

Paul Barker Kaeo School

Focus: To visit similar schools (low decile, largely Maori, rural) and to read, reflect upon, and investigate methods and strategies that are used in other schools that lead to success in mathematics.

Being a Principal in a school in New Zealand in 2014 is a complex and challenging job. It is a role that encompasses and stretches across a broad range of responsibilities and requires a high degree of expertise across a range of tasks - *'In short, principals are ultimately responsible for the day to day management of everything that happens in their schools'* Ministry of Education 2008.

Amongst the myriad of responsibilities every Principal faces each day arguably none is more important than leading change and improvement within their school, in particular in relation to teaching and learning. How this occurs and how principals see their role in school improvement is an area of interest for me and the main subject of this paper. My focus is on leading improvement in mathematics given that this an area identified in my school as needing additional focus and improvement. Accordingly, my report has mathematics at its core but aims to provide insights into all school curriculum improvement. In addition, it was my goal to identify and investigate extra assistance programmes and strategy's in mathematics that are being used successfully in other schools, their strengths and weaknesses, implementation strategies, and the barriers to their implementation.

What drives Mathematic change?

When children or groups of children present as having difficulty at maths time there is an expectation that the principal, either in conjunction with other staff or alone, will intervene in some way to overcome these problems and accelerate the learning of these children.

This need for action is noted as 'Leading Change' and 'Problem Solving' in the document Kiwi Leadership for Principals, a document that outlines responsibilities for Principals and contains some suggestions for same but understandably does not cover specific actions. Questions relating to how to identify potential problems, what actions to take, what ongoing work is required and the principals' role in all of this remain. To investigate this I spent time considering my own approach to 'learning problem solving and change' and had discussions with other principals around this topic to determine their approaches to same.

All Principals surveyed considered that it was their role to seek a solution to children or groups of children who are not making the expected progress at mathematics time. In general, action and review was initiated through five occurrences.

1. Assessment data identifying school wide need for review.
2. Teachers highlighting individuals or groups of children not making the expected progress.
3. Parents requesting additional assistance for their children.
4. Regular curriculum review.
5. Review of current teaching practice.

All Principals commented on the use of assessment data to ascertain the need for review in mathematics and a range of assessments are used -principally Numeracy Project expectations and

basic fact progress, and for some National Standards. Principals are generally driven by school wide data and the drive towards meeting the schools annual goals with most principals commenting that the distance from actual progress to expected progress is the most significant driver for their review of mathematics teaching.

Teachers concerns about individual children or groups of children were also identified as a key driver of change with teachers concerns being addressed both at a school wide and classroom level.

Principals see their role at this level to:

- Provide advice and guidance to teachers.
- Direct teachers to ideas and the practice of others both within and outside of their school.
- Facilitate professional development where applicable and available.
- Develop and initiate additional programmes where applicable.

When parents or caregivers highlight concern about the progress of their child many Principals see this as a driver to consider the pedagogy and effectiveness of the child's teacher rather than any of the other possible reasons for this lack of progress, at least initially. Parental concerns often result in the principal visiting the child's classroom to observe teaching and planning, and can be a conduit to considering the effectiveness of individual teachers pedagogy - maybe in the belief that when children are demonstrating difficulty that the teacher should be reacting to this prior to the situation becoming a concern for parents or caregivers and that if this is not the case then a review of the teachers work is warranted and the starting point for change.

Principals also see regular curriculum review as a conduit to mathematics improvement and most have a planned timetable for reviewing both the progress being made at mathematics time and the programmes being used. Most Principals along with other staff members consider current practice as part of regular curriculum review, either with or without the assistance of a mathematics facilitator, to determine where change is required and can be affected.

Finally, Principals also consider the regular provision of mathematics professional development as an important part of their role in maximising mathematics learning. Most led school developed professional development in some form and also worked to ensure that regular facilitated professional development was provided for staff. Principals also saw that the development and monitoring of mathematics professional development from external facilitators was a key role for them to ensure that the professional development is of the necessary quality, that it meets the needs of the school and individual teachers, and that it maximises the opportunity for the intervention to lead to worthwhile improvement and development in their school.

