Sustaining the Numeracy Project: The Lead Teacher Initiative 2005

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As the Numeracy Development Projects move into a phase of supporting schools to sustain and build on the initial professional development programme, it is important to identify the factors that support or hinder sustainability. This paper reports on the perspectives of principals, teachers, lead teachers, and facilitators who participated in the 2005 lead teacher initiative, aimed at developing the numeracy capabilities of lead teachers within schools. Participants believed the initiative had been effective, with workshops and facilitator visits to schools seen as the most valuable components of the programme. Schools and teachers identified ongoing facilitator support, lead teacher leadership within schools, and principal support as central to sustaining and developing effective numeracy teaching and learning. Some facilitators stressed that schools ultimately need to take responsibility for their ongoing numeracy professional learning if they are to successfully sustain numeracy practices.

Background

The New Zealand Numeracy Development Project (NDP) was implemented in 2001 following the 2000 pilot of the New South Wales Count Me In Too programme. The NDP was initiated as a result of the relatively poor results of New Zealand students in the 1995 Third International Mathematics and Science Study (TIMSS). Initial phases of the project involved the development of a comprehensive numeracy policy and strategy and several pilot projects focusing on the professional development of teachers (Higgins, Parsons, & Hyland, 2003; Ministry of Education, 2001). The NDP is part of the New Zealand Ministry of Education's Literacy and Numeracy Strategy and so reflects the key themes of that strategy: clarifying expectations, improving professional capability, and involving the community (Ministry of Education, 2002).

There are three essential elements of the NDP. They are the Number Framework, which describes the mental processes (strategies) that students use to solve number problems as well as the knowledge required to do so, the diagnostic interview, and the professional development programme (Bobis, et al., 2005). As the NDP has progressed, comprehensive evaluations have informed and shaped the development.

> The NDP is moving into a phase in which the emphasis is not only on improving the teaching and learning of mathematics in New Zealand schools but also on enhancing the capacity of schools to sustain and build on that learning. (Ministry of Education, 2005, p. 4)

In 2004, one of the evaluations commissioned by the Ministry of Education examined the sustainability of NDP practices within schools across the regions of New Zealand (Thomas, Ward, & Tagg, 2005). The evaluation report focused on the roles of facilitators and lead teachers within schools because these roles had been found to be important to the internalisation of NDP practices into school structures and classroom practices (Higgins, 2003). Evidence of the development of numeracy professional learning communities within schools was also examined, with the use of student achievement information seen as key to sustaining developments (Timperley, 2003).

In 2005, the Ministry of Education commissioned a further study into the sustainability of the NDP. The evaluation focused on the effects of the 2005 lead teacher initiative, an initiative aimed at sustaining NDP practices by developing the numeracy capabilities of lead teachers within schools. This paper reports on the findings of this study.

Method

Participants

The sample comprised all schools and facilitators involved in the lead teacher initiative in 2005. Regional numeracy co-ordinators were asked to provide lists of schools involved, along with the number of lead teachers working in each school. All lead teachers received two questionnaires, one for themselves and one for one teacher in their school, whom they were asked to select on the basis of the alphabetical order of surnames. Accordingly, 937 lead teacher and teacher questionnaires and 643 principal questionnaires were distributed to the 643 schools involved in the lead teacher initiative.

Regional numeracy co-ordinators were asked how many facilitators were working in the lead teacher initiative in 2005. Accordingly, 53 facilitator questionnaires were sent to regional co-ordinators for distribution in the seven regions involved. Table 1 shows the distribution of questionnaires across the seven regions with corresponding return rates.

