base normally reserved for the teacher. In effect this gave more power to the parents. It may be that parents' perception of school communication is that they "never have enough". Pallace School is known as encouraging a high level of parental involvement: yet even these high-contact parents expressed frustration that they did not have access to information, dissatisfaction that their concerns were not being heard, and disappointment that their potential contribution was not being acknowledged.

## CHAPTER 7

### DISCUSSION and CONCLUSION

#### 7.1 Discrepancies in Perceived Roles and Responsibilities

##### **Mathematics: the forgotten subject**

The ethnographic nature of this study (with the researcher posing as either a parent or a teacher to increase rapport) has revealed a number of points of discrepancy between teachers' and parents' views of mathematics and their respective roles. In some cases these differences are masked by the way in which **both** groups appear to view mathematics; *the forgotten subject* was the way Natasha's mother described it.

Teachers and parents alike devote time and energy to developing language skills; especially reading, in the early years of school. Young-Loveridge (1989b) compares this spotlight on reading to the lack of emphasis on numeracy. This study confirmed the view that, in the junior primary school, teachers communicate to parents a view that mathematics is of secondary importance to literacy skills. Mathematics is *briefly mentioned*, if at all, at parent teacher interviews. Mathematics *takes up too much room* to be put on the regular homework sheets.

Studies of parental attitudes in New Zealand (Visser & Bennie, 1996; Wylie & Smith, 1993) have shown parents have much less knowledge about their child's mathematics than their reading. This study also found parents had poor awareness of school mathematics or their child's progress. Given the homogeneous nature of the sample of parents (characterised as "high-contact" by the teachers) this is particularly alarming. The parents' lack of knowledge about the mathematics programme contributes to the mismatch between parent and teacher perceptions of the subject.

### **Bridging the School-to-Home Gap**

Some of the key differences in perception which are unhelpful to children's progress are summarised in Table 6. The newsletter was found to be an important factor in minimising these differences. Maths News gave information to parents about the classroom programmes. It communicated the teacher's view of mathematics as a range of skills, best developed through active experience rather than formal arithmetic, by suggesting ways that parents can help which are consistent with the teacher's view of mathematics. The teachers' positive evaluation and enthusiasm for Maths News confirm the effectiveness of a newsletter format in communicating the teacher's view to parents.

Whereas benefits can be expected from the minimisation of the differences listed in Table 6, the study also revealed other differences between the perspectives of teachers and parents that are not necessarily harmful. These are summarised in Table 7. They arise naturally from the difference in the relationships between child and teacher or parent. Rather than being minimised, these differences can all be utilised to provide a better all-round education for the child.

The major limitation of a newsletter format is that it does not allow for the two-way communication necessary for the utilisation of all the differences listed in Table 7, however even the one-way communication was beneficial. The newsletter shared information with parents, allowing them to assist their child to master mathematics concepts: by reinforcing classroom mathematics in context, and by alerting them to possible sources of difficulty: *Routine things are easy because it is just remembering to say it*; and *You can teach them so easily if you know what it is they can't do*.

The final format of the newsletter (which included objective testing) also allowed parents to assess their child's mathematics ability; but evidence of the effectiveness of this is inconclusive. It may be that this information was not helpful because parents rejected the importance of achieving set levels at set ages, in favour of child's attitude, as a means of measuring success.



TABLE 6: Differing Perceptions of Junior Mathematics  
(which are unhelpful to children's progress)

Teachers' Views	Parents' Views
<p>Early mathematics involves a range of generic skills; comparison and relationships, shape, movement and position, classification order and pattern.</p>	<p>Early mathematics is about learning to count, learning to add and subtract, and later on; learning the times tables, before mastering algorithms for arithmetic with large numbers.</p>
<p>Delaying written mathematics gives children the opportunity to develop their mathematical ideas through guided exploration with materials.</p>	<p>Written mathematics should be introduced as soon as possible. Worksheet-type activities where children write numerals to represent the number of objects shown are the starting point for mathematics.</p>
<p>Children build their own knowledge of mathematics through experience. Teachers can assist through questions that prompt the child to re-examine their own understanding.</p>	<p>Children learn mathematics by being taught methods and by memorising basic facts. Parents can help by giving children extensive exposure to arithmetic facts at an early age.</p>
<p>To fully master new concepts children need time to consolidate their understanding. It is important not to push a child on to a higher level of understanding until the lower level is fully mastered.</p>	<p>To reach their true potential children need to be extended so that they experience some difficulty with the work given. A child who regularly scores 10/10 is not being extended.</p>

TABLE 7: Differing Perspectives that could be Utilised for Effective Education

Teachers' Perspective	Parents' Perspective
<p>It is difficult to see the child as an individual. There are 20-30 children in the class and you must do the best for all of them.</p>	<p>It is difficult to see the big picture. The focus is exclusively on your own child.</p>
<p>Parents who find out that their child is not achieving as well as the others will be unhappy. Standardised testing and ranking (eg PAT tests) provide summative information for teachers but parents should not be told results for fear they will misuse that knowledge.</p>	<p>All children can achieve with the right help. If a child is having difficulty then parents should be told as soon as possible so they can do something about it. Parents trust the teacher to tell them if their child is having difficulty with mathematics.</p>
<p>Parents have unrealistic expectations and put pressure on their children which is counter-productive. Some one has to be below average! As long as the child appears to try hard in class there is not a problem.</p>	<p>Parents are highly motivated to ensure their child feels confident with mathematics. If the child is unhappy then there is a problem. Help may need to be sought from outside the school.</p>
<p>Assessment of a child's mathematics ability is frequent and ongoing. It is based on their classwork, attainment in tests and contribution to class discussion. Records are kept of progress within curriculum guidelines. A problem occurs when a child falls below the norms for his/her age. Progress within norm limits is "fine".</p>	<p>Set achievement objectives for set ages are a very restrictive way of viewing mathematics (although there are some absolutes that need to be mastered). The child is making satisfactory progress if they are happy. If the child is unhappy then there is a problem (no matter what level they are working at).</p>
<p>Teaching mathematics in context is a noble ideal but very difficult to do in practice in the classroom. Planning is too extreme and real individualisation is impossible.</p>	<p>It is sometimes difficult to find time to complete set activities or mathematics homework but it is very easy to incorporate mathematical vocabulary and thinking into everyday situations.</p>

With respect to the perspectives outlined in Table 7, the interviews revealed a predominance of the teacher's view; with parents expressing frustration that their expertise was not being acknowledged or used by the school. This one-sided view of junior school mathematics, with the teacher retaining all knowledge and power, does not optimise student learning. This study found parents to be effective teachers, possessing advantages that teachers lacked: able to individualise content; adjust tasks to the child's ZPD and provide scaffolding, within contexts that were personally meaningful for the child. Without the newsletters, parents lacked the required familiarity with classwork to be able to use these skills.

The benefits of the newsletter were limited because the communication was one-way (although it did provide a base of knowledge that enabled parents to express their concerns more coherently to teachers during parent-teacher interviews). A conspicuous need for acknowledgment of potential parent contribution was exposed by the study.

## **7.2 The Mathematics Newsletter: Sharing the Information**

### **There's more than one way of getting the answer**

Literature on reading acquisition recognises the contribution of the home. Parents are encouraged to read to their children as babies and compelled to listen and read with them at the junior primary school (through reading logs requiring parent's signatures) until they achieve fluency at reading. In contrast, junior school mathematics, is seldom shared with the home and this study found that the direct involvement of parents was often seen as a problem rather than a benefit: teaching "wrong methods" was a concern for both parents and teachers. Yet the literature shows that a decreased emphasis on the "right method" improves children's understanding of mathematics (Kamii et al., 1993; McIntosh, 1990).

It appears that restricting mathematics to the classroom setting, where the teacher has the ultimate power to award credit or discredit for answers, disempowers parents.

Children soon come to recognise that the teacher's method is the only correct one and reject parents attempts to broaden their knowledge base. (Witness Jack's rejection of his mother's advice at six years of age!) Remarkably this study found parents who demonstrated great competency with everyday mathematics believed that they cannot help their junior primary school children or will be unable to at some point in the future.

This schism between confidence with school mathematics and competence with practical mathematics was very clearly demonstrated by Adele's mother. In the interview she laughed with the rest of the family at her incompetence with a tangram puzzle. (It failed because she had started with a rectangle.) She introduced her husband as the mathematics expert and deferred to him throughout the interview, despite being much more "in touch" with the children's progress than he was. Yet she wondered aloud at her children's inability to apply their mathematics *to problems that are really quite simple*.

The mathematics newsletter was seen by both parents and teachers as a way of ensuring that parents had the knowledge required to help their child with mathematics. Parents commented that the newsletter *should carry on to high school because then we'd be learning with the children*. Teachers liked the newsletter because it showed parents the "right way" to teach their children. The result was a home school relationship which appears to have moved one step closer to the "partnership" model of parental involvement. This study suggests that by sharing knowledge and information the teachers were giving the parents a productive share in the power base.

