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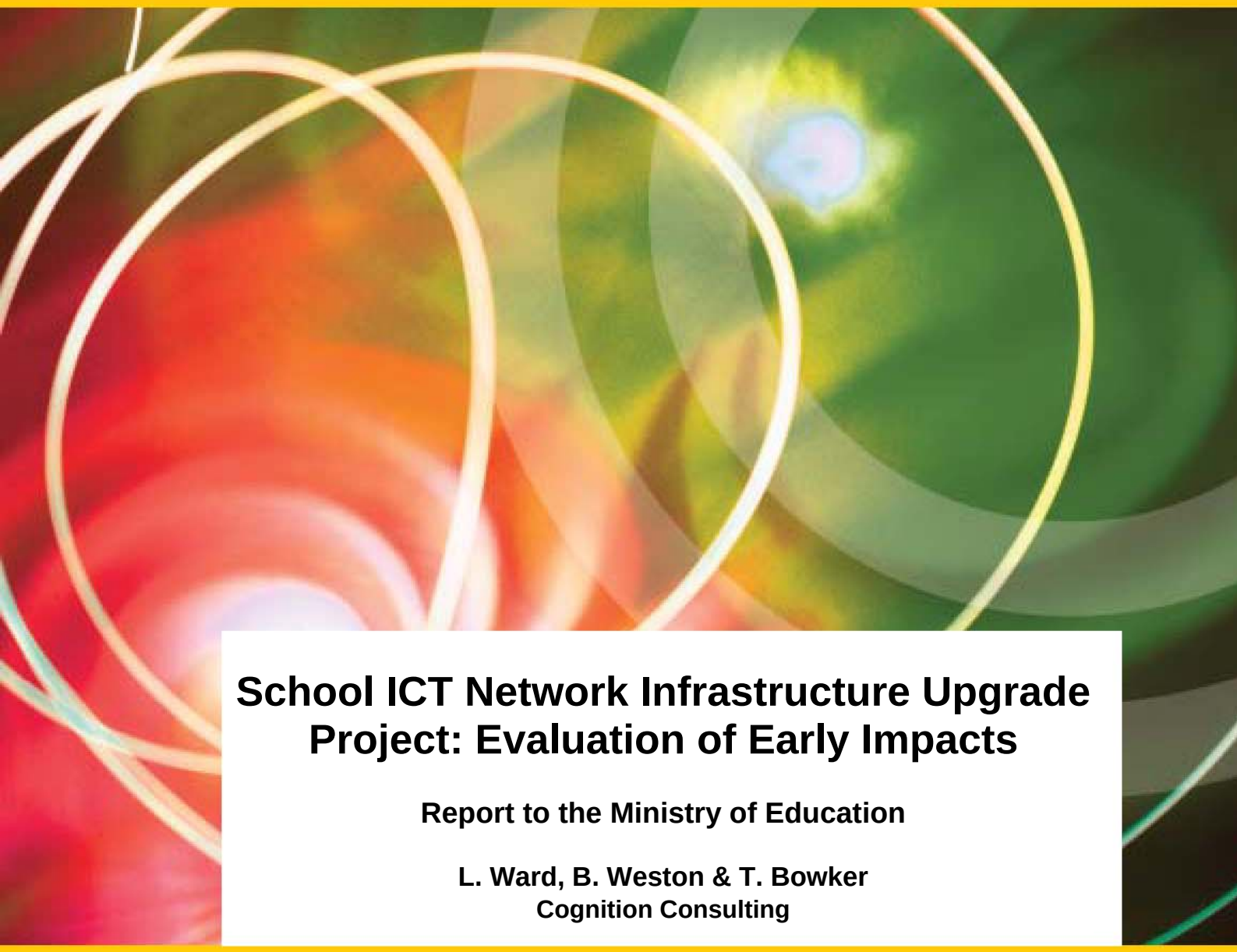

School ICT Network Infrastructure Upgrade Project: Evaluation of Early Impacts

Report to the Ministry of Education

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Final Report

Proposal prepared for:

Ministry of Education

Submitted by:

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Cognition Consulting

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Policy Context

Information and Communication Technologies (ICT) are prominent in the education policies of governments around the world and in most research concerned with the future of schooling initiatives[1]. Implicit within all such policy, and sometimes explicit, is the link between ICT and school reform, and more specifically a move towards student-centred learning practices and meeting the needs of the 21st century[2].

These goals can be clearly seen in the immediate key education priorities for the New Zealand government. These are:

- To build an education system that equips New Zealanders with 21st century skills and
- To reduce systematic underachievement in education.

Sitting beneath these educational priorities are a number of strategy documents including national policy documents related to the integration of ICT. The most recent of these is "Enabling the 21st Century Learner: An e-Learning Action Plan for Schools, 2006 – 2010[3]". In his foreword to this document the Minister of Education, Steve Maharey, states that:

> *E-learning has the potential to transform the way we learn. It's about exploiting technologies and using ICT effectively across the curriculum to connect schools and communities and to support evidence-based decision making in schools.*

It could be argued that for this to be achieved it is crucial that ICT integration occurs within the classroom through teaching and learning activities rather than in the more peripheral administration tasks.

The two previous ICT strategies for schools focussed on laying the foundations for the effective use of ICT through the enhancement of school and teacher capacity. This was to be achieved through improved infrastructure and the upskilling of teachers. In a brochure style publication called "Enabling the 21st Century Learner", 25 ICT initiatives were listed in three categories: learning professionals, learning materials and

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1 Institute for Professional Development and Educational Research. (2002). *Review of future-focused research on teaching and learning*. Wellington: Ministry of Education, Research Division.

2 Venezky, R., & Davis, C. (2002). *Quo vademus? The transformation of schooling in a networked world*. Retrieved 22 September, 2003, from http://www.oecd.org/dataoecd/48/20/2073054.pdf

3 Ministry of Education. (2006). Enabling the 21st century learner. An e-learning action plan for schools, 2006 – 1010. Learning Media: New Zealand

resources, infrastructure for learning. These initiatives are aimed at enabling the 21st century learner through supporting schools to maximise the potential of new technologies for learning.

Despite this emphasis in policy, there continue to be disappointing levels of ICT integration into teaching and learning not only in New Zealand but also internationally[4]. An analysis of the outcomes of three initiatives in New Zealand showed that while operational policy was largely being implemented, in the sense that infrastructure and professional development were provided and installed, there was limited impact in terms of the more general policy outcomes related to school reform and 21st century learning[5].

The most common types of ICT use reported in studies such as those undertaken in New Zealand secondary schools by Ward et al[6] and the ICTPD evaluations[7] are administrative and professional. That is, teachers are using ICT to do reports, communicate with each other, plan lessons and create resources, and to access the Internet for lesson plans and ideas. The ability of ICT integration to transform teaching and learning through such use appears problematic.

More recent studies[8], however, suggest that, this may be changing, particularly in primary schools. A case study of the laptop initiative (TELA) in primary schools[9] shows unintended consequences regarding the use of the laptops to directly augment and enhance classroom teaching, in that these were not the aims of the Ministry of Education. One of the factors teachers suggest is responsible for this increased use is access to a robust, accessible and fast network. They also suggest that the laptop has been the most successful professional development they have ever had as the flexibility, portability and ease of access it offers provides them with opportunities to 'play' and to practice new skills in their own time. In addition, nearly all participants in the case study focus groups reported increased confidence and motivation through the use of

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4 For example see:

Lai, K.-W., Pratt, K., & Trewern, A. (2001). *Learning with technology: Evaluation of the Otago Secondary Schools Technology Project*. Dunedin: The Community Trust of Otago.

Becker, H. J., & Ravitz, J. L. (2001). *Computer Use by Teachers: Are Cuban's Predictions Correct?* Paper presented at the Annual Meeting of the American Educational Research Association, Seattle.

Cox, M., Abbott, C., Webb, M., Blakeley, B., Beauchamp, T., & Rhodes, V. (2003b). *ICT and pedagogy: A review of the research literature* (A report to the DfES No. 18): British Educational Communications and Technology Agency.

5 Ward, L. & Parr, J.M. (2006). *Using policy as a tool for instructional reform: The case of ICT*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

6 Ward, L., Parr, J., Hattie, J., & Robinson, V. M. J. (2005). *Limited use, limited impact: The ICT dilemma.* Paper presented at the Annual meeting of the American Educational Research Association, Montreal.