Table 1
Regional Distribution of Questionnaires and Return Rates

	Number of questionnaires distributed						
	Facilitator		Principal		Lead teacher and teacher		
	Number distributed	% return	Number distributed	% return	Number distributed	Lead teacher % return	Teacher % return
Otago/Southland	2	100	67	40	100	37	41
Canterbury	8	25	65	35	135	41	41
Wellington	8	100	134	43	196	32	36
Massey	6	67	48	29	56	29	30
Waikato	14	43	161	42	212	38	40
Auckland	12	75	108	42	178	36	35
Northland	3	100	60	37	60	25	35
Total	53	62	643	40	937	35	38

Procedure

Questionnaires were developed to gather information from key participants: principals, lead teachers, teachers, and facilitators. Questions focused on the continued use of NDP practices in classrooms, school-wide developments in numeracy, the development of numeracy communities of practice, and the factors necessary to sustain effective numeracy teaching and learning. The majority of the questions involved closed responses, with participants being asked to rank factors or use Likert scales.

Questionnaires were distributed to all participants in early November, with returns requested approximately two weeks after distribution. An email was sent to regional co-ordinators at the end of November asking them to remind the participants in their regions to return the questionnaires. All questionnaires received prior to December 14 were included in the evaluation.

Findings

The findings are presented as responses to six key questions. Participant comments have been used to illustrate themes and are taken directly from questionnaires. Even though all but one of the items in the questionnaires were closed, many of the participants added comments. Some participants did not respond to all questions, so some percentages do not add up to 100.

To What Extent Are Teachers Continuing to Use Numeracy Project Practices in Their Mathematics Programmes?

One of the items in the questionnaires asked the lead teachers and teachers to make a general judgment about the extent to which they incorporate NDP practices into their classroom mathematics programmes. Eighty-eight percent of lead teachers and 83% of teachers report using Numeracy Project practices considerably or fully.

> As a staff we have put much energy and effort into the NDP this year. Staff have been reflective in their practice and are enthusiastic to maintain the impetus the project has created. (Principal)

Lead teachers and teachers were also questioned more specifically about the numeracy practices used in their classrooms. The most widely utilised numeracy practices were the grouping of students based on strategy stage, the use of numeracy activities from resource books or the website, and the use of resources such as tens frames and number lines.

> Resources are great, material masters are easy to use. (Teacher)

In general, a high degree of utilisation of numeracy practices were reported, with all seven components surveyed being used by the majority of lead teachers. Table 2 summarises these findings. Overall, lead teachers reported higher usage of Numeracy Project practices than teachers and this could be attributed to their continued training.

Table 2
Utilisation of NDP Components

	Lead teachers	Teachers
Numeracy activities (from books or website)	97%	90%
Student groupings based on strategy stage	97%	89%
Resources, e.g., tens frames, number lines, other material masters	96%	91%
NumPA assessment	89%	82%
Planning templates	66%	64%
GloSS Assessment	56%	42%
Numeracy Planning Assistant (online)	53%	25%

One common theme among participants was the way numeracy practices have become a regular part of school and classroom programmes. Lead teachers and teachers made it clear that their future practice would continue to incorporate numeracy, with over 95% of teachers and lead teachers reporting that they intended to use NDP ideas and materials in their classroom mathematics programmes to the same or a greater extent in 2006.

> We are a numeracy school: numeracy practices are fully integrated in our school. (Lead teacher)

> I always begin with a numeracy starter, even when covering another topic unit, for example, measurement. (Teacher)

What Numeracy Developments Have Occurred in Schools as a Result of the Lead Teacher Initiative 2005?

Some of the developments that occurred within schools were focused on the lead teachers themselves, reflecting the priority that is placed on lead teachers within the sustainability component of the NDP. Most of the lead teachers (83%) reported an increased confidence in their own ability to lead numeracy within their school as a result of the lead teacher initiative in 2005 and were generally positive about their role.

> I love teaching numeracy. (Lead teacher)
>
> I feel there are resources in place and a clear direction for numeracy. (Lead teacher)

Lead teachers (87%) also reported development of their professional knowledge of mathematics and attributed this to aspects of the professional development they were involved in.

