

Where to After the Cluster: Sustaining ICT PD After the Cluster Money Finishes

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Abstract

About half of all New Zealand schools have been involved in an ICT professional development cluster since 1999. These clusters have supported schools to integrate ICT in to the schools curriculum using a wide variety of different models of professional development. Each cluster lasts for three years and then the funding ceases. This research was based in a school that had finished a cluster in 2004 using one model of professional development, the use of lead teachers. The school, a metropolitan mid-decil secondary school, invested extra professional development into a group of teachers who were leading users and who have volunteered to take responsibility for a curriculum area in the school. The research focused on how the lead teacher model offered a sustainable model of professional development once the Ministry of Education funding had stopped.

This research was a participant case study of the lead teacher's model of professional development and employed both quantitative and qualitative research methods. Initially the school's teachers were surveyed for their computer literacy and the school's use of its computer suites was tracked. For the qualitative data the Deputy Principal responsible for professional development was interviewed along with the lead teachers. The lead teacher's meetings were observed as was some staff development carried out by the lead teachers.

Firstly this research found that most teachers were competent users of ICT for their personal and professional uses but only about half were confident about using ICTs with their students or how to integrate ICT into their curriculum area. This was especially pronounced in the senior school where almost no uses of ICTs were found, apart from a small number of specialist subject uses.

Secondly this research found a number of criteria for the lead teacher model to be sustainable. The lead teacher group needed a clear identity in the school with a visible leader, to be integrated into the ordinary administration and have a clear purpose. Finally the group needs to be regularly reviewed for all of the above.

It is important that more research is carried out into the sustainability of other models of professional development used in the clusters.

Chapter 1 - Introduction

1.1 Background to the Research

In 2002 my school entered into a three year Ministry of Education contract to fund Information Communication Technology (ICT) Professional Development (PD) with a cluster of three other local secondary schools. This contract, "the cluster", provided funds for a centrally co-ordinated facilitator who provided professional development to the schools. During the three years of the cluster I was involved as link between the cluster facilitator and the school. With support of the facilitator I helped to establish a group of Lead Teachers, as described by Halliday (2000), for the ICT PD programme. The Lead Teacher model of professional development was used during the three year period of the cluster funding. In this model the lead teachers were drawn from a cross-section of the school on a volunteer basis and given extra professional development. The Lead Teachers then worked with a department or group within the school to help in the curriculum integration of ICT. The funding for this ICT PD project stopped at the end of 2004.

The Lead Teacher model of professional development facilitated the integration of the ICTs into the school's curriculum. The use of the school's ICT resources has increased considerably and many teachers have become enthusiastic ICT users in their curriculum areas as evidenced by the increased demand on the school's ICT resources. The model of Lead Teachers leading the professional development in ICT appeared to be successful during the time of the cluster. More importantly the Lead Teacher model seemed to offer a sustainable model of ICT professional development in terms of the school's resources after the ministry funding from the cluster finished.

This research project was based in a mid-decile suburban high school of about nine hundred students. The following factors have facilitated this project. Firstly this school has a collaborative management structure with a Senior Management Team who are open to trialling new ideas and are ready to delegate where appropriate. Secondly the Lead Teacher's group was already established and has been a stable group for the three years of the cluster funding. These two factors make the school an ideal environment to test a model such as the Lead Teacher model and arrive at some generalisations about the successes and sustainability of the model.

There was a large component external to the school structures, consisting of an external cluster facilitator and the support of UNITEC in Schools. This external component to the school's structures was funded by the Ministry of Education (MOE) and that funding ended in December 2004. Fullan (1993, p89) describes how this external funding can be helpful in the initial establishment of new initiatives but further warns that the larger this external support, the less likely that the project continues after the funding is removed. The effect of this external funding is further expanded in the literature review. This issue, how to continue with ICT PD in a sustainable manner after the ministry funding had ceased, led to this research.

1.2 The Research

This research had two main parts. These were:

Firstly the Lead Teacher model of ICT professional development.

This research describes and examines the practices of the Lead Teachers as they help classroom teachers integrate ICT into their usual classroom teaching practices. The aim of this part of the research was to examine the impact of the model of Lead Teachers in delivering ICT professional development.

Secondly the research focuses on the issue of the sustainability of the ICT professional development in the school. The issues of sustainability are investigated and the process of sustaining the continued ICT professional development is discussed. The research investigates how the Lead Teacher model of ICT PD can be sustained in the year after the cluster funding has ended. It is intended that this research will point out a sustainable model for continued ICT professional development by examining the details of the model as used in one secondary school.

From the above details the key research questions emerged.

What roles and practices did the LT have within the cluster model?

What roles and practices did the LT have in the year after the cluster funding ended?

What effect has the LT model had in encouraging classroom use of ICT for teaching and learning?

What were the factors that helped or hindered the sustainability of effective ICT professional development in the year after cluster funding ended?

Chapter 2 - Literature Review

2.1 Background to ICT Professional Development (ICT PD)

It is necessary to describe a brief history of the ICT professional development in New Zealand schools to establish the back ground to this research. This history illustrates the changing approaches to ICT professional development as ICTs become part of the school environment.

In the 1980's many schools had spent large amounts of money on the new computer based ICTs. This investment had been driven by the public perception that that literacy in ICTs was necessary in the coming age of information. Levin and Riffel (1997) also suggest that this drive to equip schools with ICTs was often explained as "preparing students for tomorrow's worlds". (p111) and that it was considered necessary if students were to be employable. However as Cuban (1999) pointed out, many of these computers were lying under utilised in schools as teachers had little skill in their use or application to student learning.

During the 1990's Ham (2005) recalled that the Ministry of Education started a programme of teacher professional development in ICT as a response to the 1990 Report of the Consultative Committee on Information Technology in the School Curriculum, known as the Sallis Report. The programmes were contracted to consultants usually based in colleges of education or universities. The model of delivery was usually "expert consultant" (p53) or "advisory" (p53) and the content was centrally dictated for groups of teachers with a defined time of between six months and one year. At the same time the Ministry of Education continued to fund advisory services around the country to employ IT advisors, whose services were available at no cost to the schools. There was also a growth in teacher enrolments in courses in educational computing leading to diplomas and degrees from universities and colleges of education. Ham (2005) describes this varied approach a "shotgun model" (p53) providing a variety of modes of professional development.

2.2 Establishing the Cluster

Both Selby (1999) and Ham (2005) argue that by the late 1990's the Ministry of Education was responding to the business based lobby groups and looking for more direct school ownership of their teacher development programmes. Initially this came in 1996 with schools able to bid for contestable professional development funding. Then the Ministry released its new national ICT strategy, *Interactive Education: An Information and Communication Technologies Strategy for Schools* (Ministry of Education, 1998). Ham comments that for the first time in New Zealand education there was a national policy statement that gave a general vision or mission for ICT. Selby describes how this document had twin aims of increasing schools' access to ICTs through a series of structural initiatives and providing new professional development opportunities for both principals and teachers.

The 1998 budget, the government announced funding to put in place the professional development vision described in the *Interactive Education: An Information and Communication Technologies Strategy for Schools* (1998) by

creating a programme of devolved and contestable funding for professional development. This initiative became known as the “ICT PD Clusters” programme, which, in 1999 started with twenty three clusters. Ham listed four ways in which the cluster programme differed from the professional development in ICT of the previous decade;

- The funding was direct to the schools which would act as both the “producers and consumers” of their own professional development programmes rather than from the traditional providers, universities, colleges of education and advisory services.
- The programmes were only available to groups of schools “clustered” together for the benefit of all the teachers in the participating schools.
- The programmes were to last for three years, previously the custom had been for one year programmes. This was an important difference as many writers (Fullan (1991), Moersh (2002), Hargreaves (2003) and McKenzie (1998)) had pointed out that educational change of practice could not be hurried but took time to implement.
- There was no mandated delivery for the professional development, each cluster was to develop and implement their own professional development programme. Previously most professional development initiatives had been a variation on a predetermined, Ministry approved model.

The cluster model was well funded, \$100,000 per annum was supplied to the central school. The funding was only to be used for teacher professional development and could not be used to defray hardware, software or any infrastructural costs. In 1999 the first twenty three clusters began their professional development programmes that they had designed to meet their needs.

As each cluster was to design its own model for professional development it was now necessary to develop an understanding of what was meant by professional development and explain the model of professional development used in this study.

2.3.1 Professional Development

A number of writers such as Bolam (2002), McKenzie (1998) Terehoff (2002), and Salpeter (2003) identify professional development as the basic building block in a school for continued improvement. Pratt, Lai and Munro (2001) agree, adding that all teachers should during their careers, undertake some form of professional development. The New Zealand document *Interactive Education: An Information and Communication Technologies Strategy for Schools* (Ministry of Education, 1998) also recognises that the professional development is a fundamental requirement for change to occur and makes professional development one of its main focuses. With these writers suggesting that the role of professional development is so central to school improvement it is necessary to describe what is meant by professional development.

Fullan and Mascal (2000) define professional development as “the sum total of learning through formal and informal experiences”. This definition is so

broad it contributes little to understanding what professional development is. This confusion is further fuelled by Harrison (2003) who argues that there are no fixed definitions of professional development. However a number of descriptions, rather than definitions of professional development occur in the literature, these descriptions depend on the context. Bolam (2002) offers a working description that includes all the parts usually considered professional development stating that professional development is;

- An ongoing process of education, training, learning and support activities,
- Taking place in either external or work-based settings,
- Proactively engaged in by qualified, professional teachers, headteachers and other school leaders,
- Aimed at primarily at promoting learning and development of their professional knowledge, skills and values,
- To help them to decide on and implement value changes in their teaching and leadership behaviour,
- So that they can educate their students more effectively,
- Thus achieving an agreed balance between individual, school and national needs.

Although Bolam (2002) acknowledges that this definition has some problems, it does offer a useful list of the parts usually considered as professional development.

The New Zealand Ministry of Education *Curriculum Update He Korero Marautanga* states that to succeed professional development needs to be “based on a good understanding of what makes professional development work and take account of how teachers learn” Having a working list of what professional development is, it is necessary to look at what has been acknowledged as successful professional development practice and to look at the requirements for ICT professional development.

2.3.2 Effective Professional Development

When designing a professional development program in ICT McKenzie (1998) points out that it is necessary to clarify the purpose of this professional development about to be undertaken. He offered ten lessons for what he called “professional development that works” that encourages teachers to accept ICT as one of their tools for teaching and learning. He advocates spending on human infrastructure as does Fullan and Hargreaves (2002) if there is going to be any lasting change or improvement produced in a school.

McKenzie (1998) describes a process for successful professional development as a series of ten lessons. He indicates that “there are no free lunches”, emphasising that time and money is necessary to develop teacher’s ICT skills so that they can integrate ICT into the learning programmes of the school. McKenzie’s ten lessons are:

Lesson One – Spend 10-25% of the Technology Budget on staff learning to provide 15-16 hours of professional development for each staff member.

Lesson Two - Clarify Purpose, problem solve and make decisions so that the professional development is worth while.
Lesson Three - Adult Learning, use an approach appropriate for adults to learn by
Lesson Four - Designate Student Learning as the Cause.
Lesson Five – Address the Emotional Dimension, make the learning safe to support the teachers in their learning of ICT skills.
Lesson Six – Create Teams and a Culture of “Just in Time support”, to create a culture of learning and mutual support among the staff.
Lesson Seven – Use Surveys and Assessment Guide Planning, so that the professional development meets the needs of the teachers.
Lesson Eight – Invention and Lesson Development, when staff “invent” then powerful learning occurs.
Lesson Nine – Hook the Passions of ALL Teachers to draw the staff in and seek their engagement with the professional development.
Lesson Ten – Persist, The journey will take time so it is important to persist with the programme of professional development.

McKenzie’s (1998) ten lessons provide a vision of professional development that uses the ICTs in a new manner. The focus of the professional development is always on the students learning but delivering the professional development in a manner that the teachers are comfortable with.

Moersch (2002) warns of top down professional development prescribed for schools when there is pressure on schools to implement ICT programmes. When the professional development is prescribed in this top down manner then there is the danger that the professional development becomes one off training for specific applications. The ICT integration becomes “the swapping of ICT with the existing technologies, blackboard, OHP etc” (p35). Moersch argues that the professional development should be an intervention designed to reduce the emphasis on the applications of ICT and focus on instructional design and complex thinking skills. Moersch adds that ICT “can serve as a catalyst for changing classroom pedagogy from a teacher centred to a learner centred environment” (p44).

