It’s not about the technology

Patterns of teachers’ ICT skills and classroom usage
1999-2003

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Abstract

As Information and Communication Technology (ICT) becomes more commonplace in New Zealand classrooms, the question arises as to what teachers are making of the technology. The present study draws on the responses from some 8000 teachers to a survey repeated over four years. The survey sought information in teachers’ ICT usage and skills prior to entry into a professional development programme. The study found few changes for the average teachers’ use of ICT in the classroom between 1999 and 2003. Of the changes that occurred, increases in some of the personal ICT skill levels of teachers are among the most marked. This includes an increase in skills in file management, word processing, emailing, and Internet use. For the average teacher, these skills have, however, remained relatively basic. Within the classroom, these basic skills are used mainly for administration as well as planning and preparation, while some increases in skill levels was evident in the areas of Internet use for accessing lesson ideas, assessment, reading official documents, and other professional readings. There have been some increases in the use of ICT for administration, in particular for records/assessment, and writing reports for parents. Integration of ICT into classroom teaching and learning remains unchanged and at a low level during the years studied. Usage of ICT by students of the average teacher have changed little between 1999 and 2003. Important changes can be seen, however, in those teachers with a high degree of skills and usage. Growth in their level of skills is occurring, although the numbers are small.

That teachers use ICT mainly for administration purposes as well as for planning and preparation, suggests ICT is currently being ‘undersold’ as a tool for teaching and learning. Before ICT can be fully integrated by
teachers, literature cited in this report points to the need for professional development programmes to focus on pedagogical change.
1 Introduction and Research Questions

In the past, much of the research in the field of Information and Communications Technology (ICT) in education has focussed on how available hardware and software is to students and teachers, and to some extent how much and how often ICT is being used in classrooms (Cuban 1999, Lai 2001, Becker 2001). Few studies have looked at the ways in which ICT is being used in classroom settings.

The small but growing body of research measuring the usage of ICT in classrooms around the world indicates teachers’ ICT skills are increasing (Fink Jensen 2004; OfSTED 2004). However, teachers have not, to any notable extent, been able to transfer those skills into the classroom to enhance teaching and learning (Murphy & Greenwood 1998; Meredyth et al 1999; Cuckle and Clarke 2002; Grunwald 2002). The research also shows that the transferral of skills is occurring a lot slower than many would like (Smerdon 2000; McGee 2000; OfSTED 2004).

In New Zealand, ICT has substantial government support through the Ministry of Education. This support includes providing access to workshops, professional development courses, resources and grants. The New Zealand research available describes a teaching population whose ICT skills’ have improved. However, despite the government support, the level of skills is only about half way along Fink Jensen et al’s (2003) scale of ability. Teachers at the top of this scale could apply what they knew about ICT into the classroom using ICT as an instructional tool and integrating it into the curriculum. Most teachers in the Fink Jensen et al (2003) study are a long way short of this uppermost stage.

Of interest to this present study is how the use of ICT by New Zealand teachers has changed, in particular between 1999-2003. The study looks
at the ways in which ICT is being implemented within the area of teaching and learning. It then addresses issues surrounding skill acquisition and how those skills are transferred into teaching practices. Just because teachers have access hardware, software and the skills, they are not necessarily using it for teaching and learning. In fact, overseas studies show there is often little to no correlation between high availability and usage for the purposes of teaching and learning (Cuban et al 2001; Bielefeldt 2001).

Specifically, this study looks the extent of, and the ways in which, the profile of New Zealand teachers changed between 1999 and 2003 with regard to:

1. ICT skills
2. ICT usage, for planning and preparation
3. ICT usage, for administration
4. ICT usage, in the classroom/students

Data for this analysis has been taken from baseline surveys of teachers entering a major professional development course, (the Information and Communication Technology Professional Development (ICTPD) Schools Project) for the years 1999, 2001, 2002, and 2003. The questionnaire was divided into five sections, covering demographics, professional development and ICT, current ICT skills and abilities, current use of ICT for planning, preparation, administration etc, and current use of ICT with/by students.

The ICTPD Schools Project was initially undertaken from 1999-2001 as part of the Ministry of Education ICT Strategy ‘Interactive Education – An Information Technologies Strategy for Schools’ (MOE 1998). It was then extended from the original 23 school clusters, to 28 clusters from
2001-2004. The Project consisted of clusters of schools from around New Zealand, which opted into a 3-year professional development programme in ICT. The aim of the programme was to increase teachers’ ICT skills and knowledge, increase their usage of ICT for professional and administrative tasks in schools, support school policy and planning initiatives related to ICT, and to increase the frequency and quality of the classroom usage of ICT to support teaching and learning (Ham et al 2002, p.2).

This study is therefore set in the context of the current New Zealand education scene and so it is also useful to understand what the government considers ICT to be, the strategies it has in place to support its implementation, and specifically where ICT fits into the curriculum.

2 Background to ICT within the New Zealand Curriculum

2.1 Definition

ICT is defined in two parts. The first part includes the information technology consisting of the hardware and software that “allow us to access, retrieve, store, organise, manipulate, and present information by electronic means” (MOE 2002 p.5). This includes computers, scanners, digital cameras, as well as database programs and multimedia programs. The second part includes the communication technology consisting of “equipment through which information can be sought, sent and accessed, for example, phones, faxes, modems, and computers” (ibid p.5).

2.2 Policy Overview

New Zealand’s first ICT strategy for schools (Interactive Education Strategies for Schools) was released in 1998. The goals of that strategy were to build infrastructure and school capability. To achieve this, the
Ministry of Education provided: planning workshops for all principals; ICT grants and funding for a large number of schools; a three-year programme to enhance ICT use in 23 professional development clusters; the establishment of the teachers’ website Te Kete Ipurangi; and the recycled computers scheme (MOE 2002).

Since then the basic ICT infrastructure has been largely put in place, and almost every school in New Zealand has access to the Internet. A second Ministry of Education strategy document, Digital Horizons Learning Through ICT: A Strategy for Schools, 2002-2004, has built on the first and was released in June 2002. This second strategy focuses on the challenge of integrating ICT more fully into curriculum practice. Its vision is for all learners to use ICT confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community. With reference to teachers, this strategy recommends that they become “confident and capable users of ICT, use ICT to support their professional growth and administration, and integrate ICT flexibly and effectively within the curriculum to enhance learners’ knowledge, skills and attitudes” (MOE 2002 p.3).

To date, the government continues to support schools by providing further funding for professional development programmes, and developing digital resources. But the Ministry of Education does foresee that:

This process will take vision, time, commitment and a supportive environment. It is not often easy. There may be constraints in the form of infrastructure capacity and reliability, physical organization, timetables, more traditional teaching styles and assessment methods, bandwidth, and professional capability both
inside and outside of schools. Such restraints have to be resolved as a more flexible, adaptable, and student-centred learning culture is developed’ (MOE 2002 p.7).

2.3 Curriculum Documents

ICT is taught specifically as an area in its own right within the Technology in the New Zealand Curriculum (MOE 1995), and was deemed to be fully implemented in 1999 (ERO 2000). ICT is one of many areas within this curriculum, which also includes such things as food technology, materials technology, production and process technology. Here ICT includes systems that enable the collection, structuring, manipulation, retrieval, and communication of information in various forms. This includes audio and graphical communications, the use of electronic networks, and interactive multimedia (p.12).

But ICT teaching and learning is not limited to this subsection of this curriculum area where the focus is on building skills. A shift in approach and emphasis is taking place. The Ministry of Education wants ICT to be integrated within all areas of the curriculum in order that students not only learn about ICT, but also “learn with ICT and learn through ICT” (MOE 2002 p.8).

ICT can therefore be seen in most curriculum documents as a way in which to enhance teaching and learning. For example the English in the New Zealand Curriculum (MOE 1994) document explains that “while there is a need for students to be able to use technology effectively, the focus should be on using a range of technology in the process of learning, for example, to create and explore texts” (MOE 1994 p.18).
The Science in the New Zealand Curriculum document (MOE 1993) refers to using ICT as one of a long list of ways in which the teacher may gather information. Other examples include communication in science where one “may use communication technologies” (p.129), and reporting may include computers, videotapes, audiotapes, etc (p.51).

The Mathematics in the New Zealand Curriculum document (MOE 1992) states that calculators and graphical calculators and computers are learning tools which students can use to discover and reinforce new ideas (p.14).

In spite of reference being made to ICT in most of the curriculum documents, Bond (2001) is frustrated that many teachers do not yet understand that the major philosophy behind ICT in the New Zealand education system is that it is a tool to facilitate teaching and learning.

Many still hold the view that the objective is to teach pupils a range of technical skills; the fact that this view is not supported by our curriculum documents seems to be ignored. The most common thing I am asked for is a list of skills to be taught at each level of the school (para.9).

The use of ICT by teachers and the integration of ICT into the New Zealand curriculum are areas of potentially huge growth. The strategies behind its growth are not insignificant; there is a great deal of support at the government level to maximise ICT use within the school and the classroom. But there are only a small number of studies from within New Zealand to show the use being made of the ICT resources that are now commonplace in schools. The following review of the research will place
the New Zealand studies in context by reviewing those undertaken overseas.

3 Background Literature

3.1 Introduction

The literature discussed here is relatively recent, describing the levels of skills and application achieved by teachers for their own personal, professional, and classroom use. Most of the studies have been conducted over the past five years. The research cited from the United Kingdom shows ICT to be used for administration, presentation, and drill and practise, rather than enhancing teaching and learning. UK research most often points to the need for a greater focus on pedagogy in professional development courses when emphasising integration of ICT into the wider curriculum.

The research from the United States tends to most often quantify the use of ICT within the curriculum, giving statistics for the particular uses of ICT. This suggests the typical teacher is one who integrates ICT to a limited degree, within the broad classroom curricula, but, as in the UK, is more able to use ICT for personal uses such as research, communication, administration and presentation.

3.2 Australasian Research

To date, there have been few studies showing the specific use of ICT by teachers in New Zealand. But the main studies of teachers’ skill levels and their ability to integrate ICT into the curriculum go some way to establish the degree of ICT use by New Zealand teachers. The studies of ICT skills and levels of integration all tend to refer to computer and
computer program use. In reading these results one must be aware that skill level (and/or level of confidence), and actual usage of ICT are, however, two very different achievements.

The position of New Zealand teachers in regard to their adoption of ICT has been described by Fink-Jensen et al (2003) who adapted a research instrument described by Knezek and Christensen (1999, cited in Fink-Jensen et al 2003). In this study 339 principals were asked to indicate which of six stages of ICT adoption they felt most of their teachers had achieved. The five stages can be briefly described as:

1. awareness
2. learning the process understanding and application of the process
3. familiarity and confidence
4. adaption to other contexts
5. creative application to new contexts

Overall, the greatest percentage of teachers were deemed by their principals to be in the upper middle half of ICT adoption with 38 percent of primary school teachers and 42 percent of secondary teachers at level 3, or achieving ‘familiarity and confidence’. This is similar to Fink-Jensen et al’s (2001) findings, which found 41 and 43 percent, respectively, at level 3. A greater change, however, can be seen at level 4 – ‘adaption to other contexts’. Here, the percentage of primary teachers at this level has grown from 20 percent in 2001 to 31 percent in 2003, and the percent of secondary teachers has grown from 22 percent to 33 percent. In comparison to 2001, Fink-Jensen et al (2003) claim teachers as a group, “look to have progressed a stage, as less principals feel their teachers are at the earlier stages of ICT adoption and more believe their teachers are adapting to other contexts” (p.85). The 2003 figures show
that only 9 percent of primary teachers and 5 percent of secondary teachers are at level 5, that of “creative application to new contexts” (ibid). At stage 5, teachers can apply what they know about ICT in the classroom. They can use ICT as an instructional tool and integrate it into the curriculum.

