



PARENTS AS PARTICIPATING *Partners*



**LINDA MARSHALL &
PAUL SWAN** describe
a series of workshops
designed for parents



to support their
primary-aged children
to learn mathematics
effectively.

Recent research has confirmed that parental involvement in education is positively associated with student achievement (Desforges & Abouchar, 2003), yet further efforts are needed to measure the effects of such programs systematically so as to inform the development of improved methods.

Having parents help their children with mathematics can be problematic. Teachers may not feel comfortable asking parents to help with their children's mathematics, and the parents themselves are often uneasy about helping. Teachers are frequently faced with "either parental antipathy, or indifference and apathy" (Calvert, cited in Merttens & Vass, 1993). Yet, having parents on side is a useful way to overcome difficulties that occur when the content of mathematics lessons is different from that experienced by the parents in their own schooling; and when the methods used may be quite confronting to them. Parents' uneasiness may be driven by their own negative memories of mathematics at school or by their perceived inability to do the mathematics. In addition, they may need to be reassured that their children are indeed learning mathematics when they appear to be "merely" playing a game or "playing" with equipment.

In our experience we found limited support available to assist parents to help with their children's mathematics learning. To help overcome this, six 45-minute workshops were offered to parents who were bringing their children to the university campus for Intensive Mathematics Clinic sessions during the July school holidays. In return, we wanted to find out about parents' beliefs and attitudes to mathematics, their confidence in assisting their children with mathematics and how helpful the workshops were. Pre-and post-workshop interviews and surveys were used to elicit this data.

The workshops

The six workshops, held over morning tea, were conducted at the same time as the Intensive Mathematics Clinic. The first workshop topic was learning the basic version of the card game *Numero*, a game that focuses on number facts and problem solving. Figure 1 shows a group of parents engaged in playing *Numero*. At this first session, the topics for the other five workshops were also negotiated. The topics for these workshops became:

- What is place value?
- Understanding and learning multiplication tables
- Using pattern blocks to enhance understanding of fractions
- Using base ten blocks to understand addition and subtraction
- Advanced *Numero*.

Three themes came through when discussing the topics for the further five sessions:

- the language of mathematics was considered to be a barrier;
- parents were not sure what to do about "the times tables"; and
- they were confused about aspects of fractions.

The parents were given a copy of a mathematics dictionary (Bana, Marshall & Swan, 2005) at the second workshop, and the issue of the language of mathematics

was emphasised in the remaining sessions.

The first session involved learning the game *Numero* as it was felt this would not be threatening. *Numero* is more than a simple practice game as it includes elements of problem solving where children make use of strategies to maximise their point score. Asplin (2003) noted that encouraging students to verbalise their moves led to greater gains in mental computation.



Figure 1. A group of parents playing *Numero*.

One of the requested topics was how to help children understand and learn multiplication tables. Parents' disappointment that their children were not fluent with their tables was highlighted in the initial parent interviews, and the prospect of finding out about strategies to assist with this learning was welcomed. Activities and games which helped with both teaching and practising these facts were given, and parents were provided with a publication, *Tackling Tables* (Swan, 2007), which gave further ideas to assist with this task. The intention was to remove the trauma of tables that many of the parents mentioned informally during the workshops, and to provide strategies to help make the learning of these facts more enjoyable.

Another workshop dealt with standard written algorithms, particularly the subtraction algorithm. Materials, such as those shown in Figure 2, were used to explain the thinking behind the algorithm. Parents expressed interest in this

session because, although they valued the “rigour” associated with written calculations, many did not really understand why they worked.



Figure 2 . MAB blocks and place value charts

At the final workshop, *Número* was revisited, and other questions about learning mathematics were answered. For further details of the workshops, contact the authors.

Results

A brief explanation of the data is provided, and common themes and issues raised by parents are explored in the following section.

The pre-workshop interviews

Prior to the workshops, four parents agreed to participate in an informal group interview about their perceptions of mathematics. The interview was semi-structured, in that there were four pre-determined questions, but probing and prompting followed to further illuminate the responses.

Do you think Maths is an important subject at school? Why/why not?