Both McKenzie (1998) and Moersh (2002) have argued that effective ICT professional development is a process that focuses on pedagogy. Ham (2005) describes this pedagogical approach as using ICTs as a “Trojan Horse” for introducing student centred learning.

When the study school was part of the ICT PD cluster it adapted a professional development delivery model using lead teachers. Ham et al (2003) called this model a “trickle down model” (p12). The lead teachers were a team within the structure of the school. The following section looks at the literature that surrounds the formation and roles of teams and the factors necessary for a team to perform effectively.

2.4.1 Teams

For the lead teacher model of professional development to work it is necessary to have some understanding of teams, the lead teachers are a team within the school. A number of educational writers, Crow & Pounder (2002) and, Fullan (2002), while discussing teams refer to the Hackman and Oldham's (1980) model of effective teams. Crow & Pounder describe the Hackman and Oldham model as having three main parts (p218).

...effective work groups are these (a) whose output "meets or exceeds organisational standards of quantity and quality", (b) whose "members' needs are more satisfied than frustrated" and (c) "whose social process maintains or enhances the capability of members to work together on subsequent tasks"- that is , the group that doesn't "burn itself up".

Hackman in a more recent interview with Powell (2004) simplified his model into three key conditions that would increase the likelihood of a team being successful. He firstly suggested that the team needs to be a "real team", a clearly bounded or defined group with a collective responsibility for an outcome. Secondly Hackman suggests that the team needs to have "norms of conduct" that are understood by all the team members. These "norms of conduct" can be established by either the team leader or the person who created the team. Finally that the collective team performance are recognised rather than individual successes. Hackman argues that if these key conditions are in place then the conditions for a successful team that can act as a "truly self managed performing unit". He continues and adds the optimum team size is six members and that this needs to be taken into account when designing a team.

Thus the Hackman's model of a team can be used to describe the team of lead teachers used to deliver ICT professional development. They are a team with defined task and a role to play in the school. The role of the lead teachers and their delivery of professional development is now described in detail.

2.4.2 Lead Teachers

Halliday (2001) cites a number of other writers O'Donnel, Hargreaves, and Ryba & Anderson who identify similar characteristics for successful programmes of professional development using consultants or mentors to deliver the professional development to teachers. She continues

"The challenge is to design an ICT professional development programme for a large secondary school, taking into account the needs of different curriculum areas and the variety of skill levels across a large number of teachers." (p3).

Ham et al (2003) describes using lead teachers as a "trickle down" (p12) model of professional development where an investment of professional development is made in a few key teachers, the lead teachers. These lead teachers then work, both formally and informally, to help provide professional development for other members of the schools staff. Ogden & Harvey (2004) describe using the lead teacher model in their cluster where

the lead teachers would “work with classroom teachers on ICT related professional development” (p3). The focus of the lead teachers was “to make ICT an integral part of teaching and learning in the schools” (p3) of the cluster they were working with. The lead teachers were described as “coaches” (p4) who had a support role with the schools teachers. Once the lead teachers had developed the teachers they were working with to level of confidence they could disengage to work with different teachers.

Halliday (2001) offers a similar model for the whole school ICT professional development for the environment of a large secondary school that maintains a curriculum focus, identifies the different needs of teachers and is practical. In Halliday’s model there are two essential parts. Firstly, the professional development happens in workshops set in a curriculum context. The workshops combine pedagogical knowledge with technical skills to demonstrate how ICT can be used in that workshop’s curriculum area. The second part of Halliday’s model is the use of “lead teachers”, these are teachers who help lead the professional development with the long term aim of taking over the professional development.

Halliday (2001) argues that the lead teachers should be a self selected group of ten or less that cover a range of curriculum areas. The lead teachers attend extra training where the pedagogical aspects of ICT assisted learning are addressed and their own ICT related skills are enhanced. Halliday adds that the lead teachers take responsibility for a group usually based on a curriculum area but not necessarily so. Initially the main task of the lead teachers is to support and assist other teachers. Halliday notes that it is important that all the schools teachers are included in one of these teams. She suggests that that once this lead teacher model is established then the professional development facilitator should be able to withdraw and the lead teachers maintain the professional development.

While Ogden & Harvey (2004) describe a similar model to Halliday (2001), using lead teachers for professional development they differ in the selection of the lead teachers. Ogden & Harvey suggest that the lead teachers be selected by the schools management as teachers who are good users of ICT and have the confidence of the staff of their school. This point of difference is picked up in the chapter that describes the findings of this study.

This study is about using lead teachers to deliver the professional development in a manner that is sustainable. Both Halliday (2001) and Ogden & Harvey (2004) suggest that an advantage of using lead teachers is that the sustaining of the professional development is easier as the structures for professional development are already in place. The following section defines sustainability and the factors that the literature suggests affect sustainability.

2.5 Sustainability

One of the key research questions in this thesis is what are the factors that helped or hindered the sustaining of effective ICTPD in the year after the cluster? To explore how ICT PD was sustained after the cluster it is necessary to define what is meant by sustainability. The term sustainability has developed from the earlier use of the term continuation, where continuation was used to imply that the implemented change continues. Fullan (1993) calls continuation the third phase in a planned change process.

Fullan (1993) suggests that one of the biggest hurdles in change of practice is the decision to implement change. He then considers the continuation of a change that has been implemented and suggests the decision to continue with any project is a similar process to the original implementation decisions. This means that the decision to discontinue maybe taken. Berman and McLaughlin (1977) are cited by Fullan (1993) offering a cautionary note that the meaning of continuation can be misleading. Firstly if many teachers have already implemented or assimilated that change into their practice but the school had decided to discontinue the project then the change has continued. Conversely the school may chose to continue with a project but the teachers not implement that change. It appears that the change has continued but the reality is different as teachers have not changed their practice.

Fullan (1991) identifies external funding in as an important factor that can adversely affect continuity. External funding is often useful for the initial implementation of change but when the funding stops the school needs to incorporate the cost into its own budget. Fullan (1991, p89) further adds “the larger the external resource support the less likely the effort will be continued after the external funds terminate”, because of the difficulty in incorporating the costs into the regular budget. For this thesis the impact of funding on continuity of ICT PD would appear to be large, the original project, the “cluster”, was well funded and included the employment of a facilitator to implement the changes.

A number of writers, Fullan (1991), Huberman and Miles (1984) and Hargreaves and Fink (2003) all suggest that the continuation of any innovation or change project depends on whether the change gets “embedded or built into the structure” of the school. These writers call this “institutionalisation”, the change has become part of the structure of the school through policy, budget, timetable, curriculum statements and personnel assignment. Hargreaves and Fink (2003) further describe institutionalisation “when new practices are integrated effortlessly into teachers’ repertoires and can affect many teachers, not just a few” (p695). In this way changes that have been institutionalised over time to become part of the “grammar of schooling”.

”In the face of this traditional grammar of schooling, the vast majority of educational change that deepens learning and allows everyone to benefit from it neither spreads or lasts. The long standing problem of institutionalisation is now coming to be understood as the even more complex problem of sustainability” (p16)

Hargreaves and Fink (2003) have introduced the concept of sustainability. They argue that sustainability is more than persistence over time and that equating sustainability with maintainability or continuity simply trivialises sustainability.

“Sustainability does not simply mean whether something can last. It addresses how particular initiatives can be developed without compromising the development of others in the surrounding environment, now and in the future” (p694).

Hargreaves and Fink (2003) expand on this concept of sustainability and suggest that this definition implies three things. Firstly that “sustainable improvement is enduring”, the changes last. It requires committed relationships and is change “for keeps and for good”. Sustainable improvement therefore contributes to the “growth and good” of everyone. Hargreaves and Fink argue that these ideas mean that sustainable improvement does not promote model or magnet schools and the change is for everyone, not the benefit of a few especially to the detriment of the rest.

Secondly that sustainability “requires that the improvement draws on resources and support at a rate that can match the rate of change”. It is important that the improvement not draw on the resources needed by others and that the money is not spent on resources or assets which are unable to be supported in the long term. They continue to suggest that sustainable improvement requires investing in long term capacity such as development of teacher’s skills which will last long after the project has finished.

Finally and third Hargreaves and Fink (2003) suggest that sustainable improvement stimulates continuing improvement on a broad front. It is change that can allow people to “adapt and prosper” in an increasingly diverse and complex environment. Hargreaves and Fink summarise.

In education it matters that what is sustained is what, in terms of teaching and learning, is itself sustaining. To sustain is to keep alive; sustenance is nourishment. And in education, good teaching and learning that matter and last for life are inherently sustaining processes. Supporting and maintaining those aspects of teaching and learning that are deep and that foster sophisticated understanding and lifelong learning define the core of sustainable education (p694-695).

2.6 Summary

This study was about how the lead teachers could sustain effective professional development. The key writers and what they have to say in the area of professional development, building teams and the sustainability of changes have been introduced and their ideas explained in relationship to this study.

Chapter 3 – Methodology

The purpose of this section is firstly to describe and justify the method used in this study, that being a case study of a narrative type using a participant observer (Cohen, 2000) and Yin, 2003). Secondly the methods of data collection are described and the nature of that data, qualitative and quantitative explained. Finally the processes used to interpret the data are explained.

3.1 Research Questions

What roles and practices did the Lead Teachers have within the cluster model?

What roles and practices did the Lead Teachers have in the year after the cluster?

What are the factors that helped or hindered the sustaining of effective ICT professional in the year after the cluster?

The research questions used to clarify and to keep this research focused.

3.2 Delimitations of Scope and Key Assumptions

However there are two key limiting factors that are outside of the control of the study, they are;

Firstly the school is in a dramatic growth phase, growing by approximately one hundred and fifty students a year. This has meant that the school has employed twelve new teachers in 2004 and fourteen new teachers on 2005. In the Finding,s chapter the thesis looks at some the effects the growth of the school has on the professional development requirements of its staff and the structure and membership of the Lead Teacher group.

Secondly the school has supplied all teaching staff with a lap top computer, which may affect the staff professional development requirements. However as this thesis considers the delivery of professional development the effect of the laptops has not been explored even though it may contribute to staff computer skills.

3.3 Case Study

Yin (2003) suggests that a case study can be defined in parts. Firstly that a case study is an empirical inquiry used when the researcher wants to cover contextual conditions, “believing that they might be highly pertinent to the phenomenon of the study” (p13). Yin explains that the boundary between the context and phenomenon may not be clearly evident and this is different from an experiment where the context is controlled to allow the study of the phenomenon. Because the context and phenomena “are not always distinguishable in real-life situations” (p13) this leads Yin (2003) to the second part of his definition. He argues that there are many more variables of interest than the data points, which results in relying on multiple sources of data. Cohen (2000) further emphasises the multiple data sources noting that the data includes both the interpretive and subjective dimensions. Yin (2003) argues that the data needs “to converge in a triangulating fashion” (p14). Finally he suggests that a case study “benefits from the prior development of a theoretical proposition to guide the data collection and analysis” (p14). Yin concludes that a case study offers a research method that covers all aspects of the research, design, data collection and data analysis.

Thus using Creswell's (2002) and Yin's (2003) description of a case study the school in which this research is conducted is the context and the lead teachers' delivery of the professional development is the phenomenon to be studied. Finally Creswell (2002, p 485) offers a description of a case study is that an "in-depth exploration of a bounded system", where he suggests that bounded means some form of separation of the case. For this study the bounded system in the school, a separate context from the general environment for the research to take place in.

Cohen (2000 p181) quotes a Nisbet and Watt remark that "the whole is more the sum of its parts". This suggests that a research approach that describes the parts but tries to link and understand the context of those descriptions is required. Thus, as this study was to describe the role and actions of the lead teachers and make some subjective judgements about how effectively they have delivered ICTPD in the study school, a case study seems appropriate.

Having established that a case study was an appropriate method for this research it is necessary to detail the type of case study that was used. Yin uses different types of outcome to identify three groups of case study. Firstly he defines "exploratory" used as a pilot before further research or to identify hypothesis, secondly he applies the term "descriptive" for a case study which uses a narrative approach to tell its story. Finally he identifies "explanatory" to test hypotheses or to judge situations. Because this research as about the practice of a group called the "lead teachers" and their practices in the school to assist the professional development of ICT in among the staff it was decided to use the descriptive approach to a case study. By using a descriptive case study the progress of the lead teacher group can be tracked as a narrative as the year unfolds.