7 Ham, V., Gilmore, A., Kachelhoffer, A., Morrow, D., Moeau, P., & Wenmoth, D. (2002). *What makes for effective professional development in ICT?* (Report prepared for the Ministry of Education, New Zealand): Christchurch College of Education.

8 Metiri Group. (2006) Technology in Schools: What the research says.

9 Parr, J.M. & Ward, L (2006). Laptops for teachers evaluation: First interim report. University of Auckland

their laptops. These are crucial mediating factors on teacher use of ICT[10]. The findings in this report suggest similar impacts from the network infrastructure upgrade.

Infrastructure provision, such as the network upgrade and the laptops for teachers schemes, and professional development alone will never be enough to promote the full integration of ICT into teaching and learning, in that teacher readiness to use ICT, which can be seen as willingness (both to change practice and to use ICT) and capability (both to use ICT and to manage its use by others) are also needed. However, it would seem that perhaps "all the ducks are nearly in a row". That is, it may be that finally everything is in place for the desired integration to occur. Perhaps the network infrastructure upgrade is a crucial piece in the overall "jigsaw puzzle" of infrastructure (hardware & software), resources and artefacts, professional development and teacher motivation/willingness that appears necessary for the potential of ICT, to transform learning experiences[11].

[10] Ward, L. & Parr, J.M. (2005) *Limited use, limited impact: The ICT dilemma.* Paper presented at the Annual meeting of the American Educational Research Association, Montreal.

[11] Ward, L. & Parr, J.M. (2006). *Using policy as a tool for instructional reform: The case of ICT.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

The Network Infrastructure Upgrade Project

The infrastructure upgrade project is one of the "Infrastructure for Learning" initiatives mentioned in the previous section. Other initiatives providing infrastructure include the provision of laptops for teachers and principals, managed Internet services and the digital opportunities projects[12]. The purpose of this report is to consider the early impact of this initiative on participant schools both in the initial pilot (pilot Schools) of the upgrade and in the first cohort of schools to have their network infrastructures upgraded as part of the actual project implementation.

The Pilot

The pilot was implemented in 2004 with the first instalments in pilot schools commencing in July of that year. The intention of the pilot was to:

1. Test the standards developed for IT infrastructures in schools.
2. Trial the proposed IT infrastructure upgrade process.
3. Estimate the cost of performing upgrades so that we can more accurately predict the number of schools that could be upgraded within the available funding.
4. Highlight any issues that may arise from schools with existing infrastructures that have to be incorporated into the upgraded system.
5. Provide a platform for the student management systems to be tested.
6. Provide immediate assistance to schools which had been identified for attention.

Thirty-five schools were selected to be part of the pilot. These were in four clusters from different regions of New Zealand ensuring a range of decile ratings, locations and various qualities and extent of infrastructure at that stage. A sample of 26 schools from amongst the pilot schools were interviewed for this report.

The Implementation of the Project

As part of the actual project, implementation networks have been installed in approximately 350 more schools. This first cohort of schools to have a network infrastructure upgrade, were chosen by size of school

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[12] Ministry of Education. (n.d.) Enabling the 21st Century Learner.

and then status of current network. The selection of schools for upgrade was based on the model outlined in the subsequent table.

Table One: Model for selection of schools for upgrade

Priority level	Roll size	Current network status
One	<77	None
Two	78–150	None
Three	<77	Poor
Four	78-150	Poor

Based on this model the Ministry has written to approximately 550 schools offering an upgrade. These schools were required to fund a proportion of the cost of the upgrade. The uptake rate in this group was approximately 70%. The first installations in the eligible schools began in late October, 2005. For this study 24 schools were interviewed from amongst the first 50 schools to have upgraded networks installed. These schools have, therefore, had their upgrades for at least one year less than the pilot schools. Based on the model above they are all small schools and in all instances their networks were either non-existent or poor prior to the upgrade.

Methodology

All data were collected through structured interviews. The three named researchers on this report undertook the interviews. An interview schedule (Appendix One) was developed which ensured consistency across all interviews. The schedule was sent to the Ministry of Education for approval prior to its use. Minor revisions were made as a result.

The researchers used these schedules for all interviews and participant responses were noted in the appropriate sections during the interview. An abbreviated form of the schedule was sent to all participant schools prior to the interview.

Research Design

The original RFP from the Ministry outlined five research questions that they required to be answered through the interviews. These were:

1. What enhancements have been implemented or planned since the network upgrade?
2. How has the provision of the network upgrade allowed these changes to occur?
3. What level of utilisation of networks and resources is occurring or planned for since the network upgrade?
4. How is the current or planned utilisation related to a robust infrastructure and the network upgrade?
5. What initiative and non-initiative factors are inhibiting or extending effects in schools?

In order to more fully understand the impact of the network infrastructure on schools and on teaching and learning the interview schedule was divided into five sections. The first section was general and asked some initial questions. The remaining four sections were related to specific areas of use based on findings from other research into teachers' use of ICT[13]. These areas of use individually allowed the researchers to develop a more detailed picture of how the network is being used. These areas of use are:

1. Administrative use - record keeping, student management systems, reporting and other daily routine management tasks.

[13] Ward et al, 2005

2. Professional work – preparing resources, planning, searching for materials for students to use and other tasks related to teacher preparation and organisation for teaching.

3. Pedagogical use – use of ICT by teachers and students while actively engaged in teaching and learning such as presenting material, searching on the Internet, virtual field trips.

4. Professional learning use – involvement by teachers in professional development and learning through the use of ICT such as online courses.

For questions regarding the level of impact of the network infrastructure across each area of use, teachers were asked to rate the impact on a scale of one to nine. Possible responses to more qualitative general questions were included on the schedule to act both as a guide to the interviewer and to assist in note taking during the interview.

Research Participants

As already discussed a total of 50 schools were included. Principals or their representatives were interviewed, with 26 from amongst the pilot schools and 24 from the first cohort of implementation schools. It was initially intended to have equal representation from the two groups but this did not prove possible. Apart from the desire to ensure equal representation of pilot and implementation schools the decision on which schools to interview was based primarily on location.

Pragmatic decisions were made based on ease of access to schools where face-to-face interviews were to be undertaken, while phone interviews were organised with schools in more remote locations to ensure a diverse range of schools overall. There were some instances where schools that were contacted were unwilling to participate, although this was not common.

Interview participants were primarily the school principal although in a few instances deputy principals (3) or the ICT co-ordinator (2) were interviewed. Both face-face (n=39) and phone (n=11) interviews were conducted.

Data Analysis

Both quantitative and qualitative responses were gathered. Quantitative responses were entered directly into Excel for collation and analysis. Qualitative responses were of two distinct types.

The first type of response related to the types of improvements possible, the benefits experienced and the means by which the infrastructure had allowed these. As already alluded to, guides to these responses were included on the schedule and interviewers were able to simply tick appropriate columns (categories) or to add new ones as required. The number of responses within each category was entered into Excel for collation

and analysis. In these instances, in the data tables provided in this report, n= the number of actual respondents for each category (a maximum possible n of 50). In some instances respondents did not answer individual questions where they felt unable to do so. This was primarily where they felt they had insufficient knowledge. The percentage, therefore, has been determined using the number of actual respondents for that category rather than 50.

The second group of qualitative comments, around those factors that extend or hinder the impact of the network infrastructure upgrade were less specific in nature and, as a result, required more extensive coding. In these instances a robust, iterative open coding method[14] was used. One of the research team worked through all responses determining a suitable response category for each comment. A clustering[15] method was then used where smaller coding patterns were grouped into bigger coding categories. Reliability checking was undertaken on the coding by a second researcher although the very specific structured nature of the questions ensured a high level of accuracy. In the relevant data table for these questions 'n' is the number of times the category was counted across all sections and the percentage has been determined based on the total number of comments counted across all categories.

[14] Strauss, A., & Corbin, J. (1998). Basics of qualitative research: Grounded theory procedures and techniques (2nd.ed.). Newbury Park, CA: Sage.

[15] Bogdan, R., &Biklen, S. (1992) Qualitative research for education: An introduction to theory and methods. Boston: Allyn & Bacon.

Research Findings

The findings are reported based on the five questions outlined earlier with an initial section related to general information about the participant schools and the initial implementation of the pilot. Data for each of the five questions has been drawn from across the different sections of the interview schedule that is, across the areas of use.