> I have found the lead teacher workshops invaluable to guide me as to where I should be leading the school and learning about new developments and initiatives. (Lead teacher)

In addition to the professional development of the lead teacher, school-wide developments in numeracy were reported. Seventy-nine percent of lead teachers identified that the teaching and learning of numeracy had changed as a result of the 2005 sustaining numeracy initiatives. Principals concurred with this, with 90% rating the lead teacher as moderately to very successful in developing the teaching and learning of numeracy within the school. Those principals that stated numeracy developments had not occurred attributed this to a variety of factors, including a lack of time for the lead teacher to implement change or an inappropriate selection of lead teacher.

> We need to give her [the lead teacher] more time to work in classes with teachers. Wasn't in 2005 budget. (Principal)
>
> We chose the wrong person [to be the lead teacher]. (Principal)

Lead teachers were asked to identify the nature of the numeracy developments occurring in their schools in 2005. Table 3 summarises these findings.

Table 3
Numeracy Development in Schools

	Total	Development initiated by:		
		School	Facilitator	School and facilitator
Numeracy or maths assessment practices	79%	33%	22%	24%
Numeracy teaching practices within classrooms	77%	23%	26%	28%
Expectations for student achievement	70%	39%	17%	14%
School-wide plans for numeracy	66%	38%	10%	18%
Numeracy reporting practices (to parents, Board of Trustees)	62%	46%	6%	10%

The most widely reported numeracy developments in schools were changes in the assessment and teaching practices of teachers.

> We have sustained the numeracy programme successfully for the last three years. However, consistency of teaching methods for strategies and assessment is a factor which needed to be investigated to help student achievement. (Teacher)

School-wide numeracy developments occurred as a result of schools' initiative and support from facilitators. Nearly half of the schools initiated changes in numeracy reporting practices, and over a third of schools independently undertook developments in numeracy planning and changing expectations for student achievement. Approximately a quarter of schools made changes to both teaching and assessment practices as a direct result of facilitator support.

Lead teachers identified the types of actions they had undertaken to develop numeracy within their schools. Table 4 summarises these results.

Table 4
Numeracy Developments Implemented by the Lead Teacher

	Have implemented	Would like to implement
Regular (at least 2 per term) staff meetings focused on numeracy teaching and learning	25%	27%
Occasional (1 per term) staff meetings focused on numeracy teaching and learning	42%	21%
In-class support/mentoring of new teachers to the school (including beginning teachers)	46%	27%
In-class support/mentoring of numeracy-trained teachers	41%	31%
A school-wide focus on numeracy achievement	66%	14%
Developing school-wide plans for numeracy	55%	23%
External support (e.g., private consultants)	9%	8%
Collaborating with other schools	20%	21%

The most widely reported developments implemented by lead teachers were staff meetings focused on numeracy teaching and learning and the establishment of a school-wide focus on numeracy achievement. Two-thirds of lead teachers made developments in these areas. Just over half of the lead teachers developed school-wide plans for numeracy, and in-class lead teacher support for new teachers and trained teachers was widespread.

Principals reported supporting lead teachers in their role of leading numeracy development in a variety of ways. Over 80% of principals gave support by providing opportunities for staff meetings focused on numeracy and by informal discussions with lead teachers.

> We are starting to develop capabilities and now need a consistent approach and consolidated understandings. We meet to develop this further. (Principal)

Principals also supported lead teachers by meeting with them formally and by providing release time to enable lead teachers to work with staff.

> It's difficult to provide support for new teachers without release time. Release time is essential. (Principal)

Table 5 summarises the types of support that principals provided to lead teachers.

Table 5
Principal Support of Lead Teachers

Support provided	% provided with support
Informal discussion with the lead teacher	86
Opportunity for staff meetings focused on numeracy	84
Formal meetings with the lead teacher	48
Release time for lead teacher to support new staff	47
Release time for lead teacher to mentor numeracy trained staff within class	35
Management units (from one to four reported)	32

To What Extent Do Schools Track and Use Numeracy Achievement Data to Inform Their Decisions about the Teaching and Learning of Number?

