How are children gaining ICT skills in a low decile school classroom environment?

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Abstract

This case study explores how primary school children in one low decile school classroom gain their skills using a computer in an integrated way. Interviews were carried out with the principal, the teacher and children and an observation of a lesson was completed. Children in this study gained their Information and Communication Technologies (ICT) skills primarily in the classroom environment. Children mentored others and were being mentored to develop ICT skills in both the classroom and at the home. The study describes four strategies used by the teacher to integrate ICT into the classroom environment, and reports on children’s perceptions of their learning. The strategies used by the teacher include fostering a social-constructivist approach in the classroom which actively encourages a range of interactions, planning to integrate a range of technologies in authentic and meaningful contexts as part of the normal programme, providing a range of support systems for children to use within the classroom, and fostering of positive attitudes towards supporting each other in problem-solving and learning.
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With thanks to Elaine Mayo for her wisdom, guidance and the interesting discussions to set me on different trains of thought throughout this project. Thanks too to Wayne Dale for his support while I was doing this project.
Introduction

I was a primary school teacher for twenty-eight years prior to becoming a lecturer training our future teachers, a role I have been in for the past eight years. In my early years as a teacher, the technology used to produce multiple copies of a document was a Banda machine and teachers used a chalkboard. During my time as an educator, I have seen many changes. One of the changes in education has been the integration of ICT into the school environment. Many teachers have grappled with integrating these technologies into the classrooms.

As Digital Horizons (Ministry of Education, 2003) stresses the importance of teaching and learning with ICT it is important to gain understandings of ways in which teachers are integrating ICT into their classrooms.

After working with the children and teacher in a low decile school classroom, I developed an interest in finding out just how the children in this classroom were gaining their ICT skills.

To try to find answers to this I question things that are taken for granted in the everyday life of the classroom and examine literature relating to the topic.

In the first phase of this report, I examine literature about learning theories in relation to the use of ICT in classrooms, integrating ICT, the school culture, developing information literacy skills, fostering thinking skills and creativity and interactions used in classrooms.

In the second phase of this report I go into the classroom to look at what learning theory is being used when the children are using ICT and how the classroom culture is fostering positive attitudes for children towards supporting each other in their learning and problem-solving. I examine strategies in place in the classroom to support learners when they are using ICT. I discuss and examine the way in which planning is used to integrate the technologies in the classroom.

In the third phase of this report, I discuss the data and the strategies used in this classroom.

This is a small case study to attempt to find answers to this question so that we may use this knowledge to guide our teaching and in the training of our future teachers so that as teachers they may support learners developing ICT skills.

This study is important because the Ministry of Education has made a commitment to ensuring the integration of ICT in schools (Ministry of Education, 2003) as such, it is an important area of research for new teachers to be aware of and have some strategies to use in practice.
Literature and overview of issues

Background to the integration of ICT in the teaching and learning environment

In this section I discuss the development of the integration of Information and Communication Technology (ICT) in primary classrooms and the issues associated with this. These issues are important in looking at how children gain ICT skills because of changes in the teaching and learning environment through access to information, curriculum changes and expectations, and a shift in educational learning theory.

Education reflects, in part, the needs of the market place. Changes in society, in particular technology, have brought with them the need for schools to change. These have now expanded to include the use of computers, compact discs, video discs and satellite communications (Hopkirk & Davies, 1984). Internationally money was invested in the 1980s and 1990s resulting in a lot of hardware and software gathering dust in classrooms (Wiburg, 1994).

In the New Zealand context Hodson (1992) found that in 1984 only about 10% of New Zealand primary schools had a computer while in 1991 that figure had changed to nearly 90% of primary schools with a computer. A 2003 study found that New Zealand primary schools have, on average, one computer for every seven pupils (Fink-Jenson, Johnson & Lau 2003). These figures show the growing importance of ICT technologies within our schools.

The Internet was developed for military purposes and later for academics to exchange ideas. It was not envisaged that computer usage, with internet access, would become a routine activity in the 1990s. The computer is now affordable and is found in the majority of businesses as well as in family homes. Our students will be the adults who are using technology throughout their working lives. The skills required to use the technologies effectively are imperative to enable our students to take their place in the market place of the future.

Learning Theory and ICT

In this section I look at the assertions of how learning theory aligns with the integration of ICT into the teaching and learning environment. Learning theory and its application to the use of ICT in the classroom environment has been an important element in embedding the new technologies within the current curriculum. One aim of this study is to investigate what learning theory is being applied in the classroom while the children are using ICT. In this section I discuss literature which directly considers learning theory in relation to ICT.
Behaviourism
Behaviourism advocates that a learner is primarily a product of conditioning; that it is through external stimuli and reinforcement that learning takes place. Chen, Hsu and Hung (2000) argue that ICT was widely used for drill and practice where students are able to learn or practise a skill at their own pace with the computer taking the role of the teacher. These programs generally have a reward for correct answers.

Cognitive
Cognitive theories have a primary reliance on what psychologists call the serial processing of information. The assumption is that people process chunks of information one at a time, seeking to combine the processes used into an overall strategy for solving a problem. Chen et al. (2000) argue that tutorial software may be associated with the cognitive learning theory as new knowledge is presented in a systematic way with the expectation that students will acquire new skills and rules that they will then be able to apply in new situations. A teacher presents schoolwork at a level to challenge the child's current developmental stage.

Figure 1

Differences in the behaviourist and cognitivist approaches relating to the teaching of ICT (adapted from Chen et al., 2000) showing differences between facts versus source.

<table>
<thead>
<tr>
<th>Learning is</th>
<th>Behaviourist</th>
<th>Cognitivist</th>
</tr>
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<tbody>
<tr>
<td>Strategies for instruction</td>
<td>Responding to stimuli</td>
<td>Application of general concepts</td>
</tr>
<tr>
<td>Repeated practice by the student and feedback to reinforce correct responses</td>
<td>Plan and organise strategies for students to receive and process information.</td>
<td></td>
</tr>
<tr>
<td>Concepts</td>
<td></td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concepts</td>
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<tr>
<td></td>
<td></td>
<td>Strategies</td>
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<tr>
<td></td>
<td></td>
<td>Advance organisers</td>
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<tr>
<td></td>
<td></td>
<td>Schemata</td>
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<tr>
<td>Computer</td>
<td>Drill and Practice Instructional Games</td>
<td>Tutorials</td>
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<tr>
<td></td>
<td></td>
<td>Problem-solving</td>
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<td></td>
<td></td>
<td>Simulations</td>
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<td></td>
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<td>Electronic books</td>
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<td></td>
<td></td>
<td>Multimedia encyclopaedias</td>
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</tbody>
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In Figure 1 the behaviourist approach deals with the idea that learning is linear and knowledge can be accumulated while the cognitive approach uses the idea that knowledge is presented systematically for students to acquire skills and apply them to different situations.
Cognitive Constructivism
Based on the premise that we all construct our own perspective of the world, and that whatever is learnt has to be constructed by the individual through knowledge discovery. The emphasis is on how the student constructs the knowledge and how this knowledge can then used to construct the student’s own knowledge and apply its meanings to new situations. Through an experimenting process students validate, modify and generalise concepts and principles (Chen et al., 2000).

Social Constructivism
Social constructivism is similar to cognitive constructivism but says that how a person constructs knowledge is bound by their social cultural influence or bearing. It emphasises context and its relationship to the interpretation of knowledge. The culture gives the child the cognitive tools needed for development. With both Social and Cognitive Constructivist theories, the computer is seen as a tool to support the learning or providing access to material (Chen et al., 2000).