General Information

Demographics

While the first cohort of implementation schools had to meet certain criteria regarding roll size and geographical location to be eligible to have an upgrade, the pilot schools did not. As discussed earlier, their inclusion was determined by a totally different set of criteria. There are, therefore, a number of differences between the two groups of schools as shown in Table Two..

For the purposes of this report, low decile schools include those categorised as being a 1, 2 or 3, medium range includes 4, 5, 6 and 7 and high decile includes 8, 9 and 10. Over half (n=15, 58%) of the pilot schools were low decile, whereas only 16% of the implementation schools fitted into this category. At the other end of the scale, 42% of the implementation schools and 11% of the pilot schools fitted into the high decile category. The decile rating of a school was not a factor in determining which schools were to be included in either the pilot or the implementation of the project itself. Considering this, the spread of levels is surprisingly even across the selected schools.

When determining the size categories of schools we used Ministry classification as a guideline: small schools having rolls of 150 or less (U1–U3), medium schools with rolls of between 151 and 500 (U4 and U5), and large school rolls exceeding 501 (U6+). Over half (n=15, 58%) of the pilot schools were therefore classified as medium-sized schools, whereas nearly all (n=23, 96%) of the implementation schools had rolls of less than 150 (low).

In determining the location category of a school we identified three groups: rural, provincial or urban. Rural is described as being an area where there is only one local school. A provincial area is where there is more than one primary school but probably only one secondary school. An urban school is where there will be named suburbs and the possible choice of primary, intermediate and secondary schools. Of the implementation schools, 96% (n=24) were categorised as rural. The only one that did not fit into this was a city kura kaupapa. In contrast, only 15% (n=4) of the pilot schools were identified as being rural. The

remainder of the pilot schools were spread over the provincial and urban categories (provincial 38%, urban 47%).

Table Two: Participant school demographics

		Pilot schools		Implementation schools		All participant schools	
		n	%	n	%	n	% n
Decile	Low	15	58	4	16	19	38
	Medium	8	31	10	42	18	36
	High	3	11	10	42	13	26
Roll size	Low	10	38	23	96	33	66
	Medium	15	58	1*	4	16	32
	High	1	4	0	0	1	2
Location	Rural	4	15	23	96	27	54
	Provincial	10	38	0	0	10	20
	Urban	12	47	1**	4	13	26
Total schools		26		24		50	

*on border of our category criteria ** urban, low decile kura kaupapa

Network implementation

Each school was asked how long they had had their upgraded network. As Table Three shows this ranges from less than six months to over two years. However, one school in the 19-24 month category had had their upgraded network installed 21 months ago but did not begin using it until this month (October). This was due to extensive renovations encompassing the whole school. Their responses to the questions asked are therefore closer to those of a beginning school than a long-term school.

Table Three: Length of time the upgraded network has been in place

Length of time (months)	n	%
< 6 months	3	6
6–12 months	20	40
13–18 months	5	10
19–24 months	18	36
>24 months	4	8
Total respondents	50	

Participants were also asked whether the upgraded network was functioning. Although all said it was, many also said there had been major 'teething' problems for some schools and the response was often "it is now". It is important to note here that, despite these initial teething problems, all schools appear positive about the network upgrade and the overall impact it has had on their school. Only one school was adamant they were worse off than before. These issues do have to be acknowledged, however, as in some cases initial problems appear to have hindered the ability of schools to fully utilise the network from the outset.

During the interviews respondents made suggestions that could help alleviate these initial issues if the project were to be repeated. It was generally felt that there were issues around training, related to both quantity and quality. A key problem appears to have been that when the servers were installed only brief instructions were provided before the "manpower" has left. This meant that schools had only a very basic operating knowledge, rather than the necessary practical understanding or skills to problem solve further development or breakdowns.

It appears that a general lack of knowledge of the system and how it works has had an effect on the level of implementation and, therefore, its impact. As already mentioned, there was a general feeling that training is needed to enhance the knowledge of the potential of the system. Over half of the respondents commented that training around basic server/network understanding is essential and that there still needs to be 'on the ground' technical support. Getting to know how to use the equipment has been an issue for many schools.

Teething problems have also stemmed from a variety of other causes such as mixed platform (PC/Mac) issues, local power irregularities, school physical environment constraints (finding the actual space in small/old buildings), delays in repairs or combining old hardware with the new system. Several respondents commented that a follow-up and check up on network installation approximately one month after installation would be invaluable.

There was also the feeling expressed that a lot is expected of teachers and that the implementation and maintenance of a network should not be part of their job or a required part of their skills repertoire. The technical knowledge required was seen as "beyond our capabilities". One school commented that before the upgrade they had been able to maintain and repair the system themselves but the new network infrastructure was far too complex for them to be able to do so. It seems that while the sophistication and capability of the system was greatly appreciated and valued it had made things more difficult for schools with the increased technical expertise required. Over time one would imagine this would become less of an issue.

The next question in the general information section asked participants to rate their network before the upgrade. Table Four summarises the responses to this question. The percentage relates to the actual number of responses (n=49) to this question. In one instance the respondent had not provided an answer to this question, as they had not been at the school prior to the installation of the new network. Nearly two thirds (64% n=31) of the respondents rated their networks as being "poor" or said they had "no network" at all before the upgrade. By comparison 12% (n=6) considered their network to be "good" before the upgrade. This is not surprising given that the implementation schools were chosen based on the criteria of having no network or a poor one prior to the project.

Table Four: Ratings for existing school network before the upgrade

Rating	n	%
No network	20	41
Poor	11	23
Adequate	12	24
Good	6	12
Total respondents	49	

Impact of upgrade

Participants were also asked to rate the overall impact of the network infrastructure upgrade on their school. Table Five summarises these responses. This is an important question for this study because it helps us to understand how the respondents feel about the overall effect of the upgrade. This was the last question asked, and followed the four in-depth areas of use sections, so, in effect, it was a reflective summary of the impact of the upgrade. In many instances it was much more positive than the individual sections had suggested might have been the case. Again not all respondents gave a rating.

Table Five: Rating for the overall impact of the schools network upgrade project

Rating	n	%
Very limited impact	0	0
Limited impact	1	2
Fair impact	5	11
Wide impact	15	33
Very wide impact	18	40
Extensive impact	6	14
Total respondents	45	

No respondents reported the overall impact as "very limited", while only one suggested it had been "limited". This response was due to a school building upgrade, with the upgrade only becoming live this month (October), and as such can be discounted. In fact, the principal did indicate during the interview that she and her staff were expecting the upgrade to have a very wide impact. They had undertaken professional development and purchased equipment in preparation for the upgrade over the preceding two years.

The three highest rating impact levels: "wide", "very wide", and "extensive", accounted for 87% of all responses collectively. An initial comparison of data suggested that location, size and the decile rating of schools had little impact on responses, therefore, we did not pursue this any further. Supporting this are comments made during interviews that suggest the differences are due to individual school climate and culture rather than standard demographic factors. Factors such as the level of ICT skill of the principal (particularly as many are one or two teacher schools), general expertise within the school, the remoteness of the school and access to local services all seem to have affected the overall impact of the network infrastructure upgrade. Other respondents commented that while the effect had been wide already they expected that as they became more confident and skilled the impact would be even greater with time.

Additional purchases

Finally, in this section, participants were asked what they had bought in the way of hardware or software since the network upgrade. Table Six summarises these responses. Some participants named more than one purchase (n=40, 80%) while others reported no purchases (n=5, 10%). Also included in the table is information on the maximum number of items purchased by any one school.

As discussed earlier 'n' = total number of respondents reporting a purchase within each category. The percentage has been determined based on the total sample of 50 schools.

Table Six: Number of respondents reporting hardware or software purchases since the network upgrade

Items	n	%	Maximum number by an individual school
Computers	26	52	28
Data projector	23	46	3
Networked photocopiers and printers	16	32	7
Digital cameras and videos	15	30	8
Teachers laptops	14	28	6
Purchased programmes	14	28	5
Downloaded programmes	12	24	1
SMS	10	20	1
Wireless, broadband	7	14	1
Server upgrade	6	12	1
Telephone systems – new or upgrade	6	12	1
Memory sticks	6	12	25
Nothing	5	10	-
Interactive whiteboards	4	8	8
Microphones and headphones	4	8	20
Televisions	3	6	14

The most common purchases were computers, with over half of the schools (52%) adding to their existing computers. One school increased its total by 28 units. The next most common item was data projectors with just under half (46%) purchasing these. Approximately a third of schools purchased networked photocopiers/printers (32%), digital/video cameras (30%), teachers' laptops (28%) and software (28%).