An extensive study of the effectiveness and the effects of the 23 Information and Communication Technology Professional Development (ICTPD) School Clusters’ programme (Ham et al 2002), found some major gains had been made through this particular professional development programme. At the start of their professional development almost a third of the programme’s participants had never used ICT with their classes, and just under half had used ICT with their classes ‘only once or twice’. By the end of the programme approximately 70 percent were using ICT routinely (p.6). Ham et al (2002) reported and observed the greatest usage of ICT was as a tool or medium for the presentation of work or for information gathering through the Internet. The participants of this programme felt the main effects on student learning from the introduction of ICT-based activities into their classroom was the ability to offer a more varied programme, and to “increase the range of skills and abilities demonstrated by students, and to increase students’ motivation” (p.7). As a professional development programme, the ICTPD school clusters programme was given credit for having a positive impact on teaching and learning in a general:

The great majority of participating teachers reported that the ICTPD programme had increased their effectiveness as teachers, had increased their enthusiasm for teaching, both generally and for using ICTs in particular, and had helped them to offer more varied,
motivating and creative teaching/learning activities in their classrooms (p.5).

Ham et al (2002) conclude that teachers on this professional development programme achieved relatively high levels of ‘incorporation’ of some ICT into their teaching programmes, but only moderate levels of ‘integration’. Their definition of integration is one that means ‘the routine, ubiquitous, authentic, transparent and monitored use of a wide variety of ICTs in contexts which optimise the educative ‘value’ and ‘quality’ of the experience for students” (p.8).

The Otago Technology Project (Lai, Pratt, & Trewern 2001) reports that only 15.7 percent of secondary teachers could use technology as an instructional aid and integrate it into the curriculum. The authors of this study feel that the overall adoption of technology in teaching in the years leading up to their report has been slow, in spite of the huge investment in the purchase of technology hardware and software for schools.

Perhaps the most positive results come from the Curriculum Stocktake: National School Sampling Study (MOE 2003), where it was reported that over 60 percent of schools were integrating technology with other learning areas. This was particularly evident in primary schools, where teachers cover all curriculum areas. Intermediate school classroom teachers also integrate technology with other learning areas, whereas specialist technology teachers at this level teach technology in blocks or modules. Secondary school technology teachers also teach technology in blocks or modules or as a new subject with its own timetable slots. Over half year 7-15 teachers and 39.9% of year 9-15 teachers reported that their school integrates technology with other learning areas. The degree to which integration was taking place, and the specific usage within the integration, was not noted in this study.
The most relevant study undertaken in Australia on the use of ICT in schools goes some way to describe the idea that a lack of ICT skills by teachers leads to a lack of ICT integration into the curriculum. As teachers in this study have not been ranked according to a scale of adoption, or skill acquisition, one can only infer that if the skills are lacking, so too will the level of integration. Nearly all the teachers in the National sample study of the information technology skills of Australian school students (Meredyth et al 1999) possess the basic range of skills required to use computers. The majority has more than half the advanced skills specified. However, a considerable proportion of teachers (from 25 per cent to over 50 per cent) lack some skills necessary to use or teach a range of computer applications. Twenty-four per cent do not know how to use the Web and more than a third cannot use email.

There are distinct imbalances in the use of computers in classes according to curriculum areas. There is stronger emphasis on using computers to seek information and for creative writing, drawing, musical composition and so on, than for communication uses, even in areas such as Languages other than English (p.160). These levels of creative and communication uses of technology at school were lower than expected by the researchers. It seems reasonable to assume that the low level of experience with creative and communication uses is linked, in part, to the gaps in teachers’ advanced skill profiles (p.336). The majority of schools surveyed in this study appear to have reached a stage of planning that ensures that students ‘have regular use of computers at one or more year levels’. Fewer claim that students have “regular planned access to technology as a means of instruction’ or that they have access to information technology as an object of instruction” (p.343).
3.3 U.K. studies

Studies from Great Britain show a similar low level of ICT integration by teachers. Most of the research points to the need for professional development to focus more on changing teachers’ pedagogy to support the use of ICT in the classroom, in order for integration to occur more fully.

Owen Lynch, the Chief Executive of the British Educational Communications and Technology Agency, claims many school staff lack basic skills in the subject of information technology (BBC 1999). He feels “Although the possibilities for using information and communications technology (ICT) as a tool for teaching and learning in schools had increased in recent years, they were not being exploited. We have not as yet reaped the expected educational rewards” (para.3).

The fact that ICT integration has not happened as fast as some would like is borne out in the Office for Standards in Education (OfSTED 2004) report which claims the incidence of the effective application of ICT in lessons across all subjects is increasing slowly but steadily. The impact of ICT on teaching was rated satisfactory or better in 77 percent of the schools visited, a slight increase since the previous report. The quality of teaching in lessons where ICT is used has improved, with 59 percent of lessons rated good or better (p.4). The spread of ICT as a tool for teaching and learning has continued at a “slow, albeit steady, rate” (p.6). This is especially the case in secondary schools, where departmental organisation can hinder whole-school progress. But the report finds that the government’s aim of ICT being embedded in the work of schools is a reality in only a minority of schools. The more typical situation is one where pupils’ ICT experiences across the curriculum are “sporadic and dependent on teachers; in many schools, opportunities to exploit the
technology are lost on a daily basis” (p.6). However, the report finds that teachers’ use of computers for preparing lessons and learning materials, administration, assessment and tracking pupils’ progress continues to grow steadily.

The Williams (2000) research, funded by the Scottish Office Education and Industry Department surveyed teachers in primary and secondary schools across Scotland. It found that the majority of teachers were still in the early stages of ICT development, what would be referred to as ‘entry’ or ‘adoption’ phases (Dwyer et al 1991). It found that use of ICT was relatively low and was focused on a fairly narrow range of ICT, predominantly word processing. There was very little use of the Internet and the World Wide Web or e-mail by either primary or secondary teachers, despite high levels of access to technology.

ICT was still seen as an extra or add-on rather than an integrated resource within teaching. Many teachers were still concerned with ‘teaching ICT’ than ‘teaching with ICT’. Teachers were generally positive and the vast majority wanted to develop their ICT skills and knowledge. Teachers had basic ICT competence but did not feel competent enough to rely on ICT as a core teaching medium.

Very low levels of ICT usage are also reported by Cuckle and Clarke (2002). Less than 20 percent of respondents used ICT applications frequently (weekly or more often) and more than 40 percent did not use them at all (p.330). There were differences in the frequency of use of ICT for classroom teaching (but not for preparing materials) according to subject specialties. All respondents teaching IT and Design & Technology reported ICT use daily and in music once or twice a week on average. In the other subjects ICT use varied in frequency but averaged less than once a week.
The lack of integration of ICT into the Maths curriculum was also seen by O'Reilly (2003) as the result of too many pressures for teachers in their training year and in their first year of teaching. The authors found the integrating ICT into mathematics lessons presented formidable difficulties for student teachers. "In addition to the extra demands of classroom management, differentiating for individual differences, and presenting subject knowledge in novel ways, these beginning teachers have to contend with the barriers of computer skills and technical problems" (p.424).

### 3.3.1 Less emphasis on technical skills

Professional development courses are seen by many as not meeting the needs of ICT integration in Great Britain. A report from the National Foundation for Educational Research (cited in BBC 1999) noted that although the numbers of computers in schools has increased dramatically over the last 10 years, the percentage of secondary school teachers using computers twice a week or more has remained constant, at about 32 percent (para.6). It goes on to state that where professional development is available, short courses were regarded by teachers as being a quick way to get technical skills, but did not give them much, if any, opportunity to consider the educational implications of the technology (para.11). The report makes the point that most teachers still lack the confidence in the use of information technology, despite more than 10 years of training for teachers in this area.

So even when teachers, or student teachers, have been taught to use ICT, this has not necessarily meant they can transfer these skills into the classroom teaching and learning situation. One of the major implications of Murphy and Greenwood's (1998) study was that despite their
perception of being ‘trained’ to use ICT, over 75 percent of the student teachers have never used a computer in class during their school experience (p.10). This finding is reinforced in a study of the 1997-98 cohort of Postgraduate Certificate of Education students in the UK (Cuckle, Clarke, & Jenkins, 2000). It showed that although students had a wide range of ICT skills at the start of their course, they were not always able to transfer their skills to the classroom. The majority ended up using their skills for preparing materials and assessing coursework. This study showed the access to ICT equipment has a small effect on the use of ICT in classroom teaching. Although initial competence with computers was strongly related to personal use of ICT, it was not strongly related to use of ICT in classroom teaching.

Both at the start and at the end of the course, our students expressed enthusiasm for increasing knowledge and using ICT with pupils. But despite considerable skill and enthusiasm, ICT was not used as much as it might have been for classroom teaching (p.17).

Previous studies (Cox et al, 1988; Cox, 1994 cited in Williams 2000) have shown that until recently the majority of courses offered in the UK to train teachers in the uses of ICT have focused on the technical aspects of ICT with little training about the pedagogical practices required and how to incorporate ICT in the curriculum. In many ICT professional development courses, teachers are not always taught how to revise their pedagogical practices, how to replace other traditional lessons without depleting the curriculum coverage, and so on. This means that after teachers had attended a course they still did not know how to use ICT for teaching pupils, they only knew how to run certain software packages and
to fix the printer. There were many such courses offered all round the UK which had very little long term impact on the uptake of ICT in schools.

It would seem from these studies that there is more to being able to integrate ICT into the curriculum at large, than merely possessing ICT skills. A need to change the pedagogical focus is being called for (Williams, 2000).

Interestingly, it is not just the teachers at the chalk front who are deemed to be slow in their uptake of integrating ICT in the curriculum. Simpson et al (1999) note that in Teacher Education Institutes (TEI’s) those who are teaching the teachers are unlikely to have practical experience and authoritative knowledge of the pedagogical use of ICT in classrooms. Typically they have responded to the new technology, not by any radical incorporation of its use in their teaching, but merely peripherally by recruiting it to support their long established routines and to add polish to their work as presenting materials to students, administration, and communication with colleagues. Simpson et al (1999) talk of the time it will take for teachers to reach the level of integration that is being sought by the government. These researchers feel the development of the use of ICT in schools, across the curriculum and in a range of forms to match the diversity of instructional styles of teachers, will undoubtedly take many years and possibly decades. They feel it is therefore reasonable to suppose that during the whole of this period TEI staff will be unable to meet the national expectation that they can demonstrate an innovative range of pedagogical usage of ICT to new teachers.

3.4 U.S. studies

Even with high Internet connectivity and computer access, American classroom use of ICT is described by Cuban (1999) as being “uneven,
slow, and of decidedly mixed variety” (p.3). Cuban describes three
groups of computer users amongst teachers in the late 1980’s. There
were, in his estimation, around 10 percent of teachers who were ‘serious
users’ who have “incorporated the powerful machines into the very fabric
of their lives in and out of school” (p.1). The second group, of around 25
percent of teachers, are the ‘occasional users’ and they are teachers who
considered computing technology to be “marginal rather than central to
their classroom”. The last group, who make up the majority of teachers,
he called ‘non-users’ where the use of computers for teaching is “minimal
to non-existent” (ibid).

A decade later, after huge investments have been made in computer
hardware, between 10 and 20 percent of teachers had become serious
users. Between 33 and 40 percent had become occasional users, and
between 40 and 50 percent remained non-users. This, he claims, is a
modest shift. He has found that “two decades after the introduction of
desktop computers, teacher adoption and use of information technologies
has been episodic, uneven, and slow” (p.2). Cuban’s view is that teachers
themselves need to have a greater say in how and what they use in regard
to technology, creating what he terms as ‘hybrids’ of technology use in
classrooms (p.9). More pertinently, he warns readers to “expect modest
changes in teachers using technologies in their classrooms to be measured
in decades, not years, and to be hybrids of traditional and innovative
practice (p.10).

Other more recent surveys have also documented the limited integration
of technology into the school curriculum to date. For example, Becker
and Ravitz (2001) looked to answer the question of whether computers
are playing a significant role in teachers’ instructional practices within
academic subjects. The researchers show how Larry Cuban’s claim that
computers are not playing a significant role in teachers’ instructional practices is statistically correct. For most teachers surveyed, computers continue to play a minor role in student learning of academic subjects. The researchers predict that the importance of will rise over the next ten years as they become easier to use and more available, and as more teachers are trained in project-based instructional methods. In this study, only 10 percent of teachers surveyed met the criteria of exemplary computer users (p.5).