Figure 2

<table>
<thead>
<tr>
<th>Learning framework</th>
<th>Cognitive-Constructivism</th>
<th>Social Constructivism</th>
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<tbody>
<tr>
<td>Assumption</td>
<td>That knowledge is constructed by individuals</td>
<td>That knowledge is constructed in social contexts</td>
</tr>
<tr>
<td>Definition of Learning</td>
<td>People build and then apply their knowledge</td>
<td>People build socially, share and agree, build up the knowledge</td>
</tr>
<tr>
<td>Learning Strategies</td>
<td>People collect information and then create concepts and principles</td>
<td>People exchange and share ideas</td>
</tr>
<tr>
<td>General Orientation</td>
<td><img src="image" alt="Diagram" /></td>
<td>Through authentic and meaningful contexts people discuss and discover meaning</td>
</tr>
</tbody>
</table>

In Figure 2 the constructivist approach deals with the idea that the learning is nonlinear and that knowledge can be constructed individually or socially. With these approaches, ICT is seen to be a tool to enhance the learning.

Both cognitive constructivism and social constructivism share common perspectives about teaching and learning. Some of these are:

- emphasise authentic tasks in a meaningful context rather than abstract instruction out of context
- provide real world settings or case based learning
- encourage reflection on experience
- support collaborative construction of knowledge through social negotiation, not competition among learners for recognition

Using constructivist models ICT is integrated into the classroom where the teacher creates a context for learning whereby students become engaged in interesting activities that encourage and facilitate learning. The teacher does not simply stand by and watch students explore and discover but guides students as they approach problems, encouraging them to work in groups to think about issues and questions, giving support, encouragement and advice as they tackle problems that are rooted in real life situations. Teachers thus facilitate cognitive growth and learning, as do peers (Hsu, Chen & Hung, 2000).

**Future learning**
Brown’s (n.d.) “future theory” relating to the integration of ICT in the classroom is described here. He points to social constructivist communities evolving in learning environments. These communities do not have the teacher or any other person as the expert but expertise is the community of practice. He argues that although constructivism is currently accepted as the most relevant view of learning a social constructivist view is becoming more prevalent. Due to the development of ICT, where escalating amounts of information are available, he also suggests that a new learning theory is evolving. Brown (n.d.) refers to this as **navigationism** where the emphasis will be on knowledge navigation. Learning will be an activity of exploring, evaluating, manipulating and navigating. Learners will solve contextual real life problems by actively engaging in problem solving and they will use all-embracing communication and collaboration. While doing these activities the aim will not be on gaining or creating knowledge but to solve problems. Knowledge will be created during the process although this will not be the focus of the activity. The teacher will become a coach to learners showing them how to navigate as well as becoming a mentor in the skills and proficiencies that are required. The focus of the learning is on the navigating in the ocean of accessible knowledge.
Figure 3 shows a learning community where everyone within the community is regarded by each other as competent and able to contribute to the community. The teacher is a member of the learning community.

**ICT integration**

With the introduction of computers into schools, there has been tension about whether these should be located in labs or in the classrooms. In a New Zealand context Wood (2002) argues that for ICT to be successfully implemented in schools there needs to be both a context and a reason for doing so and further that a change in the school culture is necessary.

In order to assist New Zealand schools with the integration of ICT the Ministry of Education put out a strategy for schools in 1998. This dealt with key action areas for learners, teachers, leaders, Māori, families, the community, businesses, resources and the infrastructure. Schools were encouraged to develop the skills of their teachers by joining a cluster group for staff training and development.

For successful integration of ICT in classrooms, a claim made suggests a focus on three main aspects for children and teachers: using the computer as a creative tool, using the computer to develop higher order thinking skills, and developing a range of teaching strategies (Cleverley, 2004). Pisapis (1994, cited in Williams, 2000) suggests that an ideal goal for the integration of computers is for “student use of computers to be woven integrally into the pattern of teaching” (p 12).

McKenzie (1998) promotes using a just-in-time approach to exposing children to ICT skills. The just-in-time approach uses the idea that learners are taught skills to enable them to complete an authentic and meaningful task as opposed to a just-in-case approach where skills are taught in the
expectation of being used at some future date. He discusses four types of intervention as effective classroom strategies for helping children gain ICT skills:

1. adding to the student toolkit as needed
2. untangling wrong thinking
3. empowering independent problem-solving
4. encouraging invention of new tools and skills.

Yelland (2001) discusses a report by the Kaiser Family Foundation (1999) of schools in the United States of America which found that children in the 2 to 18 year age group spent only about half an hour a day using computers including the use of computers during school time. Yelland (2001) states that the relevance for educators is that children are not developing skills in the use of ICT for authentic learning tasks but instead are mainly using computers for fun and that effective integration of ICT occurs in environments where teachers and learners engage in new partnerships for learning where there are collaborative and problem-solving settings. She says it appears evident that computers must be an integral part of the classroom as marginal use of them will not affect outcomes. She suggests that this can only happen through school reform in curriculum and pedagogy.

In order for ICT to be integrated into the curriculum Yelland (2001) states that changes in the learning process occurs which are characterised by

1. problem or project oriented – investigations are authentic and there are many solutions to the problem
2. student centred – students feel empowered by their work and participate in developing their own investigations. Teachers act as guides, facilitators, and provide the materials to support their learning.
3. collaborative – since learning with authentic tasks is an interactive experience between teachers and students and as students acquire and use information they need to exchange ideas and create relationships with each other and with professionals relevant to their work
4. relevant – learning with ICT has the potential to create educational opportunities to meet the needs of individuals and groups in diverse ways and allows them to work according to their needs and interests.
5. productive – the use of ICT encourages both teachers and students to become ‘content producers.’

Yelland’s (2001) arguments are supported in the New Zealand context in 2002, when the Ministry of Education published a document, Digital Horizons, to take the school communities forward into the
global community. A goal is that children should “have systematic opportunities to develop digital and information literacy, and enjoy using ICT creatively and critically in extending their horizons and growing as life long learners” (Ministry of Education, 2002, p. 12) meaning that children use ICT regularly in different contexts. This goal argues that by providing opportunities to use ICT the learners will develop their skills. Eisenberg and Johnson (1996) make similar observations and argue that while there is agreement amongst the public and educators that there is a need for children to become ‘computer literate’ there is only a vague idea of what being ‘computer literate’ actually means in terms of computer skills. Digital Horizons (Ministry of Education, 2003) emphasises the need not to just “build technical skills, but to promote the use of ICT to extend and enrich educational experiences across the curriculum, building digital and information literacy so that all learners become confident and competent in using technologies” (p. 8).

Some studies suggest that pupils are motivated by the use of ICT. McEune (2004) found that pupils are positive about the use of ICT seeing advantages in “increased self-esteem, greater control over their learning and greater independence” (p. 2).

Wood (2002) argues that ICT is a tool to enhance teaching and learning and a key danger is that ICT can become the objective in itself.

*Raising Achievement with Māori Pacific and other students in low decile schools through ICT* (RAMP Report), looked at how ICT can be used to enhance learning and teaching and identified ways in which the use of ICT can help to raise achievement for Māori, Pacific and other students in low decile schools (Stanley, 2004). This report is of particular interest to this study as the school in this study is also a low decile school in a New Zealand context. This study found that after three years of working with a group of schools to provide staff development that not all schools had fully achieved a shared understanding of the ICT integration framework within the school.

Stanley (2004) and Wood (2002) both highlight professional development as a factor for successful ICT integration into the classroom. Burns (2005/2006) lists professional development as a factor but goes further to point out that the staff development needs to focus on the development of the teachers’ understanding of the practices that are best suited to capitalize on the technology’s potential. She argues that many teachers do not appreciate that software applications are not all cognitively and instructionally equal which has resulted in many using conceptually easier kinds of software—lower-order applications that, although engaging, focus on simple cognitive tasks.

Another factor identified in the RAMP report (Stanley, 2004) is that it is extremely important for teachers to have access to “contemporary functioning technology in their learning environments” (p. 24). This mirrors Burns (2005/2006) who says that in order for successful integration of ICT into the
school it is necessary to provide access to sufficient functioning hardware and software for the students.

