In What Ways Could ICT Teaching And Learning Take Place At Orewa College?

Osmosis, Integration and/or Specialist Subjects?

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DECLARATION

I, Lisa Marie Ballantyne, declare that this thesis represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this university or to any other institution for a degree, diploma or other qualification.

Signed: .....

Lisa Marie Ballantyne

ABSTRACT

As a leader in ICT at Orewa College, I was continually aware of the debate amongst staff surrounding the place of ICT teaching and learning at the school. An aspect of this debate was focused on whether specialist ICT subjects should continue to exist at the school. It was from this discussion that the inspiration for this thesis arose. Although Ministry documents (MOE, 1995b; MOE, 2002) provided guidance, what ICT teaching and learning should be occurring seemed vague. This research was a response to a need to find out the best ways for ICT teaching and learning to take place at Orewa College. The importance of this research was highlighted only a week before completion when a Draft Essence Statement for the new Technology curriculum was released (Talk2learn, 2004). This essence statement did not include ICT, and it was stated that this absence was deliberate. If the current Draft Essence statement forms the foundation of the new Technology curriculum, ICT will not be a major focus of any curriculum statement in New Zealand.

This thesis is a single site case study that investigates the ways that ICT teaching and learning could take place at Orewa College. A combination of qualitative and quantitative methodology has been utilised within an ethnographic paradigm and triangulation of data collection methods and groups of participants was employed to increase validity of the data. Participants included the staff, parents and students of Orewa College, local employers, representatives from tertiary institutions, contributing schools and other North Shore secondary schools. Data collection methods included document analyses, questionnaires, email interviews, partially structured face-to-face interviews and observations.

A need has emerged for a combination of some specialist ICT subjects and some integration of ICT across the curriculum, with some ICT learning taking place in a more osmosis-like discovery method. However, a greater revelation is that a new and evolving pedagogy that ICT teaching and learning needs to take place within has emerged and needs to be integrated into all subjects, including the teaching and learning that takes place within specialist ICT subjects. It is also discovered that the intended flexibility and choice in how ICT teaching and learning should take place has been limited by the current assessment framework. An ongoing partnership between schools and their communities is additionally highlighted as an important part of students' continual learning in the field of ICT.

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CHAPTER 1 - INTRODUCTION

"To infinity and beyond!" (Buzz Lightyear In Toy Story, 1994).

STOP PRESS!!!

The importance of this study was exemplified only one week prior to completion in discussions that took place on Massey University's listserv (nzcomped@massey.ac.nz) regarding the Draft Essence Statement for Technology education, released on the *talk2learn* website (Talk2learn, 2004). It was stated by the writers of the essence statement that the absence of ICT from the essence statement was deliberate. If this draft statement is allowed to form the foundation for the new Technology curriculum, ICT will not exist as a major part of any curriculum document in New Zealand. Lively debate surrounding the place of ICT education and related teaching and learning has surfaced within the professional listserv, mentioned above, which focuses on Computing Education in New Zealand. It is therefore timely that this research is focused on ways that ICT teaching and learning could take place at Orewa College. It is envisaged that discussion within this thesis will assist in providing some direction in the ongoing debate.

Overview

There is currently a profound lack of consensus within New Zealand secondary schools on the place of Information and Communications Technologies (ICTs) in the curriculum. The debate, outlined in more detail later, surrounds whether ICT skills and knowledge should be learned in specialist subjects, integrated across the curriculum, or learned via an osmosis-like process in which students simply absorb ICT skills and knowledge whilst using ICT as a tool. This lack of consensus leads to conflict, misuse of time and resources, and inconsistencies in student learning. As Head of the Business Department in a large secondary school I, as researcher, realised there was a need to examine in rich detail the different ways in which ICT teaching and learning could take place at the secondary school in which I was employed during the period of research. I have attempted to reconcile these differences and put forward recommendations for ICT teaching and learning at Orewa College.

My role throughout the research period has been "participant-as-observer" (Burns, 1994:258). Participant observation and the related issues of bias and invisibility are discussed in Chapter Three.

This chapter outlines in detail the background to this research. The main aim and objectives of the study are outlined and rationale for the specific content of the research is given. A brief overview of the thesis is also given.

Background and Rationale

A Brief History

During the 1980s computers were gradually introduced into secondary schools in New Zealand. Typing Departments took on the teaching of computer skills in many schools over the following years and, in some schools, Computer Studies Departments were also created. Computer skills were originally only taught in these specialist areas. Other Information and Communication Technologies (ICTs) were introduced into schools, such as the overhead projector, facsimile, cameras and video cameras and, subsequently, their digital versions.