### **Importance of meaningful context**

Mathematics education is similar to reading in terms of stability of performance and the demonstrated success of school-based early intervention (Clay, 1980; Young-Loveridge, 1993). The contribution of the home life is also significant for student success in both areas: Home orientation towards numeracy is a significant factor in

children's mathematics achievement upon entry to school, even when socio-economic status and mothers educational levels are taken into account (Young-Loveridge, 1989c). While literacy and mathematics skills are frequently embedded within normal household tasks and routines, in contrast to reading, mathematics suffers from a lack of visibility. This study found that parents often do not recognise the educational value of activities with embedded mathematics.

*You don't realize how much you talk to your children about maths until it is brought to your attention. It wasn't until I actually asked [the teacher]. I told her that I don't really do much maths with Liz. She started saying the things they've been doing. I said "Oh, I've been doing that as well". And Liz is good with her maths.*  
(Liz's mother, Milland)

The curriculum document calls for mathematics activities to be presented *in a meaningful context* (Ministry of Education, 1992) but teachers report that it is difficult to do this within the constraints that operate in a classroom. In contrast parents found it *easy* to present mathematics in a meaningful context. This study found that **if they know** what mathematics is being done in the classroom the parents were able to support their child's learning. They were able to individualise mathematics for their child in realistic, familiar contexts. Parents used their natural educational advantages documented in the literature: intimate knowledge of their own child, the shared experiences they have with the child, and their personal motivation for helping their child to succeed.

### **Newsletters shared benefits with low-contact parents**

High contact parents are more likely to know "what is being done in the classroom" (for example Jack's mother modified her multiplication activities after seeing them talking about groups in class) so it is not surprising that there is such a wealth of literature equating parental involvement with greater chance of academic success. Visser and Walker (1993) found that helping in the classroom was one of the few ways parents found out about school mathematics programmes. In this study teachers strongly identified high-contact parents as being supportive educationally, yet the percentage of high-contact parents is declining as working outside the home becomes the accepted role for a mother of primary school aged children. Teachers

commented on the lack of available 'mother help' and expressed concern about the inability of 'working mothers' to become involved in the classroom.

The newsletter format gave all parents who could read English ready access to information on school mathematics programmes. This avoided problems associated with a home-based intervention targeted at low achievers, which may relatively disadvantage children already handicapped by the discontinuity between their home and school environments (Toomey, 1996).

### **Newsletters positively affected communication**

The third cycle of interviews, occurring after the newsletters had ceased, clearly showed the positive effect newsletters had upon communication. Parent satisfaction was demonstrably higher when they received a newsletter. All parents who responded to the questionnaire<sup>1</sup> were in favour of the Maths News. For one parent the newsletter enabled her to support her child with special needs to the extent that she was achieving well above the level expected by the teacher. Even those parents familiar with the education system, for whom the newsletter appeared to offer little advantage, felt that it was valuable because it *served as a reminder that every now and then I need to be talking about these things* (Joe's mother).

Tizard and Hughes (1984, p.252) noted that parental expectation is generally high and parents will put a great deal of effort into ensuring their children *acquire the skills, knowledge and values that they believe to be important*. The newsletter provided a base of knowledge from which parents who had previously been ignorant about mathematics could approach the teacher. Both parents and teachers reported that parents identified specific problems at the parent teacher interviews. Wylie and Smith (1993, p.95) describe how close contact enables teachers and parents to work together *to find ways to bring the child over the obstacles they were encountering* and warn that without frequent informal contact the teacher may *limit their expectations*

---

<sup>1</sup> Leah's mother initially reported that she "liked them with some reservations" and she "didn't feel strongly either way" about their continuation. Her questionnaire response was the least positive of those collected. After three months without the newsletters she had revised this view.



*of the child.* Given that frequent informal contact with the teacher is not possible for many parents; the newsletter provided an alternative way of ensuring a child's potential is not limited by low teacher expectations.

### **7.3 Implications of the Study**

#### **Implications for primary school mathematics**

A clear need for parents to receive regular information about the classroom mathematics programme was identified in this study. There have been major changes in the content and mode of delivery of the mathematics curriculum since most parents were at school. Many parents retain a view of primary school mathematics as rote learnt basic facts and arithmetic algorithms.

If teachers intend to embrace the new curriculum, with its emphasis on mathematics in a meaningful context, it is essential that this objective is communicated to parents. Parents reported the presentation of mathematics in context was *easy* (compared to finding time for activities) when they were given some suggestions, but without the newsletter they did not know what was being studied in the classroom.

#### **Implications for school-to-home reporting**

This study found that, in addition to information about classroom programme, parents believe they have a right to accurate information about their child's progress. If a partnership model of education is to be adopted, it is not defensible to tell a parent that their child is "fine" or "OK" in mathematics when the child has just completed a barrage of assessment resulting in a detailed profile. Detailed assessment information is as important to the parent as to the teacher if they both wish the child to reach his or her potential. There is a need for parents to have access to the "big picture" of their child's progress in relation to class and age norms. Teachers consider this essential for their own purposes but are reluctant to give details to parents.

**Implications for home-to-school communication patterns**

This research and the associated literature review also pointed to a communication problem from parents to teachers. It appears that teachers do not acknowledge the validity of parents' views about their child's individual characteristics and needs. For instance, the issue of extending able children was raised by one parent in this study. Variability between parents' and teachers' assessments of the ability of the children supports the case that parents' concerns may be valid - and are certainly worth acknowledging. Parents appear to base their view of the situation on their child's confidence and happiness in the mathematics class. While it is true that "someone has to be the bottom" in a class, the parallel idea that "some children have to hate mathematics" does not need to be accepted as a fact by either a teacher or a parent. Parental concern about a child's attitude to mathematics must be accepted, and should be followed up by the school in a sensitive manner.

Parents reported a willingness to seek help from outside the school if it is not possible for the school to alleviate their concerns. This need not be seen as a criticism of the school. All the parents in this study readily accepted that a school has limited resources. Looking beyond the school for education simply reflected the parents' intense desire to see their child reach his or her potential. Schools need to be confident that all reasonable efforts have been made to liaise with parents who are concerned about their child's progress. If a solution acceptable to both child and parent is not possible within the school, it is important that a parent's decision to seek outside help is respected and supported by the classroom teacher.

#### **7.4 Limitations of this Study**

Ethical and practical considerations prevented the researcher from observing or interviewing junior primary school children directly. It is not clear whether the lack of evidence of knowledge transfer is due to this deficiency or because the newsletter did not affect transfer. Even if observations had been included in the methodology; it may well be that it was unrealistic to see an observable change in home or school behaviours in the given research time-frame.

The decision to use interviews as the prime method of data collection also affected validity: It was difficult to check the accuracy of respondents' statements. Moreover the research process itself may have significantly affected the parents' reactions to the newsletters and thus the findings.

The selection and size of the sample of respondents was problematic. In a study of the effects of newsletters it is imperative that all the "types" of parents are represented in the comments. Hard-to-reach parents, or parents who are not comfortable being interviewed about mathematics, are the ones who often "fall out" of educational research (and this study is no exception). It is acknowledged that the comments of these people may be the most valuable of all, given that high-contact parents already have opportunity to influence school policy.

#### **7.5 Implications for Further Research**

Previous research has indicated that a newsletter may be an effective *starting point* for involving parents in mathematics education. This study found Maths News was beneficial to both children's and parents as well as teachers. The role and the effectiveness of the newsletter was considered from many vantage points; some of which were addressed in detail in the results. Others are still open and require further exploration.

**Questions related to the newsletter that warrant further exploration:**

- Are the levels of parent satisfaction with the newsletter really as widespread as indicated by this small sample? It is important to repeat this research with an emphasis on contacting *all* parents receiving the newsletter so that data can be gained from those sections of the population that were not represented in this study.
- Would the newsletter be more effective in conjunction with take-home packs designed for the purpose of intervention? There are many anecdotal accounts of the popularity of take-home games or back-pack activities but little has been done to critically evaluate them.
- For what years of the New Zealand school system is the newsletter helpful? Is there a need to extend the coverage upward from the junior primary school level? Would a similar newsletter be effective at the pre-school level (given that many parents reported mathematical interaction with younger siblings)?
- Homework is recognised as a critical factor in mathematics success, especially at higher levels of education. This study showed parents find specific activities harder to complete than activities using mathematics in context. Is “worksheet” type homework the most effective use of this time, or would it be better to tailor homework to applications of schoolwork in real contexts?
- How can parents be used to help teachers to provide mathematics in meaningful contexts for their students? Would this improve knowledge transfer? Is this feasible, equitable or practicable for teachers to utilise parents’ expertise?

Although not a direct focus of the research, the study highlighted potential research areas of parent-school communication and community perceptions of mathematics education that need further exploration.