Mann, Shakeshaft, Becker and Kotkamp’s (1999) study was set up to look at a computer skills programme and student achievement while using the programme. Data were collected from 950 fifth grade pupils and 290 teachers from 18 elementary schools in the USA. Data collected were both quantitative (state tests, survey results) and qualitative (on-site field documentation, case analysis, interview). All of the schools involved in the study were involved with the computer skills programme. This study is of particular interest to schools starting out with integration as it covers only schools who have been using computers with students for seven years and highlights some of the concerns that they may be facing when making decisions, for example, whether to put the computers in a laboratory or classrooms. The schools selected in the study were to represent the range of variables that might influence technology use and student achievement such as intensivity of basic skills/computer education use, software vendor, student prior achievement and socio-demography. Some findings of the study were

1. that students who had access to the programme in their classrooms did significantly better than students who were taught the same programme in lab settings
2. that teachers who had computers in their rooms reported higher skill levels in managing instruction, planning lessons, delivering instruction and word processing
3. that where there were computers in the classrooms there was more time spent using computers for other subjects
4. that sixty one percent of teachers with computers in their classrooms felt confident using computers in their teaching while only 43% of the teachers using a lab felt confident using computers in their teaching

School culture
The school culture is an important feature in the integration of ICT. Means and Olsen (1994) suggest that a climate of school reform became evident in the 1990’s which resulted in discussions about the nature of teaching and learning which led to the view that students needed to be challenged with authentic real world problem solving tasks. In this setting ICT is used to support the learning as students and teachers research, organise, manipulate and present information. Wood’s (2002) study began in 1999 when the school became a lead ICT school. Staff developed a plan to integrate ICT into their school and worked with a cluster group of surrounding schools to provide staff development on how to integrate ICT into the classroom environments. Priorities were to make computers more accessible to staff and students, classrooms were to have computers as well as pods available for use, and to increase staff comfort level through professional development in ICT. A
school intranet\footnote{Intranet: a network of computers that can be accessed only by an authorized set of users, for example those within a single school} was established to provide the infrastructure for use by students with minimal guidance so that staff could cater for different levels of ability. RAMP (2004) found that for successful integration of ICT that there needs to be a school culture where ICT is valued and seen as an important tool to be used to enhance the teaching and learning. They contend that this cannot be achieved by just supplying a range of technology to the teachers. Further, they suggest professional development needs to be both developing the teachers' skills using the technology and developing their understanding of ways in which technology can be applied to teaching and learning. Burns (2005/2006) asserts that some professional development for teachers for integrating ICT into classrooms has focussed on technology skills without teachers understanding how to best capitalise on the technology's potential.

**Developing Information literacy skills**

An important aspect in the integration of ICT into the teaching and learning environment is the development of the learner’s information literacy skills. Information literacy is defined as the ability to access, evaluate, organize, and use information from a variety of sources (Hume, 1999). There appears to be some conflict between whether these skills are being taught in the classroom environment or whether learners are gaining them by osmosis. Gawith (n.d.) describes a research model whereby learners work through six steps to develop information literacy skills. As with other similar models an important aspect is the evaluation and reflection by the students as they move through the learning process. Moore’s study (2002) however, suggests that many teachers are not using any model to teach these skills. When teachers were asked to describe a model or process to use for researching she found that while they agreed that information literacy skills were essential to life-long learning “the few teachers who could describe this process tended to focus simply on finding information without looking at how it was used in any way” (Moore, 2002, p. 17). Over half of the participants felt that these skills would develop naturally as children worked with different resources. This view implied that there was little need to teach information literacy skills explicitly.

**Fostering Thinking Skills and Creativity**

While many believe that there are great opportunities for children to use ICT tools to develop their thinking skills Burns (2005/2006) found in her study that many teachers were using the technologies in the classroom primarily to teach low-level skills. In order to integrate ICT into the classroom teachers need to be aware of Thinking Skills frameworks such as de Bono’s Six Thinking Hats, from which they can view student skills and creativity (Burns, 2005/2006).
Being aware of a thinking skills framework enables teachers to plan and evaluate so that students are gaining skills in a situation whereby they are able to relate it to the real world.

**Interactions**

Cooper and Brna (2000) believe that it is important to encourage a wide range of interactions to help with the co-construction of ideas that supports and nurtures children’s development. This view fits into the social-constructivist and points to the importance of researching interactions within the classroom environment.

This study aims to ascertain how the children are gaining their ICT skills and what learning theory underpins the classroom practise when they are using ICT in the teaching and learning environment.
Methodology
Methodology, as defined by Clough and Nutbrown (2002), gives the reasons and justifications for decisions made about the research while the method is some of the ingredients within the research. Research requires the researcher to question that which is taken for granted in everyday life. An important part of qualitative research is triangulation; where data from more than one source is gathered to attempt to clarify and validate meaning (Stake, 2003). Taylor (1998) points out that this is a way for researchers to check out insights gleaned from the different informants or the different sources of data so that observers may gain a clearer understanding of the setting and those being studied. One of the qualitative methods of research is the case study as it can be seen to satisfy the three beliefs of the qualitative method: describing, understanding, and explaining (Yin, 1989).

Case study
I chose to use a case study as I was examining a single event and setting in an educational context. Bogan and Biklen (1998) and Stake (2000) define a case study as being an examination of a single even or setting and Stake (2003) points to researchers using the term ‘case study’ to draw attention to what can be learnt from the study of a particular case. Haigh (2004) says that a case study approach is often used in educational studies. It can be a preferred strategy when the researcher is carrying out a study in a real life context (Yin, 1988). Case studies can be used to bypass time-consuming tasks, such as setting up meetings with multiple parties and revising documents based on multiple reviews. In comparison with other evaluation methods, case studies may be easier to achieve in a short time. Some reasons for carrying out case studies (Burns, 1990) include their value as a preliminary study to a major investigation, their ability to probe deeply, their ability to generate anecdotal evidence to illustrate general findings, and that it may be a preferred approach when some applicable behaviours cannot be manipulated. Thomas (1998) says that case studies may involve descriptions, explanations, evaluations and predictions. However, the richness of information may be an impediment to drawing causal inferences (Stoke, 1999). A criticism of case study methodology is that its dependence on a single case means that it is not capable of providing a generalizing conclusion (Yin, 1993). The importance of a case study in this instance is that it provides insights into the workings of a well-organised classroom.

In this study there is anecdotal evidence gathered to support interpretations and possible explanations from a particular case. Additionally the behaviours of the students and the teacher could not be manipulated.
Research question and skills

How are children gaining ICT skills in a low decile school classroom environment?

This key question in this study assumes that children are gaining skills in the classroom environment but seeks to find out how they are doing so.

Other questions arising from the key question are

- What methods do children use to gain their ICT skills?
- Where do children claim they are gaining their ICT skills? If they are gaining them somewhere else, are they transferring this knowledge to different situations?
- Are children problem-solving to gain the knowledge required to complete the task?
- To what extent do people who have learnt to become successful ICT users need supportive and available mentors?
- How does the teacher plan to allow opportunities for children to gain ICT skills in the classroom environment?
- How does the classroom culture encourage the development of ICT skills?

In order to address these questions I have collected and analysed the following data:

- I interviewed the children to identify the people children consult (Principal, teacher, peers, parent helps, siblings, parents)
- I noticed the kinds of interactions; verbal, body language, collaborative – this was carried out through observation in the classroom
- I investigated what a child does when they want help, for example how do they signal? Who gives the help? Observations were carried out in the classroom.
- I observed the patterns of interactions in the classroom.
- I noted what scaffolding was available in the classroom environment, for example written tutorials. To do this I used observation and interviews with the children and classroom teacher.
- I noticed problem-solving strategies used by the child/ren.

Methods and sources of data

This is a small case study using one inner city, low decile school classroom. I had been in the school and worked in this teacher’s classroom prior to this study and therefore knew that ICT was being integrated into her classroom programme.
Interviews

Initially I interviewed the principal, and the classroom teacher. Interviewing the principal gave me an understanding of how the school had integrated the technologies and provided the professional support for the teachers. Interviewing the teacher gave me insights into her development with the technologies.