What do Principals do to affect change?

Whilst identifying the need for mathematics work is relatively straight forward it is the change itself that is the key to mathematics learning improving and in accelerating learning for those who find mathematics difficult. The first step was therefore to recognise that a 'business as usual' approach would not successfully accelerate the learning of these children. Principals approach this task in a broad and varied manner – trying new things, attempting innovation, seeing a broader learning picture and need, and working closely with staff to maximise the opportunity for children to reach their mathematics potential.

Principals noted that they do many things, which can broadly be grouped as follows:

In the Classroom	Whole School	Leadership/Strategic	Board Level
Assisting and guiding teachers with targeting children requiring extra assistance.	Leading maths review as a 'teaching as inquiry' process.	Developing a maths focus across the school.	Identifying need for focus.
With teachers, plan how to use and implement professional development learning.	Leading and supporting Mathematics Open Days/ Maths-a – thons	Work with staff to overcome resistance to change (if any). Encouraging and motivating staff.	Provide budgeting and allocation of resources.
Support teachers trialling and experimenting mathematical ideas.	Develop a culture of maths.	Lead and be involved in Professional Development.	Leading mathematics review.
Ensure that teacher aides (if any) have appropriate level of skills and knowledge to work effectively at maths time.	Lift face and focus of mathematics across the school.	Researching and identifying appropriate mathematics professional development (including personal). Maintain an overview of and a cautious eye on mathematics programmes (including the numeracy project).	Assess progress at mathematics time.
Identify children and groups of children who need extra assistance and act positively to assist them.		Keep up to date with mathematics learning and use this information to develop new and better programmes. Manage staff well to ensure that all have the skills/knowledge/energy and time to teach mathematics well. Develop a school culture that allows and encourages children to learn well and to reach their full potential.	Assess effectiveness of mathematics programmes and projects.
		Ensuring the building and maintenance of positive learning	Setting appropriate and achievable mathematics goals

		relationships with children across school.	
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In addition to these things Principals also spoke of the need to be the ‘salesperson for mathematics’ and to ensure that mathematics is given the appropriate level of importance in the curriculum and that making mathematics a priority learning area was seen as a key focus for them.

Mathematics Interventions

All Principals had experience of developing a mathematics intervention of some sort. Professional development had had some positive affect on mathematics learning but was sometimes seen as being a short term boost to mathematics learning rather than having a long term affect with many staff quickly losing the focus on mathematics and the learning made during mathematics professional development once the facilitator had gone and when a new learning area became the new focus. Principals saw negating this all too common occurrence as a key role and most attempted to continue to emphasise mathematics and to prioritise mathematics after professional development ended to highlight key learning provided by the professional development.

Many Principals researched and introduced mathematics interventions in their schools, in particular to assist those children needing extra assistance at mathematics time. *Can Do Maths*, *COSDRRICS* and *Spring into Maths* are common extra assistance mathematics programmes and all have shown some level of success in accelerating children’s mathematics learning. These initiatives are focused at the early maths years and target early number concepts. Principals see these programmes as not only providing the potential for accelerating mathematics learning, but also as a way of being seen as assisting children not making the expected progress at maths time. Most Principals use teacher aides to run the programmes though most are with the oversight of teaching staff and in some cases aspects of the programmes are used by teachers in the classroom.

Other interventions include streaming at mathematics time, though interestingly as some schools trial and begin streaming (cross class grouping) others having trialed this are returning to a one classroom based strategy. In one case a school is employing a mathematics specialist to work with small groups. The Ministry of Educations ALIM project had been used by several schools with principals noting varying degrees of success (particularly in the long term) of this initiative.

Interestingly, few principals reviewed the effectiveness of intervention programmes used in their schools rather they made decisions around the effectiveness of the initiatives based on the schools ability to meet or exceed its mathematics targets, assuming that to reach the school goal, meant that the extra assistance programmes were having a positive effect on the children’s learning. This is consistent with findings by the ERO in their work in 2013 where they found ‘*minimal evidence of schools using self review processes to inquire into and evaluate the impact of support programmes ... where the intent was to accelerate learner progress*’.