Nearly all schools collect information on student achievement in numeracy, with 97% of teachers and lead teachers identifying that they do so. The most widely reported use of achievement information was for reporting to parents. Ninety-two percent of lead teachers reported this, with the majority of these teachers using achievement information to report to parents two to four times a year. Use of achievement information to report to Boards of Trustees was also high (86%).

Student achievement information was used by over 80% of schools to identify student learning needs and to develop teaching programmes, with a third of schools using the information for these purposes more than four times a year. Table 6 summarises the reported uses of achievement information.

Table 6
Reported Uses of Achievement Information by Lead Teachers

		Frequency of Use		
	Information used	Once a year	2–4 times a year	More than 4 times a year
Reporting to parents	92%	14%	76%	2%
Identification of individual learning needs	90%	8%	47%	35%
Reporting to Board of Trustees	86%	45%	40%	1%
Development of teaching programmes	81%	15%	38%	28%
Development of school targets or benchmarks	80%	52%	28%	
Comparison with national achievement data	73%	51%	22%	
Staff appraisal process	55%	35%	20%	

Lead teacher and teacher views on the development of numeracy targets to track student achievement varied, with the majority of lead teachers (79%) stating numeracy targets had been developed but less than half (40%) of teachers reporting this.

Lead teachers and teachers who responded that their school had targets were asked to state what those numeracy targets were. Lead teachers were asked to provide targets that had been developed for the school. Copies of school documents were supplied by 17% of lead teachers and were generally comprehensive. Teachers were asked to supply the targets for the year levels they teach and 35% of teachers did so. The nature and detail of the targets provided by teachers varied greatly, with some teachers stating the strategy stages students were expected to achieve, others describing the skills to be focused on, and some using levels from the New Zealand Mathematics Curriculum to describe achievement targets. Some teachers described achievement goals in terms of progress made by students. Examples given by teachers include:

> By the end of year 6, 80% will be working with stage 5+. (Teacher)
>
> Complete stage 7 by end of year 6. (Teacher)
>
> Target for year 2: Move up at least one level from the beginning of the year. (Teacher)
>
> Target for years 4 and 5: To raise student achievement in all the add/sub and mult/div domains and give them vocabulary to work with. (Teacher)
>
> 80% pass rate in basic facts to 20 and tables to 10. (Teacher)
>
> Children's abilities in problem solving to be raised. 80% of year 4 children working at or beyond level 2 [of the curriculum]. (Teacher)

What Have Been the Most Effective Elements of the Lead Teacher Initiative (2005)?

All participants were asked to identify the most effective elements of the lead teacher initiative, and participants' views provided results from a variety of different perspectives. In general, principals thought the initiative was effective, with the majority of principals (92%) viewing the lead teacher programme as moderately or very effective in developing the numeracy capability of the lead teacher in their school:

> Found the whole professional development increased her knowledge. (Principal)

Participants were asked to rank components of the lead teacher initiative to provide a measure of the relative effectiveness of each component. While some participants ranked elements from one to five, as asked, others appeared to misunderstand the question and rated each element individually on a one-to-five scale. This means that the relative effectiveness of each component is less clear than if the ranking had been consistently used by participants. Both types of response have been combined and used as an indication of the effectiveness of each of the initiative's elements.

The majority of lead teachers received support by attending workshops (87%) and having a facilitator visit their school (62%). Lead teachers found this support valuable:

> Workshops are crucial for staff development opportunities and to further own understanding of where the project is headed, children's targets, and MOE expectations. (Lead teacher).
>
> Facilitator visits to school maintain programme and keep it vital. (Lead teacher)

Lead teachers also found facilitator visits to classrooms valuable and facilitator support to mentor teachers and lead numeracy within the school helpful. Table 7 summarises the support received by lead teachers and the perceived effectiveness of this support.