### **7.6 Summary of Outcomes**

The newsletter was beneficial to both parties and affected the relationship between the parents and the teachers in regard to mathematics. It increased parents' awareness of the mathematics embedded in their everyday activities (even in the households where a parent was already involved in education) and a greater incidence of role modelling in the home was reported. However, parents were more likely to comment on the effect on the mathematical knowledge of younger siblings than the target child.

No direct evidence was found to show that the newsletter improved transfer of knowledge or skills between home and school, although teachers thought it would have created the environment where improved transfer was possible. Specifically, the teachers found that newsletters enabled parents to be more specific with their concerns at parent teacher interviews. Additionally, they felt that the newsletters provided information to enable parents to take a more direct teaching role. There was an expectation among the parents that if the newsletters continued they would be able to "keep up with the children" and provide support throughout the primary school years.

The study suggests that labels like "over-anxious" and 'pushy' are counter-productive for parent, child and teacher. Teachers and parents are in an educational partnership aimed at developing each child to their full potential. The aim is the same for both parties. Labels imply that one partner is doing it wrong. Compulsion (set homework tasks) implies that one partner does not trust the other to fulfil their part of the undertaking. It appears that open communication is crucial to the success of the partnership. From the teachers' perspective this means ensuring the parents know what is going on in class, why, and how they could support or use classroom mathematics in real life.

## Bibliography

- Aubrey, C. (1993). An investigation of the mathematical knowledge and competencies which young children bring into school. *British Educational Research Journal*, 19 (1), 27-41.
- Bastiani, J. (1988). "How many parents did you see last night?" A critical look at some of the problems of evaluating home/school practice. In J. Bastiani (Ed.), *Parents and teachers 2 From policy to practice* (pp. 206-218). Windsor: NFER-Nelson.
- Bell, J. (1993). *Doing your research project a guide for first-time researchers in education and social science*. Philadelphia: Open University Press.
- Bennett, S. N., Desforges, C., Cockburn, A. D., & Wilkinson, B. (1984). *The quality of pupil learning experiences*. London: Lawrence Erlbaum Associates.
- Bennie, N., Henry, E., & Ratcliff, B. (1990). *Beginning school mathematics: A study of the implementation*. Wellington: Ministry of Education.
- Boaler, J. (1993). The role of contexts in the mathematics classroom: Do they make mathematics more real? *For the Learning of Mathematics*, 13 (2), 12-17.
- Brooks McLane, J., & Dowley McNamee, G. (1990). *Early literacy*. London: Harvard University Press.
- Bruner, J. S. (1985). Vygotsky: A historical and conceptual perspective. In J. V. Wertsch (Ed.), *Culture communication and cognition* (pp. 21-34). Cambridge: Cambridge University Press.
- Burgess, R. C. (Ed.). (1985). *Strategies of educational research qualitative methods*. London: Falmer Press.
- Burns, R. B. (1994). *Introduction to research methods* (2nd ed.). Melbourne: Longman Cheshire.
- Burns, R. B. (1997). *Introduction to research methods* (3rd ed.). Melbourne: Longman Cheshire.
- Carr, M. (1992). Maths for meaning: tracing a path for early mathematics development. In B. Bell, A. Begg, F. Biddulph, Malcolm Carr, Margaret Carr, J. McChesney, & J. Young-Loveridge (Eds.), *SAMEpapers 1992* (pp. 65-80), Hamilton: University of Waikato.
- Carraher, T. N., Carraher, D. W., & Schliemann, A. D. (1985). Mathematics in the streets and in schools. *British Journal of Developmental Psychology*, 3, 21-29.



- Carraher, T. N., & Schliemann, A. D. (1985). Computation routines prescribed by schools: Help or hindrance? *Journal for Research in Mathematics Education*, 16 (1), 37-44.
- Cattermole, J., & Robinson, N. (1985). Effective home/school communication - from the parent's perspective. *Phi Delta Kappan*, 67 (1), 48-50.
- Choat, E. (1978). *Children's acquisition of mathematics*. Windsor: NFER Publishing Co.
- Clay, M. M. (1980). Reading recovery; a follow up study. *New Zealand Journal of Educational Studies* 15 (2), 137-155.
- Clay, M. M. (1985). *The early detection of reading difficulties* (3rd ed.). Auckland: Heinemann.
- Cobb, P. (1994). Where is the mind? Constructivist and sociocultural perspectives on mathematical development. *Educational Researcher*, 23 (7), 13-20.
- Cobb, P., Wood, T., & Yackel, E. (1993). Discourse, mathematical thinking and classroom practice. In E. A. Forman, N. Minick, & C. A. Stone (Eds.), *Contexts for Learning: Sociocultural Dynamics in Children's Development* (pp. 91-119). New York: Oxford University Press.
- Cockcroft, W. H. (1982). *Mathematics counts (Report of the committee of enquiry into the teaching of mathematics in schools)*. London: HMSO.
- Cohen, L., & Manion, L. (1984). *Research methods in education* (4th ed.). London: Routledge.
- Coleman, J., & Hoffer, T. (1987). *Public and private schools. The input of communities*. New York: Basic Books.
- Cooper, L. (1996). *PERM report. An exploratory study: Parent education in relation to mathematics in the New Zealand curriculum*. Unpublished report, Auckland College of Education on contract to the Ministry of Education.
- Cooper, L., Whitehead, D., & Patrick, J. (1996). The home-school connection! Parent education in relation to mathematics in the New Zealand curriculum; exploratory study 1995. *The New Zealand Mathematics Magazine*, 33 (2), 42-46.
- Cooper, L. (1997, October). *Family maths and/or parent involvement in mathematics education*. Paper presented at the 5th biennial conference of the New Zealand Association of Mathematics Teachers, Palmerston North.

- Davies, D. (1996). Crossing boundaries: Community-family-school partnerships. *Forum of Education*, 51 (1), 83-91.
- Delamont, S. (1992). *Fieldwork in educational settings methods, pitfalls and perspectives*. London: Falmer Press.
- Department of Education. (1976). *Towards partnership* (McCombs report). Wellington: Department of Education.
- Department of Education. (1985). *Beginning school mathematics Cycle 1-8, Module 1,3*. Wellington: Learning Media.
- Department of Education. (1992). *Beginning school mathematics Cycle 9-12, Module 1,2 & 3*. Wellington: Learning Media.
- Department of Education, Committee to Review the Curriculum for Schools. (1987). *The curriculum review*. Wellington: Department of Education.
- Department of Education. (1988). *Getting started*. Wellington: Curriculum Review Action Unit.
- Desforges, C. W. (1989). Teachers' perspectives on classroom interaction. In C. Desforges (Ed.), *The British Journal of Educational Psychology Monograph Series No. 4 Early Childhood Education* (pp. 158-166). Edinburgh: Macdonald Lindsay.
- Desforges, C., & Cockburn, A. (1987). *Understanding the maths teacher a study of practice in first schools*. London: The Falmer Press.
- Donaldson, M. (1978). *Children's minds*. Glasgow: Fontana/Collins.
- Doyle, W. (1983). Academic work. *Review of Educational Research*, 53, 159-200.
- Dye, J. S. (1989). Parental involvement in curriculum matters: parents, teachers and children working together. *Educational Research*, 31 (1), 20-33.
- Ernest, P. (1996). Popularization: Myths, massmedia and modernism. In A. J. Bishop, K. Clements, C. Keitel, J. Kilpatrick, & C. Laborde (Eds.), *International Handbook of Mathematics Education* (pp. 785-817). Dordrecht: Kluwer Academic Publishers.
- Elliot, J. (1991). *Action research for educational change*. Milton Keynes: Open University Press.
- Epstein, J. L. (1987). Parent involvement what research says to administrators. *Education and Urban Society*, 19 (2), 119-136.

- Evans-Schilling, D. (1996). Preparing educators for family involvement: Reflections, research and renewal. *Forum of Education*, 51 (1), 35-46.
- Fine, M. (1993). [Ap]parent involvement: Reflections on parents, power, and urban public schools. *Teachers College Record*, 94 (4), 682-710.
- Ford, M. S., & Crew, C. G. (1991). Table-top mathematics - A home-study program for early childhood. *Arithmetic Teacher*, 38 (8), 6-12.
- Franklin, J., & Krebill, J. (1993). Take-home kits. *Arithmetic Teacher*, 40 (8), 442-448.
- Garden, R. A. (Ed.). (1997). *Mathematics & science performance in middle primary school results from New Zealand's participation in the Third International Mathematics and Science Study*. Wellington: Ministry of Education.
- Gelman, R., & Gallistel, C. (1978). *The child's understanding of number*. New York: Oxford University Press.
- Goetz, J. P., & LeCompte, M. D. (1984). *Ethnography and qualitative design in educational research*. San Diego: Academic Press.
- Goldstein, S., & Campbell, F. A. (1991). Parents: A ready resource. *Arithmetic Teacher*, 38 (6), 24-287.
- Goldring, E. B. (1991). Parents: Participants in an organisational framework. *International Journal of Educational Research*, 15 (2), 215-227.
- Greenberg, P. (1989). Parents as partners in young children's development and education: A new American fad? Why does it matter? *Young Children*, 44 (4), 61-75.
- Hannon, P. W., & Cuckle, P. (1984). Involving parents in the teaching of reading: a study of current school practice. *Educational Research*, 26 (1), 7-13.
- Hatano, G. (1993). Time to merge Vygotskian and constructivist conceptions of knowledge acquisition. In E. A. Forman, N. Minick, & C. A. Stone (Eds.), *Contexts for learning: Sociocultural dynamics in children's development* (pp. 153-166). New York: Oxford University Press.
- Henry, M. (1996). *Parent-school collaboration feminist organizational structures and school leadership*. New York: State University of New York Press.
- Hewison, J. (1988). The long term effectiveness of parental involvement in reading: A follow-up to the Haringey reading project. *British Journal of Educational Psychology*, 58, 184-190.