Barriers to successful mathematics interventions

Whilst all Principals surveyed expressed a desire to provide interventions that accelerated mathematics learning, in particular for those children finding progress difficult, almost all expressed that there were barriers to do so. In the main these centred around resourcing. The cost of additional learning resources was seen as minimal and largely manageable but funding a teacher

aide to own and run an extra assistance programme was seen as costly, in particular given the need for in depth training of the teacher aide and mentoring of them by a teacher/school management. For some from isolated areas where the cost of travel for training or those in small schools where funding and time are at a minimum this was particularly a problem. One Principal noted that the ideal intervention would be from a registered teacher with a penchant for mathematics but that for his school at least this was no more than a dream. He noted somewhat with a heavy heart that this type of intervention would in his opinion provide a much better bang for buck than system changes currently being discussed as a method to lift learning but that under current or proposed funding models the use of a trained teacher for these most vulnerable children was all but impossible. This perspective is consistent with the ERO's identification that often "...the use of the least qualified adults to work with the learners who need the most expert teaching is accepted practice in many schools".

In addition, Principals noted the increasing pressure for schools to be all things for all people and the broad range of responsibilities placed upon them to minimise societal problems that eat up time for teaching and learning and the impact this has in the amount of time that schools have to improve mathematics outcomes. Others indicated the impact that the numeracy project had had in terms of the lack of clarity at the beginning of the project, the changing goal posts overtime within the project (in particular in relation to the balance between number knowledge and number strategy) and the lack of on going professional development in relation to the numeracy project (the observation above around the 'falling away of professional development learning over time is relevant here). Principals also noted the effect that the numeracy project on other areas of mathematics such as measurement and geometry and that this is only recently being addressed in some schools.

What next?

Kaeo School works successfully to assist its children to learn at the rate expected for their age. This is across all learning areas. However, mathematics is the area identified as needing additional work and the development of an extra assistance programme to add to our raft of programmes for those experiencing difficulty with reading, writing and spelling.

It is clear that most Principals have similar ideas around how to provide extra assistance to children who need it and that in the main it is how successfully initiatives are introduced that makes the difference in what they achieve – often it is not the programme but the people that make the substantive difference.

In the case of Kaeo School our Strategy for Maori Achievement works for all children and indeed for all people who come into contact with our school. It sets the framework for our school that provides a clear vision for the school including those things identified as being key to accelerating the learning of our children – an understanding that all children can be successful at school, high expectations for learning, strong learning relationships, staff working cooperatively and with passion for their students, having clear goals and plans and working with parents and families to involve them in the learning process.

Kaeo School also uses a range of accepted assessment data and clearly identifies those children who need extra assistance – working with them and monitoring their progress carefully to help them reach the expected levels for their age. Mathematics professional development has been regular, we have invested in mathematics resources and we consider, as we do all curriculum areas, our mathematics programme on a regular basis to identify areas that require improvement and change.

Where we can do better is to lift the profile of mathematics in our school. Literacy levels have been low in the past and this understandably has been a key focus for the school. Much has been invested in providing literacy support and extension over recent years which has been extremely successful but has understandably meant that mathematics has taken a back seat at times. For example we have three reading and spelling interventions and none for mathematics. We have invested our own funds in Writing Professional Development but waited for Mathematics Professional Development to be provided by the Ministry of Education.

Our goal now is to address this balance by implementing a mathematics intervention programme in the Junior School and we plan to investigate the “Spring into Maths’ programme with a view to having this up and running this year and providing an opportunity for its effectiveness to be reviewed during 2015. In addition, I plan to lift the emphasis on mathematics across the school by promoting mathematics and by working to develop a culture of mathematics at our school. In response to our mathematics professional development teacher appraisal will have at its core mathematics and our mathematics goals will be reviewed.

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