I interviewed children to find out their own perceptions of where they gain their ICT skills. Based on my earlier observations and in consultation with the classroom teacher six children were chosen to be interviewed. These children displayed varied levels of confidence while using ICT. Two children were very confident, two were of average ability in the classroom and two with below average ability in the classroom.

The interviews were face-to-face that were tape recorded and later transcribed. In this way, I was able to look at trends or patterns from the observations and interviews.

Purpose of the Interviews

We research to try to discover and document human behaviour in or to learn how the world works (Neuman, 1997). By doing this we can learn to control events and improve the way things are done. The goal of social research is to discover how people construct meaning in natural settings, such as a classroom (Neuman, 1997, p. 69). Cuttance (2002) noted, “schools that developed ICT-based innovations found the discipline of researching and measuring the impact of their innovations to be a significant challenge” (p. 99). I am attempting to find out how the children are gaining and developing their ICT skills and interviews are a way to find out.

Participant Observation

I observed one classroom lesson during the school morning. I chose a school I knew was integrating ICT into classroom programmes. I was a participant-observer rather than an unobtrusive observer, or a complete participant or an observer as participant (Burns, 1994). This meant that students did not only know me as a researcher, I was also working with them in the classroom in support of the teaching. I went at a time convenient to the teacher and when ICT was part of the classroom programme. I observed something small enough to be manageable (Neuman, 1997). When doing observations it is important to record data using an exact system and to do the recording as soon as possible after the event to avoid errors in perception (Neuman, 1997). I recorded my observations as soon as possible after the events.

Tape Recording

During the observation I tape recorded interactions between myself and the children; between the teacher and the class and interactions between children. This enabled me to check for patterns drawn
from more than one source by looking at the observations and the interviews. Interviews with the children were also tape-recorded and transcribed.

**Semi-structured interviews**

Reinharz (as cited in Bishop, Berryman, Tiakiwai, and Richardson, 2002) states unstructured interviewing allows access to people’s thoughts and ideas which are expressed in their own words. Burgess (as cited in Bishop et al., 2002) says that interviews as conversations offer opportunity for a reciprocal dialogue that engenders trust and openness. This personal approach encourages the participants to share their observations and recall of pertinent information (Bogdan and Biklen, 1998). Interviews are valuable when we need to ask open-ended questions or open-ended probes to allow respondents to say what they think “with greater richness and spontaneity” (Oppenheim, 1992 p. 81). An advantage of face-to-face interviews is that the interviewer can ask all types of questions and use probes (Neuman, 1997).

These interviews were semi-structured, audio taped and face to face. Having semi-structured questions was to ensure children were discussing the topic. I made use of open-ended questioning to allow me to ask more in-depth questions to clarifying responses (Neuman, 1997). An advantage of using face-to-face interviews also allowed me to see any facial expressions or non-verbal interactions that may not be clear from an audio tape transcription (Neuman, 1997).

After my observation in the classroom and in consultation with the teacher, six children were chosen to interview. Two children were competent using a computer, two with average computer skills and two needing help when using a computer. Three girls and three boys were chosen to keep a gender balance.

**Ethics**

I applied for approval from the College of Education Ethical Clearance Committee. I supplied children, parents/caregivers, the principal and the teacher with letters outlining the project and gained their permissions to investigate this study (Appendices 1, 2, 3, 4). I gave assurances to all parties that all data would be remain confidential to my supervisor and me and that no identifying findings would be published. All participants of this study were given an assurance that they could withdraw from the study at any time. All participants were made fully aware of the College’s complaints procedure. Children interviewed were asked to invent a code name to be used by me for the purpose of the data storage which is required to be for five years.

All names used in this report are pseudonyms.
Findings – Descriptions and summary of data

Background to the school and classroom

In this section I will give a background to the school and the classroom. This is important to the research to show where the school and its teachers are in relation to the integration of ICT.

Cluster groups were set up in New Zealand as part of the Ministry of Education’s strategy to promote the integration of ICT into the schools (Ministry of Education, 1998). A cluster group involves several schools working together to apply to the Ministry for extra funding to enable the staffs of these schools to undertake staff development together to

1. increase the teachers’ ICT skills and knowledge
2. increase the usage of ICT for professional and administrative tasks
3. support the schools’ policy and planning initiatives relating to ICTs
4. to increase the frequency and quality of the classroom usage of ICTs to support teaching.

This school has not been part of a cluster group. Due to this fact and with the added fact of the school being a low decile school, I did not expect that I might see factors listed as important to the integration of ICT.

The school is a low decile inner city school with a transient population with many different cultures being represented. Initially the school choose to employ an ICT facilitator one day a week. Two of the teachers within the school showed an aptitude for using ICT as a tool to enhance classroom programmes. These teachers took on the responsibility for the school’s ICT programme. Over time the original teachers have left and been replaced by others.

The two teachers leading the ICT integration in the school have led ongoing staff development for teachers within the school. Both teachers also provide mentoring for other teachers through a release day each where they able to work along side their peers.

The use of ICT integration into the classroom programmes is valued by the staff members in this school and the wider school community, which can be seen by the numbers of parents attending meetings to view the work children from all classes are doing in this area.

Each classroom has between two to four stand-alone computers as well as access to a pod\(^2\) of iBooks shared between 12 classroom teachers. The teachers are able to book this pod when they require it in their classroom. Each classroom has a printer. Other hardware teachers have access to are; digital

\(^2\) Pod; a portable bank of computers which are able to be relocated easily
still cameras, digital video cameras, and data projectors, which are all available through a booking system and shared between the teachers.

The principal said the school has a contract with a small company who support them in terms of any issues that may develop. They do not support classroom programmes but just in making things work. The classroom teacher has responsibility for the ICT programme in the school. She enjoys using ICT as a tool to enhance children’s thinking and learning. The classroom is set up to cater for the use of the pod without disruption.

During the year she ensures that the children are using a range of software applications. In this way, she is introducing the class to a range of technologies and software applications requiring more than simple cognitive skills.

There are twenty-eight children in the class. The children are 10 year olds in Year 6. Some of the children had been with the teacher the previous year and so had done a lot of computer work previously. Other children in the class had a limited exposure to the use of the computer as a tool. The teacher paired the children for the lesson based on her own prior knowledge of the children’s ability.

For this lesson the classroom had two computers and also used a pod of 12 laptops (Mac computers).

Figure 4
Classroom layout

Figure 4 shows the classroom layout and where the children and computers were placed during the lesson. The data show was placed on a child’s desk at the front of the classroom so that it could be projected onto the whiteboard. This classroom has areas for the children to use such as a Reading Corner and computer area.
Background to the teacher
For ethical reasons the teacher in this study is known as Jane.
Prior to the lesson observation, I interviewed Jane to find out about her background and her views on integrating ICT.
The RAMP report (Stanley, 2004) identified three significant elements needed in the successful integration of ICT. These were
1. the development of teacher skills in the use of technology
2. teacher understanding of the ways in which technology can be applied to teaching and learning
3. a school wide culture meaning that ICT is valued and seen as an important tool for enhancing the teaching and learning.
These elements guided my semi-structured interview with Jane.

The Teacher
Jane has the responsibility for ICT within the school. With another teacher in the school, Pat, she is an ICT facilitator. Jane came back to teaching after time spent in the home when she was bringing up children. At the time she came back the school was beginning professional development for teachers to be able to integrate ICT into the classroom environment. Jane had not used a computer at all. Emma, an ICT facilitator in the school at that time, was undertaking her own personal professional development by taking additional ICT papers through the College of Education.

Jane reports that she and Emma worked well together (Jane also had her child in this teacher’s class). Jane learnt many computer skills through staff development sessions provided by Emma. In addition to this, her daughter learnt a lot of ICT skills while in Emma’s classroom and is now teaching Jane when she needs it. Jane has found that being in a school where there has been a ready access to the computers has been an advantage.

Jane described the skills that the children come into the classroom with as being widely diversant as the school population is made up of a high number of a transient population. She explained that some of the children in the class are very skilled using a computer while others coming in are not able to make a space between words when typing. In the classroom, she buddies the more skilled children with those less skilled so that the children are supported by each other. To do this she finds that using laptops and small groups of children working together works well. In these groups, Jane has one skilled person who is able to lead the group and teach.