With three exceptions, the table only includes purchases made by more than 10% (n=5) of the interviewed population. Other such purchases, not recorded here but made by a few schools, included hub modification, tablets, digital microscopes, video conference and podcast hardware and library systems. These accounted for less than 10% individually.

The exceptions were interactive whiteboards (n=4, 8%), microphones and headphones (n=4, 8%) and televisions (n=3, 6%). These have been included because they represented large numbers of purchases albeit across only a few schools. They are also purchases with very specific uses relating to teaching and learning. One school has purchased 14 televisions which have been mounted in every classroom. They are used for podcasts on a daily basis. Four schools have purchased microphones and headphones, the latter being for individual work in computer suite situations where quiet is required.

While several respondents commented that they had not made any purchases, they qualified this by stating that they had pre-empted the upgrade by pre-installing and ordering the hardware that they knew they would need. Others intend to make significant purchases in the up-coming twelve months as shown in the following table.

Respondents were also asked about future improvements within each area of use. The results of this are detailed in a later section of this report. However, given the comments reported in this section regarding future purchases of hardware and software, data related to these were analysed separately and are reported below. Again, the percentage has been determined based on the total number of possible respondents (50).

Table Seven: Number of respondents reporting intended hardware or software purchases in the next year

Intended purchases	n	%
Increase equipment – non specific	9	18
Data projector	9	18
Interactive whiteboards	9	18
Computers	8	16
SMS	8	8
Wireless, broadband	4	8
Networked photocopiers and printers	3	6
Digital cameras and videos	2	4
Teachers laptops	2	2

As this table shows there was a definite preference for increasing student use of computers, data projectors and interactive whiteboards, as well as the upgrading or purchasing of student management systems. This suggests increased classroom use as an intended goal. Comments made during the interviews imply that the increased accessibility and reliability afforded by the network infrastructure upgrade has allowed ICT

hardware and software to be spread across the school environment, allowing for a greater level of integration into the classroom than previously possible.

Levels of Use of Network

Participants were asked to report their levels of use for each area of use before the upgrade, currently and as anticipated in one years time. This was on a scale of one to nine, where one was very limited and nine was extensive use. Overall levels of use were determined by totalling the reported levels of use for each individual category and dividing the total by four to retain the one to nine scale.

Table Eight summarises the number of responses for each level of use: low (1-3), medium (4-6) and high (7-9) while Table Nine summarises the average response for each area of use and the average shift over two time periods. The percentages in Table Eight are based on the actual number of respondents.

Table Eight: Number of respondents within each level of use by category of use

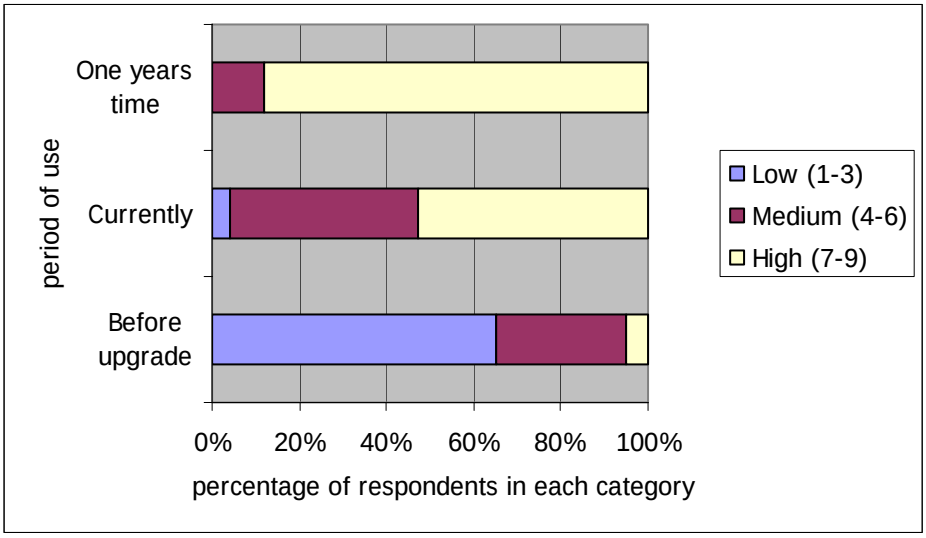
		Administrative		Professional		Pedagogical		Professional development		Overall	
		n	%	n	%	n	%	n	%	n	%
Before upgrade	Low (1-3)	27	57	29	62	34	72	29	61	28	65
	Medium (4-6)	15	32	14	30	11	24	13	28	13	30
	High (7-9)	5	11	4	8	2	4	5	11	2	5
	TOTAL	47		47		47		47		43	
Currently	Low (1-3)	7	14	1	2	4	8	5	11	2	5
	Medium (4-6)	21	43	22	45	28	57	25	53	23	53
	High (7-9)	21	43	26	53	17	35	17	36	28	65
	TOTAL	49		49		49		47		43	
One years time	Low (1-3)	0	0	0	0	0	0	1	2	0	0
	Medium (4-6)	7	15	5	10	5	10	5	10	5	12
	High (7-9)	41	85	44	90	44	90	41	88	38	88
	TOTAL	48		49		49		47		43	

These data show an apparently staged shift in levels of use, for all areas of use, from before the upgrade to what is anticipated in one years time. For example, in terms of pedagogical use while 72% of respondents report low levels of use before the upgrade none anticipate low levels of use in one years time with 90% predicting high levels of use then. While this is self-reported it does suggest that respondents are keen to utilise the potential of their network in the classroom. Perhaps more telling is that 57% report they are currently using the network to a medium level in the area of pedagogical use.

In fact, apart from professional development, all participants anticipate at least moderate levels of use in one year's time and, in this instance, only one participant reported low levels of use, which he admitted was due to personal preference for face-to-face learning (it was a one teacher school).

Figure One is a graphical representation of this data, which clearly shows the extent to which the overall levels of use are changing. This highlights the impact of the network infrastructure upgrade with no schools reporting low use in one year's time and the majority predicting high impact. This is compared to a majority of schools reporting low overall use before the upgrade.

Figure One: Comparison of percentage of respondents within each level of overall use at different periods of time



The following table shows both the mean levels of use across each of the areas of use and the average change from before the upgrade and currently (change one) and before the upgrade and in one years time (change two).

Table Nine: Mean reported levels of use across different categories of use

	Administrative	Professional	Pedagogical	Professional development	Overall
Before upgrade	3.65	3.36	2.85	3.31	3.16
Currently	5.89	6.52	5.93	5.70	5.97
One years time	7.81	8.08	7.69	7.46	7.71
Change one*	2.29	3.25	3.12	2.43	2.81
Change two**	4.16	4.72	4.84	4.15	4.55

* Change in mean levels of use between before the upgrade and currently

** Change in mean levels of use between before the upgrade and in one years time

This table clearly shows that the areas where the greatest shifts have been made are in professional and pedagogical uses. It may be that schools were already using their networks for administrative work and, therefore, there was less room to move. It may also be that, in the case of professional development, teachers prefer to utilise other means. Indeed in a number of other studies there is evidence to suggest this is the case[16]. What is interesting here, taking educational policy into consideration, is the shift in use directly related to teaching and learning and what is happening in classrooms.

A complicating factor for this data is the varying levels of time that schools have had their network as, for example, change one could represent a change over a period of six months or over two years. The following table uses the same raw data to calculate the overall average changes in levels of use reported across schools grouped by the extent of time they have had their network upgrade. The same two time periods have been used (i.e. before the upgrade to current use and before the upgrade to anticipated use in one years time).

[16] For example the evaluation of the Farnet project and the laptop case studies both undertaken by Parr and Ward.

Table Ten: Reported change in mean level of network use by length of time since network upgrade

Length of time	Change One (Mean)	Change Two (Mean)
<6 months (n=3)	1.42	2.50
7–12 months (n=20)	2.60	4.35
13–18 months (n=5)	4.19	5.56
19–24 months (n=18)	2.57	4.41
>24 months (n=4)	4.31	6.50

It can be presumed that the first two groups of schools are comprised entirely of implementation schools while the last two are entirely pilot schools. There may be some cross over between the two types of schools in the middle category (13-18 months). Overall, there is a steady increase in the average change in mean levels of use for both time periods, suggesting that the longer a school has the network the greater its impact. The implication is that the impact of the network upgrade is ongoing and that what is reported here is not yet a maximum level of impact for many of the schools.

