

# **Raising Achievement in Mathematics**

## **Principal's Sabbatical Report**

**Alan Watts  
Stella Maris School  
Term 4 2015**

## **Acknowledgements**

My grateful thanks goes to Catherine Cyprian for leading the school in my absence, and to our leadership team for so ably supporting her..

I would also like to acknowledge the Board of Trustees at Stella Maris for encouraging and supporting my application.

I acknowledge the Ministry of Education for making sabbatical leave available to Principals. This opportunity for rejuvenation and reflection has been invaluable.

My thanks to all the schools I visited and the teachers and principals that I interviewed. I appreciated the warm welcome I was given in every school and the time that was given to me. School staff willingly shared their expertise and what was working for them to raise mathematical achievement in their school.

## **Purpose**

- ✓ Visit a cross section of schools to learn what they are doing to raise mathematical achievement.
- ✓ Examine current research about raising mathematical achievement.

## **Background**

Stella Maris is a decile 9 school in Silverdale Auckland, that has just celebrated its 10<sup>th</sup> birthday.

In 2013 - 91% of students were at or above the national standards in reading, 85% in writing while only 81% were in mathematics. Of Maori students 71% were at or above the standard in mathematics while 100% of Pasifika students were at or above the standard.

## **Research Findings**

- Teachers who are successful in raising mathematical achievement have an ethic of care for their students. They have high yet realistic expectations about what their students can achieve.
- Teachers who are successful in raising mathematical achievement provide students with opportunities to work both independently and collaboratively.
- Teachers who are successful in raising mathematical achievement put students current knowledge and interests at the centre of their instructional decision making.
- Teachers who are successful in raising mathematical achievement ensure students develop ideas about the nature of mathematics and discover that they have the capacity to make sense of mathematics.
- Teachers who are successful in raising mathematical achievement ensure that to make sense of a new concept or skill students need to be able to connect it to their existing mathematical understandings, in a variety of ways.
- Teachers who are successful in raising mathematical achievement make use of a wide range of formal and informal assessments to monitor learning progress,

diagnose learning issues and determine what they need to do next to further learning.

- Teachers who are successful in raising mathematical achievement encourage their students to explain and justify their solutions.
- Teachers who are successful in raising mathematical achievement foster students use and understanding of mathematical terminology.
- Teachers who are successful in raising mathematical achievement draw on a range of representations and tools to support their students mathematical development.
- Teachers who are successful in raising mathematical achievement have substantial content and pedagogical knowledge.

## **Findings**

The schools I visited are all looking at how they can raise the mathematical achievement of their pupils.

Some used a teacher aide, but the most effective were the schools that dedicated a teacher to working with students who were not meeting the national standards.

One school freed up a teacher from class responsibilities. This teacher then worked with small groups of targeted students 3 or 4 times per week. There was close communication with the classroom teacher and students were constantly mapped using google docs. This allowed teachers to see at any time how their students were achieving. The mathematics teacher and the classroom teachers knew what the next learning steps were for that student. There was a daily short burst on number knowledge. This resulted in a shift in number knowledge and the students ability to apply this to problem solving. There was an emphasis on place value for approximately half of the time. The school was planning on the mathematics teacher working some of the time in classrooms the following year to model practice to classroom teachers.

Another group of schools pooled some of their staffing and 2 mathematics teachers itinerated around these schools working 40 minutes per day four days a week for 15 weeks with a group. Each group cost the school .05 of their staffing or \$3,000.00. The programme catered for 20 groups per school year, which was around 80 students. The mathematics teachers devised their teaching programme based on “numpa” testing. These teachers also ran parent meeting to show parents how they could help their child.

The mathematics teachers found a variance between classroom teacher assessments and what they found. The facilitators were also used to improve teacher practice.

One lower decile school found that employing a teacher aide for 2 hours per class per week made the greatest difference in raising mathematical achievement. All students in the school has flash cards that were graded to take home each night, 4 days a week. The teacher aide tested every child twice a week to monitor progress. This was found to have the most effect on raising mathematical knowledge. The flash cards enabled parents to support their child in mathematics instead of confusing them by trying to show a different way to which the child was being shown in school.

Another school was working on a Ministry of Education programme which was very structured but did allow some teacher flexibility. Students were selected from previous years results and those from stanine 3 and below in PAT testing in mathematics. The programme was run over two and a half days with 4 groups having 2 forty five minute sessions. Reports were sent to the ministry of Education as well as the Board of Trustees. The biggest shift was in year 4 students. This was thought to be because these students didn't have to unlearn previous learning. The programme was also supported by a numeracy team who met with the teachers of students in the programme each fortnight.

### **Implications**

- Schools need to look creatively at how they staff their school. 1 teacher per class of students may not be the best way to raise mathematical achievement.
- Students who are below the standard in mathematics need more time spent on mathematics. This means less of something else.
- Schools need to create positions that recognise mathematics teachers of excellence who can share good practice with other teachers.
- Schools need to plan for continuity and sustainability of good mathematics teachers. This could be done by having two mathematics resource teachers at any one time.
- Gaps in place value knowledge need to be carefully looked at.
- Using the whole village to educate a child concept pools ideas and expertise.

### **Benefits**

- Students in all the schools I visited who were getting extra mathematics time with a knowledgeable mathematics teacher were increasing their achievement in mathematics.
- Creating a parent friendly resource that enables parents to support their child's mathematics learning enhances what the school is trying to achieve.
- Classroom teachers can be supported in their mathematics teaching through modelling by resource teachers of mathematics.

### **Conclusions**

It is not always possible to have more funding to raise mathematical achievement so the challenge is to use existing staffing entitlements in different ways. If schools were given extra mathematical teaching entitlement this would assist greatly in raising mathematical achievement.

We need parent friendly ways to enable parents to support their child's mathematical learning.

## **References**

*Anthony, G., & Walshaw M. (2009). Effective Pedagogy in Mathematics. International Bureau of Education.*

*Fraivillig, J, Murphy, L. & Fuson, K. (1999). Advancing Children's Mathematical Thinking in Everyday Mathematical Classrooms. Journal for Research in Mathematics Education.*

*Iterative Best Evidence Synthesis Programme. (2010) 10 Key Findings for Making a Bigger Difference in Mathematics Teaching: Challenges for New Zealand Schooling.*