Cohen (2000) explains that a narrative method is often used in biographical research where it emphasises the interplay between interviewer and interviewee actively constructing a life history. Yin adds that a narrative allows the researcher "to compose open ended answers to the questions" (p103) that may allude to the connection of "specific pieces of evidence and various issues in the case study" (p 104). Finally Czarniawska (2004) points out that a narrative is a valid "mode of knowing" (p 6) in a post modern society where a narrative leaves open the nature of connections, unlike the situation in a positivist or scientific paradigm. In this case - the story of the group of lead teachers and how they deliver ICT professional development, the narrative style offers the chance to explore the operation of the group and the actions and thoughts of individual members of the group as the research unfolds over time (Yin, 2003 and Cohen, 2000).

It is necessary to explore the role of the participant observer in a case study. In any case study the "purpose of the observation is to probe deeply and analyse intensively the multifarious phenomena" (Cohen, 2000, p185) that make up the case being studied. Both Yin (2003) and Cohen (2000) comment that participant observation allows for a greater depth of understanding of the motivations and actions of the group being studied. Yin (2003) adds that

participant observers provide unique and unusual opportunities in collecting data. Participants may have better access to data and “be able to perceive reality from the view point of someone inside the case study rather than external to it” (p94). Yin (2003) continues adding that participant observers may have the advantage of being able to manipulate minor events, such as convening a meeting. While this is not a precise manipulation such as an experiment it can produce a greater variety in the data collected. Thus a participant observer can give a fine grained detail to the case.

However when using a participant observer to collect data it is necessary to be aware of the limitations of this model described by Yin (2003) and act to minimise them. Firstly the participant observer may at times need to take a position or advocacy role at times. Secondly Yin (2003) points out that the participant observer may become a supporter off the group being studied and finally the participant role may take too much attention and not take insufficient notes or observations. These factors will be addressed in the Findings chapter.

Finally in summary this research is a case study of a narrative type using a participant-observer to compile the data for the research.

3.4.0 Data

Yin (2003) advises that the strength of case studies is the ability to use many different sources of evidence. The advantage of the use of multiple sources of evidence “ is the development of converging lines of inquiry, the process of triangulation” (p98). Davidson & Tolich (1999) describe triangulation as the use of different methods, sources and methods of analysis to generate a variety of evidence that leads to a single consistent interpretation.

There are two types of data gathered for this study, qualitative and quantitative data. This section will explain the different types of data, describe the processes used to collect data and the methods used to analyse that data.

3.4.1 Quantitative Data

In short data that consists of quantities, or contains measured values, the variables in the research have been translated into numbers (Davidson & Tolich, 1999).

In this study there are two points that have involved the collection of quantitative data, firstly a survey of the school’s staff to explore their computer literacy or skill levels. Secondly the use of the schools computer suites was recorded from the room booking records to discover who was using the suites and what they were doing. These two surveys were carried out to help describe the background that the research took place in. How both of these surveys were constructed and analysed is explained fully in later sections of this chapter.

Quantitative data can be thought of as “hard” (Davidson & Tolich, 1999, p19) and can provide unassailable truths as it explores relationships between the variables and significance of those relationships. Cohen places quantitative data in the positivism paradigm. Neuman (1997) defines the positivist paradigm as:

Positivism sees social science as an organised method for combining deductive logic with precise empirical observations of individual behaviour in order to discover and confirm a set of probabilistic casual laws that can be used to predict general patterns of human activity (p 63).

Davidson & Tolich (1999) comment that positivism emerged from the ability of the sciences, especially physics, to explain phenomenon and solve problems. Positivist methods are concerned with observable phenomena which are used to create “law-like relationships” (p 27) in an objective and neutral approach.

It is the positivist or scientific concern for control that has reduced the significance of individual choice an important part of any research involving humans. Cohen (2000) explains how quantitative data “neglects the hermeneutic, ascetic, critical, moral, creative and other forms of knowledge” (p19). To allow for this individual difference this study also involved the collection of qualitative data.

3.4.2 Qualitative Data

Dictionaries indicate that qualitative means about quality. Qualitative data “reflects on the quality of something” (Davidson & Tolich, 1999, p 19). Qualitative data records individuals’ own theories and what meaning and value they have placed in the context of the research they are part of. Davidson & Tolich (1999) add that qualitative data lies in the interpretive paradigm. Neuman (1997) defines the interpretive paradigm as follows.

The interpretative approach is the systematic analysis of socially meaningful actions through detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds (p 68).

In summary Davidson & Tolich (1999) argue that the “strength of qualitative research lies in its validity” (p 34). They explain that qualitative data accurately collects the opinions and actions of the participants in the study even though qualitative data may not be generalised to other locations.

This research used a number of qualitative data points to construct meaning from the research context. These collection points included a number of interviews with the lead teachers and a number of observations of lead teacher meetings and professional development. How these interviews and observations were carried out and analysed is detailed in the following sections of this chapter. Below is a summary of the individual techniques used to gather qualitative data.

3.4.3 Interviews

The use of interviews can be thought of as an exchange of views by the conversation between individuals on “a topic of common interest”(Cohen, 2000, p267). Thus an interview values data from individuals and allows the participants “to discuss their interpretations of the world in which they live” (p 267). While Cohen indicates that interviews can also be used to extract quantitative data by standardising the questions and the process of interviewing that was not done in this research. Because the interview subjects knew the interviewer the discussions that the interviews generated provided a wide range of valuable qualitative data. The sample size used for the interviews was too small for any meaningful quantitative data to be collected. However all interviews were carefully planned and a prepared standard set of questions was used for each interview to make later analysis easier.

3.4.4 Focus Groups

In addition to the interviews it had been planned to use focus groups to further collect further data about the functions of the lead teachers. Because the lead teacher group was small, five members, it proved difficult to organise as finding a convenient time with enough of the lead teachers present to conduct a meaningful focus group. The advantage that a focus group offered would have been the interaction between the participants, rather than the interviewer, allowing the views of the participants to emerge (Cohen 2000). Since the research was carried out by a participant observer who was present at all lead teacher meetings where similar discussions to those expected in a focus group were observed. As well Cohen (2000) indicates that focus groups are often contrived settings. In comparison the observed meetings were in a meaningful context making the originally proposed focus groups redundant.

3.4.5 Observation

All observations were made by a participant observer. Both Yin (2003) and Cohen (2000) comment that at times the roles of observer and participant mutually interfere and the observations are restricted. To help overcome any gaps in the recorded observations the minutes from all these meetings were attached to the recorded observations for analysis.

The next two sections, Reconnaissance and Participants detail each of the key data gathering points and explain why each technique was used and the sort of data collected. As this study is presented in a narrative style the data points are presented chronologically.

3.5.0 Background

Before this research could start with the collection of data about the nature of the lead teachers and their interactions with the wider staff of the school it was necessary to explore how this group was established and had performed during the cluster. This information firstly was derived from two interviews, one with the Deputy Principal (DP) responsible for the lead teacher group and one with the facilitator from the cluster. The two interviews were to discover how the performance of the cluster was viewed from two different viewpoints. The facilitator would provide an external perspective and the Deputy Principal an internal view.

Secondly the school's teachers were surveyed for their computer skills. This would help establish a description of staff skill levels and help the lead teachers develop their professional development plan for the year.

3.5.1 Facilitator

This semi structured interview was quite short and sought her views on how the lead teacher group had worked in the school during the cluster. The questions, contained below as figure 1, used for this interview acted as general guide. The qualitative data this interview generated was used establish how the cluster was viewed from the external facilitators point of view and to summarise her perceptions of the previous performance of the lead teacher model of ICT professional development. The summary report to the Ministry of Education was not available at the time this study was written.

Figure 1

Warm-up- Interviewer

Describe topic and introduce the main themes for the discussion:

- Description of the cluster and your role in the cluster.
- Description of the lead teacher group from your perspective.
- Your experiences with the lead teacher group and the school.
- The successes of the professional development program.

Background

Why the lead teacher model was chosen for this school?

Can you explain your role as facilitator for this school?

Was this different from the other schools that you worked in?

- if so how

Tasks

Can you outline the successes achieved in ICT implementation achieved in this time?

Why do you think these successes occurred?

What do you think the school can do to continue with these successes?

What would you change in the way the professional development was implemented now (the value of hind sight)?

Are there any other comments about the progress of this school in the time it was part of the cluster?

Thank-you

3.5.2 Deputy Principal

This interview was designed to be an in-depth analysis of both the performance of the lead teacher model during the cluster and how that model fitted with the broader culture of the school, from the Deputy Principal's perspective.

The interview would also continue and look at the changes that had been made to the lead teacher model since the cluster had finished. The interview would seek the reasons for the changes made to the lead teacher model and the selection of the members of the lead teachers group in the current year. The significance of ICT professional development in the school would be established and how the lead teachers would be used to support this professional development would be explained. The goals and expectations of

the lead teachers group were shared and the Deputy Principal's role in achieving those goals.

Lastly the interview would look forward to the future and the longer term developments envisaged in the ICT area and how that could impact on the ICT professional development requirements of the school. All the data collected in this interview was of a qualitative nature and reflected the Deputy Principal's interpretations of her role and that that of the lead teacher's group.

The questions used as a guide for this interview are contained in Appendix 1.

3.5.3 Staff Survey

The first task that the lead teachers did at the beginning of the year was design a teacher survey to establish the skills of the staff in using ICT and also to offer the staff a chance to request any particular professional development that they might require. Many writers (Inglis, 1999, McKenzie, 1998 and Dawes & Leask, 1999) suggest that the important first step in planning any professional development programme is establishing the current ability and requirements of the staff. This researcher contributed to the survey design but because it was intended to be used by the lead teacher group to identify the needs of individual staff members it could not ethically be used. However the collated results after the staff identification had been removed were used to give some general descriptions of the staff and what the staff collectively saw as their needs in ICT professional development. Therefore it is appropriate to discuss how this survey, found in Appendix 2, was designed and how the quantitative data that it would extract would be used.

The survey had two sections, the first part asked the staff to rank their skills at using computers in one of three levels. Both Inglis and Dawes & Leask suggest that a three level response reduces the amount of drift between individuals when using a larger number of choices so that a more accurate picture of the staff skills emerges. The first section was divided into parts for each group of use with increasingly more complex tasks so that a picture how expert the staff was in each area would be discovered.

The second part of the survey was more general, asking for any feedback about the computer skills. The last question, asking for any specific professional development requirements was designed to enable the lead teacher group to target any individuals with special requirements and to see if any specific area of professional development emerged. For ethical reasons this research only looked at these responses in a collective manner so that individuals were not identified.

During the three year period of the cluster there were two surveys a year asking the teachers about their computer skills and uses. To allow comparisons and changes to be explored during the cluster the surveys took about twenty minutes to complete and each one asked similar questions. Because of these frequent surveys there had built up a resistance to surveys among the school staff, especially to longer questions requiring answers in words. This resentment was well known to the lead teachers so the survey

was designed to be as far as possible a tick box affair and to take the minimum time possible.

The survey was administered at a staff meeting, deliberately saved till the last agenda item so that teachers could complete before leaving. The survey was handled this way to maximise the return rate and enabled fifty six staff to complete the survey which represented a 93% completion rate.

When the survey was administered a number of staff expressed their resentment towards another ICT survey but it was considered necessary as the exit data from the cluster did not include the new staff to the school. Because the study school is in a roll growth situation there were fourteen new teachers, which represented 23% the teaching staff.

3.5.4 Survey of Computer Suite Use

The next step in the study was to look at how one of the school's computer suites was used. This data was originally planned to be collected by analysing the booking sheets, however informal observation discovered that the booking sheets and actual use often did not correspond. Sometimes classes booked into the suite never appeared and other classes often arrived at times when the booking sheets showed no entries. At other times teachers swapped bookings or came to other informal arrangements. To overcome this problem this researcher, who had an office at the back of one suite collected the data by direct observation of the classes using that computer suite. So that the original ethical considerations were met only the data that would have been recorded on the booking sheets was noted, the form level, subject and a general description of the task performed.

The use of the computer suites was recorded over thirty six days in an eight week period when ninety nine periods were recorded. By collecting over such a long period it was assumed that a general picture of the computer suite use would be observed. The researcher had previously noticed that sometimes one subject would almost completely dominate the suite bookings for a week as all classes performed a certain task, for instance in one of the observed weeks most of the school's Year 9 classes were observed doing a similar graphing task.