- Hewison, J., & Tizard, J. (1980). Parental involvement and reading attainment. *British Journal of Educational Psychology*, 50, 209-215.
- Higgins, J. (1994). *Promoting mathematical processes in the junior classroom Final report to the Ministry of Education*. Wellington College of Education.
- Hopkins, D. (1993). *A teacher's guide to classroom research*. Buckingham: Open University Press.
- Hughes, M. (1981). Can preschool children add and subtract? *Educational Psychology*, 1 (1), 207-219.
- Hughes, M. (1986). *Children and number difficulties in learning mathematics*. Oxford: Basil Blackwell Ltd.
- Hulsebosch, P. L. (1991). Beauty is in the eye of the beholder: How and why teachers involve parents. *International Journal of Educational Research*, 15 (2), 183-200.
- Inagaki, K. (1992). Piagetian and post-Piagetian conceptions of development and their implications for science education in early education. *Early Childhood Research Quarterly*, 7, 115-133.
- Kamii, C., & De Clark, G. (1985). *Young children re-invent arithmetic*. New York: Teachers College Press.
- Kamii, C., Lewis, B. A., & Jones Livingstone, S. (1993). Primary arithmetic: children inventing their own procedures. *Arithmetic Teacher*, 41 (4), 200-203.
- Keith, T., Reimers, T., Fehrmann, P., Pottebaum, S., & Aubery, L. (1986). Parental involvement, homework and TV time: Direct and indirect effects of high school achievement. *Journal of Educational Psychology*, 78, 373-380.
- Kemmis, S., & McTaggart, R. (1982). *The action research planner*. Victoria: Deakin University.
- Kirkby, P. (1992). Story reading at home and at school: Its influence upon children's early literacy growth. *Reading*, July 1992, 7-12.
- Lange, D. (1988). *Tomorrow's schools: The reform of educational administration in New Zealand*. Wellington: Government Printer.
- Lave, J. (1988). *Cognition in practice: Mind, mathematics and culture in everyday life*. Cambridge: Cambridge University Press.
- Leder, G. C., & Gunstone, R. F. (1990). Perspectives on mathematics learning. In N. F. Ellerton & M. A. Clements (Eds.), *School mathematics: The challenge to change* (pp. 105-120). Geelong, Victoria: Deakin University.

- Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues*, 2, 34-46.
- Madell, R. (1985). Children's natural processes. *Arithmetic Teacher*, 32, 20-22.
- Masingilia, J. O. (1993). Learning from mathematics practice in out-of-school situations. *For the Learning of Mathematics*, 13 (2), 18-22.
- Mawson, T. (1996). Parent participation: Teacher and parent practices and perceptions at an Australian Government primary school. *Forum of Education*, 51 (1), 92-102.
- McDermott Murphy, D. (1997). Parent and teacher plan for the child. *Young Children*, 52 (4), 32-36.
- McIntosh, A. (1990). Becoming numerate: Developing number sense. In S. Willis (Ed.), *Being numerate: what counts* (pp. 24-43). Hawthorn: The Australian Council for Educational Research Ltd.
- McIntosh, A., Reys, B. J., & Reys, R. E. (1992). A proposed framework for examining basic number sense. *For the Learning of Mathematics*, 12 (3), 2-8, 44.
- McNiff, J., Lomax, P., & Whitehead, J. (1996). *You and your action research project*. London: Routledge.
- Meadows, S., & Cashdan, A. (1988). *Helping children learn: Contributions to a cognitive curriculum*. London: David Fulton.
- Meadows, S. (1993). *The child as thinker: The development and acquisition of cognition in childhood*. London: Routledge.
- Measor, L. (1985). Interviewing: A strategy in qualitative research. In R. G. Burgess (Ed.), *Strategies of educational research qualitative methods* (pp. 23-54). London: Falmer Press.
- Mellor, W. L., & Hayden, P. (1981). Issues and channels in communication between a school and its parental environment. *The Journal of Educational Administration*, XIX (1), 55-67.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Fransisco: Jossey-Bass Inc.
- Merttens, R., & Vass, J. (1990). *Sharing maths cultures: IMPACT: Inventing maths for parents and children and teachers*. Hampshire: Falmer Press.

- Minichiello, V., Aroni, R., Timewell, E., & Alexander, L. (1990). *In-depth interviewing: Researching people*. Longman Cheshire: Melbourne.
- Ministry of Education. (1992). *Mathematics in the New Zealand curriculum*. Wellington: Learning Media.
- Mortimore, P., & Sammons, P. (1987). New evidence on effective elementary schools *Educational Leadership*, 45 (1), 1-8.
- Newman, R. S. (1984). Children's achievement and self-evaluation in mathematics: a longitudinal study. *Developmental Psychology*, 76, 857-873.
- O'Connell, S. R. (1992). Maths pairs - Parents as partners. *Arithmetic Teacher*, 40 (1), 10-12.
- Office for Standards in Education. (1993). *Reading recovery in New Zealand. A report from the office of Her Majesty's Chief Inspector of Schools*. London: HMSO.
- Orman, S. A. (1991). Mathematics backpacks: Making the home-school connection *Arithmetic Teacher*, 40 (6), 306-08.
- Parlett, M., & Hamilton, D. (1972). *Evaluation as illumination: A new approach to the study of innovatory programmes* (Occasional Paper No. 9). Centre of Research in the Educational Sciences, University of Edinburgh.
- Parr, J., McNaughton, S., Timperley, H., & Robinson, V. (1993). Bridging the gap: practices of collaboration between home and the junior school. *Australian Journal of Early Childhood*, 18 (3), 35-42.
- Pateman, N. A., & Johnson, D. C. (1990). Curriculum and constructivism in early childhood mathematics: Sources of tension and possible resolutions. In L. P. Steffe & T. Wood (Eds.). *Transforming children's mathematics education: International perspectives*. Hillsdale, NJ: Lawrence Erlbaum.
- Patton, M. Q. (1980). *Qualitative evaluation methods*. Beverley Hills: Sage.
- Phtiaka, H. (1996). Each to "his" own? Home-school relations in Cyprus. *Forum of Education*, 51 (1), 47-59.
- Picot, B., Ramsay, P., Rosemergy, M., Wereta, W., & Wise, C. (1988). *Administering for excellence: Effective administration in education*. Wellington: The Taskforce to Review Educational Administration.
- Pratt, M. W., Green, D., MacVicar, J., & Bountrogianni, M. (1992). The mathematical parent: Parent scaffolding, parenting style, and learning outcomes in long division mathematics homework. *Journal of Applied Developmental Psychology*, 13, 17-34.



- Ramsay, P., Baimba, A., Kaai, T., Hawk, K., Poskitt, J., Harold, B., & Marriott, R. (1989). *CRRISP Curriculum Review Research In Schools Project The desirability of partnership in education: The research evidence* (Occasional Paper No. 6). Hamilton: Department of Education, University of Waikato.
- Ramsay, P., Harold, B., Hawk, K., Kaai, T., Marriott, R., & Poskitt, J. (1990). *"There's no going back" Collaborative decision making in education*. (Final Report). Curriculum Review Research In Schools Project. University of Waikato.
- Ramsay, P., Harold, B., Hawk, K., Marriott, R., & Poskitt, J. (1992). Sharing curriculum decisions with parents: an overview of the findings of Project CRRISP. *New Zealand Journal of Educational Studies*, 27 (2), 167-182.
- Ramsay, P., Sneddon, D., Grenfell, J., & Ford, I. (1983). Successful vs unsuccessful schools: A study in southern Auckland. *Australia and New Zealand Journal of Sociology*, 19 (2), 272-304.
- Rasinski, T. V. (1989). Reading and the empowerment of parents. *The Reading Teacher*, 43 (3), 226-231.
- Raven, J. (1989). Parents, education and schooling. In C. Desforges (Ed.), *The British Journal of Educational Psychology Monograph Series No. 4 Early Childhood Education* (pp. 47-67). Edinburgh: Macdonald Lindsay.
- Resnick, L. B. (1987a). Constructing knowledge in school. In L. S. Liben (Ed.), *Development and learning: Conflict or congruence?* (pp. 19-50). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Resnick, L. B. (1987b). Learning in school and out. *Educational Researcher*, 16, 13-20.
- Rogoff, B. (1987). Specifying the development of a cognitive skill in its interactional and cultural context. *Monographs of the Society for Research in Child Development*, 52, 153-159.
- Saxe, G. B. (1989). Selling candy: A study of cognition in context. *The Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 11 (1&2), 19-22.
- Saxe, G. B., Guberman, S. R., & Gearhart, M. (1987). Social processes in early number development. *Monograph of the Society for Research in Child Development*, 52 (2, Serial No. 216).