Limited integration of ICT with regular classroom curricula has also been noted by Grunwald et al (2002). About 80 percent of district leaders report that the primary instructional use of the Internet is for research, including teachers’ research for their lessons. Internet use for students in subject areas is primarily for history/social studies (76 percent) and science (58 percent) (p.2). Overall, 43 percent of district leaders rate new teachers as only “average” in competence to integrate technology with instruction. School leaders from smaller districts rate 35 percent of their new teachers expert in contrast to school leaders from larger districts who rate only 18 percent of their new teachers expert in technology integration with instruction (ibid).

Doherty and Orlofsky’s (2001) analysis of interviews with 500 7th and 12th graders from a weighted sample of high and low technology schools also revealed schools are not effectively using computers as a learning tool to help students understand or visualize new concepts. They also found that the average use of school computers is a little under three hours a week, and only 50 percent of students with computer access at school use school computers one hour or less a week. In summary, the authors conclude that the survey results demonstrate a wide gulf between technology's promise and the reality of how it is used in schools.
Low levels of integration within the curriculum were also shown by the Davis and Eslinger (2001) study. A significant number of participants in this study indicated using computers for ‘free time’ as a reward for completed assignments, as remedial, tutorial, or reinforcement skills, and for student writing experiences. The participants described limited use for actual direct classroom instruction or integration with subject matter.

Studies that show specific usage of ICT over time are hard to find. But comparisons can be made from Evans-Andris’ (1996, cited in Mumtaz 2000) research from eight years ago. It showed that the predominant teacher role was one of facilitating computer experiences for students, and in the main this involved limited and repetitive use of software intended for drill and practice or word processing.

Since then, usage remains mostly in these same areas. Figures from 2000 show that teachers assigned students to use these technologies for word processing or creating spreadsheets most frequently (61 percent did this to some extent), followed by Internet research, practicing drills, and solving problems and analysing data, (all scoring around 50 percent) (Smerdon 2000). Moreover, many teachers used computers or the Internet to conduct a number of preparatory and administrative tasks (e.g., creating instructional materials, gathering information for planning lessons) and communicative (e.g., communication with colleagues) tasks.

Becker (2001) believes ICT has the ability to have a significant impact in academic subjects such as science, social studies, and mathematics. In these areas he believes students could acquire information, analyse ideas, and demonstrate and communicate content understanding. But his findings show ICT is used for these purposes in only a small minority of secondary school academic classes. He has found word processing to be the primary application of computers in secondary schools. Across
American school grades 4-12, for teachers who used computers frequently, word processing was used nearly twice as much as the next-most common types of software—CD-ROM reference materials and games for practicing skills. Frequent use of computers by middle and high school teachers and their students in math, science, social studies, and English is, as Larry Cuban argues, still very much a rare phenomenon. Outside of word processing, Becker finds very few teachers have their students make frequent use of computers during class.

In particular subject areas Becker and Ravitz (2001) found that only 25 percent of secondary English teachers, 17 percent of science teachers, 13 percent of social studies teachers, and just 11 percent of Maths teachers make weekly use of computers in their classrooms (p.5). Even when computers are regularly used in the classroom, they are not used as tools to help students better understand sophisticated concepts or visualise something in a new way. Rather, most teachers and students use technology, and more specifically drill-and-practice tools and application software, to automate previous instructional practices.

The most recent figures (International Society for Technology in Education 2003) show ICT technology is being used at least weekly by 57 percent of teachers with their students for research. Student presentation is the next highest use, with 47 percent of classrooms, drill and practice situations are used by 39 percent of classrooms (slide 10). For teachers’ personal use, the highest uses are shared by word processing and electronic grading, each with 57 percent of teachers using ICT for this use at least weekly. The next highest is using the Internet, with 54 percent of teachers; and classroom presentation use involves 52 percent of teachers (slide 8).
The correlation between high access to equipment and software, and teacher and student usage of this technology, was studied by Cuban et al (2001) in the Silicon Valley in California. Researchers found a low correlation between access and integration of ICT into classroom teaching and learning practices. From this study it was also discovered that most of the available training was too generic and not specific to the needs of the teachers, and that few teachers made fundamental changes in their instructional strategies. (p.825)

These findings are similar to those of Bielefeldt (2001) who found high capacity in one area, such as equipment, may have limited effect on teaching and learning if it is not complemented with the training and other support needed to make use of these facilities. The most helpful technique for promoting integration of technology into teacher education was reported to be professional development. But the type of professional development course undertaken was seen as most important by this research. Bielefeldt (2001) claims the use of technology in everyday classroom experiences seems to be more important than specific computer classes. His findings showed that the institutions reporting the highest levels of student technology skills and experience were not those with heavy computer course requirements, but those that made use of technology on a routine basis throughout the teacher training programme.

3.5 The next step

The studies from Australasia, U.K. and the U.S. draw a picture of a teaching population that has not yet successfully integrated ICT into its everyday teaching practice. There is evidence to suggest that skill building in ICT, although not an immediate precursor to integration of ICT into the classroom, is a step on the way.
3.6 Application of skills to personal needs

Some research indicates the next step towards integration (after the basic skill building) is applying newly acquired skills to one’s own personal needs. Referring to tertiary teachers, it is felt that “for academic staff to be able to integrate IT into their teaching, computers must be meaningful to them on a personal level” (para.4 Cheung 1996 cited in Lawson and deMatos 2000). These authors have found that many academic staff use computers to prepare teaching materials, research papers, correspondence and to collate marks. This use of computers on a personal and management level is the first stage of a two-stage model, and is essential before moving to the second stage where computers can be integrated into teaching (para.4 Snyder 1993, cited in Lawson & deMatos 2000).

3.7 Why as well as how

But to reach the ideal of full integration, the literature suggests that professional development will be needed to provide a clear understanding of why there is a need to teach using ICT, as well as examples of teaching and learning through a constructivist model.

Most pre-service technology coursework has previously focused on procedural skills, as do typical in-service staff development offerings (McGee 2000). He says there appears to be a belief that teachers will readily transfer their technical learning to their own classrooms without any consideration of how or why it can be used purposefully, and he suggests that training must be contextually relevant to increase the likelihood new skills will be used. Without contextually relevant training, teachers have no guidance on how or where to introduce ICT into their practice. Cuckel et al’s (2000) study found that because ICT had more
obvious applications in the sciences and maths, it was unlikely to challenge existing teaching and learning skills and therefore would not contribute anything new in regard to teaching and learning. Where it challenges existing teaching and learning, teachers may find it difficult to understand how ICT can supplement their approach (p.17). This situation, where teachers do not have a clear or coherent sense of the reasons for educational change, what it is, and how to proceed, is described by Fullan (1991 cited in Cox et al 1999) as one of the most fundamental problems in education reform. “Thus there is much faddism, superficiality, confusion, failure of a change programme, unwarranted and misdirected resistance and misunderstood reform” (para.5).

Ager (2000) feels learning any new technique or strategy is difficult. Any changes need to be carefully considered and planned for. “A major change such as incorporating new technology into the classroom, which many people feel could revolutionise the way we teach and learn in schools, is bound to be painful.” He goes on to say that for planning to be effective “it needs to be based on the feeling that the use of ICT is worthwhile and beneficial. If you do not believe this to be the case then you will inevitably fail to use ICT effectively” (p.15).

3.8 Less emphasis on technical skills

Professional development programmes are cited by many researchers as emphasising the skills without the specific use for teaching and learning, or the ‘how and why’. There seems to be an implicit assumption in these programmes that teachers should use ICT simply because it’s there for them to use (the ‘Everest Syndrome’ as suggested by Maddux (1988, cited in Lai 2001)), without asking teachers to reflect on why they should use it in the first place.
Pea (1998) warns against teaching the tools rather than using the tools for inquiry: “No more computer literacy courses, thanks!” (p.4). As ICT skills are reported to be steadily rising for students on entry to higher education (Lienard 1995, cited in Simpson et al 1999), and in Scotland they are now surprisingly high (Simpson et al., 1999), the suggestion is that very soon teachers’ colleges will be able to take for granted computer literacy in their incoming students, in the same way as they presently are able to rely on their attainment of adequate levels of numeracy and general literacy. They can then concentrate their attention on teaching and the use of ICT as a “sophisticated and empowering tool to be used by all learners” (para.6).

Robinson (1997) also found access to hardware and software alone were insufficient to ensure successful ICT uptake. He claims learning how to use information technology in the classroom also involves more than training in hardware and software use - it requires pedagogical understanding. The importance of stressing pedagogy before anything else, is discussed by Nielsen (2001) who states:

when integrating ICT in primary and secondary schools the pedagogical and educational issues ought to top the agenda and make demands on the technical aspects (hard- and software) and the craftsmanship (skills concerning expression and communication) that you want students to acquire (p.282).

3.9 A move to constructivism

The pedagogical understanding most researchers refer to is one that emphasises a constructivist approach.
According to the CEO Forum's (1999) stages of adoption, integration occurs when teachers design tasks and even change their classroom environment to take advantage of the technology. In order for teachers to effectively integrate technology, they must change the way they teach (p.23 Pratt, Lai & Munroe 2000).

LaMont and Leping (2000) attempt to create a model for successful integration of information technology in teaching and learning. Using this model in teacher training suggests that, in order for teachers to be prepared to successfully integrate information technology into the classroom, they need to be competent in a variety of what they call Type II computer applications (i.e. ones that turn the computer into a tool to enhance learning by allowing the learner to create, manipulate, and produce), they need to be able to design interesting and challenging problem based learning situations, and they need to understand and become comfortable in designing constructivist learning environments. Type I usually incudes drill and practice, it tends to render the learner passive and the computer active (p.11). Becker (2001) also points to constructivism as a necessary part of moving forward. He claims teachers with the most constructivist teaching philosophies are stronger users of computers: They use computers more frequently, they use them in more challenging ways, they use them more themselves, and they have greater technical expertise. Constructivist teachers are also much more likely to report having increased their use of computers over the past five years.

3.10 People need to change

Change is necessary if progress to the next step is to be made and many argue that this change needs to come from the teachers themselves. But it
has been suggested that perhaps the biggest barrier to teachers’ integrating technology is this issue of change itself.

Even with easy access to technology, change is not simple. “Change is itself a complex issue, and a change in learning or teaching is perhaps the most complex” (Fullan 1993, cited in Pratt, Lai & Munroe 2000). Fullan (1993) believes that changing formal structures is not the same as changing norms, habits, skills and beliefs. Pratt, Lai, Munroe (2000) note that it is not surprising, therefore, that at this stage schools have not yet undergone the change necessary to enable teachers to successfully integrate technology into their classrooms.

Many of these researchers identify the concept that it is the teachers and their ability to sustain change that is at the essence of technology integration. As Loveless et al (2001) put it “technology doesn’t change practice – people do” (p.63).

One of the major purposes of the Zhao (2002) study was to address why teachers don’t integrate computers in their teaching in more meaningful ways. It summarises some factors that will be necessary to move on to the next step in technology adoption:

- Enable teachers to select technologies that will easily integrate into their teaching style and the school culture.
- Provide opportunities for in-service and pre-service teachers to reflect upon their attitude toward computer technologies, and to clarify their preferred instructional strategies.
- Provide hands-on practice with the integration of technology and curriculum objectives.
- Enable teachers to understand the value of using technology as a means rather than as an end.
- Involve school personnel in planning and implementing technology innovations in classrooms.

- Consider the real limitations that exist in contemporary classrooms.

- Take small, evolutionary steps when integrating technology with curricula, so teachers may experience success rather than frustration with the technology.

- Provide Internet connections in classrooms, rather than in computer labs that must be reserved far in advance.