Therefore the accuracy of the survey was increased by direct observation and the longer term should have reduced random errors caused by clustering of events.

3.6. The Participants

This section outlines the methods used to collect data from the lead teachers as they performed their functions during the research.

3.6.1 The Lead Teachers

The main participants in this research were the lead school's teachers who would lead the professional development of the study school's staff. This section of the study describes how data was collected from the lead teachers about their work and how they viewed their work.

3.6.2 Focus Groups

Initially it had been planned that most of the data about the lead teachers would be collected by running a focus group. Focus groups are form of group interview that relies on the exchange of ideas among the group who discuss the topic supplied by the researcher. The participants' engage with one another, rather than the interviewer, and this allows the participants views to emerge. One advantage is that the participants' views are allowed to emerge and not those of the interviewer (Cohen, 2000). Another advantage is that the interview can produce a lot of data of a complex nature over a short period (Davidson & Tolich, 1999).

However it proved difficult to find a time when most of the group could conveniently meet for a focus group so the plan for a focus group was abandoned. Both Cohen and Davidson & Tolich point out that focus groups are a type of interview so it was decided to interview each of the lead teachers at a time that was appropriate to them.

3.6.3 Interviews with the Lead Teachers

The interviews with the Lead teachers were to collect qualitative data about how the lead teachers felt about being lead teachers and their actions as lead teachers. Because all the data collected from the interviews needed to be comparable it was necessary to prepare a set of questions that could be used as a script for the interview. The script of questions that was used is contained in Appendix 3. This would ensure that all the lead teachers were asked the same questions in the same order.

“Respondents answer the same questions, thus increasing the comparability of responses; data are complete for each person on the topics addresses in the interview. Reduces interviewer effects and bias ...Facilitates organisation and analysis of the data.” (p 271)

Cohen (2000) states the advantages of this type of interview which he calls a “standardised open-ended interview” (p271).

Cohen (2000) suggests that the disadvantages of the “standardised open ended interviews” are that the standardised wording of the questions may “constrain and limit naturalness and relevance of questions and answers” (p 271). However Yin (2003) points out that “most commonly case study interviews are of an open ended nature”. The interviewees may offer their own insights and opinions as well as the facts to any question. By allowing the interviewees to expand on each of their answers to the questions, a natural

product of a case study, the researcher considered that that the inflexibility Cohen (2003) described would be minimised.

The script of the interviews, the questions, were laid out to help illicit firstly co-operation and then allow the interviewee to develop some confidence in the process and finally to expand on their ideas around the themes of the research. Davidson & Tolich (1999) explain that an interview can be divided into three parts, which they list as;

1. introductory questions to start the informant talking.
2. a list of recurrent themes that represent the project's research interests
3. a set of generic prompts (such as "How?", "Tell me more", etc). (p148)

The introductory questions were open-ended and designed to avoid one word answers. These questions were to get the interviewees to start "talking about their world" (p 148), in other words to tell their story. To help with the flow of the interview and to avoid the interview starting in a staccato manner there were few of these introductory questions. While there were few questions it was hoped that they would start the interviewee talking and avoid the interviewer talking much and so introduce their bias. These attempted to be "huge questions to get people talking about their experiences" (p151). Once the interviewees started talking it was considered important to kept them talking and for the interviewer to be aware of the broader themes of the research as the interviewer introduced them (Davidson & Tolich, 1999).

Using the Davidson & Tolich (1999) guide to interview structure the second part of the interview should be the main themes of the study, and the questions written as a "check list of themes" (p151). The two themes explored with the lead teachers were their understanding of the tasks of the lead teachers and their professional development. Davidson & Tolich (1999) note that the interviewer should attempt to focus this part of the interview on any themes that were not picked up in the first part of the interview to ensure that all themes are sufficiently covered. The use of prompts Davidson & Tolich (1999) consider to be the third part of the interview and are "spontaneous questions that seek more information or clarification". They add that the careful use of prompts will allow the interviewees to "open their world to you" (p 151) and that the interviewer can construct a rich texture that relates to the interviewees experiences.

Davidson & Tolich (1999) argue that the questions can be written as an interview guide on one page (Appendix 3) so that the researcher listens more than asks questions. They add that the key to asking questions that find good qualitative data is to get the interviewees talking about the themes of the research and by prompting the interviewees to emphasise the key points that they bring out.

Four out of the five lead teachers agreed to be interviewed which gave a significant cross section of the group of lead teachers.

3.6.4 Formal Observations

Yin (2003) explains that case studies typically create the opportunity for direct observation which can create another source of evidence. Yin (2003) adds that the observations can be an invaluable aid for understanding the actual uses or potential problems in a case study. He makes a final comment on the reliability of the observations is enhanced by using a single observer. This research used a single observer who was a member of the lead teacher group, a participant observer.

By using a participant observer a number of unique opportunities were presented. As the observer was one of the lead teacher group he gained access to events within the group and was able to “perceive reality from the viewpoint of someone inside the case study” (p 94). Yin (2003) also notes that a participant observer may be able to manipulate minor events, in this case study and convene meetings and set the agenda of some meetings. While these manipulations are not as precise as scientific experiments they did produce a greater variety of opportunities to collect data. Cohen (2000) adds that the advantage of these manipulations is that they occur in the natural environment of the group.

There are some problems with participant observers, both Cohen (2000) and Yin (2003) warn that the observer may lose some objectivity in their observation and become a supporter of the group introducing biases. To help alleviate any bias the observations of meeting were compared to the formal minutes taken of the same meetings. Another problem that Yin (2003) describes is when the participants’ role in the meeting take so much attention that there is not enough time to record observations, again reduced by using minutes after the event to help with any gaps.

3.6.5 Informal Observations

There were a number of informal events where a lead teacher was approached by different staff for some quick fix ICT advice. These events when they happened were recorded in a research journal that the researcher used. While these events occurred mostly when the researcher was approached in his role of lead teacher they do provide a valuable source of additional evidence.

There were a number of separate points where observations were made. The formal observations consisted of three meetings of the lead teachers, one professional development session for the lead teachers and three meetings between a lead teacher and a department planning ICT curriculum integration. Each of these events and the process of observation is described in the chronological order that they were performed in the following chapter, Findings.

The following table (Figure 2) summarises each data collection point in the chronological order that the data was collected. This table briefly indicates the purpose of each data collection point.

Figure 2

3.7 Summary of Data Collection

Who involved	Data collection method	Type of data	Number of events	Purpose of data collection
Staff	Survey form	quantitative	1	1. To generalise the staff ICT skills. 2. To identify any specific PD requirements
Cluster facilitator	Interview	qualitative	1	Background for formation of lead teachers and performance during the cluster.
DP responsible for PD	Interview	qualitative	1	1. Background of the cluster 2. Design and purpose of lead teacher group
Users of the Computer suite	Observation	quantitative	99	Description of the use of ICT in the school (data collected from 99 events over 8 weeks)
Lead teachers-meetings	Participant Observation	qualitative	3	Description of the lead teacher the planning and actions for PD
Lead teacher PD	Participant Observation	qualitative	1	Description of professional development undertaken by lead teachers
Lead teachers-interviews	Interview	qualitative	4	Discovery of the lead teacher's views on their role in delivery of PD
Observation of PD lead by LT	Participant Observation	qualitative	3	Description of how the LT deliver professional development

3.8 Ethics

Both the school and the participants had given an informed consent to the collection of data for this research. The lead teachers used in this research have read the transcripts of their interviews to check for validity and their names have been changed to protect their confidentiality. There were no direct observations of student in this study.

Chapter 4 - Findings

This chapter introduces the findings for the research in a chronological order as described in the methodology chapter. Each step of the evidence gathering is introduced and the findings presented with the key meaning of each individual piece introduced. A full explanation and homologation of the evidence is left till the discussion and conclusion chapter.

4.1 Reconnaissance of the Background

There were four parts to the evidence gathering in the reconnaissance stage of this research;

1. an interview with the facilitator,
2. a survey of the staff in the study school,
3. a survey of the study school's use of the computer suites,
4. an interview with the Deputy Principal responsible for professional development.

Each part is introduced in the following section of the reconnaissance chapter.

4.1.1 Facilitator of the Cluster

The facilitator was interviewed to discover how and why the Lead Teacher model was introduced the study school during the cluster. The interview then sought the opinion of the facilitator about the success of the school and the cluster in general as a means of ICT professional development.

The facilitator worked from a local tertiary institute which provided a range of professional development services for schools, both primary and secondary. The four schools of the cluster were approached by the provider to form a cluster which was duly successful in a bid for ministry funding. The facilitator was employed by the tertiary institution at this time, 2002, to deliver the ICT professional development of the contract. The model of lead teachers as described by Halliday (2001) at Papatoetoe College was introduced. The facilitator at this time also acquired two other secondary schools from another cluster which were not using the lead teachers model of ICT professional development, she says "they were doing very ICT oriented work, like how to use inspiration". This comparison helped her form the opinion that the lead teacher model was an effective model to use in the secondary school environment, as the facilitator explains.

"That the lead teacher model could be one way of doing work in a concentrated way with a core group of teachers and get them to make the change and they model it or work with teachers in their area".

The facilitator describes how pedagogical change is an important part of the ICT professional development process and adds that the lead teacher model provides opportunity for pedagogical change because the model is in touch with the teacher's classroom needs.

In talking about the successes of the schools in the cluster the facilitator suggested that the results were varied between the schools. She indicated that the study school was particularly successful because of the way the

principal's understanding and awareness of the role of ICT in teaching and learning, pedagogy, had changed. She added some schools changed in areas where there was an exceptional lead teachers but did not make the shift to pedagogy.

4.1.2 Survey of Teachers

The survey found in Appendix 2 was administered to the staff at a staff meeting to increase the completion rate. Fifty six staff, which represents 93% of the teaching staff completed the survey. This high completion rate suggests that the results of this survey can be viewed with confidence.

The survey was divided into parts. Each part represented a different application of ICT, and then each part was sub-divided into tasks that allowed the respondents to rank their ability at that application of ICT. This division of the task was intended to allow the researcher to total the rank that the respondent had selected for each task. The total was coded by the researcher to rank the respondents' abilities into four categories for each different use of ICT. The categories were given descriptors, Expert, Able, Satisfactory and Limited to describe the respondent's ability at that particular application of ICT. By the researcher establishing this structure a detail of what the respondents could do in each part was established as well as an overall ranking of their ability for that particular application of ICT. The number of respondents in each user category was counted and recorded as a percentage of the total number of users to create the summary table below.

<i>Table 1</i>		Expert Users	Able Users	Satisfactory Users	Limited Users
Use	(n=56)				
Environment		31%	19%	38%	13%
E-mail		40%	17%	31%	13%
School Intranet		15%	4%	23%	58%
Classroom Manager		44%	17%	29%	10%
Word Processing		60%	13%	21%	6%
Spread Sheets		21%	13%	42%	25%
Presentation Software		27%	2%	35%	35%
Web Authoring		6%	17%	4%	73%

The most striking thing about this table is the high percentage of teachers who were classed as expert users of word processing, 60% of the sample. Equally surprising only 6% of the teachers in the survey were considered as limited users of word processing, as this only represents 3 teachers it is an unexpectedly small number. Table 1 also shows that teachers are confident users of email. These two results seems to fly in the face of conventional wisdom about teacher ICT skills (Dawes & Leask 1999 and Inglis et al 1999). It would appear that teachers are better users of ICT than they are popularly

given credit for, and this makes sense when it is considered that both word processing and email familiarity are modern necessity of a teachers work.

Classroom Manager (CM) is a piece of software that the school uses for student administration. Again staff are able users of this software, again a requirement of the job and have had specific training in the use of this software. Classroom Manager is used to record marks, write reports and record all the pastoral events and administer the student details. It needs to be noted that this software has no use in the classroom and is used only for the school's administration purposes.

Table 1 clearly indicates that the staff are less expert at the use of spreadsheets and web authoring tools. This can be explained as many teachers would have little use for these tools. However in both cases there are a number of expert users.

The survey of the staff to ascertain their ICT skills highlighted a number of important points about the staff skill in ICT usage. The school's staff have a number of very skilled users of ICT as shown in figure 3.