All parents agreed that mathematics is an important subject at school. They named several areas where they believed it was applicable to everyday life such as cooking, working out budgets, driving a car, and even programming a mobile phone. One parent commented that, “Maths is not just about numbers, it’s about thinking logically too.”

Tell me how you feel when the word ‘maths’ is used.

This question was included to discern if there were any negative attitudes to mathematics among the parents. They expressed specific concerns about tensions between how mathematics is taught in school and how they learned it:

I feel confident about maths and explaining the concept to my daughter but when she is looking at me with a blank look on her face ... to try and put what I know is right ... to put that into words that she will know and understands is hard. It’s the language of maths that I find hard because what they’re teaching them at school is a completely different language than what we were taught.

The barrier that is brought up from my son is, “The teacher said this ... you’re just my mum, what do you know, because the teacher said this (points to the paper) and that’s gospel” and ... I say, “I am trying to explain it to you another way,” and he says, “No, but the teacher said this”.

Are there any areas of mathematics that you feel you need particular help with?

The initial discussion centred on the difficulties they had with the language and terminology associated with mathematics—a recurring theme in the interviews. Discussion then turned to their children’s lack of fluency with their basic multiplication facts. The other topic mentioned in this discussion was their children’s attitudes to mathematics, and the notion of children identifying themselves as not being good at mathematics. One parent commented:

My main thing with my daughter is her confidence. She has talked herself into not being good at maths purely because she can’t come up with the answer straight away so she automatically put herself into the category of not being good at maths. I just know how I felt going through school not finding maths my strongest and I don’t

want her to hit high school and have that as well, so that is all part of building up her confidence in teaching her ways to work things out.

Can you describe an incident when you were helping your child/ren with mathematics that caused you some difficulty?

One parent commented, “At least four times a week, with maths homework,” to which the other parents nodded in agreement. Most agreed that it was the language used that presented their biggest problem, and the fact that in many instances processes used were different from those used when they were at school. This highlights an issue for teachers if they set homework. Nothing frustrates a parent more than children who are upset because they do not understand what to do.

The surveys

At the first session, parents were asked to fill in a survey sheet (Survey A), and a similar one was given at the end of the sixth session (Survey B). Of the 16 parents who filled in the initial survey, 15 were present to complete the post-workshop survey, with another two parents who had not attended the first workshop present for the post-workshop survey.

How important is mathematics in everyday life?

This first question on the pre-workshop survey asked the parents to rank on a five-point scale from “Very important” to “Not important”, how important they believed mathematics to be in everyday life. Fourteen of the 16 respondents (87.5%) ranked it “Very important”, with the remaining two parents ranking it “Important”. This was no surprise as all the parents had opted to bring their children to a mathematics clinic, and volunteered to participate in the workshops.

How confident do you feel about mathematics generally?

This was the second question on Survey A, and also the first question on Survey B. The five-point scale ranged from “Very confident”

to “Not confident”. In Survey A, only 25% of the respondents felt confident or very confident; however 70.5% did so in Survey B. Interestingly, one parent who felt very confident at the start of the workshops, felt slightly less confident at the end, ticking only the second box on the left. The numbers of parents who chose each category are shown in Table 1.

Table 1. How confident parents were about mathematics generally.

	Very confident		Not confident			total
Pre-workshop	1	3	8	4	0	16
Post-workshop	1	11	5	0	0	17

How confident do you feel when your child/ren ask for help in mathematics?

This third question in Survey A was the second in Survey B. The question elicited a significant change in parents’ confidence about assisting their children with mathematics, from 22% in Survey A for the top two rankings, to 81% in Survey B. In the second survey, no parent signalled a lack of confidence in helping their children compared with 37.5% in Survey A. The numbers of parents who chose each category are shown in Table 2.

Table 2. How confident parents were about helping their children with mathematics.

	Very confident		Not confident			total
Pre-workshop	0	3.5*	6.5*	4	2	16
Post-workshop	1	12	4	0	0	17

(* In Survey A, one parent ticked both “Slightly confident” and the centre boxes and put a question mark over both. This has been shown in Table 2 as “0.5%” in each category).