- Identify and enable mentors who can model technology integration and provide guidance specific to the curriculum needs of the teacher/learner (p.514).
4 Methodology

The present study was undertaken to analyse the ways in which the profile of New Zealand teachers entering ICTPD programmes has changed with regard to:

- ICT skills
- ICT usage, for planning and preparation
- ICT usage, for administration
- ICT usage, in the classroom/students.

4.1 Data Source

As part of the Ministry of Education ICT Strategy ‘Interactive Education – An Information Technologies Strategy for Schools’ (MOE 1998), the ICT Professional Development Schools Project was undertaken from 1999-2001. This has since been extended from the original 23 school clusters, to 28 clusters from 2001-2004. The Project consists of clusters of schools from around New Zealand, which opt into a 3-year professional development programme in ICT. The aim of the programme is to increase teachers’ ICT skills and knowledge, increase their usage of ICT for professional and administrative tasks in schools, support school policy and planning initiatives related to ICT, and to increase the frequency and quality of the classroom usage of ICT to support teaching and learning (p.2 Ham et al 2002).

All teachers from the clusters participating in the professional development course were invited to complete a baseline survey before beginning the course. The questionnaire was primarily designed to assist facilitators to plan appropriately targeted professional development. It
also contributed to independent research into the ICTPD School Cluster Project.

The questionnaire was divided into five sections, covering demographics, professional development and ICT, current ICT skills and abilities, current use of ICT for planning, preparation, administration etc, and current use of ICT with/by students.

4.2 Response Rate

To answer the research questions forming this study, data was obtained from the baseline surveys undertaken in 1999, 2001, 2002, and 2003. A population of approximately 1400 teachers replied to the 1999 survey, approximately 2100 answered the 2001 survey (a 65 percent response rate), approximately 1700 teachers answered the 2002 survey (a 90 percent response rate), and around 2500 answered the 2003 survey (a 90 percent response rate).

4.3 Population and Sample

The teachers answering this survey are those who were about to begin the ICTPD programme, in each of the years 1999, 2001, 2002, and 2003. The total number surveyed over the four years numbered about 8000. Schools from around the country were given the opportunity to opt into the programme, and presumably only teachers who felt they were in need of ICT professional development took up the offer. While the sample is self-selected and therefore not representative of teachers as a whole, it is a significant group representing teachers from half the schools in New Zealand.
4.4 Demographics in the sample population

4.4.1 Teaching Experience

The teaching experience of participants is broken down into eight groups within this survey, from 0-2 years experience, through to 26-30 years, and 30+ years. From the data available over the three-year period from 2001-2003, the spread of experience is broad and spans the range almost evenly, with only a 10-15 percent difference in size between them. Over the three years the range remains the same with little to no variation.

4.4.2 Gender

<table>
<thead>
<tr>
<th>Year</th>
<th>Female%</th>
<th>Male%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>72</td>
<td>28</td>
</tr>
<tr>
<td>2002</td>
<td>77</td>
<td>23</td>
</tr>
<tr>
<td>2003</td>
<td>68</td>
<td>32</td>
</tr>
</tbody>
</table>

4.4.3 Primary/secondary split

In 2001 and 2002, primary teachers made up approximately two thirds of the participants in the ICT PD programme.

In 2003, however, the wide difference has become reduced, to the extent that secondary participants slightly outnumbered primary participants by 5 percent.

4.5 Analyses

The 61 survey questions chosen for analysis in this study were the most pertinent in establishing a picture of usage over time. They were:

Question 8a-f: Attitudes towards ICT
Question 11a-o: Concerns about ICT
Question 12a-k: ICT Skills
Question 13a-f: ICT use in planning/preparation
Question 14a-f: ICT use for administration
Question 15: Extent of ICT integration
Question 17a-p: frequency of student use

(appendix 1)

For each of these questions, answers were collated, and tabulated for each year with their raw score and percentages. The data was tested against demographics such as gender, teaching experience, and area of teaching – whether primary or secondary. Line graphs were then made showing change over time.

After the initial 1999 survey, the questionnaire was substantially rewritten to form the 2001 survey and from then onwards the questionnaire has differed only slightly. The differences have meant, however, that some of the data has not been available for comparison. Data for this project could be used for Question 8: Attitudes towards ICT, from the years 2001 and 2002 only. Question 11: Concerns about ICT could not be taken from the 1999 survey. Data for Student use of ICT (Question 17) was taken from all years, although in 1999 it only extended to cover six of the eleven classroom uses. For the remaining questions, the four years of data could be compared fully.

4.6 Ethics

The respondents to the survey were asked to contribute to independent research by answering the baseline survey on entering the professional development programme. They were told their individual responses would be kept strictly confidential to the cluster facilitator and research
team, though the results of statistical and other analyses of the data may be published in non-attributable and aggregated forms.
5 Results

Responses from the baseline surveys from 1999-2003 provide a picture of a teaching population changing in its ability and usage of ICT in their professional lives, but changing little in its integration of ICT in the classroom for teaching and learning programmes.

Responses to questions about the existing skills of the teachers show a distinct change in the use of the Internet, and the level of skills in basic operations over time. These areas show the most dramatic shift for those who were working at the most basic level, where the shift to more sophisticated levels has occurred. Very large shifts in ability levels are also seen with the use of email, spreadsheets, and databases.

The rate of ICT use for planning/preparation also changed considerably. Again the Internet features much more highly in 2003 than 1999. Use of CD Roms, Digital cameras and videos also increased over this period.

Many of the teachers entering this PD programme are also using ICT more for administration, with the number who ‘never’ uses ICT for administrative purposes decreasing substantially.

Levels of classroom use, however, changed little for the entrants to the programmes. Over the same period that their general ICT skills improved significantly, and their ICT skills and usage within the administration area increased significantly, their ICT use within the classroom situation changed little. The exception to this is, again, with the Internet, where the number who ‘never’ used the Internet with classes halved over the period studied.
5.1 Skills

Data collected from 1999, 2001, 2002, 2003 baseline surveys shows those entering the ICT PD programme increased their ICT skills. The data for basic operations ability, for example, illustrates a teaching population whose majority in 1999 (57%) were at the lowest end of the basic skills listed in this survey, i.e. used the computer to run one or two programmes available (see Figure 1). In 2003 the position shifted to a situation showing a broader spread of skills across the spectrum with a substantially decreased 25 percent at the lowest end of basic skills operation. There was another 25 percent in the level above this by 2003, who declared they could troubleshoot successfully when basic problems occur; they could learn new problems on their own and could install software from a CD Rom. Those at the top end of the range listed in the survey grew from seven percent in 1999 to 15 percent in 2003.

![Figure 1](skills-basic-operations.png)

**Figure 1**
Skills: Basic Operations

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>1999</td>
<td></td>
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<td>2002</td>
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<td>2003</td>
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</table>

Level 1: I use the computer to run one or two programmes that are available.
Level 2: I run two programmes simultaneously. I have several windows open at the same time and can transfer information between documents.
Level 3: I troubleshoot successfully when basic problems with my computer or printer occur. I learn new programmes on my own and can install software from a CD-ROM.
Level 4: I can install most types of software. I can download updates and executable files from the Internet. I can unzip compressed program files. I can update hardware drivers.
Level 5: I can handle the basic administration of an NT, Novell or macintosh network.
Other skills such as file management and word processing also show a significant shift in abilities of those about to enter the programme. In 1999, 22 percent claimed to be at the top end of the ability scale used in the questionnaire for file management (i.e. can move files between folders and drives. They can understand directory paths and the use of folders and can use the find feature to locate files on the hard drive). By 2003 the amount had doubled to 44 percent who place themselves in this level of ability. Word processing skills also increased within the teaching population, with 42 percent in 2003 putting themselves in the highest end of the spectrum listed (see Figure 2). This, compared to only 23 percent in 1999 who felt they had reached this stage, shows a large increase.

![Figure 2: Skills: Word Processing](image)

- **Level 1**: I do not use a word processing program.
- **Level 2**: I occasionally use a word processing program for simple documents. I generally find it easier to hand write most written work I do.
- **Level 3**: I use a word processor for much of my written professional work, i.e. memos, tests, activity sheets, and home communication. I edit spell check and change the format of a document.
- **Level 4**: I use a word processor for all my professional written work. I use editing and formatting tools with confidence, i.e. tabs, headers/footers, auto-insertion, tables, footnotes, auto-numbering, bullets, hanging indents etc.

Use of email also increased significantly, from 19 percent in 1999 of those who are confident in its use (and use attachments, store addresses
and nicknames, have a signature, forward mail and use listservs) to 37 percent who did this in 2003.

Use of spreadsheets has increased, but not as much at the top end of the scale of skills as the aforementioned ICT skills. Those who do not use a spreadsheet had fallen from 56 percent in 1999, to 34 percent in 2003. The second level of ability in spreadsheet use, out of 4 levels (that of understanding the use of a spreadsheet and navigating within one, as well as creating simple charts/graphs) was achieved by 28 percent of teachers in 1999. By 2003, 40 percent of respondents felt they were at this level. Only small increases (seven percent and three percent) from 1999 to 2003 can be seen in the following two higher levels.

The use of graphics also rose over the period studied, with a much higher proportion of respondents at the second to highest level of ability listed on the survey (that of capturing and editing images from a wide variety of sources e.g. scanner, digital camera, Internet). In 1999, eight percent were at this level; by 2003 it had increased almost three fold to 22 percent.

Database use also increased, particularly in the second of the four levels of ability. In 1999, 26 percent were at this level, by 2003, 46 percent felt they were at this level. Hence, those not using a database had fallen from 63 percent in 1999, to 38 percent in 2003. The two higher levels had negligible changes.

The use of the Internet has shown large increases (see Figure 3). In 2003 only five percent claim not to use the World Wide Web; this figure was a much higher 37 percent in 1999. Consequently there has been a substantial shift of skills up through the levels. In 2003 the greatest proportion of responses (38 percent) were at the middle level (3rd level out of 6), whereas in 1999 only 13 percent were at this level.
Figure 3
Skills: Internet

Level 1: I do not use the World Wide Web.
Level 2: I can access Internet websites to find information. I follow links from these sites to various other resources.
Level 3: I can successfully enter my own URLs and make profitable use of keywords in Web search engines to explore educational resources.
Level 4: I can understand the significance of URL name structures and use ‘and/or’ queries and other advanced features of search engines.
Level 5: I can create web pages using either HTML or an editing program such as Font Page.

Awareness of ethical issues show a slight rise over the years, especially at the top end of the spectrum where 23 percent sat in 1999, but 38 percent sat in 2003. At this level, teachers are very clear about copyright restrictions and understand the function and significance of approved use policies and contracts. Those who are not aware of any ethical issues had decreased from 28 percent in 1999, to eight percent in 2003.

Video use/skills show only negligible changes with multimedia skills increased only slightly – in the third level (out of four) where they are able to create presentations which incorporate text and graphics, with various multimedia elements such as sound, video clips and simple animations. Five percent felt they were at this level in 1999. This increased to 12 percent in 2003.
5.2 Usage

5.2.1 Planning/Preparation

There has been a considerable shift in how often respondents use ICT for planning/preparation.

Internet use for accessing lesson ideas, assessment, reading official documents, and other professional readings, all show similar trends over the time period 1999-2003. This tendency shows respondents are less likely to ‘never’ use ICT for these purposes by 2003. The data shows a significant drop (of about 40 percent in each use) of those who ‘never’ use ICT for these Internet uses. Correspondingly, there is a rise in those who use it ‘sometimes’ – about 20 percent increase for each, and those who use it ‘often’ – between 15–20 percent increase for each.

![Figure 4](image)

Planning and Preparation: Use Internet

The use of CD Roms, and Digital Camera and Videos, also sees a fall in the ‘never’ use of around 20 percent from 1999 to 2003, to corresponding rises in the ‘rarely’ and ‘sometimes’ groups of around 10 percent in each.
5.2.2 Administration

Using ICT for administrative purposes increased substantially over the period 1999–2003. The change can be seen more at the lower end of the scale, where across each of these years there has always been a bulge for those who say they ‘never’ use ICT for administrative purposes (with the exception of Report Writing); but over this period the bulge becomes less acute. This corresponds with a slight increase seen fairly evenly across the responses from ‘sometimes’ to ‘always’ by 2003 (Figure 5 shows a typical example of this).