Jane has two classroom computers set up continuously throughout the day. These computers are on a roster system in the room where the children are rostered in fifteen-minute slots. She provides a
weekly lesson where she sets up a project and then the children are able to do this during their rostered time. Each child has a computer buddy so that if there is a problem they can ask their buddy before asking Jane. The computers are therefore an integral part of the classroom environment and used constantly throughout the day.

Jane believes that ICT work should be meaningful and authentic to the children in her class. She designs opportunities for the children to use ICT related to the current topic; for example the children made iMovies about a trip they went on and in another instance made PowerPoint presentations to present their research findings about a study of Antarctica. The school presents the ICT work to parents at parent evenings and have found parents more likely to attend these meetings. The parent reaction to these meetings has been very positive with parents proud of their children. Jane feels that the parents are keen that their children learn computer skills.
The lesson

Background to the lesson
This lesson took place during the first term of 2006.

The teacher used the fact that the class had been away on camp the previous week to generate an authentic activity. Various businesses had sponsored camp fees. On camp, they undertook many outdoor activities such as kayaking and jet boating. Digital photos were taken of the children doing these activities. Over the weekend, the teacher downloaded the digital photographs and then wrote several CD ROMS, with the photos on them, for the children to access.

On Monday, the children wrote a draft letter of thanks for sponsors. I observed the next day when they used the computer to write letters. These were to have a camp photograph inserted. This was an authentic task using the computer and developing skills in a meaningful context.

Lesson Structure
There are five parts to the lesson structure:

1. At the start of the lesson, Jane talked the pupils through turning the computers on and bringing up the program to be used. This had previously been done by children and was a reminder to them on the correct way to do this and catered for different models of computer which some had not used before. Children were able to do this without assistance.

2. Jane used a data show reminding children of previously used skills; font, styles, use of the Return Key.

3. She showed them skills that they would use
   a. inserting a graphic from a CD ROM (where graphics from the camp were stored)
   b. how to word-wrap these in the document.

4. Children were all given a tutorial (Figure 5) outlining the steps in this process. These were put into their ICT books providing scaffolding for the task and a point of reference later.

5. During the lesson the pupils interacted with each other, Jane or me to solve problems. Jane told the class that both she and I were available to the children to help solve problems.

Lesson description

Introduction
The teacher had computers ready in the classroom and tutorials ready to provide scaffolding for some of the skills they would be using. There were enough computers available for the class to use in pairs.
Children were told what they were going to learn during the lesson. These included

1. Setting out letter format
   a. revisiting what had been done the previous day
   b. Jane wrote the format for a letter on the whiteboard following children’s suggestions
      “What do I need to do now?”
   c. Jane used a red line to show where an extra line was required
2. Showing the class how to insert photos into a document
3. Showing the class how to word wrap the photos.

A class interaction between Jane and the class revisited previously used Word skills so that children would remember how to do these.
Strategies used

ICT books

Children were given new books. This was the first time these books were used. These books were for them to use to paste tutorials\(^3\) in during the year. Jane had made tutorials, using screen dumps, showing

1. how to save files
2. how to insert and word-wrap a graphic.

These tutorials were to help children with the work they were doing. Jane explained that they would be given new tutorials during the year to help them to remember things that they were introduced to.

An example of one of the tutorials is shown in Figure 5.

Jane explained her reasons for the children developing their own ICT tutorial books: “I was trying to do something with PowerPoint recently and I had forgotten how to do it. I had to look up a Help tutorial. This way you will build up your own book to refer to when you forget.” Jane was providing scaffolding that children could refer to later.

Pairing for interaction

Jane paired the children so that one competent child was working with one who may require help. The laptops were given out with the number of the laptop recorded so that the children could use the same laptop again to access their files. These computers are not networked so children saved to hard drives of individual computers.

Jane showed children how to set up laptops and then children set up their own laptop and turned them on. Some children, not sure of where each plug went, tried different holes until they found the right one; everyone solved any difficulties that arose and none asked for any help from others.

\(^3\) Tutorial; step-by-step instructions showing the reader how to accomplish a specific task
Demonstration
Using her data show, Jane demonstrated how to launch a Word document from the icon on the dock. The laptops were Macs using a dock where commonly used programs have an icon to allow easy access to the program. Some computers did not have the Word icon on the dock; help was given to those requiring it. Children launched the Word program.

Jane had ROMs with digital images available for the children to use. Jane showed how to insert a CD ROM into the drive. There were two different models of computers in the classroom and she demonstrated both models. This was necessary as the drive was located in an entirely different position on the different models. The children all looked to see where their drive was on the laptop they were using. Jane showed the children how to use the ROM to insert a graphic and word-wrap it. On the ROM were many graphics so she showed them how to view thumbnails to find the one they wanted. After inserting the graphic Jane showed them the picture toolbar appearing when the graphic was selected. She demonstrated how to select the word-wrap feature and told them to use ‘tight’ so text would wrap tightly around the graphic allowing it to be moved on the page. Once the graphic was word-wrapped, she showed them how to size the graphic to balance it on the page. In order to do this she got the children to give her instructions on the steps required to complete the task. They used the tutorial in order to give her the instructions.

Instructions given to the children were to use a size 12 or 14 font but they could choose whichever font they wanted. Children were aware of different fonts. Jane explained the roles for the pupils; one was to work on their letter while the other helped and after ten minutes, the roles would reverse. The children then immediately started the task.

Intervention
During the lesson, Jane intervened twice. The first time she noticed that many children were trying to access the graphics incorrectly. She stopped the class. Using the datashow, she demonstrated the point. McKenzie (1998) suggests that an effective classroom strategy for helping children gain ICT skills is intervention to untangle wrong thinking.

The second time was to demonstrate a skill many needed. Another intervention strategy discussed by McKenzie (1998) is the adding to the student toolkit as needed.

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*Thumbnail: small picture of the actual graphic*
Cooper et al. (2000) believe it is important to encourage a wide range of interactions to help with the co-construction of ideas that supports and nurtures children’s development. Here I looked at types of interactions occurring in the classroom and whether these interactions were helping children to construct meaning.

During the lesson, five types of interactions were seen. I describe an example of each type of interaction and I include a diagram to show how the interaction is being used in the classroom. The types of interaction were:

**Interaction Type One**

**Recall**

A class interaction between Jane and the class was used to revisit previously used Word skills so that children would remember how to do these. Jane asked questions with children responding, for example

**Jane:** How do you make a capital letter?

**Child:** you hold down the shift key while you type the letter you want to be a capital one

**Jane:** How do you make a new line?

**Child:** You press the Enter key

![Diagram](image)

Figure 6 depicts a class interaction where Jane is asking children to remember skills used previously and to verbalise how to do it. By using this questioning Jane was setting a climate for a learning community where all contributions by children were valued and members of the community were all contributing to a shared understanding.
Interaction Type Two
Developing new skills

In this interaction, Jane and the class used the tutorials as Jane showed the children how to insert, word-wrap, size and move a graphic on the page.

Jane: What do I do now?

Child: (using written tutorial) you go to Insert up the top and then go to picture.

Jane: Like this?

Child: Yes. Now you go to From file.

Children were introduced to skills they would need to complete the work they were doing. In Figure 7, the interaction is between Jane and the class with the added feature of using the tutorial to answer Jane’s query. This showed the children how to use the tutorial.

Interaction Type Three
Problem solving

In this type of interaction children worked in pairs to peer tutor and problem solve together.

Child 2: st
Child 1: st?
Child 2: street
Child 1: that’s spelt wrong
Child 2: what?
Child 1: it comes up (pointing)

Children helping each other spelling out the words needed.

Child pointing out that the red curved line means that there is a spelling error
A child-to-child interaction, Figure 8, encourages children to verbalise actions as well developing their own knowledge and arriving at a shared understanding. They verbalised spelling needed in the letter and looked at a red line denoting a spelling error. These interactions result in a shared understanding as depicted in Figure 8. This type of interaction was very common throughout the lesson. In this type of interaction the children are supporting, mentoring each other and problem solving to complete the task.