How confident are you with helping your child/ren with specific mathematics topics?

Parents were asked to rank their confidence with helping with: subtraction; “times” tables; place value; fractions; and games that make maths “fun”. Only three parents in Survey A expressed confidence in helping with place value concepts, whereas eleven (65%) felt more confident at the end of the workshops. It could be argued that knowing what “place value” meant was the problem rather than the concept itself. On the topic of fractions, 50% of respondents in Survey A either lacked some confidence, or had none at all. By the second survey, no respondents ticked either of those boxes. In fact the numbers for “Very confident” and “Fairly confident” went from six (37.5%) to thirteen (76.5%).

Table 3. How confident parents were about helping with place value.

	Very confident		Not confident			total
Pre-workshop	3	5	4	3	1	
Post-workshop	11	4	2	0	0	17

Table 4. How confident parents were about helping with fractions.

	Very confident		Not confident			total
Pre-workshop	2	4	2	5	3	
Post-workshop	3	10	4	0	0	17

How did you feel about mathematics when you were at school?

In Survey A, parents were asked to rank this from “Really enjoyed it” to “Really disliked it”. Figure 3, below, indicates their responses. One parent wrote that she liked maths at primary school but really disliked it at high school.

How parents felt about Maths at school

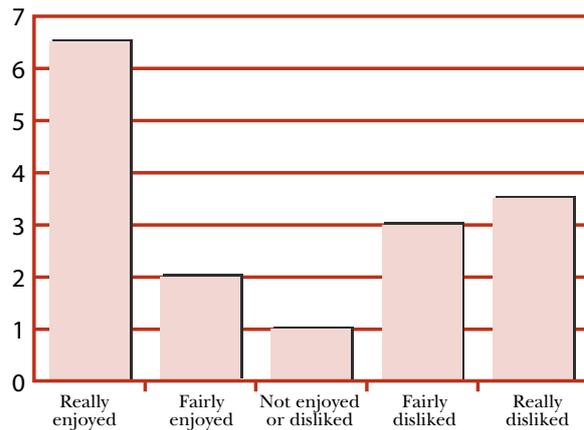


Figure 3. Parents attitudes to their own mathematics learning at school.

Why did you decide to join the Parents Maths Workshops?

In Survey A, parents were asked to comment on this item. Many parents gave more than one response to this topic. Most responses fell into one of three categories:

- to help their child, including with their homework (75%);
 - because they felt that the teaching of mathematics had changed (25%); and
 - to improve their own confidence (12.5%).
- One parent added, “To seek help for my son as I am unable to afford a tutor”.

What other assistance would you need to better help your child/ren with maths? What topics? What support?

This was the final question in Survey A. The most common responses for topics were: “All”, and “The language of maths”. Other parents nominated division, fractions and space/geometry. The most common response for support was “books or practice sheets to use at home”; but also included understanding the language of maths.

The post-workshop interviews

Individual interviews were conducted at the end of the workshops with the four original interviewees.

How has participating in the clinic changed your feelings towards maths?

All commented that they felt more positive and confident than previously, with two adding that they were always confident about their own maths, but not as much with helping their children. One spoke of the “sense of rhythm and logic [to maths]”. Two parents noticed a more positive attitude to mathematics in their children as a result of their attendance at the Clinic, and also because of their own discussions with their children.

What has been useful?

Three parents mentioned the dictionary (Bana et al., 2005), commenting that the terminology was often a stumbling block for them when helping their children. The other most common response (also three parents) referred to the game Numero, and how they believed that playing the game with their children would help overcome their hesitance with addition and subtraction facts. One parent commented that using pattern blocks to explain fractions (see Figure 4) had been an eye-opener for her.