- Schleicher, K. (1984). *Primary education: Cooperation between school and family (Prerequisites - implementation - problems) (Report No. PS 014 654)*. University of Hamburg. (ERIC Document Reproduction Service No. ED 254 306).
- Schmittau, J. (1993). Connecting mathematical knowledge: A dialectical perspective. *Journal of Mathematical Behaviour*, 12, 179-201.
- Siegler, R. S. (1981). Developmental sequences within and between concepts. *Monograph of the Society for Research in Child Development*, 46.
- Somerset, G. (1976). *Vital play in early childhood*. Wellington: New Zealand Playcentre Federation.
- Spradley, J. P. (1980). *Participant observation*. New York: Holt Rinehart and Winston.
- Thomas, G. (1994). *Discussion in junior mathematics. Helping one another learn?* Final report to the Ministry of Education. Dunedin College of Education.
- Tizard, J., Scholfield, W. N., & Hewison, J. (1982). Collaboration between teachers and parents in assisting children's reading. *British Journal of Educational Psychology*, 52, 1-15.
- Tizard, B., Blatchford, P., Burke, J., Farquhar, C., & Plewis, I. (1988). *Young children at school in the inner city*. London: Lawrence Earlbaum.
- Tizard, B., & Hughes, M. (1984). *Young children learning*. London: Fontana.
- Toomey, D. M. (1989). How home-school relations policies can increase educational inequity: a three-year follow-up. *Australian Journal of Education*, 33 (3), 284-298.
- Toomey, D. (1996). The dark side of parental involvement in schools. *Forum of Education*, 51 (1), 60-72.
- Vincent, C. (1996). Parent empowerment? Collective action and inaction in education *Oxford Review of Education*, 22 (4) 465-482.
- Visser, H., & Bennie, N. (1996). *An evaluation of the resource Beginning School Mathematics*. Wellington: Ministry of Education.
- Visser, H., & Walker, D. (1993). A survey of parent and caregiver opinions about BSM and mathematics at junior school level. *Bulletin*, No. 1, 29-34.
- von Glasersfeld, E. (1990). Environment and communication. In L. P. Steffe & T. Wood (Eds.), *Transforming children's mathematics education: International perspectives* (pp. 30-38). Hillsdale, NJ: Lawrence Erlbaum.

- Watson, K., & Young, B. (1986). Discourse for learning in the classroom *Language Arts*, 63, 126-33.
- Wells, G. (1985) *Language development in the preschool years*. Cambridge: Cambridge University Press.
- Wells, G. (1986). *The meaning makers. Children learning language and using language to learn*. NH: Heinemann Educational Books.
- Wertsch, J. V., & Tulviste, P. (1992). L. S. Vygotsky and contemporary developmental psychology. *Developmental Psychology*, 28, 548-557.
- White, K. R., Taylor, M. J., & Moss, V. D. (1992). Does research support claims about the benefits of involving parents in early intervention programs? *Review of Educational Research*, 62 (1), 91-125.
- Wood, T., Cobb, P., & Yackel, E. (1990). The contextual nature of teaching: mathematics and reading instruction in one second-grade classroom. *The Elementary School Journal*, 90 (5), 496-513.
- Workman, S. H., & Gage, J. A. (1997). Family-school partnerships: A family strengths approach. *Young Children*, 52 (4), 10-14.
- Wright, R. J. (1994). A study of the numerical development of 5-year-olds and 6-year-olds *Educational Studies in Mathematics*, 26, 25-44.
- Wright, V., Tichbon, A., & Shephard, W. (1994). *Topic based mathematics 2*. Hamilton: Mathematics Advisory Service.
- Wylie, C., & Smith, L. (1995). *Learning to learn children's progress through the first 3 years of school*. Wellington: New Zealand Council for Educational Research.
- Young-Loveridge, J. M. (1987). The development of children's number concepts. Education Department, University of Canterbury, *Research Report No 87-1*.
- Young-Loveridge, J. M. (1989a). The development of children's number concepts: The first year of school. *New Zealand Journal of Educational Studies*, 24 (1), 47-64.
- Young-Loveridge, J. M. (1989b) The development of number in five to eight-year-olds. *Delta* 42, 25-37.
- Young-Loveridge, J. M. (1989c). The relationship between children's home experiences and their mathematical skills on entry to school. *Early Child Development and Care*, 43, 43-59.

- Young-Loveridge, J. M. (1990). *The use of games and books to improve children's number concepts: The EMI-5s study*. Paper presented at the 12th NZARE Conference.
- Young-Loveridge, J. M. (1993). *The effects of early mathematics intervention. The EMI-5s study*. Hamilton: Department of Educational Studies, University of Waikato.

## **APPENDICES**

**1: Questionnaire sent to parents**

**2: Sample Newsletters developed for Milland School - BSM cycles**

Module 1, Cycle 2, Activities 1, 2 and 3 (1-1 matching)  
Module 1, Cycle 2, Activities 8, 9 and 10 (long, longer, longest etc)  
Module 1, Cycle 3, Activities 2, 3, 5 and 6 (counting to 9 etc)  
Module 1, Cycle 3, Activities 9, 10 and 11 (same/not same etc)

**3: Sample Newsletters developed for Pallace School - First format**

Geometry  
Time and Temperature

**4: Sample Newsletters developed for Pallace School - Second format**

Number - Level 1  
Number - Level 2

After I have analysed the questionnaires I will be seeking twelve parents/caregivers to be interviewed more closely about the newsletters, junior mathematics and home-school communication.

If you choose to participate in the interviews:

Your comments will be confidential.

You may refuse to answer any question.

You may request further information about the study at any time

and You will have access to a summary of the findings from my study when it is concluded.

Please indicate at the end of the questionnaire if you would be willing to be interviewed

August 1996

Kia Ora

My name is Jan Savell and I'd like to get some feedback from you about the "ROOM 8 Maths News" sheets that your child has been bringing home.

I'm a Secondary School Mathematics teacher studying towards a M.Ed.Stud (Mathematics). My personal interest in helping young children learn mathematics led me to develop and produce the "Room 8 Maths News" sheets as the first stage of my research, aimed at improving communication between home and school.

Please fill in the enclosed questionnaire and either give it to or bring it with you to the interview room (off the school foyer) where I will be waiting. I would welcome extra comments - either verbal or written onto the questionnaire.

All information I collect will be reported anonymously but at this stage I require your child's name and class so that I can keep track of returns.

Thank you for your help.




**MASSEY  
UNIVERSITY**

Private Bag 11222  
Palmerston North  
New Zealand  
Telephone 0-6-356 9099  
Facsimile 0-6-350 5611

FACULTY OF  
INFORMATION  
AND  
MATHEMATICAL  
SCIENCES

DEPARTMENT OF  
MATHEMATICS

**TITLE OF STUDY:**

An investigation into the effectiveness of parent newsletters in the junior mathematics classroom.

**RESEARCHER:** Jan Savell  
16 Salisbury Ave  
Palmerston North Ph/fax 354 6557

**SUPERVISOR:** Dr Glenda Anthony  
Dept of Mathematics  
Massey University Ph (06) 356 9099

**APPROVED by** Massey University Human Ethics Committee.  
Reference HEC95/158



Child's Name \_\_\_\_\_ Room 8

Add any further comments or suggestion here:

Has your child been bringing home the "Room 8 Maths News" sheets? How many have you received?

None	1	2	3	4	Don't know

What was your reaction to them?

Really liked them	Liked them with some reservations	Indifferent	Didn't like them

Did you try any of the suggested activities?

Yes, and made up some of our own.	Yes, tried one or more suggested activities	No, but made up some of our own	Didn't do anything from "Room 8 Maths News"

Did the "Room 8 Maths News" increase your awareness of the maths your child was studying at school?

No. We were already familiar with the school maths programme.	A little bit - but we already knew most of what we read in the newsletters.	Gave us information about what was being done each week.	We hadn't realised what was going on before we received the newsletters.

Would you like "Room 8 Maths News" to continue?

Yes	No	Don't feel strongly either way

Would you be willing to be interviewed to discuss your reaction to the newsletters in more detail?

☐

YES. My telephone no. is (06) \_\_\_\_\_ (evening)

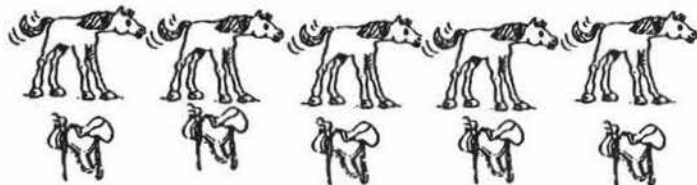
Please drop this into the interview room before you leave the school or return to Mrs Allomes as soon as possible.