**Interaction Type Four**

**Problem solving**

In this interaction the child is asking an adult for help to move text to a previous line.

**Child:** I want that part there to go up there

**Researcher:** – oh, right move the cursor just to there, the start of the 2.

    Click in there. Now what do you think we could do?

**Child:** Um, go (presses a key)

**Researcher:** what about that one, what would that do?

**Child:** Oh (accomplishes the task)

The child is asking how to take some text back to the previous line having used the Return key to go to a new line.

In a child to adult such as in Figure 9, the adult can provide prompts (coaching or mentoring), to allow the child to problem-solve and then give validation for the solution. Here the adult is in the role of mentor allowing the child to experiment in way where they feel supported.
Interaction Type Five

Problem solving

In this interaction children are asking an adult for help to move a graphic to a new position.

Child 1: Here we go
Child 2: I want to move it
Child 1: Press on the square somewhere
Child 2: Get into that thing
Researcher: –What’s the problem?
Child 2: We need to move it down
Researcher: It doesn’t want to go does it? Now what did Jane tell us to do?
Child 2: I think that’s the square
Researcher: double clicking on it. (Pause), and then we go to ---.....
Child 1: Layout
Researcher: good, well done
Researcher: and then what do we do?
Child 2: Square – here we go, here we go
Researcher: Well done
Child 1: Woo hoo

The children are trying to move a graphic to a new position. Here they need to word-wrap the graphic as the graphic is behaving like some text initially. The children were trying to problem-solve themselves, one had a hand-up signalling they required more help.

Child looks for the square that she had seen the teacher use

Adult coaches the child for the next step

Problem solving completed - validation

In interactions with more than one pupil and an adult the adult, such as in Figure 10 the adult can act as a coach or mentor and prompt the children to problem-solve difficulties encountered. This encourages children to problem-solve and provide their own answers to queries. Here the researcher is in the role of a mentor allowing children to experiment in way where they feel supported.
Classroom interactions
While observing I noted interactions in the classroom. Children moved around nearby desks to see how others solved problems or did things. Although no directions were given that children could not move around the room freely they all kept to their own near neighbours to interact with the others. A possibility for this occurring was that the children were focussed and moving far away may have disrupted their thoughts. One child, Gary, did not move but several others came to him, his computer skills appeared to be respected by other class members. The six class members I interviewed are identified on Figure 11.

Figure 11
Classroom layout, student interactions and identification of interviewed students

Figure 11 is not to scale but gives an idea of classroom layout. Movement along the outside desks in the classroom was restricted due to a tight fit of desks. Figure 11 shows types of interactions between class members. Most of the time the interactions were both ways with one pair moving to another for validation of what they were doing or to ask how the others had managed a particular skill. This does not include the interactions between each pair as these were ongoing throughout. It does not show ALL the interactions as many were repeated many times, it shows an interaction once. The
interactions in the learning environment were on-going throughout the observation. At no time did I observe any behaviour problems by the children nor did I see children ‘off task’. They were all engaged and eager to do the task.
**Interviews with the children**

Six children were interviewed in face-to-face interviews. Interviews were taped and later transcribed with other relevant observational notes which were written directly following the interviews to avoid any errors in perception. Where these children were sitting during the lesson is shown on Figure 11.

**Gary** is seen as a competent computer user by Jane and respected by the other classroom members for his computer knowledge as evidenced in Figure 11 where it can be seen that he is often asked by other group members to help. In the classroom environment he asks Jane or looks in his computer book when he has a problem. He has a sister at home who helps him when he needs it. He enjoys using the computer both at school and at home and considers himself to be confident at doing computer work. He likes to use the computer at home to play games. His sister is a secondary school pupil who taught him how to use PowerPoint. His mother has asked him to help her with computer problems in the home (when his sister is playing netball). Because he lives some distance from school, he does not have other children in the class to his home to play with his computer. He prefers to use the computer by himself rather than with others. He says that this is to give him more time on it. He uses the computer in the home more than he watches television.

**Sue** is seen by Jane as a competent computer user. She loves using the computer both at home and at school and thinks that it is easy to do tasks on the computer. If she has a problem at school she asks either her buddy or Jane. Her grandmother owns a computer and has a printer. Sue takes files to her grandmother’s to have them printed. She is proud of work she does on the computer and considers that she is good at using the computer. She is asked by other class members to help them with problems. She enjoys using the computer to draw (using Paint and Kidpix programs), both at home and at school. She enjoys using PowerPoint both at home and at school. She likes to use the computer at home with her younger brother and shows him how to do things. She has an uncle who is a keen computer user and she rings him if she and her mother are unable to solve any problems she may have at home. Her mother has shown her how to use PowerPoint. She likes working with a partner as it is fun and they can help you.

**Rosie** is seen as having average computer skills in this classroom. While she does not have access to a computer at home, she does have ready access to a close family friend’s computer. She feels confident using the computer at school. If Rosie has a problem at school, she asks her buddy and then Jane. Her favourite program is Kidpix. She has helped other class members when they needed help. She feels confident about using the computer at school. At home, her mother is able to help if she needs it. She likes to work with other class members as they can do the work together.
Ian is seen by Jane as having average computer skills in this classroom. He has access to a computer at home where he uses it to play games. If he has a problem at school he asks his buddy first and then Jane. He feels confident about using the computer at school. He has helped other class members to solve a problem when it has been something he has done previously. Ian prefers to work with a buddy than on his own so they are able to work together and help each other. At home, he uses the computer by himself.

Paul is seen by Jane as having below average computer skills in this classroom. He feels confident using the computer at school and asks Jane or his buddy or other class members for help when he needs it. He likes using the computer at school. He likes working with a partner or working on his own. He enjoys playing games on the computer. He also enjoys making pictures and writing stories on the computer. He does not have a computer in his home and does not use a computer anywhere else.

Jacqui is seen by Jane as having below average computer skills in this classroom. There used to be a computer in her home but it was broken ‘ages ago’. She does not use a computer anywhere other than school. She feels confident using the computer at school. She has been asked for help by other class members and has been able to help them. She likes to work with a partner and on her own. She likes to draw pictures and write stories on the computer.

**ICT used in a meaningful context**

McKenzie (1998) argues that ICT should be used in a meaningful context in the classroom environment. Children were asked if they had used the computer in the past week. All children replied that they had and all described the work that they were doing in the classroom.

**Sue:** We were writing our letters to the people who gave money so we could go to camp. We put some pictures in the letters so they could see what we did on camp.

**Ian:** Making pictures and writing a letter to the people that paid for part of our camp.

Jane had planned an authentic and meaningful context for the children to be using ICT in their classroom programme. The children understood the purpose of using the computer to do this and saw the computer as a tool to use to accomplish the task.

When children were asked how they knew how to do the task they all mentioned that Jane had shown them how to do the task for example:

**Rosie:** The teacher showed us.

The children were able to describe Jane showing them how to do parts of the task that they were to accomplish. They could then use this to help them with the task.
Problem solving
McKenzie (1998) argues that ICT in the classroom environment can be used to enable children to problem-solve. Children were asked what they did in the classroom when they encountered any problems.

**Gary:** I would either ask my teacher or look inside my PC book

**Sue:** I put my hand up and ask the teacher or my buddy that I’m working with.

**Sue:** We’ve just started our ICT books and it’s got how to save work in there and how to get into desktop

Access to technology
Children were asked if they had used the computer anywhere else during the week, for example at home or at a library. This was relevant to the research question the key question to the research asks how children are gaining their ICT skills and children may gain these skills from places other than the classroom environment. Therefore, it was necessary to explore other avenues where skills may be gained.

Of the six children, four had used the computer at home. The children tended to use computers in their homes if they had one there. Two of those interviewed did not have one at home and did not use them anywhere else so they had limited access to computers apart from the school environment. This would limit their ability to practise the skills learnt in other contexts.