Table 7
Support Received by Lead Teachers

	Percentage received lead teachers	Ranking/Rating[1] (as percentage)		
		1–2	3–5	6–7
Workshops	87	56	29	4
Facilitator visits to school	62	54	28	9
Facilitator visits to classes	48	53	31	10
Facilitator support with mentoring teachers	43	42	39	11
Facilitator support with providing numeracy leadership within school	53	46	36	8
Lead teacher material on NZ Maths website	74	39	40	9

Facilitators' views are in accordance with the views of lead teachers because they both identified workshops and facilitator visits to schools as the two most utilised components of numeracy support, with approximately 90% of facilitators involved in their delivery. Facilitators viewed both these elements as helpful and identified the use of email as another important support mechanism:

> Workshops provide professional learning time for numeracy. (Facilitator)
>
> When visiting a school, I withdraw each teacher from the classroom and work with them related to their needs. I demonstrate with children where necessary. (Facilitator)

Table 8 summarises the numeracy support elements delivered by facilitators.

Table 8
Support Delivered by Facilitators

	Percentage delivered facilitators	Ranking/Rating (as percentage)				
		1	2	3	4	5
Workshops	95	68	18	15		
Facilitator visits per school	89	53	24	6	3	9
Facilitator visits to class	56	26	12	15		6
Other (state)	60	29	6	15	9	3

Teachers received support from lead teachers in a variety of ways. The most common and most valuable forms of support were the introduction of new resources and the use of staff meetings to focus on numeracy. Over 70% of teachers received support in these ways. Approximately half of the teachers were involved in in-class mentoring or professional readings in numeracy.

> I find support from the lead teacher useful. Helpful resources and advice about particular students. We have an extremely able syndicate leader. (Teacher)

[1] Ranking/Rating is given as a percentage of the lead teachers who received the elements listed. Where the percentages do not add up to 100, it is due to some participants not rating or ranking the element.

Table 9 describes the support that teachers received from lead teachers.

Table 9
Support Received by Teachers

	Percentage received teachers	Ranking/Rating (as percentage)				
		1	2	3	4	5
Introduction of new resources	78	31	28	18	10	6
Staff meeting focused on numeracy	70	33	23	22	10	7
In-class mentoring or support from lead teacher	53	35	18	20	8	13
Professional numeracy readings	50	15	16	30	23	12
Other (state)	11	39	17	12	5	20

One interesting aspect of the response to questions about elements of the lead teacher initiative was the misunderstanding that some participants appeared to be under as to the scope of the programme. Some participants viewed the development as the workshop component only and answered questions accordingly.

> Question: Has your confidence in your own ability to lead numeracy within your school been further developed through the lead teacher initiatives this year?
>
> Response: Those that I have been able to attend. (Lead teacher)

Such comments indicate a narrow view of the professional development programme provided by the lead teacher initiative. Also of interest were the participants who regarded ongoing workshops and facilitator support for all staff as vital:

> Need support of facilitators for all teachers to maintain programme and keep it vital. (Lead teacher)
>
> Not lead teacher's role to develop numeracy teaching, facilitator has done that ... Lead teacher duties have mainly been to ensure teachers are prepared for facilitator's visits. (Principal)

What Elements of Numeracy Support Do Schools and Teachers Believe They Need in Order to Sustain or Further Develop Effective Numeracy Teaching and Learning?

All participants were asked to rank a number of factors in order to determine their relative helpfulness for sustaining and developing numeracy within schools. Some participants answered this question as asked, ranking all factors.[2] Others appeared to misunderstand the question and rated each component individually as on a Likert scale. The average rankings presented in Table 10 are based on the responses of those who ranked the factors as requested. This represents 61% of principals, 46% of teachers, 45% of lead teachers, and 50% of facilitators. Factors reported are those in common across the questions asked to all groups of participants.

[2] Elements were ranked from 1 (highest) to 5 for principals and lead teachers, from 1 to 7 for teachers, and from 1 to 8 for facilitators.