![Figure 5: Administration Use: Records/Assessment](image)

The only exception to this was using ICT for writing reports for parents, which has had the greatest move, from 62 percent in 1999 saying they ‘never’ used ICT to do this (see Figure 6); by 2003 this had dropped to only 21 percent who do not use ICT to write reports. Unlike the remainder of uses for administration listed on this survey (where the bulge is still on ‘never’ by 2003), the bulge was at the top end of the scale of usage by 2003, i.e. where the highest proportion (44 percent) ‘always’ use ICT to write their reports.
Overall, however, there has been a substantial decrease in those that say they ‘never’ use ICT for administrative purposes, and an increase in those that ‘sometimes’ and ‘often’ use ICT in this way. The trend is yet to show any more than a ten percent increase in those that ‘always’ use ICT for administration (with the exception of report writing).

To illustrate: in 1999, 71 percent said they ‘never’ use ICT to email colleagues on administrative matters. By 2003, this had fallen to 32 percent. Those that use email in this way ‘sometimes’ had increased 11 percent between 1999 and 2003. Those who use it ‘often’ for these purposes had increased 13 percent over this time period. Those who claimed to ‘always’ use it for report writing had risen 10 percent from 1999 to 2003.

Similarly, there was a major shift in those using ICT for recording or calculating assessments, marks and grades; and for those recording students’ running records (see Figure 7). For both there has been a 36 percent, and a 33 percent decrease respectively, in those who ‘never’ use ICT for these purposes. For both there has been a corresponding growth in the spread across those who now ‘sometimes’, ‘often’, and ‘always’ use ICT for these purposes.
Accessing staff notices by using ICT grew in popularity, with 80 percent ‘never’ doing so in 1999, to a significantly lower 54 percent in 2003 ‘never’ doing so.

Recording absences by using ICT changed the least over the years 1999 – 2003. There was, nevertheless, an 18 percent decrease in those who ‘never’ do this.

5.2.3 Classroom/Student use

In contrast to levels of personal skill and administrative use, the extent to which respondents integrated ICT into learning activities changed very little over the years 2001 – 2003 (see Figure 8).

In both 2001 and 2003, 24 percent of respondents had not integrated any units of work containing ICT based learning activities into their
classroom programme.

Figure 8
Integration of ICT in the Classroom

Level 1: I have not blended the use of any computer-based technologies into my student learning activities.
Level 2: I have once or twice included an ICT based learning activity into my units of work that I plan.
Level 3: I include an ICT learning activity into several of the units that I plan.
Level 4: Most units of work that I teach contain learning activities, which involve student use of ICT tools.
Level 5: All, or almost all units of work that I teach contain learning activities, which involve some student use of ICT tools.

The remaining responses also deviated little, with only a slight increase in those who undertook one or two units of work containing ICT from 2001–2003. Those who integrated ‘several’ units of work, or who ‘mostly’ integrated work containing ICT decreased, but only slightly. At the top end of the scale, those who included ICT in ‘all, or almost all’ of their learning activities remained largely the same.

Specifically, the figures from 1999–2003 show little or no change in the frequency of student use of ICT in the classroom for particular uses suggested in this survey. There is a well-defined bulge at the lower end of the frequency-of-use scale, which covers the ‘never’ and the ‘1–2 times per term’ responses, with very few students using ICT more than that (1–2 times a week, or daily). Figure 9 Student Use: Multimedia is a typical example.
The biggest exception to this is Internet use by students, where those who ‘never’ use the Internet had fallen from 54 percent in 1999, to 23 percent in 2003 (see Figure 10). Those who used it on average 1-2 times a term increased from 12 percent in 1999, to 31 percent in 2003. Those who used it on average 1-2 times a week increased from five percent in 1999 to 19 percent in 2003.

Three other uses within the classroom show some change in frequency of use. Learning from a computer based tutoring programme increased,
albeit slightly, (with a nine percent decrease in those who ‘never’ do this, between 1999 and 2003). CD Rom use for accessing or searching for information saw an increase in use from 12 percent in 2001, to 24 percent in 2003 for those who used it 1-2 times a year, and a 15 percent increase from 11 percent in 2001 to 26 percent in 2003 who used it 1-2 times a month. Lastly, use of the electronic catalogue to find appropriate reading in the library increased slightly, with a six percent increase between 2001 and 2003 for those who did so 1-2 times a year, and a 10 percent increase over the same period for those who used it 1-2 times a term.

Otherwise, student use of ICT within the classroom (e.g. in creative work, project work, email, slide shows, multimedia, data logging, simulation, drill and practice, programming, web design, databases and spreadsheets, fax and phone work) remained constant over the years analysed.

5.3 Degree of ICT focus

The number of teachers who plan to give a substantial amount of their professional development time to ICT remained constant, at around 28-29 percent each year, from 2001-2003.

For those who are able to spend ‘some time developing skills and knowledge in this area...’ the percentage fell slightly from 57 percent in 2001 and 2002, to 43 percent in 2003.

The number of teachers who deem ICT to be a low priority in their professional development time for a particular year, increased from 4 percent in 2001 and 2002, to 27 percent in 2003.
5.4 Concerns about ICT

Over the three years 2001-2003, responses changed very little in regard to participants concerns regarding ICT.

The greatest concern was consistently one of equipment breakdown/technical problems: a little over 60 percent of those about to enter the ICT PD programme felt this was a significant concern. Slightly fewer claimed ‘lack of time to cope with it all’ as a significant concern. The third most significant concern (50 percent) was access to equipment for student use.

Around 38 percent each year had a significant concern about the ongoing need to up skill themselves in using new software packages. Over the three years around 35 percent consistently felt keeping up to date with new developments was of significant concern. About the same percentage consistently felt access to equipment for their own professional use was of significant concern. Lack of training was of significant concern to around 30 percent of respondents each year, and not knowing how to include the use of ICT in their teaching was consistently a significant concern for around 23 percent of teachers entering this course. A lack of support was of concern to a slightly growing proportion of respondents – 19 percent in 2001, 20 percent in 2002, and 24 percent in 2003. The proportion who felt there was too much change too quickly grew slightly over the three years, from 16 percent in 2001, to 18 percent in 2002, and 19 percent in 2003.

Around 13 percent each year were significantly concerned that they were already too far behind, and around 12 percent each year felt their lack of keyboard skills were of significant concern. About 10 percent over the three years were significantly concerned that ICT didn’t actually improve learning. Consistently, there was a figure of around eight percent of
teachers who felt the need to change their teaching style was of significant concern. And seven percent each year felt unexpected changes to the daily timetable were of significant concern to them.

5.5 Attitudes towards ICT

2001 and 2002 figures available for this question show little to no difference between the years in respondents’ attitudes towards ICT.

Between 35 and 40 percent of respondents in both years agreed that ICT was easy to learn. However, almost the same number (33 percent) for both years disagreed that ICT was easy to learn.

The greatest proportion (48 percent in 2001 and 46 percent in 2002) disagreed with the statement that ICT wouldn’t improve their teaching.

The greatest proportion of respondents agreed that students should use ICT daily – 65 percent in 2001 and 61 percent in 2003. But another 32 percent in 2001 and 37 percent in 2003 were either not sure or disagreed that students should use ICT daily.

Both years show consistent figures for the statement that ‘ICT is worth it for administration purposes’. Around 60 percent either agreed or strongly agreed that ICT was worth it for administration purposes.

The statement that ‘ICT will change my teaching’ split the responses fairly evenly for both years, with about a third saying they agreed that it would, another third saying they were not sure, and almost another third saying they disagreed or strongly disagreed.

That ‘ICT is worth it for the students’ has also received very consistent responses over the two years. Almost 60 percent both years either agreed or strongly agreed with this statement. Around 33 percent were unsure of
whether or not ICT was worth it for the students, and around 10 percent each year felt it was not worth it for the students.

5.6 Profile of the Average teacher entering ICTPD Clusters

To gain another perspective of the results, a picture of the ‘average’ respondent, or teacher, has been developed. Statistics for this profile have been taken from the mode score (i.e. those from the responses on the questionnaire most frequently checked).

The average teacher is of any age, male or female, and will teach in either primary or secondary schools. When it comes to worries regarding ICT, the average teacher tends to put equipment breakdown/technical failure at the top of the list. The average teacher thinks ICT is easy to learn, and thinks ICT will improve his/her teaching. But the group is fairly evenly split on the issue of whether ICT is going to change their teaching. However, he/she believes ICT is definitely worth it for administrative purposes. The average teacher agrees that ICT is worth it for the students and also thinks students should use ICT daily.

5.6.1 ICT skills of the average teacher entering ICTPD clusters

The average teacher’s skills increased somewhat over the period 1999 - 2003. In 1999, the average teacher was at the lowest end of the scale for basic operations ability; but by 2003 the average teacher’s skill level had gone up one level. In 1999, the average teacher was on level 2 for file management, but by 2003 he he/she was on the top level (level 4). For word processing skills, the average teacher jumped from level 2/3 in 1999, to the top level in 2003. In 1999, email skills and Internet skills of the average teacher were only on level 1, but by 2003 they had reached
level 3. The average teacher increased their spreadsheet skills, graphic
skills, and database skills, all of which progressed from level 1 in 1999, to
level 2 in 2003. The only area where basic skills remained the same over
the period analysed was the area of video production and multimedia
skills, where they remained at level 1.

5.6.2 ICT use in planning and preparation for the average teacher
entering ICTPD clusters

There was a small change in the average teacher’s use of ICT for
planning and preparation, but usage was still at the low end of the scale.
In 1999 the average teacher never used the Internet for planning and
preparation, assessment, or to access official documents. By 2003, the
average teacher sometimes used the Internet for these purposes. Over the
period studied, some areas remained unchanged for the average teacher,
i.e. never using CD Roms, digital cameras or videos for planning and
preparation. The average teacher, over this period, also continued to
declare he/she never used the Internet for professional reading. The only
area where ICT was used often for planning and preparation was in word
processing, where the average teacher used it often in 1999 and continued
to use word processing often in 2003.

5.6.3 ICT use for administrative purposes for the average teacher
entering ICTPD clusters

Between 1999 and 2003, the use of ICT for administrative purposes
increased for records/assessment. In 1999 the average teacher never used
ICT for this purpose, but by 2003 the average teacher often did. Although
the average teacher never used to write reports to parents using ICT, they
always did by 2003. For the average teacher though, recording absences
and running records, accessing staff notices, and emailing colleagues, remained something they never did, over the period studied.

5.6.4 Student use of ICT with the average teacher entering ICTPD clusters

Student use of ICT remained low in the classroom of the average teacher between 1999 and 2003. In 2003 he/she was still (unchanged from 1999) likely to report that their students never use ICT for project work, to email, for slide shows, multimedia, data logging, simulation, drill and practice, tutorials, programming, CD Roms, web design, databases/spreadsheets, fax/phone, or the library catalogue. The students have, however, used ICT for some creative work, perhaps 1–2 times a term, and used the Internet 1-2 times a term in 2003; this was an increase from 1999 when they would never have used them.

In 2003, regarding levels of ICT integration, the average teacher remained on level 2. This remains unchanged from the 1999 level.
6 Discussion

The snapshot of the average teacher's use of ICT before entering the ICTPD clusters programme, shows a profile changing in some areas, but remaining unchanged in many of the others.

Between the years 1999 and 2003, the average teacher had increased his/her ICT skills to some extent, especially in file management, word processing, emailing, and the Internet. This is consistent with overseas research in the area of teachers' ability levels. Although different measurements indicating teachers skill levels and stages of adoption have been used by various researchers, making results awkward to compare, the significant similarity is seen at the top end of each of the scales showing only a very small minority of teachers, with the bulk somewhere in the beginning to middle levels (Williams 2000; Becker & Ravitz 2001; Grunwald et al 2002; Fink Jensen et al 2003).