There is, however, what appears to be an anomaly with those schools that have had their network for between 19 and 24 months. They report a noticeably lower level of change for both time periods than the other schools. There are 17 schools in this category and all are pilot schools. They, therefore, may be amongst those reporting an already adequate or good network prior to the upgrade. In fact one of these schools reported no changes in levels of use at all since before the upgrade while another reported none between before the upgrade and now. In the first instance this school did state, however, that the network had enabled them to work more effectively across their ICTPD cluster. The second instance is the one where the school has only recently been able to use the network upgrade. What these data highlight are individual school differences. However, they do not detract from overall trends of increasing input.

What has the network upgrade enabled?

For each type of use, participants were asked what the network upgrade had enabled them to improve or implement. These responses were clustered into a number of categories as shown in Table Eleven. The total number of comments is greater than 50 as individual respondents offered a number of responses. The percentage, however, has been determined based on the total number of participants in the interviews (n=50).

Increased use of the Internet for sourcing materials for the classroom and increased use of ICT in the classroom by students (both at 64%) showed the highest response from participants. The next highest area was in the increased use of ICT for planning, where nearly 60% of participants stated improvement or

implementation. This was followed by the increased use of ICT knowledge by staff within schools (48%). While these percentages are reasonably high it needs to be noted that they are mentioned in one area of use responses only. What is interesting is the emphasis on uses for teaching and learning activities.

The only response that covers all areas of use is where participants have acknowledged the use of up-to-date technologies in daily life (in the classroom). Here the responses across all sections range from 10-16%. The next most common response across all areas of use is in the area of increased electronic communication. The only area where this does not feature is professional use. The range across the three types of use is from 14-24%.

As in other tables, responses of by less than 10% of participants have not been included in this table. These include: improved parent communication, developing inquiry-based learning, using the Internet for personal research and resources, using video conferencing for cluster communication, electronic information gathering, participation in distance courses, abilities to use other technologies.

There is a strong message here about the extent to which the network infrastructure upgrade has enabled both pedagogical and professional use to increase. It appears this can be attributed to increased access and flexibility and to the robustness of the upgraded infrastructure. This is important when one considers the educational policy aims outlined earlier. As alluded to it may be that the 'jigsaw' is finally coming together. That is, all the interlocking pieces required for ICT integration may now be in place. Additionally, the network infrastructure may well be a crucial piece that has hitherto been missing, or underestimated.

Considering each of the types of use mentioned, key improvements are listed below:

Administration

- Increased efficiency for data, including access
- Reduced workload for office administrator
- Savings on consumables as printing to copier
- Enabled school to widen parent email database
- Security of data and back-up systems improved
- More efficient system which will be better understood and managed with time and training
- Timely access to information - time management improved
- A more robust system that once the teething problems are sorted out, will require less technical support
- Tightening up of and consistency of school-wide procedure and approaches

Professional work

- Better access to and use of student records to inform teaching
- Easier for teachers to work from home
- Information for parents is at a better standard or professional level

Pedagogical use

- Create, store, publish content has improved – better ICT based work examples
- More response to student achievement data
- Improved cyber-safety awareness and procedures
- Classroom management improved (children accessing ICT to do different things)
- Increased cross-curricular use
- Increase in mass teaching – lots of teaching at one time – using datashows

Professional development and learning

- Increased motivation of staff, with “can do it” attitudes
- Easier access to a variety of professional materials, including online courses
- Teachers more discerning about the development that they require
- Increased involvement in a variety of initiatives in ICT

Table Eleven: Number of respondents reporting each type of improvement or implementation

	Administrative		Professional		Pedagogical		Professional development	
Improvement or Implementations	n	%	n	%	n	%	N	%
Nothing	6	12	3	6				
Installation of SMS/LMS	17	34						
Online reporting	5	10						
Online record keeping	13	26						
Increased electronic communication	10	20			12	24	7	14
Using up-to-date technologies in daily life	5	10	5	10	7	14	8	16
Development of school website	6	12						
Development of school intranet	7	14						
Increased use of ICT for planning			29	58				
Increased use of Internet for sourcing materials for the classroom			34	64				
Increased use of ICT to design resources			17	34				
Ability to use other technologies			8	16	6	12		
Enabling better staff communication			8	16				
Increased classroom ICT use by teachers					16	32		
Increased classroom ICT use by students					32	64		
Increased use of ICT based resources					19	38		
Increased Internet use					6	12		
Students having their own e-addresses					6	12		
Increased use of ICT knowledge by staff							24	48
Improved staff confidence / capabilities							20	40
Teachers partaking in online courses							15	30
Increased peer support/collegiality							10	20
In-house professional development							5	10

How has the network enabled these improvements?

For each type of use, participants were asked how the network upgrade had enabled them to undertake the improvements or implementations outlined above. These responses were clustered into a number of categories as shown in Table Twelve. As with the previous section it was possible for respondents to offer a number of responses and the percentage has been determined based on the possible total number of respondents (50).

Table Twelve: Number of respondents reporting each means of improvement or implementation

	Administrative		Professional		Pedagogical		Professional development	
	n	%	n	%	n	%	n	%
Speed of system	26	52	20	40	11	22	17	34
More capacity	19	38	19	38	12	24	13	26
Robust infrastructure - reliability improved	16	32	20	40	19	38	17	34
Provided equipment previously lacking	13	26	14	28	13	26	12	24
Accessibility	11	22	16	32	16	32	14	28
Increased inquiry learning opportunities					5	10		
Gained confidence/motivation to use equipment							20	40
Ability to incorporate new ideas and technologies							5	10

While most of the category titles are reasonably self-explanatory the following explanations provide a clearer understanding of the key categories;

- "Speed of system" includes faster accessing of web pages, initial start-ups and efficiency of printing.
- "More capacity" covers schools having more networked hardware, increased storage and multiple, simultaneous log-ons.
- "Robust infrastructure" relates to the stability of the system and its reliability. There is now less likelihood of it crashing, a frequent occurrence for some schools previously.

- The "provision of equipment previously lacking" refers to items such as networked printers and networked computers in classrooms.

- Accessibility includes such things as home access for both teachers and students, being able to use the network anywhere in the school, uninterrupted use and the opportunity to access a wide variety of resources and sites.

The first five categories in the table show strong consistency across all four sections with responses ranging from 22%-52%. The highest single response (52%) is the increase in system speed in the area of school administration. Closely behind this at 40%, in the area of professional use, is also the increased speed of the system and a robust infrastructure with improved reliability.

Separate from these five core categories, and also at 40%, is that teachers have gained confidence and motivation in using the equipment in the area of professional development. Respondents commented that teachers are now more willing to try new things. It appears that with the introduction of a reliable system there has been a change in teacher attitude towards ICT and in their willingness to use it. In the past for many teachers the risk of system failure appears to have been a reason to not use ICT with their students. While this can be seen as a rationalisation for not using ICT rather than a valid reason it may be that as one respondent stated, "*teachers are running out of excuses*" for not integrating ICT.

As in other sections, responses of less than 10% have not been included in the table. These responses included now having the ability to incorporate new ideas and technologies and increased flexibility.

What benefits has the school seen as a result of the network upgrade?

For each type of use participants were asked what benefits the school had seen as a result of the upgrade. These responses were clustered into a number of categories as shown in Table Thirteen. It was possible for respondents to offer a number of responses. The percentage has been determined based on the possible total number of respondents (n=50) rather than the total number of responses.

Only two categories of benefit span all four types of use. The first is where participants have identified increased levels of communication as a benefit. Although, not mentioned by many respondents (from 22%-36%) it is consistently identified as a benefit of the upgrade. The second category, "a more efficient and time saving system", while being consistent also has a low individual respondent count (18%-34%).

Closely aligned to the idea of increased communication was increased collaboration. Together these two categories suggest communication is an important benefit for schools. Collaboration has been differentiated from communication, however, as while it can be seen as a subset of communication it has a qualitatively different nature to some forms of simple communication, which needs to be identified here.