For more than a decade now, the New Zealand government has been attempting to integrate ICT skills and knowledge into the curriculum of both primary and secondary schools. Various documents have been published by the Ministry of Education (MOE, 1991, 1995b, 1998, 2002) for this purpose and many projects piloted (for example: ICT Professional Development Clusters, Laptops for Teachers, Digital Opportunities, Computers in Homes). However, despite all of this encouragement towards the integration of ICT, little attention has been paid to making it reality (Selby, 2001:4). Schools now have hardware and software, but no clear direction has been given as to how teachers should go about facilitating student learning in the area of ICT. Information and Communication Technology has been included as one strand in the Technology in the New Zealand Curriculum document (Ministry of Education, 1995b). Technology is one of the seven Essential Learning Areas in the New Zealand curriculum (MOE, 1995b:20). Information Skills and Communication Skills are two of the Essential Skills across the curriculum (MOE, 1995b:18-19). How the Technology

curriculum can be interpreted and how the Essential Skills can be integrated is variable. It has been left up to individual schools to decide how their students will learn the necessary ICT skills and knowledge to take them into the future - or to put it in Buzz Lightyear's words, to take them "to infinity and beyond" (Toy Story, 1994).

An International Perspective on ICT Education

An international perspective on ICT Education is outlined in detail in Chapter Two of this thesis. The debate on how ICT education should take place has broadened, according to Abbott (2001:46), into whether any ICT should actually be taught in specialist subjects, or whether all ICT skills and knowledge should be integrated into the curriculum of other subjects. The majority of literature reviewed is centred around the *integration* and/or *osmosis* styles of learning ICT skills and knowledge. There appears to be very little literature that discusses the teaching of these skills and knowledge in specialist subjects.

Dykes (2002:30) recognises that "schools are being increasingly encouraged to integrate" the learning of ICT skills and knowledge across the curriculum. Information and Communications Technologies (ICT) are seen as a "tool" by some (Eadie, 2001:30; Abbott, 2001:44) and students could absorb ICT skills and knowledge in an osmosis-like process by using these "tools", according to these authors. However, Bigum and Kenway (1998:216) state that "for each high tech 'tool' that is employed, the skills that complement its use should also be taught".

The integration of ICT is assumed to be a necessary path for all schools to follow in recent literature (Stratford, 2000:7-12; Hunt & Trebilock, 2003:9; Hay, 2001). Denny and Halliday (2003:19) refer to O'Donnell (1996) and Halliday and Cubitt (2000) who believe that "a curriculum context is essential". They see the integration of ICT across the curriculum as the ideal way of guaranteeing curriculum context. The meaning of integration, as used in this study, is outlined below.

The dominant perspectives on ICT education can be summed up as follows:

1. **Specialist ICT Options** - Those that are in favour of this perspective believe that specialist ICT teachers should teach ICT skills and knowledge in specific ICT subjects, separate from other curriculum areas, either in addition to or instead of

teaching ICT in other areas. It appears that there are very few authors published that discuss this perspective. However, the MOE (2002:12) has stated that "specialist options should be available at senior secondary school level".

2. **Integration -** Those that hold this view believe that ICT skills should be taught in all curriculum areas, as the skills are needed to assist or further student learning in each curriculum area. Some that hold this view believe that a curriculum context is essential for learning ICT skills and knowledge. It has been pointed out by Savidan (2003:40) that this perspective is suggesting the "insertion" of ICT into the curriculum, rather than the integration of it. Authors that appear to favour this integration perspective include Bigum and Kenway (1998) and Hunter (2001).

3. **Osmosis** - Some take the integration view further and see ICT as a tool that is used as "part of an innovation process" (Stratford, 2000:8). They believe no formal instruction in ICT skills or knowledge is necessary. They take the view that students will simply absorb the ICT skills and knowledge that they need in an osmosis-like process by using ICT equipment in other learning areas. Students will be self-taught in a discovery-like manner. Examples of authors that espouse the osmosis view include Jonassen (2000), Stratford (2000), the MOE (1991, 1993, 1995a, 1995b, 1998, 2002), Eadie (2001), Abbott (2001), and Hunt (1996a, b and c).

The word *integration* is used frequently throughout this study. It is used by other authors to refer to either the integration or osmosis perspectives outlined above, or a combination of these. When used by the researcher, it is used to mean a combination of the integration and osmosis perspectives. Integration, to the researcher, means some insertion of ICT into the curriculum to enable students to use ICT as a tool to further their learning in an osmosis-like process.

Considerable discussion surrounds the impact of ICT on society and culture (Examples: Hunt, 1996b:2; DeVaney 1998:568, 582; Brown and Murray, 2003:10, 15). Brown and Murray (2003:15) believe that we need to look at what type of society we wish to create and base how ICT learning will take place on this. This discussion has led to the call for more collaborative and co-operative learning styles such as the "communal constructivism" approach to learning discussed by Leask and Younie 2001:117) in which students work interactively to construct knowledge which will assist their communities. When more collaborative learning takes place there is a "de-

centering" of the teacher's place in the classroom (Muffoletto 2001:3). This discussion indicates that a more osmosis-like process of learning ICT skills and knowledge is favoured. However, Jonassen (2000:8) states that "some knowledge of any tool is required in order to use that tool".