The average teacher in the present study, before entering the ICTPD clusters programme, uses ICT a little more in 2003 than in 1999 for planning and preparation purposes. In 2003, the average teacher often uses ICT for records and assessment and for writing reports. International research shows this to be the case in other countries where, although teachers have developed some basic ICT tools, they are not extending these tools to their classroom teaching and learning programmes, but are instead using them fundamentally as administrative tools (Smerdon 2000; McGee 2000; Cuckle & Clarke 2002; OfSTED 2004).

The students of the average teacher may use the Internet 1-2 times a term, and use ICT for some creative work 1-2 times a term in 2003; a change from never using the Internet in 1999 for these purposes. Again, these results are consistent with the teaching population overseas, where the use of word processing is predominant among teachers as well as students.
(Evans-Andris 1996; Smerdon 2000; Williams 2000; Davis & Eslinger 2001; Becker 2001). A more recent study (ISTE 2003) showed usage of the Internet for research as the greatest reason students use ICT. This compares well with the present study where, in 2003, students use ICT for creative work and the Internet 1-2 times a week or daily, in greater numbers than for any other purpose.

But the results show on the whole the average teacher, despite progress, remains at the lower end of the scale for many ICT skills, as well as for use of ICT either for planning and preparation, or for administration. The fact that this study has noted progress in skills of teachers before entering the ICTPD clusters programme, over the time period studied, compares well with others who also found this to be so, to the extent they feel a certain level of skills can be taken for granted in people entering Teacher Education Institutes in Great Britain (Lienard 1995 cited in Simpson et al 1997).

Significantly, the present study shows integration of ICT in the classroom remains unchanged from 1999 - 2003, for teachers who have yet to enter the ICTPD clusters programme, with the average teacher remaining at the second level of ICT adoption. That integration has not occurred to any great extent, in any of the overseas research cited, despite considerable resources put into hardware, software, and training, is a discussion point by many. Reasons given for low levels of integration often include a lack of knowledge on how to integrate ICT into the classroom programme (Albion 2001; Murray & Greenwood 1998; Simpson et al 1999; Cuban et al 2001; Bielefeldt 2001). An interpretation of this issue as it relates to this particular study will be made in the section discussing the priority of ICT integration (7.2).
6.1 The wider distribution of teachers responses

What the description of the average teacher cannot give is the distribution of teachers outside the norm. There is a group in these statistics, that is smaller in number, but has split from the cohort of average teachers, (where they were in 1999) increasing their skills to a greater extent. By 2003 they were above the average group in their skill levels and usage of ICT. For example, the number of teachers who often used the Internet for planning and preparation had trebled over the 1999 – 2003 period, although the average group still only used it sometimes. Those who often used the Internet for assessment had increased six fold, whereas the average group still only sometimes used the Internet for this purpose. Those who often used the Internet for official documents increased from three percent to 22 percent, and similarly those who often used it in this way increased from two percent in 1999, to 12 percent in 2003. Those who sometimes used CD Rom for planning and preparation increased from 14 percent to 23 percent, and those who used it often for this reason doubled. The numbers, although low, grew rapidly over the period studied. The average group of teachers, however, did not show such progression, but this smaller group is moving up the levels making a greater representation amongst the higher levels than ever before. This occurred in all ICT areas (skills, use in planning and preparation, use in administration) with the exception of the Student Use areas and the specific question of Integration into the classroom, where little to no change occurred between 1999 and 2003 in any but their use of the Internet.
6.2 The priority of ICT integration

The results show very few teachers claimed to actually integrate ICT in their classroom practice before entering the ICTPD clusters programme, with the largest cohort of 42 percent having only once or twice integrated ICT into units of work. This second to lowest level of integration remains the level with the greatest proportion from 2001-2003, and is consistent with overseas research which points to a lack of integration of ICT by teachers. But only 23 percent of teachers in this study are significantly concerned that they do no know how to include ICT into their teaching. Integration of ICT across the curriculum is not a high priority to teachers. This, and the results showing a decreased priority for teachers in their want/need for professional development in ICT, raises issues regarding how important teachers see ICT integration.

With only seven percent of respondents claiming to fully integrate ICT, these results are lower than those of Lai, Pratt and Trewern (2001) who report 15 percent of secondary teachers could integrate ICT into the curriculum. It is, however, difficult to compare figures as the degree, or level, of integration was not defined by Lai, Pratt and Trewern (2001). Similarly, with the Fink Jensen (2003) study, a different scale of ICT adoption is used, making comparisons awkward. In this study, the largest group were at the middle stage, that of familiarity and confidence. The biggest difference between the Fink Jensen et al (2003) findings and the present study is seen in the growth of adoption. In the Fink Jensen et al (2003) study a growth of around 10 percent can be seen in the next level up, between 2001-2003. No such growth is seen in this particular study.

The findings from this study are very different from those of the Curriculum Stocktake Study (2003) which claims over 60 percent of schools are integrating technology with other learning areas. But again,
the results are hard to compare without similar levels defining the degree of integration.

Attitudes to ICT integration have not been looked at specifically in this study, but it is implied by the lack of integration, and the lack of interest in knowing how to integrate ICT, that teachers feel this in not an area of high priority. The O’Reilly (2003) study in Scotland makes reference to ICT integration as being a ‘formidable’ task (p.424) above all the other demands of teaching, and has thus been neglected. For a conclusion to be reached regarding the New Zealand situation, further study in the area of teachers’ attitudes toward ICT integration would be necessary.

6.3 ICT would improve teaching but not change teaching

The greatest proportion of teachers over the years 2001 and 2002 disagreed with the statement that ICT wouldn’t improve their teaching, that is, they believe ICT would improve their teaching. But they weren’t convinced it would change their teaching (the group is evenly split between agreeing, disagreeing, and being unsure). This is further emphasised by the low response (eight percent) of those who felt the need to change their teaching style was of significant concern.

That teachers believed ICT would improve their teaching (but not change it, nor integrate with it) implies their definition of ‘improve teaching’ lies perhaps on an administrative level for themselves, rather than on a learning level for their students. This is confirmed by the great majority of teachers who agreed that ICT was definitely worth it for administration. Much literature has described the need for change before ICT integration occurs successfully. Simply by supplying the infrastructure, and a professional development course in ICT, integration will not be assured, as other researchers have pointed out (Cuban 1999).
It is teachers who need to change the way they teach, toward a more constructivist style whereby the learner drives the curriculum, and where the learner makes the demands on the ICT. This is touched on by Nielsen (2001), and LaMont and Lepping (2000) who define a constructivist learning environment ones that turns the computer into a tool to enhance learning by allowing the learner to create, manipulate, and produce. As Pratt, Lai, Munroe (2000) point out, change in, for instance, habits, skills and beliefs is very difficult. It is therefore not surprising that teachers are slow to adopt ICT integration. But the literature is clear, and stresses that for ICT to be successfully integrated within the curriculum, teachers need to know why and how ICT can be used purposefully (McGee 2000), they need to know what it involves and how to proceed (Fullan 1991 cited in Cox et al 1999) and probably most importantly, they need to believe in it and know it is worthwhile (Ager 2000).

6.4 The gap between beliefs and practice

By far the majority of teachers agreed or strongly agreed that students should use ICT daily (Qu.8c), which is confirmed again by the majority who stated they believed ICT was worth it for the students (Qu.8f). But the reality is that in 2003 students did not use ICT daily, with no more than nine percent of the respondents saying they used any of the ICT applications daily. On average, only between 1 and 2 percent of respondents used these applications daily (Qu.17a-l). There is, therefore, a large gap between the beliefs of teachers and their practice. Looking at the concerns of teachers may go some way in addressing this issue (Qu.11a-o). The top three concerns involved technical problems, which were consistently a significant concern for 62 percent of respondents between 2001-2003; lack of time was a consistent significant concern for
57 percent of the respondents, and access of ICT for the students was consistently a significant concern for 52 percent of respondents. What wasn’t such a concern was keeping up with the skills necessary (where a minority of 39 percent found this to be a problem), or lack of training, (where a minority of 32 percent felt this was a significant concern). It would appear then, that professional development focusing on ICT skills has consistently not been a priority for teachers; but rather they felt the need for more emphasis on finding a way to technically manage the ICT, as well as manage it for large groups of children, within an economical timeframe during the day, i.e. an emphasis on how. The emphasis noted in these responses is less on the learning about ICT, towards learning more with ICT and learning through ICT (as emphasised by the philosophy within the New Zealand education system (MOE 2002)). Other research has noted a decreasing need for a focus on ICT skills, as skill levels rise (Simpson et al 1997), and a greater emphasis on the how to teach with and through ICT. However, as skill levels rise (as can be seen in this report), transference of these skills into the classroom teaching and learning situation cannot be automatically assumed. Teachers need to be shown ways in which to integrate ICT easily.

6.5 It’s not about the technology

Technology tools are already in place in most if not all classrooms, and yet teachers “are not always prepared, interested, or convinced that these tools can actually support learning or justify replacing traditional, non-technological approaches to teaching” (McGee 2000 p.198). After analysing the results from this study, McGee 2000’s claim appears to aptly summarise the situation facing New Zealand’s teachers. Until there is an underlying belief that ICT is going to improve teaching and learning
practices, ICT will remain simply as a tool to improve preparation/planning, and administrative work for teachers. Before any effective integration into the classroom teaching and learning programme can occur, the whole idea of ICT and its worth needs to be more effectively ‘sold’ to teachers. As Cuban (1999) envisages, teachers need to be part of the decision making on how and when to best use ICT in the classroom. In their teaching they need to be able to choose to use ICT because they know it will enhance that particular lesson like no other tool will, not because they feel they should somehow make use of it because it’s there. Nielsen (2001) explains “when integrating ICT in primary and secondary schools the pedagogical and educational issues ought to top the agenda and make demands on the technical aspects (hard- and software)” (p.282).

Simply by having the ICT infrastructure available will not, as this and other research shows, create an improvement in the teaching and learning for the students. But, as some research alludes to, the application of ICT skills to teachers’ own personal work it is step along the way (Snyder 1993, cited in Lawson & deMatos 2000).

As seen in the results of this study, teachers are becoming more confident and skilled at using ICT for their administration work and their planning and preparation work. Although New Zealand teachers are seemingly a long way off full integration, they are in a similar situation to teachers internationally. Unfortunately it is not going to happen as quickly as many had expected. Those who feel there is a “wide gulf between technology’s promise and the reality of how it is used in schools” (Doherty & Orlofsky 2001) will have to wait as long as many years, if not decades (Simpson et al 1999; Cuban 1999).
7 Conclusions

Analysis of the profile of the ICT use and skill levels of the average teacher shows few changes in the use of ICT in the classroom between 1999 and 2003. This lack of change in the profile reveals the situation for the biggest cohort of teachers in this study. Skill levels for those in this group have increased most in file management, word processing, emailing and Internet use. Their usage of ICT has increased only modestly between 1999 and 2003. ICT, for this group, is used mainly for administration as well as planning and preparation. The average teacher remains at the lower end of the scale for these uses, as well as many basic ICT skills. Student use of ICT with the average teacher is minimal, having increased only slightly during the period studied. These results are consistent with overseas findings where ICT is described as an administrative tool and is used predominantly for word processing, and to some extent Internet searching.

There is, however, another side to this picture, of a smaller group of teachers who are making greater progress. This can be seen by the greater numbers represented at the higher levels of ability and usage in 2003. Although still not high in number, they have increased sometimes up to seven fold since 1999. It is worth reiterating that these are teachers who have not as yet entered the ICTPD programme.

Ham et al (2002) reported that although most teachers had used ICTs little with classes before entering the 23 ICTPD School Clusters Programme, taken as a group, by the end of the programme they had achieved relatively high levels of ‘incorporation’ of some ICTs into their teaching programmes, but only moderate levels of ‘integration’ (p.10). In an evaluation of the 28 ICTPD School Clusters Programme 2001 – 2003, Ham et al (2004) found again that teachers began the programme with
low levels of classroom usage of ICTs, and increased their usage of at
least some ICTs significantly over the period of the programme. In terms
of pedagogical purposes, most ICT-based activities were, however, used
for static print purposes. Just over 25 percent were for information
gathering, and around 20 percent for multimedia authoring. The use of
ICTs for problem solving was even less common (p.45). Although skill
and confidence levels increased, sometimes significantly, as a result of
the professional development undertaken, the levels of integration into
the curriculum were negligible.