SAVELL: 2-1-1,2,3  
**Maths News**

This week we have been matching groups of items (*later we call them sets*) and commenting on whether there are "enough", "not enough", "more" or "not as many as". (*Eventually we will learn to say that sets with the same number of items are equivalent*).

For instance

- We looked at 6 cups and 8 saucers and found that we needed more cups to match all the saucers.
- We worked with 8 cars and 6 toy garages and found that we had enough garages to match all the cars.



If you would like to support our classroom mathematics with activities at home you could look for examples of matched items and comment on them. You will probably have better ideas but to help you get started we've made this list of items we thought of:

- Going swimming - have we enough towels for everyone?
- Playing with dolls - do we have enough beds?
- Any sort of game that matches items - eg card games like SNAP, Memory etc
- Mealtimes - endless possibilities! knives to forks, plates to people, chairs to people etc.
- Shopping - buying yoghurts, apples, ice creams etc and matching them with the people who will eat them (but remember we only want to match one-to-one so you don't want to draw attention to buying items like potatoes if Dad and Mum eat two!)

Have fun. Happy Mathematics!

SAVELL: 2-1-1,2,3



Savell: 2-1-8  
**Maths News**

This week we have been comparing items and talking about the differences in size. We have been using the words "long", "longer", "longest", "as long as", "tall", "taller than", "tallest" and "as tall as".

For instance

- We had three ropes which were all coiled up. We made guesses and then checked our predictions, talking about them being long, longer or longest.
- We compared collections of sticks and pencils and used these words to describe them.
- We compared the heights of our toys and then our own heights, talking about who was the tallest etc.



If you would like to support our classroom mathematics with activities at home you talk about the length or height of objects that you see. You will probably have better ideas but to help you get started we've made this list of items we thought of:

- When brushing hair in the morning talk about who has longer hair in your class, who has the longest hair in the family?
- When sorting washing compare the length of people's socks, trousers, sleeves etc.
- Measure family heights on the wall and compare them. Is Mum tall? Is Dad taller?
- Who takes the longest time to brush their teeth?, to have a bath etc?

Have fun. Happy Mathematics!



Savell: 2-1-8

This week we have been counting. Teachers recognise two types of counting.

Rote counting is the first activity that we learn. This means being able to say the numbers from 1 onwards in the correct order. We have been rote counting up to 9 in a variety of activities.

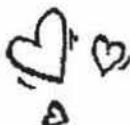
For instance

- We shut our eyes and counted to 9 while some one hid an object and then we tried to guess where it was.
- We counted to nine while each person built a tower with blocks. We tried to see who could build the highest tower.

The other type of counting (called enumeration) involves matching the numbers with objects (eg counting how many children are at the table). This is harder for small children who need to be encouraged to point to each item while saying the number that refers to it. We counted groups of up to four objects.

For instance

- We were each given a handful of beads and then we counted how many we had and compared the number to others in the group (using words like "more", "fewer" and "the same number as")
- We counted and matched picture cards with dot patterns.  
eg



If you would like to support our classroom mathematics with activities at home you can look for opportunities to count. We would enjoy practice at counting out loud (just to practice saying the numbers) and counting things (where we have to match the numbers with objects).

Have fun. Happy Mathematics!

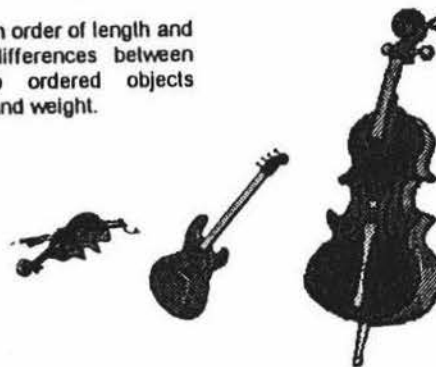
Savell: 3-1-2,3,5,6



This week we have been comparing items and talking about the differences in size. We have been using the words

"the same length as"/"not the same length as",  
 "the same height as"/"not the same height as",  
 "the same weight as"/"not the same weight as".

We laid objects out in order of length and talked about the differences between them. We also ordered objects according to height and weight.



If you would like to support our classroom mathematics with activities at home you could compare the length, height and weight of objects that you see. You will probably have better ideas but to help you get started we've made this list of items we thought of

- Compare the dimensions of family members:  
Who has the longest arms? The longest hair? Who is tallest? Who is heaviest?
- Blocks (wooden or plastic) and lego are ideal for these sort of activities.  
Can you put all the blocks in order of size?
- Stones, sticks, leaves or even worms can all be put into order of length or weight. Talk about the differences. Is this one longer than that one?
- Who can jump the highest? Shout the loudest? Stay quiet the longest?  
Great activities for long car rides!

Have fun. Happy Mathematics!

Savell: 3-1-9,10,11



## Some specific activities you may like to try

### What's missing?



Find pictures in magazines, colouring books etc of familiar objects that have either a vertical or a horizontal mirror line. Cut the picture in half through the mirror line and stick one half onto a piece of paper. Ask the child to draw in the missing half to complete the picture. When they've finished use a mirror to see how accurate they were.

### Fun with Mirrors

Put a mirror across the dotted line.

Can you read the words?

Make up some of your own.

UNIQUE - LOVE

### Roadsign Spotting

As you travel try and name the shapes of the road signs you see. What shape is a GIVE WAY sign? What shape is the STOP sign? What about the RAILWAY CROSSING?

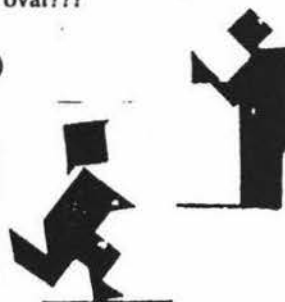
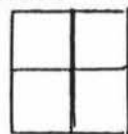
Or see who can find at least one example of : triangle, circle, rectangle, square, hexagon, octagon and maybe even oval???

The **TANGRAM** puzzle (like a jigsaw) mentioned in an earlier newsletter would provide plenty of shape recognition.

### Hidden Shapes

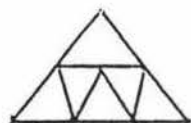
There are five squares in this drawing.

Can you find them all?



How many triangles in this one?

Make up your own examples to try out.



## Room 8 Maths News

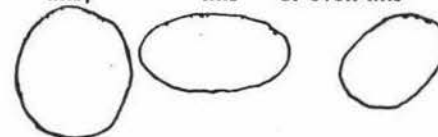
We are now working on geometry.

Geometry is about space and the way we enclose it. To understand more advanced mathematical ideas we must first be familiar with basic shapes. At this level we encourage the students to use the correct vocabulary so it is important that you can also identify the shapes they will be working with.

This is a circle.

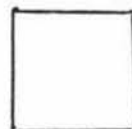


The other curved shape we work with is oval. Ovals can look like this, this or even this



This is a square.

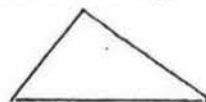
It has four equal sides.



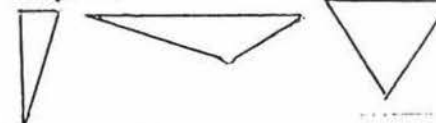
These are rectangles. They have two pairs of equal sides. They can be drawn in a number of different ways.



A shape with three sides is called a triangle.



Triangles can be drawn in lots of different ways too.



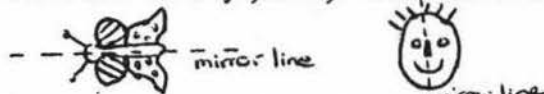
A shape with six sides is a hexagon. Although they are usually drawn to look like this



### CIRCLE OVAL SQUARE RECTANGLE TRIANGLE HEXAGON

We look for examples of these shapes, talk about their characteristics and explore what happens when we turn them around or reflect them in a mirror.

We also use mirrors to investigate the symmetry of other objects with mirrors. For instance we may find that a butterfly has only one mirror line (where we can place a mirror and re-make the butterfly). Later on this will be called a *line of symmetry*. A face also has one mirror line.

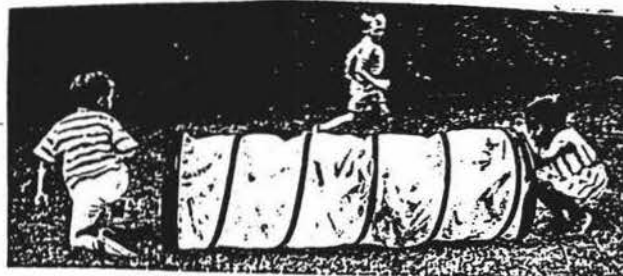


Half and quarter turns are also introduced briefly. What would this face look like if we gave it a half turn? What if we only turned it a quarter turn? (Later on this will be called the *order of rotational symmetry*)



### Three dimensional objects are mathematical too!

Following on the real-life emphasis of the new mathematics curriculum we also explore three dimensional objects. We try to find examples of **spheres** eg ball, **cylinders** eg tin can, **cones** eg road markers, **cubes** eg dice, and other familiar **prisms** eg matchboxes.



