

## Principal's Sabbatical Report

What are schools, in particular, smaller rural schools, doing to address the needs of children who are not progressing as expected in mathematics and not achieving the National Standard?

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I would also like to thank the Teach NZ, Ministry of Education, for giving me the opportunity to take sabbatical leave and investigate an area of the curriculum I have a particular interest in.

Finally I would like to thank the schools, staff, organisations and people who have given their time to share their knowledge, journeys, practices and resources they have found of value.

## Purpose

To investigate what schools, in particular, smaller rural schools are doing to address the needs of children who are not progressing as expected in mathematics and not achieving the National Standard.

To this end I looked at practices, interventions and resources used including the use of IWB's that help meet the needs of these children.

## Rationale and Background

Putere School is a U1, Decile 2, and full primary school. We are a sole charge school located an hour out of Wairoa.

Since National Standards came in we have generally had greater than 80% at standard and around 30% of those above standard in mathematics. These sound results have occurred from a strong mathematics programme being delivered to a stable group of children who have done all of their schooling at Putere.

Although our roll is stable we have had a few changes and some transients coming and going in the last two years, usually in term 4 before moving on. Almost all of these children have been below National Standards, which in turn brings with it new challenges, strategic goals and annual targets.

In 2013 our end of year results showed that we had a group of year 8 students who were all at/above NS for mathematics leaving, and a group of new pupils having arrived, with 66% of them being below NS.

Our overall results shifted to 40% now under-achieving, making it clear that we needed to focus our attention on doing something to raise the level of achievement in mathematics. This led to a 2 year strategic goal for 2014-15 being developed to look at raising the standard of achievement by accelerating the progress of targeted children.

The question that presented itself was, 'How do we go about accelerating learning for those in need?' We already had a full programme covering all strands of the math curriculum.

I had discussions with a colleague who was seconded to a role with the Waikato Maths Advisory team in 2013. The outcome for me from this discussion was the need to run extra sessions for a period of time like the ALiM programme (Accelerated Learning in Maths). This of course had to fit in with the unique environment that a sole school presents, and so a plan of action began to emerge.

### This was my case study/journey for 2014

Data history: 75% of my year 7-8 (3 out of 4) were below NS with one well below. Areas of the math curriculum that needed to be strengthened were in the number strand. We identified multiplicative strategies and decimal knowledge as the area to be strengthened within this group.

Charter Target: Realistically; to have the year 7's (2) at NS by 2015, when in year 8 (In stage 7 Number). We expect to have them all solidly in Stage 6 by end of 2014 which is still approaching NS. The year 8 (1) we want to progress from Stage 5 to be solidly in Stage 6 by the end of the year. However we will aim to have all pupils in Year 7-8 who are not achieving at National Standard to have accelerated progress over the year to be at standard by the end of 2014.

You may notice a bit of sarcasm/realism in the target. I believe the MoE's NS target setting recommendations are, although aspirational, for the most part unrealistic and unattainable for many. So I set our school a more realistic goal which was both aspirational and more importantly attainable.

The target group: I chose to take my whole senior group of Year 5-8's (6 children). In the group I had two year 5's who were to be extended, one year 7 working at this level and my three targeted children who needed to make up ground.

Work area: We moved away from the class and made our work space the staffroom. This did two things

1. It gave the group a separate identity from the classroom.
2. It made the time special for them.

They responded really well to this change in work environment.

#### Actions:

- Parents were given explicit information in 'Where to next' and 'How I can help' sections of 2013 report.
- Informed parents beginning of 2014 and handed out books (At Home with Maths – Maths Reinforcement for Kiwi Kids) to be used through the year at home as extra support and to be used at parents discretion.
- Introduced New Wave Mental Maths – Maintenance programme in class
- Explicitly teach/give practice to targeted areas of maths programme in two ½ hour sessions per week:

#### Term 1

a) Revise + /- strategies

$$230+125= (200+100) + (30+20) + (0+5)$$

$$546-208=546-200=346-8=338$$

$$334-179=334-200+21$$

b) Revise  $\times/\div$  strategies

Use compensation strategies and tidy numbers

$16 \times 8 \Rightarrow 8 \times 20 - 8 \times 4 \Rightarrow 160 - 32$   
 $3 \times 198 \Rightarrow (3 \times 200) - (3 \times 2)$   
Use partitioning/PV  
 $3 \times 125 = (3 \times 100) + (3 \times 20) + (3 \times 5)$   
Use doubling and halving  
 $12 \times 124 \Rightarrow 6 \times 248 \Rightarrow 3 \times 496$ ;  $420 \div 14 \Rightarrow 210 \div 7$

### Term 2/3

Revise whole number place value to 7 digits and consolidate knowledge and understanding. (This was necessary before moving to decimal place value where all pupils had gaps in their knowledge).