One child had used the computer in the library (at the school)

**Sue:** I used it in the library to go onto Kidpix and used it in the classroom with …

Interactions
The children were aware of the interactions that they may use to help them with any problems that they may encounter. They mentioned working with a buddy or asking another class member or the teacher (adult). They also mentioned the ICT books that they were making. These books are to provide a point of reference when they may want to remember something that they have done previously.

The children were asked who helped them on the computer at home.

**Gary:** I would ask … ‘cos she’s the one at home who knows how to do it … (sister)

**Sue:** I ask mum for help or I just ring my uncle ‘cos he’s like a computer genius – he’s an electronic man and he likes computer games

**Rosie:** Mum sometimes

**Ian:** I ask Mum for help
The children using computers at home had people to support them when they needed help. Knowing that help is there when they need it encourages children to be adventurous. People can become frustrated and ‘give up’ if they are unable to solve a problem quickly.

Children were asked the sorts of things that they did on the computer at home.

**Gary:** I usually go into playstation games

**Gary:** My sister’s shown me how to do PowerPoint and things like that

**Sue:** Going to Paint to do pictures and PowerPoint presentations. I can do PowerPoint presentations and I can do birthday cards

**Rosie:** *Writing*, like letters and stuff and different other stuff

**Ian:** Playing games.

While the children enjoyed playing games it was also obvious that they were proud of the other activities they did such as PowerPoint presentations. Some of the skills they were using to do these presentations were introduced at school while they had found out about other skills in the home situation from another member of the family. They were then able to use the skills in different contexts, build on known skills and help other members of the class.

Other questions the children were asked were whether they helped others to do things on the computer when others needed assistance.

Relating to the classroom:

**Gary:** Like saving things like that

**Sue:** Yes, once I taught … how to go into Classrooms Room 10 ‘cos she couldn’t find her letter

**Ian:** Yes, sometimes when it’s something I have done before

**Paul:** Yes, if I know how to do it. Once I showed … how to find a picture

Relating to home:

**Gary:** Occasionally I show mum when … is out doing basketball practice ‘cos I’m second best at home

**Sue:** I sometimes work with my little brother, …, he’s 8 and we like doing paintings

The children enjoyed interacting with other people to problem solve. They are going from the role of being mentored to mentoring others both in the home and the school situation, which enables them to have feelings of self-worth.
Discussion of this study

In this study I have gone into an everyday situation and attempted to question things that may be taken for granted. Triangulation is an important part of qualitative research (Stake, 2003). Taylor and Bogdan (1998) define triangulation as being a combination of methods and sources of data in a single study. I have gathered data from a range of sources in an attempt to clarify the four main issues arising from the study.

Integrating technology into the learning environment

Jane gained confidence integrating ICT into her programme by having easy access to the computers and undertaking professional development as part of the school-wide focus on ICT. The school provided her with a laptop that she was able to take home to help her gain confidence using a range of software. As she became familiar with programs, she integrated these into her classroom. She uses a range of software applications such as Word, PowerPoint, and iMovie. The children use computers daily using a roster system allowing children to practice and develop computer skills and use the computer as a tool in their learning. These are all factors identified as being important to the integration of ICT.

Using a social-constructivist approach

Jane uses a social-constructivist approach in the classroom. The children work in small groups interacting to build knowledge. They exchange and share ideas in a meaningful context. However, the model being used in the classroom moves towards that proposed by Brown (n.d.) as a future learning theory whereby class members are mentoring and coaching and the teacher is the source of skills and competencies required to navigate.

Planning to integrate ICT in authentic and meaningful contexts

When planning Jane ensures prior knowledge is revisited and new knowledge introduced at appropriate times to accomplish tasks. Jane plans opportunities where technologies are part of the normal classroom programme. By long term planning, she ensures covering a range of technologies throughout the year. Tasks are planned as meaningful and authentic to develop skills and enhance learning opportunities. This study supports the RAMP report (Stanley, 2004) that emphasises the importance of tasks done on the computer being meaningful for children and that the teacher plans to use a range of technologies.

Jane uses a range of teaching strategies and encourages children to develop higher-order thinking skills through questioning. These questions were ‘why do you think....?’; ‘what might happen if....? ’
This study supports Cleverley (2004) who suggests that for successful integration of ICT into a primary classroom the teacher needs to ensure that they encourage children to use higher-order thinking skills while using the computer. Student use of computers is woven into the pattern of teaching where the children are using the computers as part of their natural routines. The computers are available in the classroom at all times for children to use.

After discussions with Jane I have developed a diagram, Figure 12, to show the way she plans for integration of ICT and the support available for the class to enable them to complete tasks.

Figure 12
Planning for integration of ICT

Providing a range of support systems within the classroom

Jane demonstrated skills that would be required to complete the task. During the lesson, she called on the class to stop their work. This was because she saw children struggling with one skill. She demonstrated how to do this using the datashow. This supports McKenzie (1998) who suggests meaningful interventions when exposing children to ICT skills.

Jane actively encourages children to use peer-tutor by pairing less able children with capable computer users. She is writing tutorials so that children are able to keep these in a book for future reference.
Fostering children’s attitudes and approaches

The children in this study were prepared to problem solve in pairs and then seek help from other class members or an adult. This appeared to be part of the classroom culture where the children were ready and willing to help each other when problems arose for anyone. Unlike the study by Ham, Gilmore, Kachelhoffer, Morrow, Moeau and Wenmoth (2002) whereby children observed used laborious methods such as numerous undos to edit work, I observed none of the children using such methods but instead used peer-tutoring or interactions to problem-solve.

Children who were identified as having better computer skills appeared to use the computer at home and were supported in their endeavours by a parent, sibling or other family member. The more able children also mentioned teaching other family members.

All children mentioned that they felt confident using the computer and all said that they had shown other pupils how to do things on the computer. This study supports Goldsborough (2003) in that children were confident in their abilities and willing to take risks. One child told me that Jane said that they were the best class with computers. This child felt very proud of this fact.

The children were interacting freely with each other and asking each other for help. The interactions in Figure 7 show that children tended to move around in their immediate vicinity rather than moving away. The interactions I observed support Cooper et al. (2000) who tell us about the importance of a wide range of interactions to enable the co-construction of ideas.

While all the children interviewed said that they liked to play games, they all mentioned other things that they enjoyed doing on the computer that included a range of programs. This does not mirror Yelland (2001) stating that children mainly used computers for games.

A concern I have had would be that teachers use the same technologies repeatedly with little time spent on building skills and therefore children may become competent users of limited technologies.
Limitations of the study

A limitation of this study is the small size of the study; it is a small case study.

I needed to gain access to a school where the class teacher was amenable to visitors in the room for the purposes of research and where ICT was being integrated as part of the classroom programme.

Another limitation was the number of observations made. Time was a limiting factor here for both the classroom teacher and me. Ideally, it would be interesting to observe a class at regular intervals throughout the year.

The small number of children interviewed was another limiting factor. Ideally, it would be interesting to interview all of the children in the classroom however, time constraints did not allow for this.

Despite many hours, time has been a limiting factor for me with a full workload and many students and staff members requiring assistance. I therefore do not have the time to do a more in-depth analysis.
Conclusion

Children in this study are gaining their ICT skills primarily in the classroom environment. Some of the children are also gaining the skills by a mentor in the home environment. Those gaining some skills in the home environment are mentoring others in the classroom environment. It was interesting to note too that children are also, in some cases, mentoring others in the home environment with skills they have gained in the classroom environment. It would be interesting to extend this study to see how much the children’s ability to mentor others influenced their own attitudes to the use of ICT and their own self esteem resulting in their ability to do the mentoring.

My fears that children are not developing a range of ICT skills in a low decile primary school appear to be unfounded. The teacher was actively moving the children through a range of technologies to develop relevant skills. These children are building their skills through the use of a range of technologies and the teacher is actively involved in the children’s learning by coaching and mentoring them to accomplish authentic and meaningful tasks.

In the classroom environment four important ideas arose from this study.