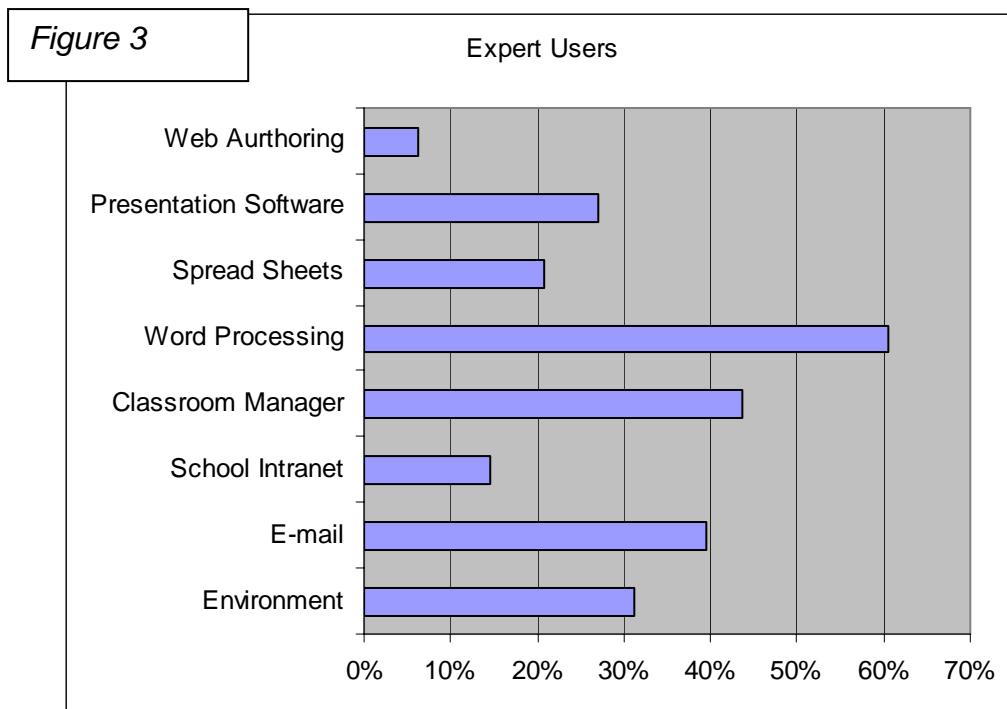


Figure 3 shows that there is a bigger number of expert users among the staff especially in the areas of ICT that staff are expected to be using on a regular basis in their ordinary work as teachers such as word processing, email and Classroom Manager. Equally while there are some expert users, they are a small number in applications that have less relevance to the regular work that a teacher would be expected to be doing, such as web authoring and intranet applications.

It is important to note that there are some expert users in every category, this creates the opportunity to develop a group of lead teachers to lead the professional development of the school staff in ICT.

Looking at Table 1 it is apparent that every use of ICT has a number of expert users, and it is this that suggests that the use of lead teachers is an appropriate model for ICT staff development. There exist in the school a core group of staff with excellent ICT skills which can be used to “trickle down” (Ham 2003, p12) the professional development to the rest of the staff.

What this could mean and the other parts of the data in table 1 is broken out and summarised for meaning in the following chapter, discussion.

As well the survey asked for some opinions of respondents and for any special requests for professional development, these sections of the survey were only completed by 8 (14%) of the respondents, a reflection of the survey fatigue that the cluster had imposed on the school. The responses were all requests for specific professional development; with some respondents making multiple requests. The largest was 7 for intranet, 5 requests for spreadsheet professional development and 3 requests for help with using the data projector. The use of the intranet was to become the focus for the lead teacher led professional development during this year.

4.1.3 Interview of Deputy Principal

The Deputy Principal (DP) was interviewed on two different occasions and provided a long discussion with little prompting. Therefore her interview is discussed in two parts, following is the part that relates to the reconnaissance and later the second part that explores what happened during the time of this study along with the findings from the lead teacher interviews.

Initially the DP discussed how the cluster had started in the school and how the lead teacher model had begun. She noted that the school had a tradition of committees and staff representation and initially the lead teachers were selected from the IT committee. However that produced a group of lead teachers who were unevenly distributed through the school departments with three members from one department. By looking for “dynamic enthusiasm” and “some interest and expertise” she “shoulder tapped” to find a more representative group. At first there was resistance as the role of the lead teachers and what they were being asked to do was still not defined, the DP observed, “there was a lack of clarity for the lead teachers.” The resistance, from the lead teachers, was overcome at the second lead teacher professional development session when the facilitator led them in some problem solving exercises to define their role. The DP comments “they came out humming and were really fired up”. The DP now believes that the lead teachers were now ready to roll out the professional development for the staff.

The lead teachers now had a clear idea of their function and led an all staff professional development session, as they would over the time of the cluster. These professional development sessions were well received as they focused

on student uses of the ICT being “showcased”. This helped create a willingness to be involved in the coming professional development.

Initially the traditional departments received their training which was task based. The training had a specific link to a curriculum area “so it was meaningful”. The project gathered a momentum of its own as different departments were trained in using ICT in their curriculum area. At this stage the facilitator led the professional development with the intention that the lead teacher in that area would pick up further development within the department. As each department worked within a specific time scale and the facilitator visited again to take a second session for the department to report progress and receive extra professional development. The DP states that this created a sort of “due date” which helped apply a gentle discreet incentive for the teachers involved to complete the tasks that they had been assigned to do in the initial training. The significance of this “due date” or “deadline phenomena” is further expanded on in the discussion chapter.

In completing the reconnaissance phase of the DP interview she commented on how the lead teacher fits into the schools collaborative management style and “egalitarian way of operating”. She noted that this manner of operation did create some tension because ICT is not curriculum area and it intersects with some of the roles of the professional development committee.

As the final stage of the reconnaissance it is necessary to present the findings from the survey of the use of one of the computer suites.

4.1.4 Computer Suite Survey

The study school has no computers in classrooms so it is safe to assume that the only use that students have of ICT is in the school’s computer suites part from occasional use of teacher laptops for the use with datashows.

The school has three computer suites. There is one specialist suite in the design area which is used almost exclusively by senior students in the Technology and Art Departments. The use of this suite was not surveyed. The suite surveyed has the newest computers so is the suite of first choice for general school use. Lastly the third suite has older less reliable computers and is used as an overflow suite when the surveyed suite is full mainly for research or word processing tasks. Thus the survey represents the typical use of the computers for the school apart from the senior students in Art or Technology, a specialist use.

The use of the computer suite was coded to show the main software use and the general type of activity carried out. The raw data was then converted using pivot table to show how the use varied with subject and year level.

Firstly the pivot table for general activity by subject area is shown as table 2 below.

Table 2

Activity (n=99)	Accounting	Art History	Biology	Business St	Economics	Classics	English	ESOL	Geography	History	Media	Mathematics	Science	Social Stud	Technology	Tourism	Work Exper	Total
excel formula												3						3
excel graphing												6						6
excel survey														1				1
inspiration/pp/poster													2					2
MYOB	1																	1
power point													2	7	1			10
Publisher			2			2	5											9
research directed		1				2			1				6	4	5	2		21
research undirected					1	1				3	1		6	4	2			18
web questions							1						2	4				7
web quiz									1					5				6
word processing				1			1	4		1					5		3	15
Total	1	1	2	1	1	5	7	4	2	4	1	9	18	25	13	2	3	99

Table 2 clearly shows that Social Studies (SS) and Science (Sci) are the two biggest users of the computer suite and that these two subjects are significantly bigger users of ICT than any other curriculum area. Collectively Science and Social Studies account for 39% of the total use of the computers suite observed.

The second discovery that can be made from table 2 is that the most common type of use of the computer suite appears to be research, 39% of the recorded uses are research, either directed or undirected. Research also spans the greatest number of curriculum areas, occurring in 10 or 56% of the surveyed curriculum areas.

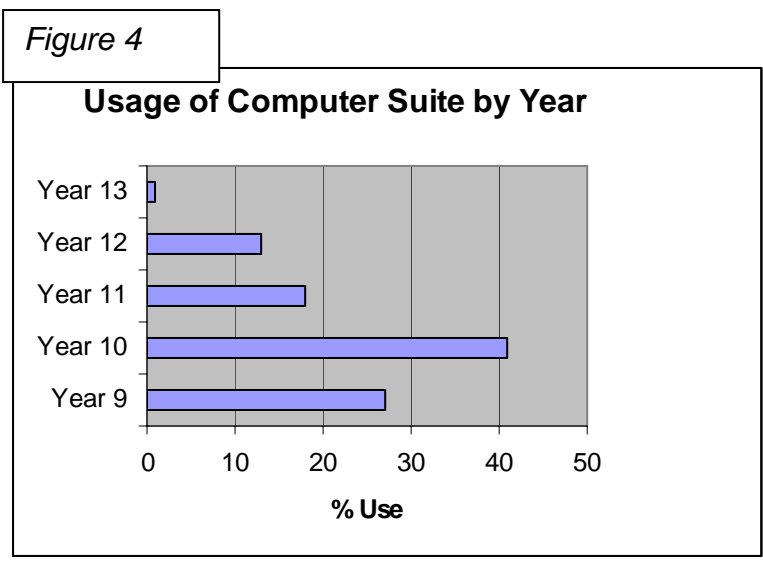
Table 3 is a pivot table from the observations of the computer suite and shows the type of ICT use compared to year level.

Table 3

Count of no events Activity (n=99)	Year					Grand Total
	9	10	11	12	13	
excel formula		3				3
excel graphing	6					6
excel survey		1				1
inspiration/pp/poster		2				2
MYOB				1		1
power point	5	5				10
publisher	3	2		4		9
research directed	5	3	8	2		18
research undirected	1	10	4	5	1	21
web questions	3	3	1			7
web quiz	1	4	1			6
word processing		5	3	7		15
Grand Total	24	38	17	19	1	99

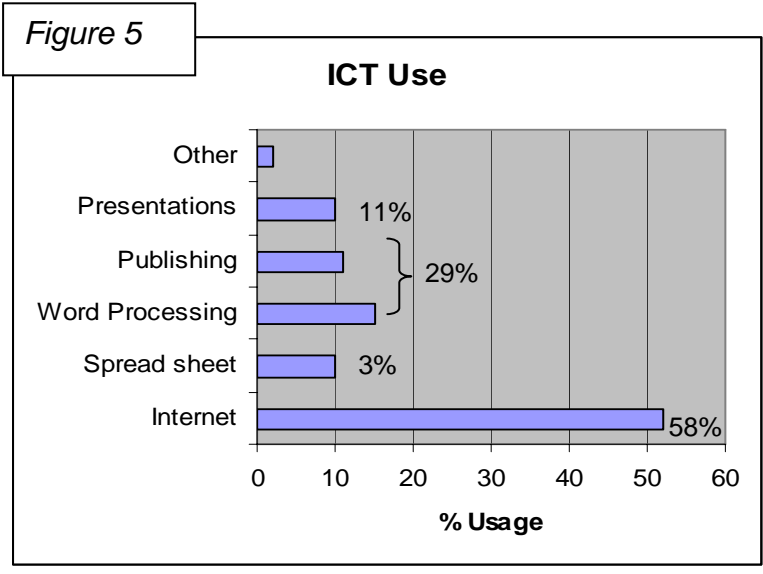
From the extended survey of the computer suites two very distinct trends emerge, firstly the tendency for the amount of computer use to reduce in the senior school.

Table 3 also indicates that the largest use of the computers is research and shows that research is reasonably evenly spread across all the year levels. Table 3 also indicates that the main use of the computer suites are by Year 9 and 10 students, they account for 62% of the observed uses but only comprise 54% of the school roll. There is tail off of computer use as students become more senior, only one year 13 class was observed in the eight weeks observed. This tail off is more dramatic once it is realised that ESOL and employment skills classes do not do formal qualifications, NCEA at year 12. Removing ESOL and Employment Skills classes from the data, so that that the year 12 numbers reflect classes working at a year 12 level of qualification reduces the number of observed Year 12 classes to 12.



This trend is identified clearly in figure 4 where the use of computers in Year 13 has almost disappeared from the graph. Coogan (2005) identified this trend among New Zealand English teachers and explains that as the pressure of high stakes external assessment (NCEA) increase in the senior school the use of ICT for teaching and learning reduces. Conversley Figure 2 shows that in the junior school, Years 9 and 10, there is a much greater use of ICTs for general classroom use.