Develop and consolidate decimal place value to 3 decimal places.

- This term was knowledge based with little strategy development. I deliberately chose this path knowing the children struggled with any problem solving activities as they lacked the conceptual understanding of the decimal system.
- The children responded well to this approach and frustration levels were kept low.
- I used the 'No Nonsense' maths resources with the children.
- There were a lot of discussions and opportunities to clarify understandings as we moved forward. This was always an important part of the children's learning sessions.
- I also found that the children benefitted from reading decimal numbers out aloud and I tried to incorporate this into the sessions whenever appropriate. It seemed to help with their understanding of the decimal places and separate it from the way we read whole numbers.

### Analysis of the 2014 programme

The development of the children's knowledge was pleasing and the extra sessions invaluable.

The two year 5's being extended did very well with one being well established in stage 6 and the other making excellent progress to be now in early stage 7.

The year 7 who is at standard strengthened her existing knowledge of + /- / $\times$  / $\div$  strategies, whole number knowledge to 7 digits and decimal place value knowledge to 3dp which puts her in a strong position moving towards the year 8 standard.

The following were my three targeted children who all started in similar positions, had equal opportunities but had different results. I'll look at them individually.

### Case Study 1

Year 8, boy, stage 5 numbers, operating well below the National Standard. Our realistic target was to have this pupil firmly in stage 6 and moving towards Stage 7.

The child has a good attitude, some potential to do better but no support from home with his mathematics. No support is given; even to tables learning; and parent discussions haven't helped. "School is where you learn not home." The child has a history of poor/inconsistent attendances at school and on average attends 75% of the year. Each year discussions had helped focus the parent on this and improvements were always

seen early on only to diminish through the year. These barriers proved to be detrimental to his learning providing the school with unnecessary hurdles to jump.

Result: With these barriers in place affecting his learning it was very pleasing to see the pupil make good progress this year due to his positive attitude and focused learning sessions. We achieved our goal and the student progressed from being well below standard to being below standard. This would not have been achieved without the extra mathematics sessions targeting his needs.

### Case Study 2

Year 7, girl, NZ European, stage 5 numbers, operating below the National Standard. Our goal was to have this pupil firmly in stage 6 and moving towards Stage 7; and to then have her solidly in Stage 7 and approaching Stage 8 by the end of 2015.

The child has a good attitude, good potential to do better and good support from home with her mathematics although the parents find much of the maths difficult. Excellent support is given with tables learning and support with the home work-book. School and home work well together to support her learning.

Result: We exceeded our goal, with this student moving into Stage 7. She reached her potential through hard work, a great attitude, focused teaching and good home support.

### Case Study 3

Year 7, girl, Māori, stage 5 numbers, operating below the National Standard. Our goal was to have this pupil firmly in stage 6 and moving towards Stage 7; and to then have her solidly in Stage 7 and approaching Stage 8 by the end of 2015.

The child has a good attitude, some potential to do better and little support from home with her mathematics where her grandparents find the maths too difficult to help with. Excellent support is given with tables learning. School and home work well together to support her learning.

Result: We achieved our goal with this student moving her solidly into Stage 6. She reached her potential through hard work, a great attitude, focused teaching and some good home support. We hope to progress solidly into Stage 7 with number in 2015.

### Analysis of resources used

1. At home with Maths (goes to Stage 6) was a resource that parents and children enjoyed and it was relatively inexpensive.
2. New Wave Mental was very good but difficult to do daily as it could be time consuming and the impetus was lacking by the third term. It could be a resource used on certain days or for a certain period of time each term.
3. The use of No Nonsense tasks were very well received by the children. They allowed for a lot of oral discussion on any skills, knowledge or strategies used. There is a lot of repetition in the tasks which can be used as little or as much as needed. This helped the lower achievers to consolidate their knowledge and skills which helped them to tackle problems.