The language we use with our three dimensional objects is also important. We use the words **face** (for the sides) **edges** (where two faces meet) **corners** (where three edges meet) when we are describing what these three dimensional objects look like. For instance we might discover that our "cube has six faces, eight corners and twelve edges."

### WHAT CAN PARENTS DO TO HELP

Every day you touch, look at and use objects. Talk to your child about the shape of these things. *The baked beans can is a cylinder. The lolly is a sphere. This picture is in an oval frame.* Confidently using words like oval, rectangle, square etc is a big step towards understanding geometry later on.

Symmetry is a more difficult concept but you can help by noticing the way things change when we look at them in the mirror or when we turn them around.

Please talk to Mrs [redacted] if you are unsure about any of this work or the language used. Symmetry is a relatively new subject in the mathematics curriculum and you may not have met it in your own schooling...

...and don't be afraid to ask your child to tell you what they've been doing in class. They may enjoy being the teacher for a change!

## TOP HATS - a Maths Holiday SPECIAL ACTIVITY

(Strictly speaking this activity is only marginally concerned with time and temperature but I love it so much that I just had to put it in - so close to the holidays - Bon Appetite)

**Top Hats** is a simple sponge recipe that does not require accurate weighing. You do need scales, bowl, spoons, muffin tins and paper cases, jam, two eggs, flour, sugar and margarine.

Place the two eggs on the scales and balance them, in turn, with the flour, sugar and margarine. Put the sugar and margarine into the bowl and mix them together. Break the two eggs and add them to the mixture, along with the flour. Mix all ingredients thoroughly.

The oven needs to be set to 190 C or 375 F or gas mark 5.

Before the sponge mixture is put into the paper cases ask questions like:

- What size spoon do we need to put the mixture into the cases?
- How many little buns will the mixture make?
- How many paper cases shall we put in the tins?

As the mixture is put into the cases remember to ask:

- Have we enough mixture to fill these cases?
- Do we need to get out some more cases or another muffin tin?

The sponge cakes will take 20 minutes to cook.

Once the tins are in the oven ask:

- Can you set the timer for 20 minutes?
- What time by the clock will the cakes be ready?
- If we check them 5 minutes earlier, what time will that be?
- Can we clear everything away in 20 mins?
- Shall we get the cooling tray ready?
- What size spoon will we need to put jam in the cakes?

Once the cakes are out of the oven, check the time and ask:

- Were they ready on time, earlier or did we cook them longer?
- How long will they take to cool?
- What time will we put the jam in?

Once the cakes are cool slice off the top, put in a spoonful of jam and put the "top hat" back on.



*This recipe is one of many excellent home based mathematics activities in a book "Help your child with Maths" by Angela Walsh.*

## Room 8 Maths News

We are now working with time and temperature.

- We read clocks (both digital and analogue) to the hour or half hour
- We discuss how long a planned activity will take.
- We compare the time taken for different activities and decide which took the longest/shortest etc.
- We read thermometers and record temperatures.
- We compare temperatures to find which is the coldest/hottest and ask questions about the difference in temperature.

The mathematics syllabus stresses that mathematics must be presented in a realistic context. We use real-life examples as much as possible and encourage the children to contribute their own ideas and experiences to discussion.

Measurement work (especially with time and temperature) lends itself to hands-on activities with plenty of interaction. Once the children are competent at the actual measurement tasks they are encouraged to compare results and draw conclusions from them.

eg For the last three nights the TV weather has shown Auckland's temperature as being higher than Palmerston North's ... does this mean that Auckland is warmer or colder than Palmerston North? What clothes would we take to Auckland for a holiday? What clothes would we take to Dunedin?

Students can be extended with "What if..." or "I wonder ..." questions. For instance "I wonder what temperature it would be in Palmerston North if it was snowing...", "What if there was no TV in NZ.... How much extra time would you have each day if you didn't have TV?... Would it be enough time to bake a chocolate cake EVERY day?



## How can parents help?

Parents have the perfect environment for mathematics - the home during normal family life! While at school we strive to come up with realistic examples of time or temperature, your examples will naturally be realistic.

Give your children plenty of practice at telling the time. Many children are confident with a digital watch. Extend them to a round clockface, first with half hours, then quarters. Some children may like to practice counting up in 5's (a useful skill for future years when they begin learning times tables.)

Encourage them to estimate and measure time. Notice that *Barney* takes 20 minutes but *What Now?* goes on all morning - more than 2 hours?

When you naturally comment on temperature encourage your child to have a go at estimating. For instance "It's cold today isn't it? What temperature do you think it would be? Maybe 12 degrees?"

If you have a thermometer encourage them to measure temperatures. With a clinical thermometer they could compare their temperature taken under their tongue with that under their arm. Or use a thermometer to compare temperatures in different rooms of the house - or between inside and outside. Weather forecasts are available on TV, radio and the newspaper - do they agree with your thermometer in the backyard?

If you have any questions about the way we approach measurement topics at school please ask Mrs S. It is important to remember at all times that every child is an individual. Some children may already be reading an analogue watch to the nearest 5 minutes while others struggle to master "the O'clocks". All skills will improve through practice and practice is most effective when the child feels that they are being successful.

This newsletter has six specific activities. You may like to try one of them. Choose a level of difficulty that guarantees your child success.

## Maths Activities you can do at home

### HOLIDAY PREPARATION

Listen to weather forecasts for your intended holiday destination. Compare them with your home temperatures. Is it going to be warmer, colder or about the same? OR (if you are staying home you can always pretend) Get each person in the family to choose a possible holiday location. Note the temperature each day and see who has the best weather.

### ODD-ONE-OUT GAME

Make up a list of four things. Players must guess the odd one out.  
eg togs, shorts, woolly jersey, sandals (*jersey isn't worn on a hot day*)  
eg eating your breakfast, brushing your teeth, putting on your shoes, brushing your hair (*eating your breakfast takes much longer than the others*)

### ONE MINUTE IS ENOUGH

Most parents will have encouraged their children to "be quiet for exactly one minute" in the car but have you ever had a game of dares that must be carried out in one minute?

eg Can you eat an apple in 1 minute? Can you get into your PJs in 1 minute? Can you run around the garden? Can you tidy your bedroom?

### THUNDER

Every 3 seconds timed between the sight of lightning and the sound of thunder indicates that the storm is 1 kilometre away.

### TIMETABLES

These holidays why not catch the bus. Use a bus timetable to choose a good time to catch the bus into town. Or let your children be part of the train/plane/ferry planning if you are planning a longer trip.

### VIDEO

Encourage your child to choose a favourite TV programme and set the video themselves to record it.

Our Number over the next days involves two-digit numbers, as described on the first page of the newsletter.

At the end of the unit the children will be tested on questions similar to the ones below:

$$\begin{array}{r} 1. \quad 5 \\ +3 \\ \hline \end{array} \quad \begin{array}{r} 2. \quad 63 \\ +34 \\ \hline \end{array} \quad \begin{array}{r} 3. \quad 6 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 9 \\ -4 \\ \hline \end{array} \quad \begin{array}{r} 5. \quad 48 \\ -23 \\ \hline \end{array} \quad \begin{array}{r} 6. \quad 15 \\ -7 \\ \hline \end{array}$$

Round to the nearest 10

$$7. \quad 32 \quad 8. \quad 78 \quad 9. \quad 55$$

Estimate the answer by rounding these numbers to the nearest 10

$$\begin{array}{r} 10. \quad 48 \quad \text{rounds to } \underline{\quad} \\ +21 \quad \text{rounds to } \underline{\quad} \\ \hline \text{sum} = \underline{\quad} \quad \text{Estimated sum} = \underline{\quad} \end{array} \quad \begin{array}{r} 11. \quad 85 \quad \text{rounds to } \underline{\quad} \\ -42 \quad \text{rounds to } \underline{\quad} \\ \hline \text{Difference} = \underline{\quad} \quad \text{Estimated} = \underline{\quad} \end{array}$$

12. Show how you can check addition (by using subtraction).

$$\begin{array}{r} 24 \\ +6 \\ \hline \end{array} \quad \begin{array}{r} \underline{\quad} \\ - \underline{\quad} \\ \hline 24 \end{array} \quad \begin{array}{r} \underline{\quad} \\ - \underline{\quad} \\ \hline 6 \end{array}$$

Answers:

1. 8   2. 97   3. 13   4. 5   5. 25   6. 8   7. 30   8. 80   9. 60 (5 rounds up)  
10. 48 rounds to 50, 21 rounds to 20, sum=69, Estimated sum 50+20=70  
11. 85 rounds to 90, 42 rounds to 40. Difference=43, Estimated difference 90-40=50  
12.  $24+6=30$ ,  $30-6=24$ ,  $30-24=6$

## Room 8 Maths News

LM2#1

*Thank you to all the parents who returned my questionnaire. I really appreciate the feedback. This term I am trialling a new format.*

*Jan Savell.*

The newsletters will detail the objectives for the upcoming mathematics topic and give you examples of questions you could use to "test" to see if your child is having difficulty. As usual activities are suggested for you to do with your child at home to promote understanding.