This present study of teachers skill levels and usage, integration levels
remain generally unchanged and at a low level over the period 1999 -
2003, for any group, despite any of the increases seen in skill areas.
Questions on integration of ICT into the curriculum have raised
interesting issues. Firstly, teachers appear to be unconcerned about the
lack of integration of ICT in their classrooms, with only 23 percent who
said not knowing how to include ICT into their teaching was of
significant concern. Further investigation into teachers' attitudes
regarding their perceptions on the worthiness of ICT in enhancing
teaching and learning practices would complement these results.
Secondly, teachers believe that ICT will improve their teaching, but are
unconvinced that it will change their teaching and very few are concerned
about the need to change their teaching style. The implication of these
results, and other questions regarding administrative uses, is that teachers
feel the ICT available to them is most useful on an administrative, and
planning and preparation level. Used for these purposes, teachers feel ICT
will improve their teaching.

Thirdly, student use of ICT, although growing slightly over the period
studied, remains low. However, it is teachers' belief that students should
use ICT daily. The gap between beliefs and practices requires further investigation, but by looking at the results of this study it would appear the concerns of teachers over technical problems, lack of time, and access to ICT, need to be addressed. Teachers appear to be unconcerned about learning ICT skills, but want to know how to technically manage ICT, as well as manage it for large groups of children within the short timeframe available in the school day.

The title of this report ‘It’s not about the technology’ suggests the immediate focus, the technology, is not actually the main factor in the discussion. A wider perspective, outside the technology, needs to be taken to discover the whole story. Literature cited in this study alludes to a need for a change in teachers’ beliefs and practices before technology will be fully integrated within the teaching and learning practices of everyday classrooms. Technology integration will occur only as a result of these changes – not the other way around. To add technology without addressing more constructivist ways of teaching and learning is like talking about a bike race without discussing the person riding it. Future studies focussing on the people, who must implement ICT, would be useful.

A greater focus in professional development therefore needs to be made on pedagogical issues regarding integration of ICT into the classroom – not merely on how it can be done, but more importantly on why it should be done, and even if it should be done at all. That teachers mostly use ICT for administration and planning and preparation is an important and significant step along the way towards integration. The next step, however, towards greater classroom use for teaching and learning may still be a long way off for classrooms in New Zealand, as well as overseas.
'To many teachers the Internet is like one of those ‘good news/bad news jokes’: The good news is you now have the Internet in the classroom. The bad news is you now have to use the Internet in the classroom. In candid moments, most teachers will admit having access to the Internet is a mixed blessing: it leads to wonderful learning opportunities, but requires a great investment of time and energy. (Gray 1998 p.62)

‘Teachers are being challenged to take up the technology and incorporate it effectively into all aspects of teaching and learning.

The challenge is enormous. For many reasons, effective use of the ICT in ways that provide for dynamic and worthwhile learning opportunities for students has proven to be a difficult task for teachers. (Trewern 2001 p.129)
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Information and Communication Technologies

28 Cluster Schools ICT Professional Development Project
Ministry of Education 2001-2003

Baseline Data Survey 1

This questionnaire is designed to assist Facilitators with the planning of appropriately targeted professional development, and to contribute to independent research into the ICTPD School Cluster project. Individual responses will be kept strictly confidential to the cluster Facilitator and a Research team contracted to the Ministry, though the results of statistical and other analyses of the data may be published in non- attributable and aggregated form.

The survey is in 5 Parts. Please complete the relevant sections of all PARTS.

PART 1. Demographics
PART 2. Professional Development & ICT.
PART 4. Current use of ICT for Planning, Preparation, Administration etc
PART 5. Current Use of ICT with/by Students.

PART 1 DEMOGRAPHICS

Name: _____________________________________________________________

School: __________________________________________________________

Current position(s) of responsibility (DP, HOD, Syndicate Leader etc etc)

No. years teaching experience: □ 0-2 yrs □ 3-5 yrs □ 6-10 yrs □ 11-15 yrs
□ 16-20 yrs □ 21-25 yrs □ 26-30 yrs □ 30+ yrs

Gender
Primary Only
□ Female □ Male

Year Levels taught last year and this year
Year Level(s) taught last year
Year Level(s) being taught this year: __________________________

Secondary/Intermediate
Specialist Teachers Only
Subject/s taught last year and this year:

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PART 2. PROFESSIONAL DEVELOPMENT IN ICT

1. Please list any scheduled ICT professional development activities you have participated in during the last 12 months.
   eg: night classes, in-service courses, after school sessions, holiday courses, online courses, tertiary papers etc.

   _____________________________________________
   _____________________________________________
   _____________________________________________
   _____________________________________________

2. How do you prefer to learn new computer skills?
   Please rate each option in the right hand box as it applies to you. Enter a 3,2,1 or 0 rating.
   
   3 = strong preference. 2 = a preference. 1 = no view either way. 0 = would rather not work this way
   
   | a | On my own, with written support material | Rating |
   | b | One to one with a tutor                |        |
   | c | Working regularly with a partner       |        |
   | d | In a small group                       |        |
   | e | In a large group ie. lab situation     |        |
   | f | Other (specify)                        |        |

3. What are your preferences when working in a group?
   Please rate each option in the right hand box as it applies to you. Enter a 3,2,1 or 0 rating.
   
   3 = strong preference. 2 = a preference. 1 = no view either way. 0 = would rather not work this way
   
   | a | to work with others at the same/similar levels of learning or experience re. ICT | Rating |
   | b | To work in groups with a mixture of levels of learning or experience re. ICT |        |
   | c | to work with staff from other schools |        |
   | d | to work with staff from my own school |        |
   | e | to work with members of my own department or syndicate |        |
   | f | to work with members of other departments or syndicate |        |
   | g | to work in separate primary or secondary groups |        |
   | h | to work in mixed primary-secondary groups |        |
   | i | Other (specify) |        |
4. **How able/willing are you to attend some sessions in your own time?**
   
   Please rate each of these options with a 4, 3, 2, 1, or 0 rating.
   
   4 = enthusiastic. 3 = can arrange it. 2 = can but would rather not. 1 = would but can’t arrange it.
   0 = this is beyond reasonable expectation
   
   a. After school sessions
   b. Occasional Saturday mornings  
   c. Several Saturday mornings  
   d. School holiday programme - half day  
   e. School holiday programme - whole day  

   Comment

5. **To what extent are you able to focus on ICT issues in your PD this year?**
   
   Please tick the box alongside ONE of the following descriptors
   
   □ I plan to give a substantial amount of PD time to ICT issues this year
   □ I plan to spend some time developing my skills & knowledge in this area this year
   □ I am uncertain as to whether I will be able to make enough time for significant progress
   □ Developing ICT skills and knowledge is not high on my list of priorities for this year

   Comment

6. **Please list 3 or 4 specific goals or objectives that you would like to achieve as a result of your participation in the ICTPD Schools Cluster Programme.** Please indicate how important those goals are by writing a number 1-3 in the box alongside each objective to indicate priority.

   1 = A major goal. If I do not achieve this I will consider the course a failure.
   2 = An important but secondary goal. I want to achieve this if at all possible.
   3 = A minor goal. Achieving this would be a nice bonus.

   **OBJECTIVES (BE AS SPECIFIC AS POSSIBLE)  PRIORITY (1-3)**

   a.__________________________________________________________________________  □
   b.__________________________________________________________________________  □
   c.__________________________________________________________________________  □
   d.__________________________________________________________________________  □
7. Preferred PD Activities

Facilitators in the ICT Clusters are planning to use a range of types of professional development activities. Please read the following explanation of each type, and indicate your preferred option/s in the grid below. Note that clusters are not necessarily contracted to offer all of these types of PD. This is to get some idea of your current preferences.

Please indicate in the right hand the boxes how much each option appeals to you. Write in each box a number 0-4 representing the extent of appeal of the activity.

<table>
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<tr>
<th></th>
<th>Study Groups: Teachers join a study group of three of more members with common interests and goals. The group meets regularly (eg lunchtimes, after school, evenings) to explore new and better ways of teaching, to share tips, resources, stories and to develop trial projects. The results of these trial form the basis of discussion at subsequent meetings. Project directors would provide ongoing advice and support.</th>
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<td><strong>Rating 0-4</strong></td>
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<td>b</td>
<td>Technology Coaches: Every teacher could become a technology coach - good at something and prepared to help and support others accomplish this. The idea is that everyone can make a contribution to the ongoing learning culture in the school. Responsibility is shared broadly so that each teacher has an area of expertise and everyone is an expert in something</td>
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<tr>
<td>c</td>
<td>Technology Mentors: Teachers who are highly skilled in certain areas are paired for a short time with less skilled teachers in order to pass on their expertise</td>
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<td>d</td>
<td>Tutorials: Short bursts of on-site learning – perhaps an early morning session on inserting graphics into text or organising bookmarks in a browser for those unsure of the methods. The agendas for these short tutorials would be based on teachers' needs</td>
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<tr>
<td>e</td>
<td>Workplace Visits: Visits to ICT intensive workplaces would be organised so that teachers can see the impact of ICT and better understand the implications for learners and classrooms.</td>
</tr>
<tr>
<td>f</td>
<td>Release Time: Time given to discuss and translate new ideas and strategies into practical classroom unit plans with the help of a mentor</td>
</tr>
<tr>
<td>g</td>
<td>Professional Reading: A regular selection of reading material will be available, which describes the latest developments in teaching and learning with ICT and also developments which could have an effect on schools in the future. Those choosing this option will receive hard copies of key readings for personal study.</td>
</tr>
<tr>
<td>h</td>
<td>On-the-spot Support: Facilitators will be available to provide classroom support for those teachers who feel unsure when first trialing the use of ICT with their classes</td>
</tr>
<tr>
<td>i</td>
<td>Listserv Membership: This is an informal discussion group using email where teachers in the cluster can talk over problems and successes, ask questions and offer solutions. Teachers can gain confidence and may wish to join one or more of the many other listserves available for teachers.</td>
</tr>
<tr>
<td>j</td>
<td>Workshops/Seminars: These will offer a varied programme of activities and will be scheduled outside school hours</td>
</tr>
<tr>
<td>k</td>
<td>School Visits: Visits to other schools both within and beyond the cluster to investigate initiatives that are being, or have been implemented</td>
</tr>
<tr>
<td>Other suggestions:</td>
<td></td>
</tr>
</tbody>
</table>
8. We are interested in knowing how you feel about new information technologies and programs. Please indicate with a tick in the appropriate box the extent to which you agree or disagree with each of the following statements.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
<td>Most of the new technologies which have become available to me have been easy to learn with relatively little outside support.</td>
<td>Strongly agree</td>
<td>Agree</td>
<td>Not sure</td>
</tr>
<tr>
<td><strong>b</strong></td>
<td>Most of the technology that has been shown to me would do little to improve my ability to teach or my students' ability to learn and think. <em>Please indicate reasons for your answer.</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>Students should be using ICT on a daily basis as part of their lesson programme. <em>Please indicate reasons for your answer.</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall, I think the growth in use of ICT in our school has been worth the investment in terms of improved administrative efficiency. <em>Please indicate reasons for your answer.</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>These new technologies will substantially change the way I teach and/or relate to my students. <em>Please indicate reasons for your answer.</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>f</strong></td>
<td>Overall, I think the growth of use of ICT in our school has been worth the investment in terms of enhanced student learning. <em>Please indicate reasons for your answer.</em></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. Complete the following sentence as it may apply to you:

The computers in our school make me feel ______________ because ____________

The computers in our school make me feel ______________ because ____________

The computers in our school make me feel ______________ because ____________

10. In my opinion the main benefits to be gained from the use of ICT in schools are:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

11. My greatest concerns about using these new technologies are:

*Please rate each of the following as it applies to you, on a 0-2 scale.*

2 = significant concern  1 = some concern  0= no concern

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Rating (0-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>The ongoing need to upskill myself in using new software packages</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>Access to equipment for my own professional use</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Access to equipment for my students’ use</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>Equipment breakdown/ technical problems</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>The need to change my teaching style</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>Not knowing how to include the use of ICT in my teaching programmes.</td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>Keeping up to date with new developments</td>
<td></td>
</tr>
<tr>
<td>h</td>
<td>Lack of time to cope with it all</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>Lack of support</td>
<td></td>
</tr>
<tr>
<td>j</td>
<td>Too much change, too quickly</td>
<td></td>
</tr>
<tr>
<td>k</td>
<td>Lack of training</td>
<td></td>
</tr>
<tr>
<td>l</td>
<td>My suspicion that they don’t actually improve learning</td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>Unexpected changes to the daily timetable</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>Feeling already too far behind</td>
<td></td>
</tr>
<tr>
<td>o</td>
<td>Lack of keyboard skills</td>
<td></td>
</tr>
<tr>
<td>p</td>
<td>Other concerns. Please specify:</td>
<td></td>
</tr>
</tbody>
</table>
PART 3. CURRENT ICT SKILLS

Please note that this is a baseline survey to ascertain usage of ICT among cluster teachers on a national basis at the beginning of the 28 Clusters Programme. Parts of it will be repeated at the end of the programme to detect national trends in terms of what areas teachers choose to focus on in their PD, and local trends in terms of the programme’s success in meeting your own specific objectives. You are not necessarily expected to have much or any experience in the particular activities outlined below, and certainly not all of them, either now or at the end of the PD.