### Analysis of programme

1. Parent support with homework books, discussions, supporting children positively was very important in the child's progress.
2. Being in a different room away from class was very positive and allowed children to discuss, clarify and consolidate their knowledge and skills in a quiet, uninterrupted and non-threatening environment.

3. Knowledge and skill development with plenty of repetition and discussion was an important part of the children's progress. Understanding and conceptual knowledge increased and mathematical links were strengthened. The pace was set by the children's progress.

## Professional Development and Readings

I attended some courses in 2015 to further my knowledge of computer applications or maths pedagogy.

1. This course was run by Charlotte Wilkinson an international author, speaker and consultant in maths and author of 'Wilkie Way' maths books and the Pearson Mathematics series. [www.ncwilkinsons.com](http://www.ncwilkinsons.com)

The main point to come out of this was that the knowledge and understanding of the place value system is at the heart of children's learning and when they have a mastery of this they can then use and manipulate numbers to solve problems.

2. The Mathletics online programme ran a course to show new applications in using the programme and setting it up for the New Year.

This organization is very good with its support which is free to all subscribers. They also provide free online webinars and telephone support.

<http://www.mathletics.co.nz/>

3. In April, 2015, I attended a Mathematics Symposium in Napier attending 3 workshops. The keynote speaker was Katie Makar from the Queensland University. She spoke about 'Learning through Mathematical Inquiry.' The key things from this were that a good inquiry needs:

- An authentic problem/topic
- A good inquiry question and
- The potential for mathematical depth

Authenticity drives the investigation and a good question has ambiguous (e.g. best) words that require the students to clarify and determine pathways to solutions. This in turn leads to depth of understanding. Students need to justify as much as possible their findings to take their understanding to a higher level. They struggle often to see links between the problem and evidence they've collected and conclusions that they've come to. Presenting their findings helps clarify these links.

An inquiry does not replace the core programme but is integrated into it. Shorter inquiry questions can be used.

Inquiry examples – What's the best loop plane you can make? (Measurement, stats and number); How many times can you bounce a ball in 1 minute?

Other workshops attended reinforced using problems and activities that promote deeper understanding by recognizing patterns and making connections.

Websites to use: [www.http://academic.research.microsoft.com/Author/34337432/katie-makar](http://academic.research.microsoft.com/Author/34337432/katie-makar)  
[www.educationcounts.govt.nz/goto/BES](http://www.educationcounts.govt.nz/goto/BES)

(BES (Iterative Best Evidence Synthesis) Programme - What Works Evidence - Hei Kete Raukura)

[www.Teachingchannel.org/](http://www.Teachingchannel.org/)  
[www.Sparklebox.co.uk](http://www.Sparklebox.co.uk)

4. I researched some of the work done by Suzanne Chapin and Catherine O'Connor, authors of 'Maths Solutions'. They advocate a teacher's skillful use of classroom talk be used as a method for promoting and supporting student learning. Essentially, having to talk about their thinking, children strive to make sense of their own understandings and try to clarify these for themselves and others. They use 5 talk moves, which are 'conversation actions' designed to make maths discussions more productive.

They are:

1. 'Revoicing' - "So you're saying....is that right?" Used to clarify meaning when children's ideas are not clear.
2. 'Repeating' - "Can you repeat what Joe said Katy?" Used to encourage listening, slow the pace of instruction, focus on the main ideas and reflect.
3. 'Reasoning' - "Do you agree or disagree and why?" To use reasoning to analyse and/or support ideas.
4. 'Add on' - "Can anyone add to this conversation?" Used to elicit contributions from other students.
5. 'Wait time' - used to allow children time to compose their responses.

For other information from Chapin/O'Connor read/go to: [www.mathsolutions.com](http://www.mathsolutions.com)

5. I went on the NZ maths site and looked at 'Exploring Mathematics Interventions' - Exploratory evaluation of the Accelerating Learning in Mathematics Pilot Study by Alex Neil, Johnson Fischer and Rachel Dingle. This study reviewed student's shifts in attitude and achievement using NumPA and PAT tests after a ten week intervention (ALiM). Most schools operated 4-5 extra sessions per week. General progress in the NumPA stages was mixed with many advancing a stage or more, many staying at the same level and a few falling back a level. PAT tests showed a large number of students made significant changes after the intervention. The shifts in attitude showed that many had stayed the same, whilst those that had changed, many of them had a more positive attitude to mathematics and less negative attitudes to mathematics. Of course there was also a reasonable number that liked mathematics less and had more negative attitudes too.