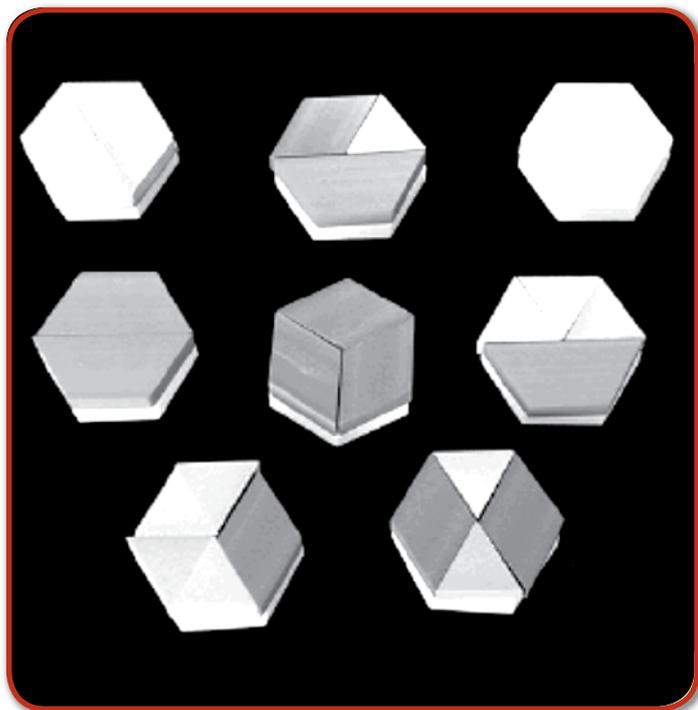


Figure 4

How has your confidence changed towards helping your son/daughter with their homework?

All responses for this question were positive; with comments about now being willing to help rather than referring their child back to the teacher for assistance, or cringing when asked for help. One parent talked about, “rushing for the popsticks and counters”; another that she now knew that it was OK to let the child have time to think rather than pushing for a quick answer. She also added that the idea of playing games to help, and more particularly talking through their thinking while playing the games, was really important.

All parents indicated that they had found the workshops useful. One parent concluded, “I’m now really excited about maths, and looking forward to helping my son”.

Limitations

The parents who participated in the six workshops were self-selected, and therefore less likely than others to be intimidated by the prospect of mathematics. They realised the importance of mathematics in that they had enrolled their children in the Intensive Mathematics Clinic and made the effort to come on campus six times during the July school holidays. This demonstrates a commitment to assisting their children with mathematics. By taking part in the Parent Workshops, they showed a further desire to enable their child to be successful in mathematics. This sample, therefore, is not representative of the typical parent population, so results cannot be generalised. However, there are many useful comments that teachers can take on board.

Conclusion

Carefully constructed parent workshops have the potential to break down barriers between the school and home, particularly in an area

such as mathematics where adults often lack confidence. Increased support from parents for their children, teachers and the school can only improve outcomes for children.

The positive responses to the pre-and post-workshop surveys, and the overwhelmingly positive comments in the pre- and post-workshop interviews seem to reinforce the belief that parents would like to assist with their children's mathematics, but need support to do this. Running a series of "Parent Help" workshops is one way to give that support and enable parents to become more confident in taking on this role. Clearly if carefully managed, better school/parent relationships have the potential to improve children's mathematics performance.

Given that the introduction of the Australian Curriculum with different words and phrases may unsettle parents, parent information workshops such as those described here are one way to allay these fears.

References

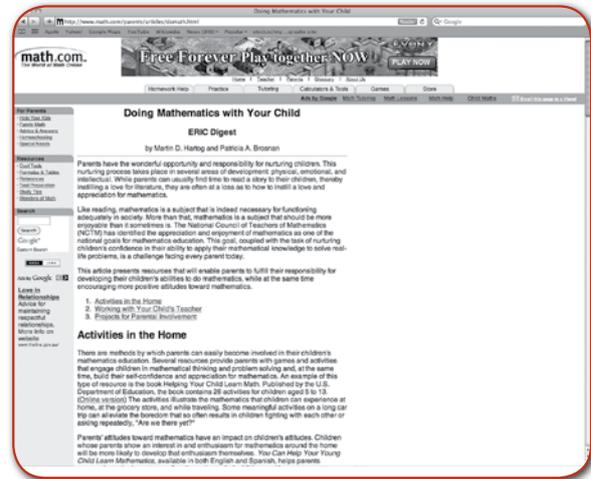
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Websites available for parents