Secondly the main usage of computers in school is internet.



Note
The numbers shown on the graph are taken from the cluster exit survey in 2004

Figure 5 indicates that more than 50% of the usage of the computer suites was using the internet for research, more than twice the usage of the schools computers for any other application. When the usage observed is compared to the usage described from the 2004 cluster exit survey the same pattern of usage emerges. This supports the argument that the usage is similar, and so the professional development that supported this usage has been sustained.

Equally interesting is the the observation from Table 3 that about half of the internet usage was for research undirected by the teacher, sometimes with

only loose connections to the subject curriculum. This was not a focus of this research and is an area that could be subject to further research, and coincidentally the school has set the use and process of research as its focus in 2006 for professional development.

Having discussed how the lead teacher model became established to deliver the professional development during the cluster and how the study school now uses its ICT resources the rest of this chapter looks at how the lead teacher model progressed during the year after the cluster ended.

4.2 Lead Teachers

Initially this section looks at the process the lead teachers used to establish what and how they would develop the professional development for the current year. Below is a chronological review of the process that the lead teachers went through.

4.2.1 Professional Development

The teachers who had volunteered and been selected for the lead teacher role during the current year had an initial day of professional development. This development consisted of two hours training with an outside provider in the use of the school's recently purchased intranet. This was well received and helped raise the enthusiasm of the lead teachers as they learnt how to use the intranet and of the possibilities it offered in their curriculum area. This was followed with a discussion on how to use the intranet in the school and to formulate the standards that would be used with the intranet. Finally the last two hours of time was used individually for the lead teachers to develop some resources for their subject area on the new intranet.

This day proved a valuable time as it stimulated the enthusiasm of the group, a similar response from the previous years group where the Deputy Principal noted that it was the opportunity for some fulfilling professional development that engendered an of enthusiasm in the lead teachers. As well this professional development also gave the lead teachers the opportunity to set a task based focus for the year, the introduction of the intranet to the school.

In both the interviews with the lead teachers and the following meetings lead teachers commented on how valuable this professional development had been. The value came from setting the context fro the lead teachers to work within, in this case the intranet.

4.2.2 Meetings

Immediately following the professional development two meetings of the lead teachers were scheduled for the following term. However this meeting was arranged by mutual agreement of appropriate dates in the following few weeks and was not posted on the official list of term dates published by the Deputy Principal. This single fact was to have a huge impact on the following meetings. In the days before the meetings an agenda was placed in pigeon hole of each of the respective lead teachers. By the time the day of the meeting arrived a number of the lead teachers had offered apologies for they had forgotten about the meetings and arranged other things. Because of the

number of the lead teachers who were unable to attend the lead teacher meetings were postponed. There were no lead teacher meetings in this term

The following term the lead teachers meetings were published in the schools meeting schedule. The meetings then occurred. Thus a single important discovery was made, meetings need to be scheduled in the schools overall planning and published as any other event.

When the meetings are included the central planning process two significant changes occurred. Firstly the participants could quickly access the times of the meetings from the central planning records and make arrangements accordingly. Secondly the meetings were given a greater degree of importance, by being on the official list of meetings the participants realise that the meetings had the weight of management support.

4.2.3 Initial Meeting

The initial meeting started with this researcher explaining his intended work during the year. The background to the research that would be occurring during the year was explained. The continuation of the professional development programme that existed during the cluster was presented as a focus along with the hope that the lead teachers would become an established part of the school's ICT professional development programme. Finally the focus of the professional development would be integration of ICT into the existing curriculum, and less on the individual ICT skills of the teachers.

The Deputy Principal picked up the discussion and explained how the lead teachers had been selected and what it was intended that they should do. The meeting minutes record and summarise her statement.

“All members of this group are experienced and respected (by the staff) teachers that represent a significant curriculum area in the school. The school has and will be investing professional development in this group with the idea that the knowledge gained trickles back into the wider staff of the school.”

The following discussion arrived at a description of the lead teachers that the minutes listed as;

- The lead teachers act as an access point for staff queries, just in time professional development.
- That at times the lead teachers can help departments organise their ICT programmes.
- That lead teachers should be acting in an initiator role with the new technologies, for example intranet, applications of software, use of projectors, interactive whiteboards etc”

The role of the lead teachers had been defined and now the meeting proceeded to a discussion about what the group would focus on for the year. The focus of the group on the intranet development was discussed and generally agreed on. As the intranet was installed and the schools resource bookings sheets had been moved to the intranet some discussion centred on

problems that some teachers were having, especially booking the library. This became the first task for the lead teachers, to check with their departments that all teachers could use the resource booking components of the intranet.

This discussion helped to illustrate to the researcher one of the strengths of the lead teacher model, the researcher, in his IT role, had set up the booking module of the intranet and thought that it was running well as it was being used. He was unaware that some teachers were using the librarian or other teachers to book resources for them because they did not know what to do. The lead teachers were able firstly to identify the problem and then quickly rectify it by quietly helping the teachers that were having problems. An example of just in time professional development.

The meeting moved back to discussion about how the students would use the intranet and then to the more general “how the school computer systems work from a student’s perspective”. The intranet is just part of the school’s computer system, which requires an understanding of the user names and passwords to access the internet, intranet and school server to save student work. The lead teachers talked about the problems that students had using the school system due to a lack of understanding. This generated the idea that that in the following year during the first few weeks there should be an orientation process for the new year 9 students, to introduce them to the schools computer systems.

The meeting closed after discussion about the next meeting time. Mean while the lead teachers were given the task of ensuring that teachers in their department were able to access the intranet and to start to develop resources for the intranet.

The meeting had helped to refocus the lead teachers after a long break since the initial professional development meeting. Significantly at this meeting the Deputy Principal had clarified the role of the lead teacher group, this clarification had demonstrated to the lead teachers that they had an important role and that the school management supported the role of the lead teachers.

4.2.4 Following Meeting

The next meeting occurred four weeks later, as part of the usual meeting cycle. This had not happened during the previous term and was an affect of the meetings being included on the published meeting schedule. This meeting was very workman like and focused on the tasks that the lead teachers had embarked on.

The meeting opened with a report back about the intranet professional development that the lead teachers had started with their departments after the last meeting. There was a greater understanding among staff about the booking system and the discussion looked at rolling the booking system out into other areas of the school, such as the gym, meeting rooms and the school theatre.

The meeting moved to planning for the intranet and it was decided that a consistent layout was needed for the department and student pages. A consistent layout would allow the intranet users to more quickly access information held in each page. A guideline for page layout was agreed upon and this guideline would be taken back to the department by the lead teachers.

The plan for how to introduce the new students to the schools computer systems was discussed and the key points that would need to be covered decided on. A formal proposal for this orientation task would be written and given to the school's senior management team to incorporate into the start up programme for the new year.

The meeting proceeded smoothly and produced a range of outcomes for the lead teachers to implement. At the end of the meeting there was some time for general business and this opened up some problems with the schools computer systems. This was not part of the business of the lead teachers group but there was an issue with one aspect of the school email system and this meeting allowed some of the members to vent a frustration that they and some of their fellow teachers had. The outcome was verification of the problem and an agreement to take the issue to the appropriate part of the school management. The teacher that had raised the issue had felt supported by the group and there was an outcome that would see the issue addressed. The lead teacher group had acted to support one of their group and address a problem with the school's computer system.

The process of the lead teachers planning and their meetings has been described and explained. The next step is the implementation of the lead teachers implementation of their planning.

4.3 Delivering ICT Professional Development

The researcher then followed the professional development of one department in the process of planning the ICT component of their curriculum for the following year. This process at times involved the researcher as an observer and at other times as a trainer who delivered some of the professional development. The researcher was involved in four separate meetings with the department which took about six hours of contact time with the department.

4.3.1 Initial Meeting

The researcher led the initial meeting that had two purposes, firstly to show the department how the intranet worked and the possible uses of the intranet. The second part of the meeting would be to plan how the department would use the intranet.

Initially the researcher delivered the professional development by demonstrating the school's intranet, showcasing some of the school's other departments that had started to develop the intranet. Next the department were led through some examples from other schools of the same subject use of intranets or internets.

The meeting started with a general reluctance to the concept of the intranet. Even though most department members thought the intranet was a good idea they were reluctant mainly because of the perception of the amount of work that seemed to be needed to be done in preparing resources for it. However once the work of other departments was showcased the department members came to realise that the existing resources of the department that was already on their central files could easily be adapted to the intranet. Then when the department members saw the work of other schools they became quite enthusiastic which led easily to the second part of the meeting, the planning.

The planning part of the meeting was largely run by the head of department and the researcher in his role as a lead teacher acted mainly as a source of advice. This part of the meeting was very productive with the meeting finishing with most members given a range of small tasks to complete to enable the department to start the construction of their part of the intranet.

This meeting had introduced the department to the school's application of the intranet and established a process that the department would use to establish its presence on the intranet. The next two meetings were to investigate how the department would increase its minimal integration of ICT into the curriculum.

4.3.2 Curriculum Integration

There were two meetings of about an hour each with about half of the department in each meeting. This meeting was held during the senior exam week and was split so that the minimal relief was needed to cover the teachers involved in the department. The researcher, in his role as a lead teacher chaired the meetings with the intent of the department's teachers exploring the possible ways that ICT could be integrated into the curriculum. It should be noted that the head of department was not present at either meeting, she had done this to encourage free discussion by the two groups.

Each meeting started with an explanation of the purpose of the meeting, to explore possible topics within the department's schemes that could be enhanced by integrating ICT into the scheme. The department already had one topic that met the school's curriculum ICT goals but accepted that this unit was dated and used a "demonstrate and copy as I do" kind of pedagogy. The aim was to develop a more student centred unit of work.

The teachers explored what they had seen done or ideas that they had about how ICT could be used to enhance the delivery or student's learning. This discussion varied between the two groups, the first group had two young enthusiastic teachers from overseas who had seen and used a number of different techniques and software used overseas. They led the discussion and talked a lot about the subject specific software that they had used. The second group needed a little prompting but when they got started talked more about how the ICTs could be used to develop student centred tasks from the work that they already did. The second group had a more grounded approach where as the first group required that the meeting chair to continually refocus

the group, as result the first group took longer to reach a consensus about what could be done for the next year.

The two groups ended in different places, because of the different sort of discussion each had had. The first group never reached a place where they had reached any decision about what they could do next year, however they had made a number of recommendations about different subject specific software that they thought the department should investigate. The absence of the head of department had meant that this group had engaged in a free and open discussion and it had been important that this group was independently chaired to help it maintain some degree of focus.

The second group had when the meeting ended identified elements of the exiting departmental schemes that could easily be modified to integrate ICTs into the curriculum in an enriching and meaningful manner to enhance the students learning. This group had effectively created a direction that the department could effectively follow.

From these two meetings the lead teacher, the researcher, reported back to the head of department with the minutes from each meeting. The head of department then looked at the recommendations from each group. She decided to investigate the software identified by the first group and that the recommendations of the second group would be followed up in the next professional development meeting to plan for implementation in into the scheme for the following year. This lead to the last stage of this cycle of professional development, was the planning of the unit to be used in the following year.

4.3.3 Planning Meeting

The final meeting in the series was to discuss what changes the department would make to its schemes to integrate ICT into its curriculum. Before this meeting occurred the lead teacher and the head of department met to discuss what topics would be used in the schemes being discussed. This allowed the lead teacher the opportunity to prepare some ideas for possible ICT tasks. The topics chosen had exemplar units available from the Ministry of Education web site, <http://tki.org.nz/e>, these were printed and given to the department staff to act a starting point for the discussion. This time the meeting was chaired by the head of department and the role of the lead teacher was advisory.

The meeting started well, the previous meetings had laid the ground work so that the department members knew the purpose of the meeting. The meeting proceeded in a business like manner with the department members focused on producing a unit that they would be able to use in the next year. Those present bounced ideas around as the details of the unit took form. The presence of the lead teacher was vital in this process guiding and affirming the department members helping their ideas to take a shape that was practical with the schools ICT resources. By the end of the meeting the planned unit had a form. The head of department assigned various department members the assorted tasks of writing the elements of the unit up

ready to be implemented in the following year. When the meeting finished the department members felt that they had formed a new and interesting unit of work using ICTs in an innovative manner.