To read it in more detail go to [www.nzmaths.co.nz](http://www.nzmaths.co.nz) (accelerating Learning)

6. I attended a MoE session promoting and informing us about PaCT (Progress and Consistency Tool). At the moment the Ministry are paying schools \$150/teacher and \$150 for one administrator to use/administer it. It covers reading, writing and mathematics. It is flexible in its use and I signed up to use it just for mathematics which has made it manageable for me. To find out more ring up your local MoE office or go to [www.pactinfo.education.govt.nz](http://www.pactinfo.education.govt.nz)

7. I visited a school in England to discuss the new maths curriculum that has just come out. At this stage they were still unsure on it or how it would impact on their school and children as it was so new. I did read about it in an overview written by Charlotte Wilkinson which was very interesting. The UK has no levels in the new maths curriculum but instead a list of what should be taught at each year level. The lessons themselves will consist of a starter activity, followed by a whole class activity where a concept is taught. In the class the bright children can be extended whilst the slower children can be given easier tasks on the concept. Professional Development seems to be lacking and teachers are not getting the support with it (that sounds familiar).

To read more go to [www.thewilkieway.co.nz](http://www.thewilkieway.co.nz) and find the August newsletter.

## Resources I Found Useful

### 1. [Mathsweek.org.nz](http://Mathsweek.org.nz)

This website is active to all NZ schools free of charge during Mathsweek in August. The games and daily activities for the week are available outside of Mathsweek so you can revisit them whenever you want which is great. Access is available on PC, tablet or iPad.

It has the following activities I found challenging and rewarding for the children.

- 'Who wants to be a Millionaire?' - A good group activity guided by the teacher on the IWB.
- L1, L2, L3, L4 Daily Challenge Questions. There is a junior and senior set. These are very good and can be done as a group or individually on a PC.
- Games: Code Breaker, Rotate Translate, Raining Money, Balancing Act, Canyon Splatter, Savings Game, Square Bricks, Jigsaw, and The Ordering Game. These games offer a range of skills to practice.

### 2. [Maths Games](#) from RIC Publications/Curriculum Concepts – IWB (Win & Mac)

There's a Lower School and Middle School CD pack.

The middle pack has three games 1. Fractions Fun 2. Decimal Dilemma 3. Diving into Decimals.

It's best directed by the teacher using the IWB but can be used by individuals or groups on the IWB or class computer. The children have to use resources e.g. MAB blocks as they calculate and answer questions. This hands on approach helps consolidate conceptual understanding and proportional thinking.

### 3. [Numeracy 123](http://Numeracy 123) [www.numeracy123.com](http://www.numeracy123.com)

This is a great resource. You can use on the IWB to display the questions for the class or group, or photocopy worksheets. There are various packs of CD's.

1. Numeracy Knowledge Stages 1-7 (3CD pack)
2. Numeracy Strategy & Knowledge Stages 1-7 (3CD pack)
3. Numeracy Problems Stages 2-7

These CD's come with a hard copy version too and are full of great activities at each of the number stages. They are fantastic for strengthening the children's problem solving skills with questions that are short and easy to read.

Each problem solving sheet has 10 questions.

You can choose pages that have all 10 questions on the same strategy which allows you to discuss and consolidate a desired strategy or

You can choose a page with mixed strategies. This provides great opportunities to discuss methods used when the children have finished.

These problems can be used in conjunction with the strategy posters in resource 4.

4. Link Educational Resources [www.link-educational-resources.co.nz](http://www.link-educational-resources.co.nz)

This is a great set of A4 laminated colour posters for wall display. Two posters/page for stages 1-7. They are very reasonably priced from \$6-17. Each resource comes with a PDF copymaster for use in your 'modelling book' and/or for your students' books

Posters: Stage 4—All Strategies

\*Counting on \*Counting back \*Skip counting in 2's

\*Skip counting in 5's \*Skip counting in 10's \*Finding  $\frac{1}{2}$  and  $\frac{1}{4}$  of sets

Posters: Stage 5 Multiplication & Proportional

\*Using repeated addition or subtraction (multiplication)

\*Using repeated addition (unit fractions)

Posters: Stage 6 Proportional

\*Using multiplication and division facts (unit fractions)