The "collaboration" category involves teachers, students and schools working together, sharing ideas and resources and supporting each other. Within this category, an increase of 'teacher talk', the more informal, spontaneous mentoring and sharing of ideas was described by 10% of the respondents.

The most frequently used category for any single area of use was shown in the professional development section, where the "upskilling of staff" was mentioned by 74% of participants. It was also noted by 10% in the administrative section. This response was significantly higher than the next closest categories at only 36% (n=18). This next level included "better student use of equipment and resources", "increased communication" and "more time spent using ICT for professional work".

As with the "communication" and "collaboration" categories, "confidence and motivation with ICT" is closely linked to "upskilling". However, while an important determinant of confidence and motivation upskilling teachers in how to use ICT is insufficient to develop these attributes on its own. Teachers also need to feel capable of successfully managing the processes around teaching and learning with ICT and of being able to facilitate student use. They also need to see benefits in the use of ICT. The data here suggests that, as with the laptops, this increase of confidence is occurring as a result of the upgrade. This may be, at least, partially due to confidence in the system and fewer concerns over the need to trouble shoot or deal with technical issues.

Some respondents (16%, n=8) reported greater benefit from participation in other initiatives such as the ICTPD clusters and the laptop project. The comments were around the idea that when this project, ICTPD and the laptop project all work in isolation you see little benefit. However, when they combine and are all in place there are huge gains to be made. Many felt that being in a cluster was what made the difference for them in terms of the benefits seen, in that they were able to share ideas and support each other. The feelings of isolation often felt by small, remote schools were lessened through ICT. In addition, one respondent stated that the increased collaboration and cluster processes helped dovetail into other initiatives such as Atol (Assess to Learn).

Again the implication is that the "jigsaw" needs to be complete before the full impact of ICT on teaching and learning will be seen. That is skilled, confident and willing teachers, a robust infrastructure and sufficient hardware and software are all needed.

Other benefits below the 10% threshold for inclusion in the table were: increased student learning independence, more variety in teaching methods, more effective data analysis and sharing of student files, increased cyber-safety awareness and greater consistency of school processes and systems. Community and presentation methods to parents and Boards of Trustees have also improved in quality (such as presentations and digitally produced information, often visual to assist in understanding) and in frequency. For example, use of email for newsletters and homework notifications.

Table Thirteen: Number of respondents reporting each type of benefit to the school

	Administrative		Professional		Pedagogical		Professional development	
Benefits seen	n	%	N	%	n	%	n	%
Better teacher use of ICT equipment and resources	13	26					18	36
Better student use - equipment/resources					18	36		
Increased communication	13	26	18	36	9	18	11	22
Upskilling of staff	5	10					37	74
More efficient system/time saving	17	34	17	34	9	18	13	26
Greater data efficiency and analysis	14	28	7	14				
More cost effective	5	10						
Access to software	5	10						
Greater teacher access	5	10						
Better time management			5	10				
More ICT activities planned/prepared			13	26				
More time spent using ICT for professional work			18	36				
Better planning/assessment techniques			13	26				
More resources			8	16				
Increased teacher confidence/motivation			7	14			15	30
Increased collaboration			14	28			12	24
Accessibility			5	5				
Better student ICT work examples					10	20		
Increased student motivation					17	34		
Involvement in variety ICT initiatives					8	16		
Improved student skills and capability					14	28		

What future improvements or new initiatives are intended over the next year?

For each area of use, participants were asked what future improvements or new initiatives they intended to implement within the next year. These responses were clustered into a number of categories as shown in Table Fourteen. It was possible for respondents to offer a number of responses. However, the percentage has been determined based on the possible total number of respondents (n=50).

Table Fourteen: Intended future improvements or new initiatives in the next year

	Administrative		Professional		Pedagogical		Professional development	
Future improvements or new initiatives	n	%	n	%	n	%	n	%
asTTle/e-asTTle	7	14	5	10				
e-administration	8	16	2	4			3	6
SMS/LMS implementation	27	54	12	24			12	24
Access to student files/information	8	16						
Website – upgrade and communication	7	14	5	10	8	16	3	6
Electronic attendance	12	24						
PEN/LeadSpace usage			7	14				
Better use of TKI resources			14	28	9	18	7	14
Digital resources (DLO's)			6	12				
Professional learning networks			8	16	5	10	11	22
Laptops/increased equipment			11	22	13	26	7	14
ICT based units/better integration of ICT			8	16	9	18		
Collegial upskilling			7	14				
Virtual learning networks/distance learning opportunities					9	18	4	8
Developing in-house PD							6	12
Continuing/starting in ICT clusters							13	26
Finding online learning opportunities							7	14
Online ICT PD							5	10

The range of numbers of responses in this table is quite narrow, with all but one falling below the 30% mark. The implementation of student and learning management systems had the highest number of respondents at 54%. This could be due to the pending Ministry of Education requirements that schools have an SMS in place.

As in other tables, responses of less than 10% have not been included. Other future improvements or new initiatives below the 10% threshold included: participating in distance learning opportunities, keeping up with new technologies and developing cyber-safety architecture.

Only one category spans all four sections, this is in the area of "website upgrades, communication and development". However, it features only at a low level of response (6%-16%). The categories of "making better use of TKI resources", "participating in learning networks" and "increasing equipment" rated in three of the four types of use.

It appears that the increased capacity, reliability, accessibility and speed of the upgrade has meant that using online resources such as TKI, virtual learning networks and other online professional development and learning opportunities had now become part of the ICT culture of many schools. Purchasing new equipment has been discussed in-depth in an earlier section, so these categories are not referred to here again.

The impression gained through the interviews is that much of the work in the next year would revolve around consolidating the rapid progress made so far rather than implementing new initiatives.

What factors extend or hinder the effects of the network upgrade?

For each type of use participants were asked what factors (both within and outside of the school upgrade project) were helping or hindering the implementation of improvements. The responses were clustered into a number of factors for both categories as shown in Table Fifteen. It was possible for respondents to offer a number of responses, including the same factor across several types of use. The percentages have been determined based on the total number of responses counted in each of the two categories (Helping=77, Hindering=210). Factors for which there are less than five responses across both categories have been included in "other". What is interesting is how many feature as both helping and hindering.

Table Fifteen: Factors helping and/or hindering changes within the school

Factors	Helping		Hindering	
	n	%	n	%
Teacher attitude	9	12	6	3
Being part of an ICT cluster	15	19	4	2
Lack of time			40	19
Lack of technical knowledge/training			24	12
Teacher expertise/capability	9	12	21	10
Own IT experts/technicians	9	12		
Lack of technical support			12	6
MOE support	6	8		
Staff turnover			9	4
SMART support			8	4
Financial issues			43	20
Other	29	37	43	20
Total	77		210	

There are three times as many "hindering" factors as "helping" ones. It is important to note that these are not negative factors so much as respondents identifying factors that could be improved to enable them to fully utilise the potential of the upgrade.

The highest number of responses among the factors was in the area of "financial issues" (n=43, 20%). This category covered a wide range of items, including the cost of replacing outdated hardware in order to obtain the most out of the new system, maintaining old hardware, purchasing other supporting hardware to support teacher upskilling, and paying for professional development and technician expenses.

The second highest number of responses amongst the hindering factors was a "lack of time" (n=40, 19%). Included in this category are such things as the fact that learning new systems is time consuming, juggling curriculum demands is an issue, that teachers in small schools have many roles and responsibilities and teachers just need time to sit down and go through the resources that are available to them.

Teacher attitude shows in both the "helping" and "hindering" sections. In the helping section, nine respondents (12%) refer to the open, supportive and enthusiastic attitudes of teachers. A lesser number of

respondents (n=6, 3%) indicated that teacher attitude was a hindrance. Presumably this is where teachers remain unwilling to make necessary changes to practice or to utilise the potential of the network.

Being a member of an ICTPD cluster was seen as being helpful towards fostering change in schools. Nearly a fifth (n=15, 19%) of respondents commented on this aspect. While this also features in the hindrance section (n=4, 2%), our interviews suggest overall that it was felt that the level and rate of change has been helped by inclusion into this initiative. It was suggested by three respondents that both the upgrade and ICTPD cluster projects should be implemented in tandem.