The first important idea for children to gain their ICT skills is that skills were developed in a social-constructivist environment. In this approach all class members were actively encouraged to contribute and share knowledge.

Secondly, Jane was familiar with a range of technologies and software which she then planned to be used as part of the normal classroom practice. The tasks were planned as meaningful and authentic to the children and encouraged higher-order thinking skills. The computers were available for children to use naturally to accomplish the task.

The third idea was that a range of strategies were in place to provide a range of support systems such as demonstration, intervention, peer-tutoring, teacher mentoring and tutorials for the children to use to find answers to problems.

The fourth idea in this study is that positive attitudes towards supporting each other in problem-solving and learning were fostered in the classroom using a range of interactions.

These ideas answer the question of how children in a low decile school are gaining their ICT skills. These ideas are consistent with information in Stanley (2004) and Burns (2005/2006).

Jane is moving towards a navigationism model as discussed by Brown (n.d.). It would be interesting to consider in more detail the implications of a move to this model.
Using these ideas a challenge for preservice providers is to ensure that students have opportunities to
develop their personal ICT skills in a meaningful context and to provide them with a model to use in
their future classrooms.
References


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Appendices

Appendix One: Explanatory note for students

My name is Diane Brooks and I am studying at the Christchurch College of Education. I want to learn about how children learn when using ICT (computers and other things like digital cameras). To help me to this I would like to watch you working and talk to you about what you are doing. There are no right or wrong answers.

Because it is important that I get what you say and do right, I would like to record this on an audio tape. The college rules say I have to keep the tapes at that college for at least five years but they will not have your name on it so no one will know it is you. No one but my teachers and I will be able to listen to the tapes — they will be kept locked up. The things I write down will not have your name on either, I will ask you to select a code name for yourself. What I am interested in is what children of your age think so I don’t need to keep a record of your name.

Your parent or caregiver has been told about this and they don’t mind me watching you or talking to you however if you don’t want to talk to me you don’t have to.

Your taking part in this project is voluntary and you are able to withdraw from the project at any time without any penalty. The College requires that all

The College requires that all participants be informed that if they have any complaint concerning the manner in which a research project is conducted, it may be given to the researcher, or, if an independent person is preferred, to

The Chair
Ethical Clearance Committee
Christchurch College of Education
PO Box 31 – 065
Christchurch

Phone: 03 348 2059

The Christchurch College of Education Ethics Committee has reviewed and approved this study.

I will be coming in to watch the work you are doing at times which are convenient to your teacher.
Appendix Two: Letter to parents/caregivers

Dear Parent/Caregiver,

Date:

I am seeking permission to observe children in the school who are willing to participate in a research study.

**Project Title:** How do children in a low-decile year 6 class gain their ICT skills?

My name is Diane Brooks, I will be working under the supervision of Dr Elaine Mayo, a Principal Lecturer in the School of Professional Development at the Christchurch College of Education. Dr Mayo’s phone number is 345 8447 if you wish to contact her. I am studying for Master of Teaching and Learning (MTchLn) at Christchurch College of Education.

I am a Lecturer at the College of Education specialising in ICT and Professional Practice. The aim of this research is to find out how children actually gain their ICT skills.

I would like your permission for your child to be observed working, using ICT, in the classroom, to be interviewed about the work your child is undertaking and to use an audio tape while I am observing or interviewing. This will require your child answering questions related to the use of ICT within the classroom. The questions will not be testing knowledge. Each survey will take approximately 10 to 15 minutes to complete. Students not taking part or not using the ICT during observations will not be interviewed or observed.

No findings which could identify any individual child will be published. Since data must be stored for at least five years according to college regulations, your child will be asked to invent a code name which will be used by the researcher during the observations and interviews. The information participants provide to the researcher will be treated as confidential and that no findings that could identify either them or their school will be published. All information will be treated as confidential.

If you agree to let your child take part, you can withdraw your child at any time by writing or contacting the class teacher or me.

Please fill in the bottom of this form indicating whether or not you happy for your child to take part in this project and return it to the class teacher.

If you have any queries or would like to be informed of the research finding, please contact:

Diane Brooks
Phone: (03)348 2059 ext 8144 Fax: (03) 343 7789

The Christchurch College of Education Ethics Committee has reviewed and approved this study.

Thank you for your consideration of this request.

Yours sincerely,

Diane Brooks

ICT Research

Phone: (03) 343 7707

✓...I have read and understand this consent form. I understand that the information participants provide to the researcher will be treated as confidential and that no findings that could identify either them or their school will be published.

I do / do not give permission for my child to participate in the ICT research project.

Signed: ___________________________ Class: ___________________________

Child’s name: ___________________________ School: ___________________________
Dear Teacher

Date:

**Project Title:** How do children in a low-decile year 6 class gain their ICT skills?

My name is Diane Brooks, I will be working under the supervision of Dr Elaine Mayo, a Principal Lecturer in the School of Professional Development at the Christchurch College of Education. I am studying for a Master of Teaching and Learning (MTchLn) at Christchurch College of Education.

I am a Lecturer at the College of Education specialising in ICT and Professional Practice. The aim of this research is to find out what is the learning that occurs when children use ICT in the classroom programme.

I would like to observe and interview children in your class who are willing to participate in this study.

I would like your permission to observe children working, using ICT, in the classroom, to interview the children about the work they are undertaking and to audio tape these sessions.

The times arranged will be suitable to you.

No findings which could identify any individual participant or school will be published. Since data must be stored for at least five years according to university regulations, your children will be asked to invent a code name which will be used by the researcher during the observations and interviews.

If you agree to have your children take part, you can withdraw at any time by writing or contacting me.

If you have any queries or would like to be informed of the research finding, please contact:

Diane Brooks  
Phone: (03)348 2059 ext 8144       Fax: (03) 343 7789

The Christchurch College of Education Ethics Committee has reviewed and approved this study

Thank you for your consideration of this request.  
Yours sincerely

Diane Brooks  
ICT Research

Phone: (03) 343 7707

I have read and understand this consent form.  
I do / do not give permission for my class to participate in the ICT research project.

Signed:

School:
Appendix Four: Letter to Principal

Dear Principal

Date:

Project Title: How do children in a low-decile year 6 class gain their ICT skills?

My name is Diane Brooks, I will be working under the supervision of Dr Elaine Mayo, a Principal Lecturer in the School of Professional Development at the Christchurch College of Education. I am studying for a Master of Teaching and Learning (MTchLn) at Christchurch College of Education.

I am a Lecturer at the College of Education specialising in ICT and Professional Practice. The aim of this research is to find out what is the learning that occurs when children use ICT in the classroom programme.

I would like to observe and interview children in a class in your school who are willing to participate in this study.

I would like your permission to observe children working, using ICT, in the classroom, to interview the children about the work they are undertaking and to audio tape these sessions.

The times arranged will be suitable to you and your teacher.

No findings which could identify any individual participant or school will be published. Since data must be stored for at least five years according to university regulations, your children will be asked to invent a code name which will be used by the researcher during the observations and interviews.

If you agree to have your children take part, you can withdraw at any time by writing or contacting me.

If you have any queries or would like to be informed of the research finding, please contact:

Diane Brooks
Phone: (03)348 2059 ext 8144
Fax: (03) 343 7789

The Christchurch College of Education Ethics Committee has reviewed and approved this study

Thank you for your consideration of this request.

Yours sincerely

Diane Brooks
ICT Research
Phone: (03) 343 7707

I have read and understand this consent form.
I do / do not give permission for my class to participate in the ICT research project.

Signed:

School:
Reflection on Networking

One of these facilitators undertook advanced studies while studying for a Diploma of ICT in Education. One of the papers she took was a paper where I was the Course Director. As the school was in the throes of setting up their own Professional Development for the staff, for which this teacher was responsible, she had a lot of discussions with the course directors of different papers to help her plan for this. I was one of these directors. This meant that during Staff Development some staff had become familiar with who I was although they had not met me. Due to this networking the classroom teacher, knowing me through this felt happy to have me in her room.