Doing Mathematics with Your Child

Martin D. Hartog & Patricia Brosnan

www.math.com/parents/articles/domath.html



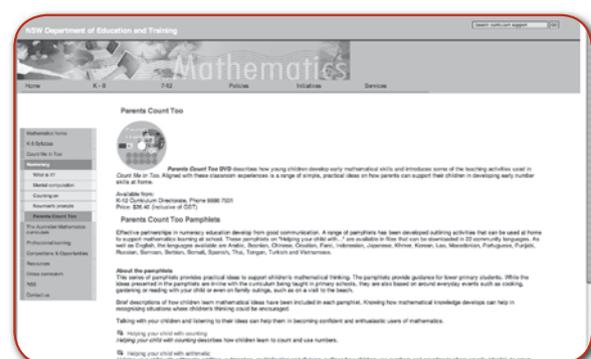
This website is backed up with research from NCTM which has identified the appreciation and enjoyment of mathematics as one of the national US goals. It is also a focus to build children's confidence and ability to apply mathematical thinking to solve real life mathematics.

The website provides three areas for parents:

1. Activities in the home
2. Working with your child's teacher
3. Projects for parental involvement.

Parents Count Too

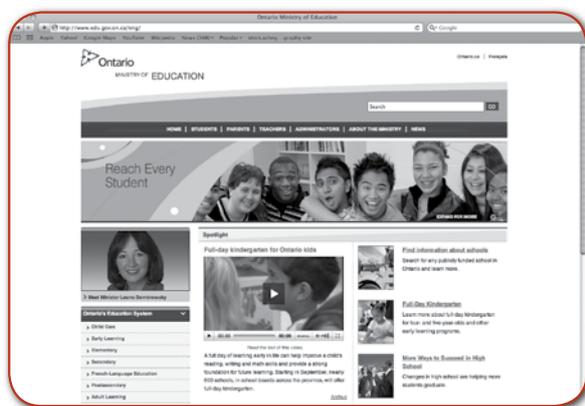
NSW Department of Education & Training
www.curriculumsupport.education.nsw.gov.au/primary/mathematics/numeracy/parents



This is a NSW site set up to help parents understand how children learn mathematics and introduces them to some teaching activities that can be used. There is a DVD for sale and some links that parents can click on to find more information and activities to do with their children. Each link takes the parent to a pamphlet that explains the concept and then provides activities to do.

Helping Your Child Do Mathematics: A Guide for Parents

Ontario Ministry of Education
www.edu.gov.on.ca



This is a 24-page guide for parents to help build their understanding about how children learn maths from Kindergarten to Grade 6. The guide explains different concepts and then gives tips on how to help children learn mathematics. There are examples and some other web links for children to access as they get older. A very good parent guide.

Helping Your Child Learn Math

www.ed.gov/pubs/parents/Math/funmath.html

A US publication that focuses on providing explanation, suggested activities for children K–Grade 5. Activities are not in strand order but do provide a range of things to do with parent pointers that explain the concept in more detail.

Other mathematics help

- **Cool Math for Parents** has some suggestions for helping with homework and suggestions to help little ones get ready for Kindergarten. www.coolmath.com/parents
- **Helping Your Child Learn Math** www.ed.gov/pubs/parents/Math
- **Literacy and numeracy tip sheets for parents** — suggestions from the Peel school district in Ontario, Canada www.peel.edu.on.ca/parents/tips/num-index.htm
- **Math and Young Children** — a list of links classified by age level www.readyforlearning.net/html/math.shtml
- **Math, Science, And Girls: Can We Close The Gender Gap?** From the National Network for Child Care's Connections Newsletter. www.nncc.org/Curriculum/sac52_math.science.girls.html
- **Teaching children mathematics** caca.essortment.com/teachingchildre_rbyv.htm
- **Teaching Math to Young Children** — This is one of a series of web pages to help students understand mathematics, and to help parents teach their children mathematics. www.garlikov.com/math/TeachingMath.html
- **Teach multiplication tables** www.essortment.com/all/teachmultiplica_rsgv.htm

Linda Marshall & Paul Swan
Edith Cowan University
<p.swan@ecu.edu.au>
<l.marshall@ecu.edu.au>

APMC