Table 10
Factors for Sustaining and Developing Numeracy

	Average ranking			
	Principal	Teacher	Lead teacher	Facilitator
Ongoing facilitator support	2.6	3.7	2.4	3.4
Release time for lead teachers to mentor and support teachers	3.3	4.4	3.4	3.8
Collaboration between teachers about numeracy practices	3.0	2.8	2.8	3.8
Lead teacher leadership within school	2.6	4.0	not asked	2.5
Principal support and leadership of numeracy within school	not asked	5.2	3.2	2.5

Participants' views on the relative importance of the five factors listed in Table 10 varied. Principals and lead teachers believed ongoing facilitator support was most helpful for sustaining and developing numeracy into the future, with principals believing lead teacher leadership within the school was equally helpful. Facilitators also identified lead teacher leadership as important and believed principal support and leadership within the school to be equally important. Teachers rated collaboration between teachers about numeracy practices as the most helpful factor for sustaining numeracy.

Each group of participants was also asked to rate other factors that they would have a unique perspective on. When all factors were considered, principals identified ongoing facilitator support as most helpful for sustaining and developing numeracy in the future and the monitoring of school-wide numeracy achievement as least helpful. Teachers believed collaboration between teachers about numeracy practices was most helpful and principal support of numeracy was least helpful. Lead teachers concurred with principals and ranked ongoing facilitator support as most helpful and believed opportunities to collaborate with other numeracy lead teachers to be least helpful. Facilitators believed that effective lead teachers within schools were most beneficial for sustaining and developing numeracy and release time for all teachers was least important.

Participants were asked what they believed the barriers to sustaining and developing numeracy were in the schools they worked in. This was an open-ended question, with respondents required to identify barriers. Results for this question are summarised in Table 11. Items listed are those that at least one group of participants identified as a barrier, with a reporting threshold of 10%.

Table 11
Barriers to Sustaining and Developing Numeracy

Barrier	Percentage of respondents identified			
	Principal	Teacher	Lead teacher	Facilitator
New staff lack training	48	17	26	58
Lack of teacher time to plan, teach, and assess numeracy	11	25	38	17
Teacher resistance to new ideas or lack of motivation	13	10	25	17
Lack of focus on numeracy due to participation in other PD projects	13	4	11	25
Lack of funding for release time and resources	18	11	18	17
Lack of ongoing PD in numeracy	12	13	10	
Resource issues: availability, ease of use, lack of updates	8	21	16	
Lack of principal support for numeracy		1	3	33
Ineffective lead teachers	3	1		31

Participants were generally in agreement about the barriers that exist to sustaining numeracy, with five barriers identified by all four groups of participants. The barrier identified by the highest number of participants was the challenge presented to a school when teachers who lack numeracy training are added to the staff. This was identified by approximately two-thirds of facilitators, half the principals, a quarter of the lead teachers, and 17% of teachers.

> Change of staff, already lost one lead teacher during contract. Not always possible to replace with numeracy-trained teachers. (Principal)
>
> Change of key staff, e.g., those who have been trained leave the school and are replaced by untrained people so school is back to square one. (Facilitator)
>
> Some new teachers (even beginning teachers) have had very little Numeracy Project experience and they can only go to catch-ups which aren't as effective as the full programme with intensive facilitator input. (Lead teacher)

Lack of teacher time to plan, teach, and assess numeracy was also widely reported as a barrier, with over a third of lead teachers and a quarter of teachers identifying this, as well as over 10% of facilitators and principals.

> Lack of time, materials, and equipment having to be made by classroom teachers. (Lead teacher)
>
> I believe planning for the non-teaching group is the biggest hurdle. Teachers need to spend up to 45 minutes a week to sort out meaningful follow-up tasks. This is not unreasonable at all, but many are not used to doing this. (Lead teacher)
>
> Teachers need ideas about how to build assessment into their programmes without it becoming too cumbersome. (Teacher)

Other barriers to sustaining numeracy that all four groups of participants also identified were lack of motivation, teacher resistance to new ideas, lack of focus on numeracy due to participation in other professional development projects, and lack of funding for release time and resources.