After this process had finished the head of department expressed pleasure in the progress the department had made in planning for ICT integration. When asked for feed back she said,

“I am pleased that the teachers have taken ownership for the development of ICTs in teaching and expect to implement a unit next year. As well we have identified about five other units that can be developed in the future, this will allow us to continue to develop our units. The process was well worth the effort “.

The process of professional development used with one department has been described. How the lead teacher guided them through a professional development process that allowed the department’s teachers to develop a positive attitude towards ICTs in their subject and take ownership of their units of work. Importantly the integrated ICT used the school’s available resources making the eventual implementation far easier.

4.4 Lead Teacher Interviews

Finally the lead teachers were interviewed to explore how they had found their involvement in the professional development process and their opinions on the lead teacher model for delivery of ICT professional development. The interviews were all conducted by the researcher with four lead teachers, all of whom had been lead teachers during the cluster. Although they were not asked to draw comparisons some comparisons were made by individuals. The interviews have been homologated by theme so that the responses from all the interviews are mixed through the following section of this thesis. Where elements of the interview with the deputy principal responsible for the lead teachers help with the themes the lead teacher interviews touched on her comments have been added.

4.4.1 Personal Involvement

Only one of those interviewed, Mark remembered how he had originally been asked to become a lead teacher. He described how had been a member of the ICT committee and from that committee role he been given the responsibility to help foster the lead teacher group when it had originally formed. Rod was a late comer to the group but along with Judy described how their use of ICT with students and an interest in ICT lead to them being involved with the lead teacher group. Jo didn’t remember how she had become involved but stated “I thought it would be good professional development for me”. Even though the lead teachers didn’t seem to be aware of it they had all been selected by the deputy principal (Keri) as “experienced teachers who covered a range of curriculum areas the staff respected”.

All of the interviewees went on to explain that that they were interested in ICT and the opportunity that the lead teacher group offered for further personal development in the ICT area. Jo and Rod both commented that the

professional development offered to the lead teachers was more fulfilling because it was offered at a relevant level for the lead teachers.

However Mark pointed out that being a lead teacher “relied heavily on input from teachers already overloaded”. Keri added that because they were all experienced teachers several of the lead teachers had other responsibilities which could lead to undue pressure on those lead teachers.

4.4.2 Role of Lead Teachers

All of the interview subjects commented that they had enjoyed the role of lead teacher and had found it rewarding. All had enjoyed the extra professional development opportunities that the lead teachers had experienced. Both Mark and Jo added that they had enjoyed the opportunity that the cluster had created for attending conferences, Mark comments, “Rotorua trip was real good, real cool” and Jo adds

“I found the TUANZ conference really useful and really interesting.

Finding out what was happening out there and it really helped me find software I was going to use in my classroom. Just good to see what other schools are up to and getting ideas”.

Unfortunately the year that followed the cluster had not been able to offer the same opportunity to attend conferences, but they seemed important to the lead teachers, helping to strengthen their role and could be considered an element of professional development.

From the interviews all of the lead teachers showed an understanding of the lead teacher role. Rod’s comment is typical and shows an understanding that the lead teachers had, that Ham calls the “trickle down effect”.

“It’s a cascade model, where you spend a lot of time investing in one person who can pass that on to other people who they come into contact with.”

This understanding of the lead teacher role seems important to the successful implementation of the lead teacher model of ICT professional development.

4.4.3 Lead Teacher Perspectives on Students use of ICT

From the interviews the lead teachers had a clear understanding of how they saw students should be using ICTs. Mark saw his role as leading students to an understanding that “ICT is a tool, not a neat little toy”. Rod indicated that the ICTs had an important role to play in modelling allowing students to change one factor and see how that could affect the final result. Judy continued on the same theme explaining the advantages of brain storming using inspiration. Jo who uses media editing software in her subject extended these ideas to using specialist software.

“They (students) know better and they catch onto it quicker and so I show them the basics on how to use the software and then they play. I give them time to play.

And then they are the ones that find stuff, they show me, and over the years I have gotten better at it – and I’m not scared of them knowing more than me. I check them out and say help me”.

Judy was less positive about specialist software describing using some high order applications such as computer aided design (CAD) could help students in technology but “the time investment necessary to teach the kids how to use it to get them to the point of competency” meant that it was difficult to implement all aspects that were available and cover the curriculum.

The lead teachers showed a unity of purpose looking to use ICT with students in a hands on manner allowing the students to explore the software. Thus the subject material being used became the focus not the ICT being used, as Mark said “a tool” for learning.

The researcher noticed that the lead teachers where often self effacing about how well they had worked as lead teachers. Jo comments, “I have shown some people the basics” and later adds, “I don’t feel like a lead teacher”, underrating her performance as a lead teacher. These are typical comments from the lead teacher group and undersell their impact. They have taken the same approach with the teachers as they have with the students. The lead teachers get along side the teachers showing them the basics, helping when teachers are stuck and encouraging the teachers’ progress.

4.4.4 Summary of Lead Teachers Interviews

The lead teachers had a good understanding of their role and were supportive of the lead teacher model, what Keri called “clarity of purpose”. The make up of the lead teachers was important, as Keri indicates “that the balance between expertise and ability to work along side fellow staff”.

The lead teachers had enjoyed the extra opportunity for personal ICT professional development. They saw the main advantage of the lead teacher model as delivering targeted ICT professional development to teachers as they needed it rather than in the more general whole school delivery mode. While the lead teachers didn’t comment on the pedagogical aspect of their delivery of the ICT professional development it was apparent from how they saw students learning with ICT that they had a unified approach of treating ICT as a tool to enhance learning in their particular curriculum area.

Chapter 5 - Discussion and Conclusions

5.1.1 What roles and practices did the LT have within the cluster model?

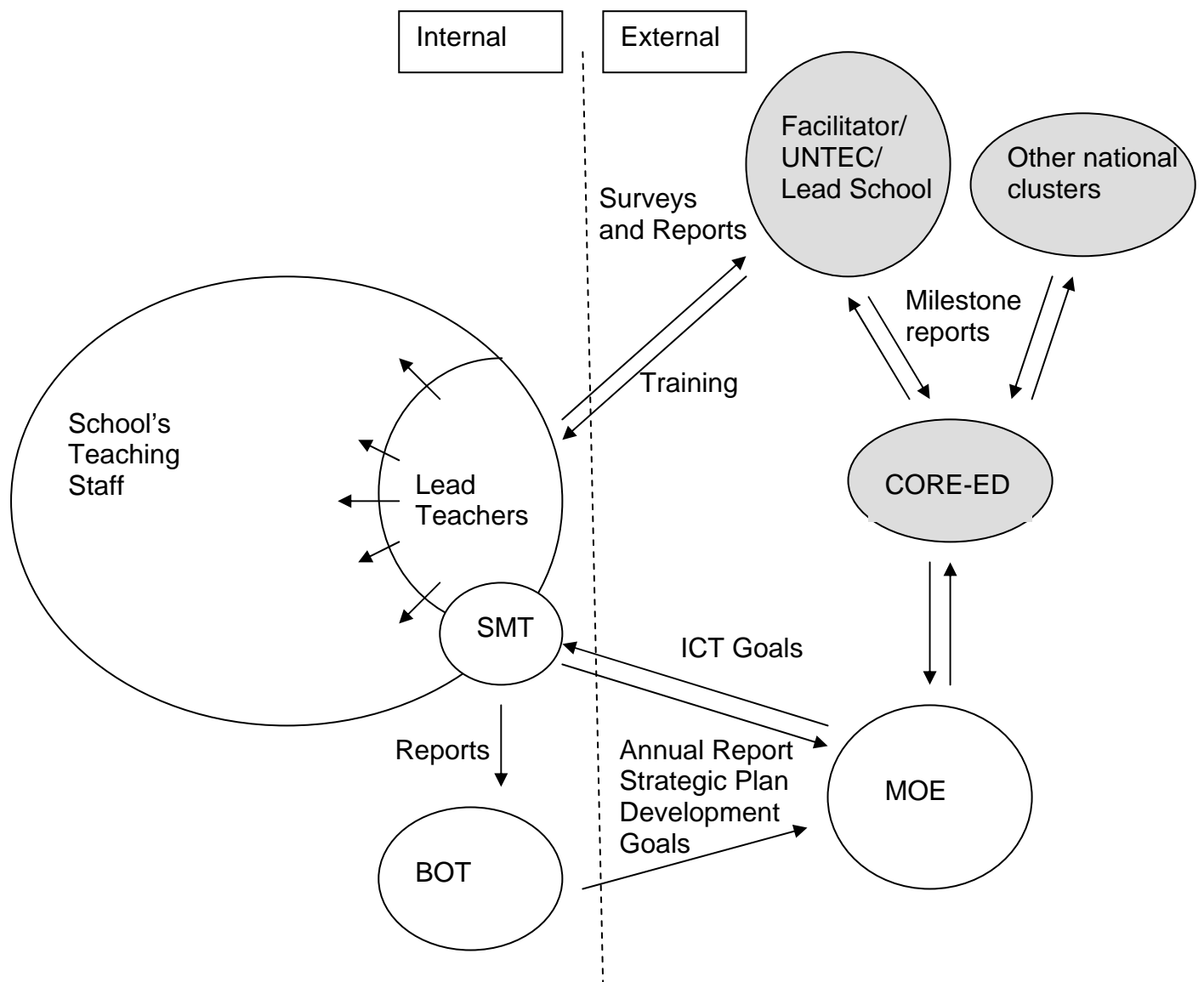
Firstly it is necessary to briefly describe the system of ICT professional development that existed during the cluster. While the lead teachers existed during the cluster there was an external facilitator who provided most of the professional development. The facilitator worked directly with each department in the school to develop a professional development programme that was tailored to each department's requirements. The professional development was a mix of how to use the ICT as well as how to use the ICT for teaching and learning of the students, pedagogy. The facilitator indicated that it was this joint focus on ICT training and pedagogy that was the particular strength of this model of professional development, as described by Halliday.

The lead teachers acted to supplement the professional development that the facilitator provided, because they were on site. Teachers were able to approach the lead teachers for support - just in time support. These lead teachers by both attending extra professional development and a variety of conferences were used both to model the use of ICT with students and to be exemplars for the rest of the staff in the use of ICT. Again the focus was on improving both the ICT skills of the lead teachers and their understanding of the use of ICT for student teaching and learning. The facilitator commented that this model had proved very successful in the study school during the cluster when real progress in the use of ICT had been made.

The structure of the lead teacher model used by the school for ICT professional development during the cluster is outlined below in Figure 6.

The lead teachers continued to work under the leadership of the deputy principal responsible for the school's professional development programme. However, the ordinary running of the group was left to the teacher who acted as a chair for the group.

Figure 6
Communication during the Cluster Funded Model ICT Professional Development



When the cluster finished the support of the facilitator, CORE-ED and the links to other clusters disappeared along with the funding for those links. The whole top right of figure 6 was removed.

This research looked at how the lead teachers could replace that external support in a sustainable manner for the school.