\*Using multiplication and division facts (non-unit fractions)

Posters: Stage 7 Proportional

\*Using equivalent ratios \*Use unit fractions \*Use place value

\*Compensating from tidy numbers \*Compensating from fractions

\*Using equivalent fractions

Posters: Stage 8 Proportional

\*Finding fraction of a quantity \*Finding decimals of a quantity

\*Finding percentages of a quantity \*Finding equivalent ratios

\*Finding a multiplier between the units

5. Mathsletics <http://www.mathletics.co.nz/>

This programme is set up to the New Zealand Curriculum. I have trialed this programme in class this year and have found it extremely good. It is a flexible programme which covers the core curriculum strands of number and algebra, statistics, and measurement and geometry. You can set up work to cover the strand you are working on. Work can be reassigned if scores are low allowing for further practice with similar type questions. Work can also be adjusted to easier or harder questions depending on children's ability.

In 2015 I visited and/or surveyed a number of schools in and outside of the Wairoa District to see what they were doing to raise the standards in under achieving Maths students. Some had taken part in ALiM, some had MST (maths support teachers) and others had interesting systems in place or were strong in the use of computer programmes to support learning.

I surveyed 10 small rural schools (1-3 Teachers) and 3 larger schools of which 1 had participated in ALiM. Of the 10 small schools 4 were in my Wairoa West Cluster. I wanted to see if there were any anomalies in knowledge or use of resources and to see if we were perhaps disadvantaged in any way compared to other small schools in different areas or schools in larger city areas.

The school survey was to gather information on their processes; how they gathered information and determined needs/targets (1-3), their systems to attend to these needs/targets (4-8), and the resources they used to assist them reach their goals (9-11).

### Results of visits and surveys

Wairoa West Cluster (4 schools- 3 sole charge and 1 two teacher)

1. Data collecting tools used was standard across the schools with PAT's, NumPa, JAM, asTTle basic facts tests, observations and unit checkups/tests being used.
2. Targeted areas were not only trying to accelerate learning but striving to improve attitudes towards mathematics which was seen as very important.
3. Over the last 3 years Maths and literacy were targeted equally by 3 of the 4 schools whilst in 1 school literacy had been the only focus.
4. Only 50% of our cluster was aware of ALiM and MST's and 0 out of 4 had used them.
5. Only 3 of our cluster were aware of PaCT and 1 out of 4 had signed up to use it.
6. Parent support at home was seen as vital with underachievers. Poor access to Professional Development was seen as a hindrance to learning opportunities.
7. 1 out of 4 used the Teacher working with small groups/individuals for extra mathematics (like RR) whilst 1 used the teacher release for this; 3 out of 4 used T/A's to support learning, 1 didn't due to cost; 1 out of 4 used Parents to support learning at school.
8. 3 out of 4 schools group on ability regardless of age whilst 1 school keeps them in their age group giving extension or easier work if needed.
9. There is an awareness of computer/online programmes but only TKI-NZ Maths is used by all. Cost and time were not an issue.
10. Main resources used were, No Nonsense Maths, NCM Maths, Dragon Maths, Start Right, FIO, TKI units and free computer/IPad games. The schools used a variety of resources to motivate and challenge their children.
11. All used problem solving activities in their programmes and all felt language was a problem with many activities. This was overcome by modelling, going at children's pace and using materials. This meant activities often took longer than was planned.

The other small rural schools (6 schools- 2 sole charge, 1 two teacher and 3 three teachers)

1. Data collecting tools used included GloSS, IKAN, asTTle, basic facts, AWS strand tests, PAT's, student group contributions, observations and snapshots.
2. Targeted areas have been fractions/decimals for one school; the other strands of geometry and measurement and basic facts for two other schools; problem solving and the specific mathematics language that goes with it by one school.
3. Over the last 3 years 4 out of 6 schools have targeted mathematics and 2 have not.
4. 4 out of 6 schools were not aware of ALiM and MST.
5. 3 out of 6 are aware of PaCT and one school was strong in views that it wouldn't be using it as it's too much work.