> Not all teachers on board, some are reluctant and not willing to change. (Teacher)
>
> Commitments to other contracts make it harder to maintain a watching brief in numeracy. (Principal)
>
> All these [professional development] programmes are excellent, but there is too much. If we had been able to concentrate solely on numeracy, I think greater progress would have been made. (Principal)

Principals, lead teachers, and teachers believed a lack of ongoing professional development in numeracy and issues surrounding resources, including resource availability and ease of use, were also barriers to sustaining and developing numeracy.

> We have found that resources have been lacking in the senior area, which has been frustrating for the classroom teachers. (Principal)

Approximately a third of facilitators identified lack of principal support and ineffective lead teachers within schools as barriers. Small percentages of teachers, lead teachers, and principals were in agreement.

In addition to those factors identified in common with other respondents, facilitators described two other barriers to sustaining numeracy. These were the lack of a numeracy professional development culture within schools (22%) and the lack of support for numeracy from schools' senior management teams (14%).

To What Extent Are Schools Developing Numeracy Communities of Practice?

Teachers were asked about the numeracy practices they participated in, to get a picture of the types of professional numeracy activities happening in schools. Results are presented in Table 12.

Table 12
Professional Numeracy Activities

	Percentage of teachers participated	Frequency (as percentage)		
		Once a year	2–4 times a year	More than 4 times a year
Reflection on own teaching practice	86	6	24	56
Collaboration with other teachers	83	3	24	56
Use of numeracy achievement information	81	13	48	20
Numeracy meetings (staff, syndicate)	80	8	43	29
Use of numeracy targets	54	15	28	11

Over 80% of teachers were involved in reflecting on their own teaching practice, collaborating with other teachers, and using student achievement information in numeracy. Just over half of the teachers made use of numeracy targets.

The frequency of these activities varied, with just over half of the teachers reflecting on their own teaching practice and collaborating with others more than four times a year. Nearly half of the teachers were involved in using achievement information and staff meetings based on numeracy between two and four times a year. Twenty-eight percent of teachers report using numeracy targets between two and four times a year.

One of the facilitators provided a comprehensive summary of two schools that she believed were successfully sustaining numeracy developments. The following excerpts are taken from her comments and illustrate the belief that successfully sustaining schools are those that are empowered to take responsibility for ongoing numeracy professional learning within their school and have strong leadership through effective and committed lead teachers and principals.

> Having worked with two successfully sustaining schools, it is apparent these schools face all the same barriers as other schools – teacher mobility, resistance by individual teachers, etc. However these schools have high quality lead teachers ... The principals have numeracy sustainability in the strategic plan for the school and both schools have a strong professional learning community ... Expectations are set and barriers are not viewed as barriers but as problems to be solved. There is the expectation that the schools themselves are empowered to solve the problems rather than wait for someone else to do it for them ... The lead teachers felt it was imperative for the workshop element of the NDP to continue to be offered for catch-up teachers but felt in-school support should come from themselves.

Concluding Comment

Lead teachers and teachers continue to incorporate NDP ideas and materials into their classroom mathematics programmes, with the most widely utilised numeracy components being the grouping of students based on strategy stage and the use of numeracy resources and activities. School-wide numeracy developments were reported, with changes in the teaching and assessment practices of teachers being widespread. Lead teachers also reported an increased confidence about leading numeracy developments and an enhanced professional knowledge of mathematics.

Participants believed the lead teacher initiative had been effective in developing the numeracy capability of lead teachers in their schools, with workshops and facilitator visits to schools seen as the most valuable components of the programme. Schools and teachers identified ongoing facilitator support, lead teacher leadership within schools, and principal support as key to sustaining and developing effective numeracy teaching and learning. Barriers to sustaining and developing numeracy that were reported included the challenge presented to schools when teachers who lack numeracy training are added to the staff and a lack of time for teachers to plan, teach, and assess numeracy.

Schools appear to be developing numeracy communities of practice, with teachers involved in reflecting on their own teaching practice, collaborating with other teachers, and using student achievement information in numeracy. The majority of schools reported using student achievement information to identify student learning needs, to develop teaching programmes, and to measure progress against targets.

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