

Supporting children's developing confidence with mathematics by establishing educationally powerful connections and relationships with families

New Zealand research shared in the **School Evaluation Indicators: Effective Practice for Improvement and Learner Success** identifies the benefits for children when teachers and leaders form educationally powerful partnerships with parents, families, whānau and communities. Such partnerships increase the range of resources available to support the learning of children; they enhance outcomes for all children, but especially those at risk of underachieving. Partnerships have the potential to achieve large positive effects for academic and social outcomes.

When **EAST TAIERI SCHOOL** leaders signed up for the Ministry of Education's ALiM (**Accelerated Learning in Mathematics**) intervention, leaders decided to start with small groups of children and then extend effective practices across the school.

By working with parents and situating mathematics learning in engaging and authentic contexts, teachers found they were able to accelerate the children's progress. The children gained the understanding and skills to fully explain their mathematical reasoning to peers, teachers, parents and whānau.

As a first step in the redevelopment of the school's mathematics programme, leaders released a specialist teacher from her normal class duties for a year to teach small groups of children. This teacher also worked with other teachers, provided advice about individual children, and led a learning team that met once a term to discuss curriculum development, learning progressions, and possible changes.

Working with parents and whānau

As part of the ALiM intervention, teachers aimed to involve parents and whānau in authentic mathematics learning with their child. They were able to build on existing practices such as mathematics evenings for parents where the children ran some of the sessions.

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“We run a maths evening every second year for our school community. It is very successful in terms of participation. We always have a large crowd: about 75 percent of our school community come. We have about six to eight children from our classes running knowledge or strategy examples sessions. If you have the children running it and doing the teaching, you get the parents. The children also value the leadership opportunities gained through displaying their skills to the adults.”

“We transform our large shared space into junior, middle, and senior maths areas so parents and children can come to the evening and see the progression of our programme. They can see the foundations in the junior school and then the progression through the stages. They see the equipment used at different levels and how this is supported by the use of computer programs or apps.”

Leaders

Teachers met with the parents of children who were selected for the intervention before, during and following their involvement.

Every second Friday the children in the intervention, together their parents, came to a Breakfast Maths session. Here, the children shared their progress and the strategies they were learning over a shared breakfast. By the end of the 10 weeks the children were able to explain to their families what they were doing and why.

At the conclusion of the intervention the teachers met with each child and their parents to try and ensure that the progress made would be sustained.

They shared with the parents what the child had learned by way of knowledge and strategies, and gave them a toolkit of ideas to use.



Children explain their maths strategies to parents at a Breakfast Maths session

Engaging in authentic mathematics tasks

The children in the intervention group also went on a 'Maths Big Day Out', where, with their teacher, they visited parent workplaces to see mathematics in action. One parent was a builder; others worked in a café, the Post Office, the library, a supermarket and a travel centre. The children learned, for example, about the cost of sending mail, how to make and follow budgets, the importance of making a profit so you can pay the bills, how to design a holiday, and how library books are arranged.

Later the children used some of what they had learned from the visits to plan and run a cake sale to raise money for a child requiring expensive medical treatment. This involved:

- > conducting and analysing the results from a survey to find out what people would buy from a cake stall
- > calculating costs, price and profit
- > designing and constructing cones for popcorn
- > measuring ingredients, packages for small items, and the amount of popcorn required to fill a cardboard cone
- > handling money and giving change.

The cake sale was very successful and children were proud of their work. They liked counting the money into piles of tidy numbers as a first step to determining profit.

At the start of the intervention all the children had been achieving below the expected level. By the end of the intervention seven of the eight were achieving at the expected level.

Developing children's confidence to share their strategies and learning

The teacher also undertook a mini inquiry while working with a small group of six children, in class, for five to 10 minutes, four times a week. Finding that three of the children were reluctant to share their ideas and that the others needed to slow down and think, she decided to introduce them to the '*talk moves*'. She began by going through each of the moves, explaining it and giving examples. This helped the children understand the complexity of the problem-solving process. They saw that they needed to take time to work out and explain their thinking. It also helped them to slow down, process the problem, and then decide which strategy they should try to solve it.

The teacher made a set of prompt cards for the children, to remind them of questions they could ask and ways they could share their thinking. These increased their confidence and gave them a wider range of strategies to use.

By using the cards the children provided insight into their thinking and areas of confusion. Over time the teacher found she was prompting the children less and less.

The teacher used other visual prompts to help the children approach problems. Three that proved useful were:

- > **Read** the question carefully. What is the important information?
- > **Understand** the question. What do you have to find out?
- > **Choose** the right operation and strategy for your calculation.



Teachers could see that children who did not normally have the confidence to participate in group discussions were now wanting to share their thinking. Those who needed to slow down were using 'talk moves' cards to check their ideas and solutions. The children were also more engaged. Instead of simply accepting that their answer was correct they wanted to explore why and to look at their methodology in greater depth.

As the children were learning to engage more in group discussions at school they were also acquiring the language and confidence to explain their mathematical reasoning to their parents. As a result, parents became better placed to help their children apply mathematical strategies in the context of the home.