6. Parent and student attitude was seen as important but could also be a hindrance as could funding, resourcing, transient roll/pupils, irregular release days/continuity of teaching group and big multi-level classes.
7. No one used teachers to be released to work with groups but 3 out of 6 used release teachers to work with small groups/individuals; 2 out of 6 used T/A's and 2 out of 6 used parents to support learning at school.
8. Two school groups by ability all the time and uses stage based groups for number whilst the other 4 schools use ability groups sometimes.
9. There is an awareness of computer/online programmes. Only two programmes were recognized/mentioned by all with 5 out of 6 having used Mathletics and 4 out of 6 having used TKI-nzmaths. Cost and time were not an issue.
10. Main resources used were, hands on resources, No Nonsense Maths, NCM Maths, FIO, the numeracy books, and online resources e.g. TKI units. Some found it important to use a variety of resources to help with motivation.
11. All used problem solving activities in their programmes and many felt language was a problem with activities. This was alleviated by modelling/scaffolding regularly, going at children's pace and using materials. Often this meant lessons went for longer than planned.

#### The three larger schools

1. Data collecting tools used included GloSS, IKAN, asTTle, basic facts, PAT's, and stepping stones.
2. Targeted areas have been statistics (1), number knowledge (1) and no targets by the third school. One school picked 8 struggling pupils then took the bottom 4 and targeted their weaknesses whilst another used the stepping stones to target students.
3. 2 of the three schools had targeted maths in the last three years. For one school it had not been a priority.
4. 2 of the 3 schools were aware of ALiM and MST's and 1 had been a part of them.
5. 2 out of 3 were aware of PACT but none used it.
6. Hindrances to progress were time for release, language in problems and sometimes unrealistic parent expectations.
7. 2 of the 3 schools used T/A's and Release Teachers for support whilst ALiM schools used teachers only.
8. One school had moved away from ability groups whilst the other two always used them finding they worked best.
9. All 3 schools used mathletics whilst 2 out of 3 used mathsweek online and TKI site and just 1 school used MTS online resources.
10. Main book resources used were NSM (National School Maths), NZ Maths, FIO's and No Nonsense books.
11. Two out of three schools used problem solving activities regularly but found language was a problem. One school used real life problems and discussions to help those underachieving.

The use of 'Stepping Stones' in one school' deserves further comment. The stepping stones are based on the knowledge and skills required in each of the numeracy stages. The children are placed on a step along the continuum. Homework tasks are then given to practice these skills and develop their number knowledge which can then be applied to strategies. This method has merit and seems to work very well. For under achievers as well as all others it helps consolidate and strengthen their skill set, before moving on to the next step. The parents are an important part of the process in offering support and encouragement.

I also got to talk with 8 school principals and asked them the following question:  
What do you find works best with underachieving students?

- a) Using lots of problems to solve
- b) Giving lots of practice with skills and knowledge followed by trying to apply them.

We discussed the pros and cons of working with/being given word problems vs skill development followed by number sentences to practice a strategy. Although all use problem solving activities in their programme they unanimously said that with their underachievers, working on the skills first produced better results. This way the children got repetition, repetition and more repetition at using a strategy/practicing a skill and their confidence in using the strategy/skill was achieved much quicker than by using a problem. Often these targeted children also have reading difficulties which hinders their ability to problem solve even with plenty of modelling and support. Once these children have a greater skill base and conceptual understanding they are more likely to be able to apply them to problem solving tasks.

There was also a general feeling amongst many that the present number system (NumPA) which was receiving some adverse publicity on TV was not working for many under achievers. There are often too many strategies to deal with which can further confuse them. Along with the mental strategies there were a few that were beginning to develop the children's ability to use the working form for solving number problems and ensuring they developed competency with the method. Along with this they were also working on improving their basic facts knowledge and skills.