**REMEMBER** not all children will be able to do all activities (that's why they will be taught in class!) Mrs S. can be approached at any time if you are concerned or you have questions.

Our topic to start Term 4 will be **NUMBER**.

At this level we will be dealing with numbers up to 100.

- writing the numerals
- rounding numbers to the nearest 10
- addition and subtraction of the numbers
  - estimation of answers
  - addition and subtraction as opposites.

### The preparation for Number work

We have already covered some number work earlier this year so the children should be able to:

1. Write the numerals to 20.
2. Work out the answers to addition and subtraction problems with answers to 20.
3. Use the signs > (greater than) and < (less than) to compare two numbers less than 20.

You could check that your child is competent at earlier number work by:

1. Writing out a series of numbers and asking them to write in the missing ones. eg 11 12 \_ 14 or 5 \_ \_ 8 \_ 10
2. Asking them to add or subtract numbers to 20. eg  $13 - 2 = \_$  or  $8 + 5 = \_$ .  
*At this level it is expected they would "count in their heads" or use fingers to help them find the answers.*
3. In class we also use story problems. eg We had twelve apples in the fruitbowl and then Grandma arrived with six more. How many apples do we have now?
4. The children will probably need a little revision of  $<$  and  $>$ . Problems with the operator missing eg  $8\_3$  (Ans  $8 > 3$ ) are appropriate.  
*Ask them how they remember which one is which. Have they got a special way of telling less than and greater than apart?*

If your child has difficulty with the numbers up to 20 it is important to give them more practice at using them. You can probably think of many ways of doing this. Here are a few suggestions:

- Look for numerals in the environment. Walk along the road calling out the numbers on the letterboxes or make a game of "run to the number 13, hop to number 17, walk backwards to 21..."
- Check out the prices in the supermarket coupon books. Write out a "shopping list" when you go to the supermarket. Write in the prices beside each item.
- Count your steps as you walk along the road. How far is it from the door to the letterbox? How far from the letterbox to the car? Which is the greater distance? If you walk from the car to the letterbox and then to the door how many steps do you walk altogether?

## New Mathematics Work

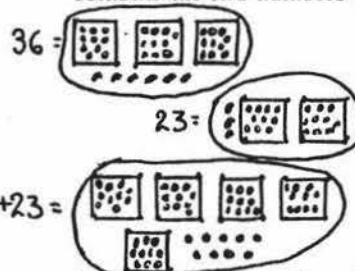
Remember that formal addition and subtraction methods are still relatively new to your child. In class we encourage the use of base ten blocks, the abacus and other "hands on" equipment so the children understand what is happening when they use pen-and-paper techniques.

A very popular way of introducing two digit addition is to use BEANZ. These are plastic beans which are bagged into groups of 10.

ie 10 beans to a bag (no more, no less)

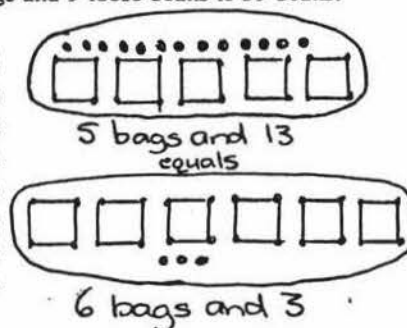
and any beans left over remain as "loose beans"

Children quickly learn that a shortcut to counting individual beans is to count how many bags (of 10) and how many loose beans. They can then combine the two numbers to get a two-digit answer.



The children are encouraged to add  $36 + 23$  by gathering 3 bags and 6 loose beans (for 36) in one pile, and 2 bags and 3 loose beans (for 23) in the other pile. For addition we join these two piles together to find that we have 5 bags and 9 loose beans ie 59 beans.

In some situations the children find that they can "regroup" their beans to get the answer. eg  $38 + 25$  would give 5 bags and 13 loose beans. These loose beans can then be *regrouped* so that you have one more complete bag and three loose beans left over. Hence you now have six bags and three loose beans ie 63 beans.



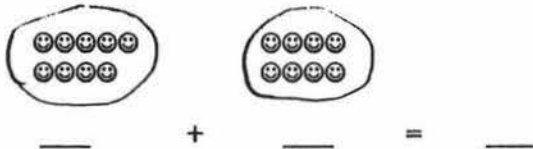
## Room 8 Maths News

### Our Number work over the next days

involves continued work with two-digit numbers up to 20 as detailed on the first page of this newsletter.

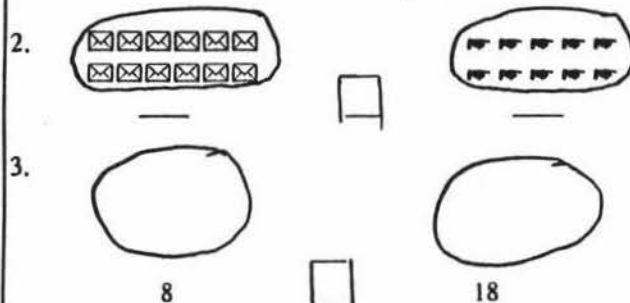
At the end of the unit the children will be tested on questions similar to the ones below:

1. Nine girls and eight boys from Room 8 went to the School Gala. How many children from Room 8 went to the Gala altogether?



Fill in the numbers and the correct sign to compare the sets below:

< less than  
> greater than  
= equals



Answers:

1.  $9 + 8 = 17$

2.  $12 > 10$

3.  $8 < 18$

The newsletters will detail the objectives for the upcoming mathematics topic and give you examples of questions you could use to see your child's progress. As usual activities are suggested for you to do with your child at home to promote understanding.

**REMEMBER** not all children will be able to do all activities (that's why they will be taught in class!). Mrs E can be approached at any time if you are concerned or you have questions.

We started Term 4 with the topic of NUMBER.

At this level we are dealing with numbers up to 20. We've been

- writing the numerals
- counting the number of objects in a set
- joining two sets together
  - (and starting to record the results using + and =)

### New mathematics work

Now we are comfortable with + and = (read as "plus" and "equals") so we are extending their use to story problems.

eg: Mrs. picked 12 daisies for Speedy and brought them to school. At school the children of Room 8 gave her another 5 daisies. How many daisies did she have for Speedy altogether?

We are also comparing sets

and using < (less than) and > (greater than) to record our results.

eg:  $15 > 12$  and  $12 < 15$

If your child is having difficulty with the numerals from 10 to 20 this will be noted by the teacher and more practice will be given.

**You can help your child with their mathematics by:**

- Giving lots of opportunities to write down and read numbers greater than 10.
- Using the new vocabulary (plus +, equals =, less than <, greater than >) whenever you can.



As teachers we try to use number in "real life" contexts but in the classroom this can be difficult to do. As parents you can take the opportunity to "talk maths" as you carry out your normal family activities.

**Here are a few suggestions - we're sure you will think of more!**

- Look at the advertisements in the junk mail for items that cost less than \$20. Read out the prices to each other. Ask "Which is the cheapest?" (*The skateboard because \$16 is less than \$19*)
- Count how many steps it takes to walk from your bedroom to the bathroom. Make a map of your house and write in the number of steps to each room. Compare the bathroom to the kitchen. Ask "Which is the longest distance?" (*The bathroom because 12 steps is greater than 9 steps*)
- Talk about numbers in the family.
  - eg Xena is older than Bruno because Xena is 11 years old and Bruno is 7 years old and we know that *11 is greater than 7*.
  - I gave three pieces of apple to Bruno and four to Xena because Xena is older so I gave her the *greater number*.

## Some games you could play to extend your child's number concepts

- Take turns at playing "Guess my number". You write down a secret number. Your child writes down their guesses. You tell them if their guess is less than, greater than or equal to your number. They guess again and so on until their guess is correct.  
This game can be extended to numbers greater than 20 if your child is already confident.

- Take turns at playing "Guess my NEW number" with marbles, beans or teaspoons. Show your child 8 spoons in one hand, 7 spoons in the other and ask them to fill in the equation (number sentence) to show what will happen if you join the two sets together.

$$\square + \square = \square$$

If she's right she can make up the next addition problem for you!

This game can be extended to imaginary objects eg If I had 13 elephants in one cage and 5 elephants in the other cage, how many would I have altogether? Write the equation.

- "Make 20" can be played with a pack of playing cards with the picture cards removed. Players take turns at laying down cards until the total is 20. If the total of the cards on the table is less than 20, play continues. If the total is greater than 20, play ends and no points are scored. If the total equals 20 then the person who played the last card gets a point.