12. Please indicate your current level of achievement in each of the following ICT competencies. Tick the boxes which best reflect your current level of knowledge/skill attainment. (Be honest, but be kind to yourself! We will be asking the same questions again at the end of the programme. You may tick more than one box for each ICT/skill.)

IF YOU CURRENTLY DO NOT USE A COMPUTER AT ALL, PLEASE TICK THIS BOX □ & PROCEED TO PART 5.

<table>
<thead>
<tr>
<th><strong>a. BASIC COMPUTER OPERATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ I use the computer to run one or two software programs that are available.</td>
</tr>
<tr>
<td>□ I run two programs simultaneously. I have several windows open at the same time and can transfer information between documents.</td>
</tr>
<tr>
<td>□ I troubleshoot successfully when basic problems with my computer or printer occur. I learn new programs on my own and can install software from a CD-ROM.</td>
</tr>
<tr>
<td>□ I can install most types of software. I can download updates and executable files from the Internet. I can unzip compressed program files. I can update hardware drivers.</td>
</tr>
<tr>
<td>□ I can handle the basic administration of an NT, Novell or Macintosh network.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>b. FILE MANAGEMENT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ I do not save any documents I create on the computer.</td>
</tr>
<tr>
<td>□ I select, open and save documents.</td>
</tr>
<tr>
<td>□ I save work in a variety of locations eg. local hard drive, a specified network location, floppy disk. I create my own folders to keep my files organised.</td>
</tr>
<tr>
<td>□ I move files between folders and drives. I understand about directory paths and the use of folders. I can use the find feature to locate files on the hard drive</td>
</tr>
</tbody>
</table>
c. WORD PROCESSING

- I do not use a word processing program.
- I occasionally use a word processing program for simple documents. I generally find it easier to hand write most written work I do.
- I use a word processor for much of my written professional work *i.e.* memos, tests, activity sheets and home communication. I edit, spell check and change the format of a document.
- I use a word processor for all my professional written work. I use editing and formatting tools with confidence *i.e.* tabs, headers/footers, auto-insertion, tables, footnotes, auto-numbering, bullets, hanging indents etc.

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d. SPREADSHEET USE

- I do not use a spreadsheet.
- I understand the use of a spreadsheet and can navigate within one. I create simple spreadsheets and charts/graphs.
- I use spreadsheets for a variety of record-keeping tasks. I use labels, formulas, cell references and formatting tools in my spreadsheets. I choose charts which best represent my data.
- I am confident in the creation of complex spreadsheets with multiple formulae and circular references.

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e. DATABASE USE

- I do not use a database.
- I understand the use of a database. I can locate information from a pre-made database such as a library catalogue or school journal database.
- I create my own databases. I define the fields and choose a layout to organise information I have gathered. I can use my database to answer questions about my information.
- I can create complex databases with extensive search and analysis facilities.

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f. GRAPHICS USE

- I do not use graphics in my word processing or presentations.
- I open/create and place simple pictures into documents using a drawing program and/or clipart and/or a scanner.
- I can create and enhance graphic images using simple editing tools *e.g.* resizing, recolouring, cropping, rotating.
- I capture and edit images from a wide variety of sources *e.g.* scanner, digital camera, Internet.
- I use sophisticated image handling software with confidence *e.g.* Corel, Photoshop.
**g. INTERNET USE (WWW)**

- [ ] I do not use the World Wide Web.
- [ ] I can access Internet websites to find information. I follow links from these sites to various other resources.
- [ ] I can successfully enter my own URLs and make profitable use of keywords in Web search engines to explore educational resources.
- [ ] I understand the significance of URL name structures and use ‘and/or’ queries and other advanced features of search engines.
- [ ] I can create web pages using either HTML or an editing program such as Front Page.

**h. TELECOMMUNICATIONS USE (E-MAIL)**

- [ ] I do not have an e-mail account.
- [ ] I have an e-mail account but I rarely use it.
- [ ] I send and receive e-mail messages. I check my e-mail regularly and keep the size of my mail folders manageable.
- [ ] I am confident in the use of e-mail. I use attachments, store addresses and nicknames, have a signature, forward mail and use listservs.

**i. ETHICAL USE**

- [ ] I am not aware of any ethical issues surrounding computer use.
- [ ] I know that some copyright restrictions apply to computer software.
- [ ] I am very clear about copyright restrictions as they apply to the use of software on both personal and school computers. I understand the function and significance of approved use policies and contracts.

**j. VIDEOTAPE PRODUCTION**

- [ ] I do not use a video camera.
- [ ] I create original video tapes for home and school projects.
- [ ] I create original video tapes using editing equipment.

**k. PRESENTATION SKILLS/MULTIMEDIA**

- [ ] I do not use a computer presentation program.
- [ ] I am able to create a simple linear slideshow in presentation applications such as Powerpoint, Claris Works, KidPix or Hyperstudio, incorporating text and graphics.
- [ ] I am able to create presentations which incorporate text and graphics, but also various multimedia elements such as sound, video clips and simple animations.
- [ ] I can create branching presentations incorporating methods of making presentations interactive such as buttons, timed links, or basic scripting etc.
PART 4. CURRENT USE OF ICT FOR PLANNING, PREPARATION, ADMINISTRATION, ETC

Please note that this is a baseline survey to ascertain usage of ICT among cluster teachers on a national basis AT THE BEGINNING OF THE 28 CLUSTERS PROGRAMME. Parts of it will be repeated at the end of the programme to detect national trends in terms of what areas teachers choose to focus on in their PD, and local trends in terms of the programme's success in meeting your own specific objectives. You and your students are not necessarily expected to have experience in any particular activities or groups of outlined below, and certainly not all of them, either now or at the end of the PD.

13. Please indicate the frequency with which you use ICT as part of your planning, preparation and presentation of classroom materials.

Enter a rating 1,2,3,4 or 5 in the box on the right.
5 = Always  4 = Often  3 = Sometimes  2 = Rarely  1 = Never

<table>
<thead>
<tr>
<th></th>
<th>I use Word Processors or a Desktop Publishing package to produce task sheets, tests, handouts etc.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>I access the internet for finding and collecting lesson ideas.</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>I access the internet for assessment items</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>I access the internet to get official documents from the Ministry, NZQA etc.</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>I get lesson content materials from electronic encyclopaedias on CD ROM.</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>I produce lesson materials using digital cameras, video editing, digitising, scanning etc.</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>I access the internet for professional readings, subject association newsletters etc.</td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>Other use of ICT for planning, preparation etc. Specify.</td>
<td></td>
</tr>
</tbody>
</table>

14. How frequently do you currently use ICT for the following administration purposes?

Enter a rating 1,2,3,4 or 5 in the box on the right.
5 = Always  4 = Often  3 = Sometimes  2 = Rarely  1 = Never

<table>
<thead>
<tr>
<th></th>
<th>Recording or calculating assessments, marks and grades.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Recording students' running records.</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>Accessing staff notices.</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Email correspondence with colleagues on administrative matters</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>Writing Reports for parents.</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>Recording absences.</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>Other (Please specify)</td>
<td></td>
</tr>
<tr>
<td>g</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART 5. CURRENT USE OF ICT WITH STUDENTS

15. Please tick the box that best describes the overall extent to which you have integrated ICT into your classroom programme for students prior to the ICTPD Cluster Programme.

- [ ] I have not yet blended the use of any computer-based technologies into my student learning activities.
- [ ] I have once or twice included an ICT based learning activity into units of work that I plan.
- [ ] I include an ICT learning activity into several of the units of work that I plan.
- [ ] Most units of work that I teach contain learning activities which involve student use of ICT tools.
- [ ] All or almost all units of work that I teach contain learning activities which involve some student use of ICT tools.

16. In which subject(s) (Secondary) or Learning Areas (Primary) have you used ICTs with students the most?

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

17. Describe any ONE or TWO activities you have tried involving student use of the ICT, and indicate how successful you consider that activity was in fostering student learning.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
17. Please indicate the average frequency (using the 1-5 scale below) with which some or all students have done any of the following during your lessons over the last year.

NB: Only put an entry in frequency section if students HAVE used ICT for such purposes. If they have not, then leave that activity blank.

**Key to frequency entries:**

- **5** = Daily or almost daily  
- **4** = Avg. 1-2 times a week  
- **3** = Avg. 1-2 times a month  
- **2** = Avg 1-2 times a Term  
- **1** = 1-2 times over the year  

| a | Composing, editing and presenting creative work using Word Processors &/or graphics packages |
| b | Composing, editing and presenting ‘project’ or content-based work using Word Processors &/or graphics packages |
| c | Accessing or searching for information on the internet |
| d | E-mailing other students or experts about a current topic or problem |
| e | Presenting their learning in the form of computerised slide shows (mainly or exclusively text & pictures) |
| f | Editing and composing multimedia presentations or videos using computer software (ie; including sound and moving images) |
| g | Data logging using external monitoring devices connected to a computer |
| h | Working through content or concept simulations on computer |
| i | Practising skills or reinforcing knowledge using content specific Drill and Practice programmes (eg: Maths Games, Reading Games etc) |
| j | Learning from a computer based tutoring programme |
| k | Writing computer programmes or scripting interactive presentations |
| l | Accessing or searching for information on electronic encyclopaedias (eg: on CD ROM) |
| m | Designing and/or creating web-pages to present learning |
| n | Recording, calculating and analysing data using Databases or Spreadsheets. |
| o | Faxing or phoning other students or experts about a current topic or problem |
| p | Using the electronic catalogue to find appropriate reading in the library |
| q | Other (specify) |
| r | Other (specify) |
| s | Other (specify) |
| t | Other (specify) |

Thank you for completing this survey. We appreciate the attention you have given it. We will be revisiting the questions at the end of the programme with a view to identifying changes in usage etc over the period of the programme and assessing the impact of the programme in terms of meeting your needs and expectations.

This version of the baseline questionnaire has been developed by Vince Ham, Christchurch College of Education. It is based heavily on the Needs Analysis questionnaire developed by Liz Probert and Angela Longney for the Pakuranga ICT Cluster in the 23 ICT Cluster Schools Project 1999-2001.

If you have any queries or comments regarding the questionnaire, please contact: Dr. Vince Ham, Christchurch College of Education. Box 31 065 Christchurch. Email: vince.ham@ece.ac.nz