Teacher capability and expertise were seen by 12% (n=9) of the respondents as being helpful. Several commented on the value of younger teachers coming through with the skills and expertise that was needed, particularly in small, rural schools where ICT support was difficult to access. Other respondents (n= 21, 10%) indicated that the lack of teacher expertise was a very definite hindrance to positive change. Staff turnover (n=9, 4%) also had an impact on change, especially when schools had trained teachers and they left with untrained staff replacing them, which was often reported as the case in small isolated schools.

A total of 12% (n=9) of respondents have employed skilled teacher aides or local parents as ICT specialists to promote change. They have found this to be a viable option as technical problems cost a significant amount, especially in isolated areas. They are being used to manage networks and in some cases teach basic skills to students in designated classrooms (ICT suite). In contrast are those respondents (n=12, 6%) who indicated that they needed to employ outside technical expertise and that the logistics of this made them think twice before commencing maintenance work. Another issue was being able to locate suitable technicians willing to come out to a rural area as needed. Delays in the provision of support are, therefore, a major hindrance to using the network for many schools.

A number of respondents appreciated the high level of consultation with the Ministry of Education, with 8% making special mention of this. During the interviews it was apparent that schools had a general feeling that the Ministry of Education wanted the project to work and that they were supporting schools to succeed in a variety of ways.

Nearly half of the respondents (n=24, 12%) identified that a lack of training in the new network and their own limited technical knowledge had had a very limiting effect on change within their schools. In many instances they noted that they felt that more than an hours training on the network was necessary. One respondent stated, "*Training is crucial – the time was not enough at start.*" Another respondent summed it up this way: "*we needed to know – how it functions, why it does certain things, the best way to use it…we had to work it out as we went along and when problems occurred we did not have the know how to get it up and running again*." As already outlined there were also general comments made about teachers being expected to be technicians as well as practitioners of teaching and learning.

Other helpful factors that were discussed but fell below the inclusion threshold included: good technical support from SMART, reduced maintenance costs, a more reliable system, greater accessibility and a supportive Board of Trustees. There were a number of hindering factors that also fell below the inclusion threshold which included: changing teacher mindsets about distance learning, not having enough equipment.

Conclusions

Based on the above findings and the overall impressions of the researchers, there appear to be four major themes arising from this study.

1. It would appear that a number of interlocking pieces or conditions are necessary for integration to occur and that these are in place in many of these schools.

2. Positive changes in teacher attitude, confidence and motivation are evident.

3. The network infrastructure upgrade is enabling increases in pedagogical and professional use.

4. The need for greater initial support and training at the outset.

Firstly, as discussed at the beginning of this report, infrastructure provision and professional development alone are not enough to promote the full integration of ICT into teaching and learning. Teacher willingness to change practice and to use ICT, along with their capability to use ICT and manage its use by others is also needed. Findings from these interviews suggest that all of these conditions are now present in a significant number of schools covered by this initiative. The network infrastructure upgrade is definitely one piece of a "jigsaw" that includes various other ICT initiatives such as ICTPD and TELA. It appears that where a number of initiatives are present within a school there is a higher level of integration and use of ICT.

Secondly, increasing teacher confidence and motivation are crucial mediating factors on teacher use of ICT. What is suggested in relevant sections in this report is that teacher attitudes, including their confidence and willingness to use ICT, are changing as a result of the network upgrade. As with the provision of laptops, learning to use the network and realising what it offers has had a positive impact on both their skill levels and on their willingness to use ICT. With increased use comes increased confidence, which leads to increased use. It appears that in many of these schools this positive cycle is now occurring.

Thirdly, while teacher use of ICT for report writing, communication, planning and creating resources shows an overall increase, so does the integration of ICT into daily teaching and learning. The findings clearly show an increase in pedagogical and professional use. This is an increase not always apparent in the past. For example, one school commented that there is now more variety in their teaching, as they continue to find different ways to use the new equipment and software. The variety of hardware that has been purchased, or is intended for purchase, also shows increased classroom use in a relatively short space of time. Another school commented that using the technology has now become part of the culture of the school, and that a higher importance is being placed on the use of technology for teaching and learning. Others reported that there was

a much higher uptake of ICT inclusion and integration across a wide range of curriculum areas, and that this was now the norm rather than the exception. It appears that increased confidence in the network has allowed teachers to trial new ideas, resources and equipment in classrooms. Part of this can be attributed to the robustness of the upgraded systems. It appears that one of the reasons teachers can now work with more confidence is because of the reliability of access. As one school put it: "*we now have an efficient system, less frustration, and more confidence and willingness from our staff and students to try new things"*. Several schools mentioned that there was a new excitement about learning and teaching and that the upgrade had been a catalyst in change management within the school.

Finally, it would appear that the network infrastructure upgrades have been hugely successful. The issues mentioned by respondents have been primarily teething problems and, while these do need to be considered for future implementation, they are not major. When considering the responses it appears that the upgrades have had a very positive impact on schools in a number of ways. Of particular note must be the increased classroom use. As mentioned earlier, it may be that 'all the ducks are now in a row' in many schools. That is, everything is in place for the potential of ICT as a tool for teaching and learning to be realised.

Appendix One: Interview Schedule

Note to interviewers:

- The points in the tables are for your notes only. Please do not ask the participants to choose from the options. They are there purely for you to tick if this particular option is mentioned by the staff member to save time and to be used as prompts. Including space for extra notes about that particular point if required.
- As part of the introduction to the interview, it may be appropriate to refer to the introductory paragraph (sent to all schools) below. A one page summary sheet was sent to schools to assist them in preparing for the interview. Therefore, they should have some understanding of the questions purpose of the interview

> **Introduction**
>
> This evaluation project is intended to find out about how you are utilising your school network since the upgrade. The questions will enable you to reflect on the impact the upgrade has had on your school. Examples could include:
>
> - Any new equipment purchased (hardware, software etc)
> - Any new ICT initiatives you are now involved in or will be (AsTTLe, learning networks, Leadspace, online networks)
> - Any professional development opportunities for teachers

- In regard to the sliding scale – ask the staff member to give you the number – this is written in the box!
- Ensure that within each section the question and answers are focused clearly on the key area namely administration, professional work, pedagogical use, professional development and learning.
- Try not to get sidetracked on the ‘issues’!
- The ethics paragraph is at the bottom of the survey if participants are concerned with what happens to the information they give.

Section 1 – General information

School name	
Respondent name	
Position	

How long have you had the network?	
Is the network functioning?	

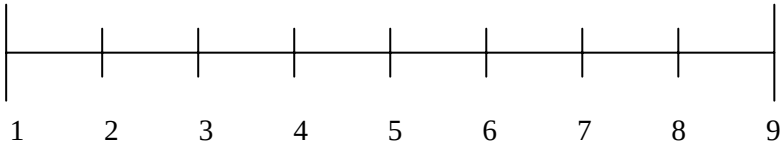
How would you rate your school network **before** the upgrade?

No network	Poor	Adequate	Good
☐	☐	☐	☐

What other equipment (hardware, software etc) have you purchased since the network upgrade?

Section two - Administration

This area is intended to find out about how you are utilising your school network since the upgrade in the area of administration systems. (**For example:** record keeping, student management systems, daily routine tasks).



On a usage scale of 1 = very limited and 9 = extensive use, please indicate your perceived levels of use at each of the following times:

Before the network upgrade ☐

Currently ☐

In one years time ☐

1. In terms of administration, with the upgrade of the school network, what has this enabled you to improve or implement?