## Conclusions

1. In my research I did not find any new ways that schools gather maths data. The small rural schools and the bigger town schools I had contact with are all aware of the needs of the children in their care and all use recognized tools and methods for collecting data ranging from PAT's, NumPa, IKAN, JAM, asTTle, basic facts tests, unit checkups/tests including AWS strand tests, student group contributions, observations and snapshots.
2. I did come across a new application that the MOE want schools to use as a moderating tool. It is PaCT which stands for 'Progress and Consistency Tool.' My district is skeptical of this tool and the politics behind the MOE's promotion of it. I am one of two schools in the Wairoa District to have signed up to it. I have used it for mathematics only and found it to be a great tool for helping decide where a pupil is in relation to the National Standard. However, more than that, it is simply a great tool for determining what the best fit is for pupils on a continuum of skill/strategy development. There is a range of exemplars to help you with your decision making and the whole process gives you the chance to reflect on what the next steps are for the children in their learning and your teaching. I think if teachers/schools use this tool for mathematics they will find it worthwhile.
3. Many of the rural schools often target more than one area e.g. mathematics and reading whereas larger urban schools often target one area as a school focus due to the larger staff and roll thereby making it more manageable. I have found that having more than one target whilst trying to have extra mathematics sessions was not sustainable or at the least very difficult. I would recommend one main focus/target are set for small rural schools each year.
4. Parent support is vital for children who are targeted to have their learning accelerated, whether it is to help or just give moral support. When a child sees his/her parent's value their learning then the chances he/she will value their learning goals increases exponentially. The attitude of targeted children is seen as very important in all schools. Many schools expressed improvements in attitude were evident even when children don't make the standard.
5. ALiM schools reported positive feedback with more than half of the students targeted reaching the National Standard. Some of those that didn't had poor attendance, parental support and/or poor attitudes.  
It must be noted that all pupils selected for ALiM are just below NS and therefore have a high chance, with good teaching in place, of achieving the National Standard; which of course looks good for the ministry statistically.  
I'd like to see more than just those pupils being targeted; and, with realistic, attainable goals.
6. Rural schools are more likely to use teacher aides, parents and principal release teachers or release time to provide extra assistance for targeted children. Larger schools do use T/A for support but in ALiM, teachers are only used for this role as using T/A's for support in mathematics isn't recommended by the MOE. However in small rural areas where the options are limited they often have a close relationship with the staff and can be utilized in a team approach with support always close at hand.
7. I wanted to see if my cluster was disadvantaged in any way compared to other schools. As far as use of data gathering tools and resources are concerned we are in a good

position. Where we are lacking, which was also evident in the other small schools, was in our awareness of ALiM, MST's and PACT.

Only one small rural school has participated in ALiM. 6 out of 9 rural schools were not aware of PACT, ALiM or MST's which could be seen as a failing of the MOE.

Schools are prioritized for MOE support and when schools have no high needs in an area they do not apply for assistance because they know they won't get it.

As a result I think that we become disadvantaged by not getting training or being upskilled in practical ways to deliver mathematics in the class.

I would suggest that the Ministry need to take a more proactive role in supplying professional development to all schools, especially in the light of recent debate about the expertise of teachers' knowledge in mathematics. The mathematics advisory service where professional development was delivered or accessible to all schools, especially rural schools, is unfortunately now a thing of the past, and current availability seems to be restricted to only the neediest. Small rural schools with small budgets need more recognition and support from the ministry to ensure all get professional development to upgrade teaching skills on an annual basis as a right.

8. Many principals felt that practice, practice, practice with skills and knowledge helped prepare under achieving children better than using problems that could often be wordy e.g. FIO's. Often problems were seen as a barrier especially if there was too much reading involved, because often these children have learning difficulties in the literacy areas as well.
9. All schools use a range of resources to motivate and engage their students. None rely on just one resource. The use of materials with targeted children was seen to be very important by all schools. I have listed and given an overview of some resources that I felt were very good and promoted or aided good learning.

## Summative Conclusion

All schools use the same range of assessment tools to determine children's progress and achievement and to set targets/goals. Whilst the same sorts of resources are available, the use of these varies and /or differs across the schools. The NZ methods of teaching mathematics are under scrutiny both publicly and by some teachers. Perhaps we should look to successful countries and follow their lead?

All schools that have targeted mathematics have used the resources available to them to do their best to accelerate the low achievers learning. There's no magical cure, just hard work and dedication to helping the children who just find mathematics difficult.

There are discussion techniques (Suzanne Chapin and Catherine O'Connor) and inquiry techniques (Katie Makar) that would add value to your learning groups.

There are different schools of thought on using ability groups versus not using them, but what really works for children is the support offered to them in an environment where they are valued.

Professional Development opportunities for small rural schools (as well as the Wairoa District) are lacking and consequently they are not getting the opportunities to upskill and therefore the children in turn are disadvantaged too.

The only way to accelerate children's progress from my experience and research is to give those underachieving pupils extra time on a regular basis over a period of time, on top of their normal mathematics learning. This will require planning, time, resources and commitment from all involved; staff, students and parents.