5.1.2 What roles and practices did the LT have in the year after the cluster?

Figure 7: The Communication after the Cluster Funding Ends

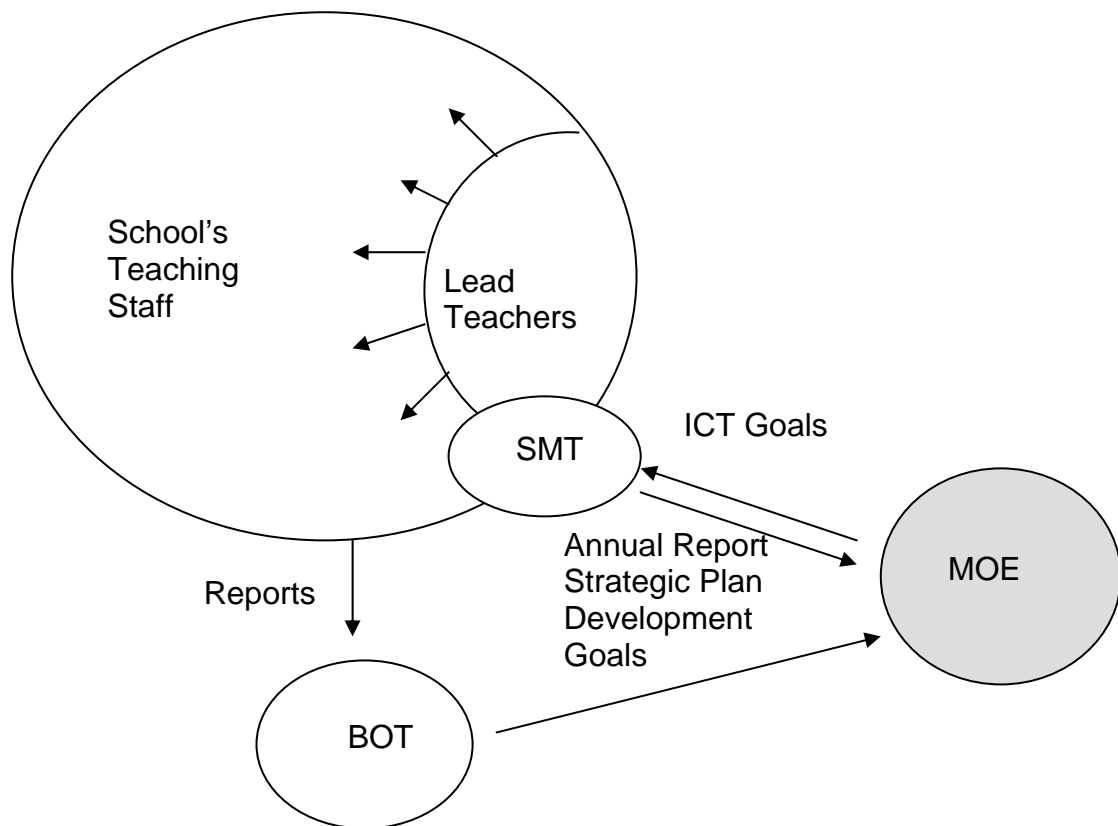


Figure 7 shows the major change, that the external support of the cluster has been removed. The lead teachers continued to work under the leadership of the deputy principal responsible for the school's professional development programme. However the ordinary running of the group was left to the teacher who acted as a chair for the group.

The next section of this study looks at the lead teachers and describes their roles and practices as lead teachers and discusses the factors that affected the group of lead teachers.

5.2 Lead Teachers

The formation of the lead teachers is critical, during interviews both the facilitator of the cluster and the deputy principal emphasised that the correct people must be picked for lead teachers. The lead teachers needed to be experienced teachers that had good skills with ICT. However more importantly the lead teachers needed to be respected by other teachers if they were to have any impact with the staff that they were going to be working with, or if staff were going to seek them out for just in time advice.

The group of lead teachers in this study were all interested in ICT and the use of ICT in teaching and learning pedagogy, even though they didn't use the term. They all used ICT in an innovative manner and were willing to let

students explore what the ICTs could do for their learning. Because they were interested in how the ICT could help their teaching they had a positive attitude and were willing participants both in further professional development and sharing what they had learned with the other staff in the school.

During the early meetings of the lead teachers it was clearly explained to them what the purpose of the group was. This clarity of purpose was important. The lead teachers indicated during interviews that they had appreciated knowing what their role was and were supportive of the lead teacher process. The clarity of purpose, specific tasks for the year also helped to focus the professional development that the lead teachers had received. The targeted professional development was important, it had helped to maintain the focus of the group, as the DP stated after one such professional development “had got the group buzzing”. Thus from the clarity of purpose and directed professional development the group had specific goals.

The leading of the lead teachers appears to be important. It was observed during meetings that the group had a clear direction that had explained the purpose of the lead teachers and helped them to set their and the groups’ goals. This leadership was often low key as suits a voluntary group but helped to maintain the group’s clarity of purpose, restating their goals when necessary.

Lastly the lead teacher group needed to be part of the school’s ordinary management structures. When the meetings were part of the school meeting cycle the members of the group gave the meeting dates more importance. Also when the meetings of the group were scheduled in the school’s ordinary meeting cycles then clashes with other meetings were reduced as most of the lead teachers had other responsibilities in the school. Lastly this scheduling of the meetings seemed to lend the lead teacher group kudos in the school, a level of recognition of the importance that management afforded the lead teacher ICT professional development task.

The key role of the lead teachers is the delivery of professional development. The next section discusses the role the lead teachers took in the ICT professional development carried out in the study school.

5.3 Professional Development

One of the strengths of the lead teacher model is that the lead teachers are on the school site. There are a number of advantages using lead teachers for the delivery of professional development to the school’s staff. The following section outlines the advantages that this study found to having the professional development delivered by lead teachers.

Because the lead teachers are practising teachers that are prepared to explore the different applications of ICT to their own teaching they have a good understanding of how ICTs can be used by students for learning. Therefore the lead teachers are well positioned to deliver professional development that focuses on the application of ICTs to teaching and learning.

This sits well with the rest of the school's staff who are largely competent users of ICT, as shown in the staff survey.

Because the lead teachers are on site and have been selected because of their reputation among the staff the delivery of professional development by the lead teachers is well received by the staff. Because the lead teachers are on site they reported that in the usual informal interactions between teachers they often had discussions with staff about the formal professional development that the lead teachers had been involved in, either delivering or that the lead teachers had received. These informal discussions helped to reinforce any formal professional development that the lead teachers may have carried out. As well the lead teachers were often approached for brief advice on the use of ICT, just in time advice, an important element in teachers feeling supported in implementing ICTs.

When planning professional development the lead teachers have an in-depth knowledge of the school, the students and the personalities of the staff. This detailed knowledge means that the lead teachers have a good idea of what is required for professional development in each area of the school. They have worked closely with a department to design a professional development plan that meet the needs of that department. As well, the lead teachers also understand intuitively the most appropriate manner to deliver the professional development to each department in the school. These two factors, individual department plan and knowledge of the department members, meant that effective professional development is delivered to each department of the school.

All of the above factors have meant that the lead teachers have been able to concentrate on the pedagogy of using ICT with students, the real requirement of ICT professional development in schools today.

5.4 Sustainability

What are the factors that helped or hindered the sustaining of effective ICT Professional Development in the year after the cluster?

Professional development for ICT was sustained in the year following the cluster. The sustainability occurred in two distinct ways. Firstly the sustainability of the changes in teaching practice that the cluster had introduced continued, for example the Social Studies and Science departments were observed using units of work that had been developed during the cluster. Secondly the lead teacher group continued to deliver and support teacher's professional development in ICT thus the practice of lead teachers was sustained.

The sustainability of the units of work developed during the cluster occurred because the teachers valued the professional development that they had received and had created units of work from that professional development. The units met their needs. Furthermore the changes developed under the cluster were manageable within the resources of the school (Fullan & Hargreaves 2002)

The support of the school's management team was crucial to the sustainability of the lead teachers' practice. The support of the management lent credibility to the group both in terms of their practice and the task that the lead teachers carry out. Simple tasks such as scheduling the lead teacher's meetings in the usual calendar of school meetings gave the lead teachers validity. Furthermore the extra professional development that the lead teachers had had and time for that to occur could not proceed without the support of the management team.

During the research the lead teacher group evaluated the role of the lead teachers and set a focus for the year, the intranet in the year of the study. This focus gave the lead teachers a sense of purpose. The group was guided through the evaluation process by the group leader who ensured that the lead teachers had clear goals and a collective clarity of purpose. This purpose was different from the focus during the cluster and added to the ecological diversity of the school, another contributing factor to sustainable change (Fullan & Hargreaves 2002)

Finally the sustainability occurred because there was a natural evolution as the lead teachers took over the role of professional development that the cluster facilitator had led. There was a long term change, sustained change

5.5 Conclusion

This research had two main parts, firstly observing and describing the roles that the lead teachers took in developing and delivering ICT professional development and secondly reaching some conclusions about the sustainability of a lead teacher model to ensure the delivery of continued ICT professional development.

The lead teachers were found to be an effective method for the delivery of ICT professional development to improve the skills of teachers using ICT with their

students. The model was effective because the lead teachers were able to tailor the professional development to the needs of individual departments or teachers. However, to be effective the lead teachers needed to be recognised as exemplar users of ICT and so respected by the staff of the school.

The use of lead teachers to deliver ICT professional development was found to be sustainable for the study school so long as a few conditions were met. To be effective the lead teacher model required leadership and support from the schools management. This support required that the lead teachers received extra professional development themselves and some time allowance to carry out some of their lead teacher roles.

Thus sustainability didn't mean that we did everything exactly the same as it had been under the cluster, but that the general impetus of keeping the ICT professional development beyond the cluster remained part of the schools culture.

Survey Staff 2005 Term 1**Computer Skills**

Please complete the following questions with the column that describes your skills in each area.

Key to Columns

1. I have no skills or limited skills in this area
2. I am able to perform tasks in this area
3. I have skills in this area

Your timetable code:

Environment, Windows XP, Network and Laptop	1	2	3
Open programs as needed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Save and retrieve files in folders as needed (XP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create, organise and manage files in folder (XP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manage user accounts on own laptop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Save and retrieve files in folders as needed (network)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create, organise and manage files in folder (network)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Able to use the data display for power point, pictures, movies etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E-mail -Neomail			
Send and receive mail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Address book, to manage addresses, create groups & send mail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use tools to manage mail folders and save preferences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School Intranet			
Able to access the school intranet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Load files for student and teacher access on intranet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Able to create pages for use on the intranet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Databases - Classroom Manager			
Enter marks and information for reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use teacher columns to make own markbook and analyse marks entered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Word Processing - MS Word			
Edit eg copy paste, find, page set and replace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Format eg fonts, borders, bullet points, columns etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inserting eg pictures, dates, annotations, page numbers etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using tools eg spell check, auto correct, macros etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using tables eg inserting, formatting, sort data, merge cells etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spread Sheets – MS Excel			
Edit eg copy paste, find, page set and replace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formatting eg number format, borders, colour, auto formatting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Charts eg creating appropriate charts and graphs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula eg inserting formulas, creating or editing formulas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data Management eg sorting, reports etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation Software – Power Point			
Edit eg copy paste, find, page set and replace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inserting eg slides, art/graphics, movies etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formatting eg fonts, bullet points, templates etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slideshows eg transitions, animations, build buttons, hyperlinks etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Web Authoring –MS Front Page			
Handle files eg open, publish and import	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Edit eg copy, paste, to do tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using tools eg hyperlinks, web settings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

Please add any comment about your computer skills

Please add any comment about professional develop that you would like for skills that you need to use ICT in your class

Thank you for your time

Possible Questions Interview

–DP (in charge of Professional Development, thus responsible for the Lead Teachers)

Warm-up

Describe topic and introduce the main themes for the discussion:
Sustainability of Information Communications Technology Professional Development (ICT PD)

Background

Describe the ICT PD worked during the cluster

- Describe your input in to the selection of the lead teacher model
- How does the Lead Teacher (LT) model suits the climate/environment at WSC (the school where the research is being undertaken)
- How were lead teachers selected?
- Explain your perceptions of the lead teacher model – strengths/weaknesses
- How does ICT PD fit into the schools Professional Development (PD) programme
- Was there an increased use of ICT in curriculum?

School Development

What adjustments are necessary for the continued ICT PD (since cluster ended)?

What barriers (if any) have you encountered with your use or continued development of ICT?

What factors facilitate the teachers to keep using/developing ICT?

What impact has the Ministry contract and its termination had upon you?

Discussion/Future

Can you identify the strengths and weakness of the Lead teacher model for the continued ICT PD ?

What are your opinions about the lead teacher model of ICTPD?

Are there changes you would make to the model?

Are there any comments that you would like to make?

Offer a chance for any further comments, discussion or thoughts

Possible Questions –Lead teachers

Warm-up

Describe topic and introduce the main themes for the discussion:

What barriers (if any) have you encountered with your use or continued development of Information Communication Technology (ICT)?

What factors facilitate you to keep using/developing ICT?

What impact has the Ministry contract and its termination had upon you?

Sustainability of ICT Professional Development (PD)

Background

Why have you consented to be Lead teacher?

How long been a lead teacher, involved in cluster (or not)?

Background or skills with in ICT

- personal
- uses with students

Tasks

Where is your dept at with integration of ICT into its curriculum?

Describe what you are doing with your dept?

How is this helping with

- integration of ICT with curriculum
- helping students with higher level tasks

Personal Development

What PD related to ICT are you doing?

What PD would you like to do?

How does PD help with your role as a Lead teacher?

Discussion/Future

Can you identify the strengths and weakness of the Lead teacher model?

What are your opinions about the lead teacher model of ICTPD?

Are there changes you would make to the model?

Are there any comments that you would like to make?

Offer a chance for any further comments, discussion or thoughts

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