Guide notes	✓	**Further comments**
Installation of SMS/LMS		
Online reporting		
Online record keeping		
Improved parent communication		
Increased electronic communication		
Ability to use other technologies (eg alert texts, web-text)		
Use of up-to-date technologies such as e-portfolios, online space		

Development of school website		
Development of school intranet		
Online data collection methods (eg surveymonkey)		
Electronic information gathering (eg property/equipment requests online and recorded in a log)		

2. How has the network upgrade enabled you to make these improvements to your administration systems?

Guide notes	✓	**Further comments**
Speed of system		
More capacity		
Robust infrastructure – reliability improved		
Provided equipment previously lacking		
Ability to incorporate new ideas and technologies		
Conforms to school vision		

3. What benefits to administration has the school seen as a result of the improved infrastructure?

Guide notes	✓	**Further comments**
Better time management		

Increased communication – school and community wide		
Increased efficiency for data		
Cost efficient		
Better school presence		
More efficient system		
Easier data analysis		
Increased skill base		
Robust hardware and software		
Flexibility		
Better understood and managed by schools		

4. What future improvements or new initiatives for administrative tasks do you intend to implement within the next year?

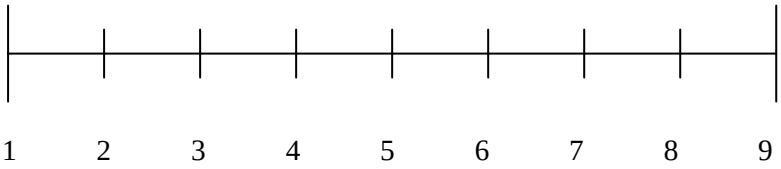
Guide notes	✓	**Further comments**
AsTTLE/e-AsTTle		
PEN/Leadspace usage		
E-Admin		
Internet/managed internet services		
Better use of TKI resources		
Digital resources (DLO's)		
Student learning services (eg any questions)		
Professional learning networks		
Virtual learning network/distance learning opps		
SMS/LMS implementation		
Cyber safety architecture		
Laptops/increase equipment		

5. What factors (both within and outside of the school upgrade project) are helping or hindering any changes? (referring to administration systems)

Helping	**Hindering**

Section three– professional work

This area is intended to find out about how you are utilising your school network since the upgrade in the area of professional work. **For example:** preparing resources, planning, searching for material for students to use in classroom practice



On a usage scale of 1 = very limited and 9 = extensive use, please indicate your perceived levels of use at each of the following times:

Before the network upgrade ☐

Currently ☐

In one years time ☐

1. In terms of professional work, with the upgrade of the school network, what has this enabled you to improve or implement?

Guide notes	✓	**Further comments**
Increased use of ICT for planning		
Increased use of internet for sourcing materials for classroom		
Increased use of ICT to design resources		
Ability to use other technologies (eg alert texts, web-text)		
Use of up-to-date technologies such as e-portfolios, online space		

2. How has the network upgrade enabled you to make these improvements to your professional work?

Guide notes	✓	**Further comments**
Speed of system		
More capacity		
Robust infrastructure – reliability improved		
Provided equipment previously lacking		
Ability to incorporate new ideas and technologies		

3. What benefits has the school seen (to professional work) as a result of the improved infrastructure?

Guide notes	✓	**Further comments**
Better time management		
Increased communication – school and community wide		
More ICT based activities planned and prepared		
More time spent using ICT for professional work		
More efficient system		
Easier data analysis		
Better planning and assessment techniques		

4. What future improvements or new initiatives, to assist you in professional work, do you intend to implement within the next year?

Guide notes	✓	**Further comments**
AsTTLE/e-AsTTle		
PEN/Leadspace usage		
E-Admin		
Internet/managed internet services		
Better use of TKI resources		
Digital resources (DLO's)		

Student learning services (eg Any Questions)		
Professional learning networks		
Virtual learning network/distance learning opps		
SMS/LMS implementation		
Cyber safety architecture		
Laptops/increase equipment		
ICT based units/better integration of ICT		

5. What factors (both within and outside of the school upgrade project) are helping or hindering any changes? (referring to professional work)

Helping	**Hindering**

Section four – pedagogical use

This area is intended to find out about how you are utilising your school network since the upgrade in the area of pedagogical use. **For example:** use of ICT in the classroom, students using emails, accessing and searching information on internet, virtual field trips

On a usage scale of 1 = very limited and 9 = extensive use, please indicate your perceived levels of use at each of the following times:

Before the network upgrade ☐

Currently ☐

In one years time ☐

1. In terms of pedagogical use, with the upgrade of the school network, what has this enabled you to improve or implement?

Guide notes	✓	**Further comments**
Increased use of ICT in the classroom by teachers		
Increased use of ICT in the classroom by students		
Increased use of ICT based resources in the classroom		
Use of online communication		
Ability to use other technologies (eg alert texts, web-text)		
Use of a variety of up-to-date technologies in the classroom		
Increased opportuinities are connected, authentic, relevant		

2. How has the network upgrade enabled you to make these improvements? (referring to pedagogical use)

Guide notes	✓	**Further comments**
Speed of system		
More capacity		
Robust infrastructure – reliability improved		
Provided equipment previously lacking		
Ability to incorporate new ideas and technologies		

3. What benefits has the school seen as a result of the improved infrastructure? (referring to pedagogical use)

Guide notes	✓	**Further comments**
Better student use of ICT equipment and resources		
Increased communication – school and community wide		
Better ICT based student work examples		
More efficient system/time saving		

Motivation of students has increased		
Involvement in a variety of initiatives in ICT		

4. What future improvements or new initiatives do you intend to implement within the next year? (referring to pedagogical use)

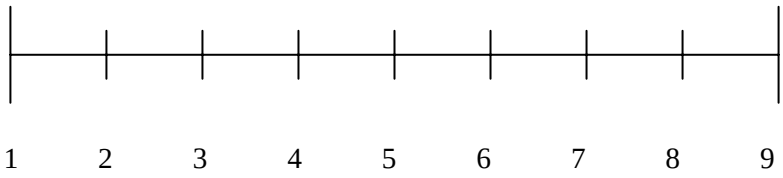
Guide notes	✓	**Further comments**
AsTTLE/e-AsTTle		
PEN/Leadspace usage		
E-Admin		
Internet/managed internet services		
Better use of TKI resources		
Digital resources (DLO's)		
Student learning services (eg any questions)		
Professional learning networks		
Virtual learning network/distance learning opps		
SMS/LMS implementation		
Cyber safety architecture		
Laptops/increase equipment		
ICT based units/better integration of ICT		

5. What factors (both within and outside of the school upgrade project) are helping or hindering any changes? (referring to pedagogical use)

Helping	**Hindering**

Section five – professional development and learning

This area is intended to find out about how you are utilising your school network since the upgrade in the area of professional development and learning. **For example:** improving teacher skill and knowledge, online courses, listservs



On a usage scale of 1 = very limited and 9 = extensive use, please indicate your perceived levels of use at each of the following times:

Before the network upgrade ☐

Currently ☐

In one years time ☐

1. In terms of professional development and learning, with the upgrade of the school network, what has this enabled you to improve or implement?

Guide notes	✓	**Further comments**
Increased use of ICT knowledge and use by staff		
Improvement in confidence and capability		
Use of online communication (listservs etc)		
Ability to use other technologies (eg alert texts, web-text)		
Use of a variety of up-to-date technologies in daily life		
Partake in online courses		
Partake in distance courses		

2. How has the network upgrade enabled you to make these improvements to professional development and learning?

Guide notes	✓	**Further comments**
Speed of system		
More capacity		
Robust infrastructure – reliability improved		
Provided equipment previously lacking		
Ability to incorporate new ideas and technologies		
Gained in confidence/motivation to use equipment		

3. What benefits has the school seen as a result of the improved infrastructure? (referring to professional development and learning)

Guide notes	✓	**Further comments**
Better teacher use of ICT equipment and resources		
Increased communication – school and community wide		
Upskilling of staff		
More efficient system/time saving		
Increase in interest/motivation of staff		
Involvement in a variety of initiatives in ICT		

4. What future improvements or new initiatives to assist professional development and learning do you intend to implement within the next year?

Guide notes	✓	**Further comments**
AsTTLE/e-AsTTle		
PEN/Leadspace usage		
E-Admin		
Internet/managed internet services		
Better use of TKI resources		
Digital resources (DLO's)		
Student learning services (eg any questions)		
Professional learning networks		
Virtual learning network/distance learning opps		
SMS/LMS implementation		
Cyber safety architecture		
Laptops/increase equipment		
ICT based units/better integration of ICT		

5. What factors (both within and outside of the school upgrade project) are helping or hindering any changes? (referring to professional development and learning)

Helping	**Hindering**

Please give a rating for the overall impact of the schools network upgrade project on your schools environment

Very limited impact	Limited	Fair	Wide	Very wide	Extensive impact
☐	☐	☐	☐	☐	☐

Any other comments

Thank you for participating in the interview. We appreciate your time.

Note: All interview responses will be collated and reported on anonymously. You or your school will not be recognised in any reports that are written as a result of the evaluation. CCL will retain copies of all interview transcripts and notes in a secure location for up to three years after the evaluation. After that time they will be destroyed. If you have any concerns over the way this evaluation is conducted please feel free to contact Des Hammond, CEO of Cognition Consulting (Level 1 Pfizer House, 14 Normanby Road, Mt Eden, Auckland).