An Expansion of the Ministry of Education Perspective

The MOE(1995b:28) discusses the need for more collaborative learning styles in ICT education and also states the need for teachers to work collaboratively. Ministry of Education documents (1991, 1993, 1995b, 2002) have demonstrated a very strong inclination towards the integration of ICT skills across the curriculum. However, the word integration, when used in Ministry documents appears to mean a more osmosis-like style of learning ICT skills and knowledge in the use of ICT as a tool. It has also been made very clear, however, that individual schools must customise their own Technology programmes (including ICT) to suit the needs of their students and their school (MOE,1995b:29).
Although the Ministry's main focus seems to be on the integration of ICT skills and knowledge across the curriculum, they state that specialist ICT options should be made available to senior students (Ministry of Education, 1995b:29).

Boundary of the Research

From the background information outlined, emerged the reasons for researching how ICT teaching and learning could take place at Orewa College in the future.

ICT is included in the Technology curriculum document (MOE, 1995b) and in two of the Essential Skills[1] to be taught across the New Zealand curriculum - Information Skills and Communication Skills. The document *Technology in the New Zealand Curriculum* (Ministry of Education, 1995b:30) states that Technology programmes need to "reflect the particular character of the school". This is the reason that this research has been based solely on Orewa College. Recommendations, made in the final chapter of this study, have been largely decided by the culture and character of the school. However, an international perspective has been gained on the topic and a wide range of

[1] More information on the Essential Skills across the New Zealand curriculum can be found at: http://www.tki.org.nz/r/governance/nzcf/ess_skills_e.php

participants including other North Shore schools have been surveyed to assist in deciding the ways in which ICT teaching and learning could take place at Orewa College. It was necessary to gain the views of those in the Orewa College and wider North Shore and international communities as Orewa College students will eventually join the wider society.

Berg (2001:229) outlines an "intrinsic" case study and states that "intrinsic case studies are undertaken when a researcher wants to better understand a particular case. It is not undertaken primarily because it represents other cases". It is the uniqueness of Orewa College that primarily forms the basis of this research. However, it is possible that this research may also prove to be instrumental in assisting other schools to plan how ICT teaching and learning will take place at their schools in the future.

Orewa College

Orewa College is a large, state, decile eight, co-educational secondary school with strong values and high aspirations for its students. It is now in a transitional phase, moving from being a Year Nine to 13 school to encompassing Year Seven and Eight students from 2005. Teachers of ICT at this school over the past decade have been leaders in their field. The Business Department at Orewa College currently includes specialist ICT subjects. ICT options offered to Year 10 to 13 students at Orewa College at the time of writing include: Technology:ICT, Information Management, Computer Studies, Desktop Publishing and Introductory Information Management. It must be noted that Technology:ICT and Desktop Publishing courses did not run in 2003 due to insufficient student interest. (Five students had opted to study Technology:ICT; 14 students had opted to study Desktop Publishing. A new International Computer Driving Licence (ICDL) course is to be offered to Year 12 students for 2004. At present there are no specialist ICT options offered to Year Nine students. (Year Nine ICT classes were cancelled from 1996 due to the large class sizes that did not fit into the computer laboratories). Some computer skills are taught in other curriculum subject areas, however computers are mainly used as tools to complete various tasks in these other subject areas. Teachers book whole classes or parts of classes into the computer laboratories to use various computer applications.

Future ICT learning will need to, additionally, cater for Years Seven and Eight students that are soon to be integrated into the college. It is necessary to find out what ICT skills and knowledge these students are coming to Orewa College with already, so that we can plan how to build on that skill and knowledge base. The principals of all contributing primary schools have been surveyed for this purpose.

Before we can plan for the future, it is necessary to first understand where we are now and how we got here (Courtenay, 1994:23). The current situation has been outlined. The next section gives a brief history of ICT at Orewa College.

A History of Unrest and Growth

Since the introduction of computers into secondary schools, there has been unrest between the Computer Studies and the, then-called, Typing department in many schools in New Zealand. This unrest has been largely caused by disagreement over what Information and Communications Technologies (ICT) content should be taught in each department. Stories of this unrest will differ slightly from school to school, but this is the story of Orewa College from the researcher's perspective.

When computers were introduced to Orewa College, computer skills were only taught by the newly formed Computer Studies department. All computers at Orewa College were Apple MacIntosh computers. This was for two reasons. Firstly, the 'Apples for Schools' program launched by Apple Computers at the time made their computers easily attainable for schools. Secondly, the teacher who became the first Head of Computer Studies was familiar with Apple Computers and preferred them to IBM computers and their clones, largely for their user-friendly interface. In 1993, the Typing department moved from using typewriters to using computers to prepare their students for the computers they would use in offices. Typewriters were very fast becoming outdated. The interface of the IBM clones had become comparatively user-friendly with the introduction of the Windows operating system. The IBM clones were cheaper than the Apple computers at the time and more businesses were using IBM clones than were using Apple computers. For these reasons, the Typing department chose to purchase IBM clone computers, against the advice of the Head of Computer Studies at the time. The Typing department changed the name of its subject to Word Processing and later to Information Technology. At this time the department was renamed as the Information Technology Department. Only word processing applications were taught in

this department at this stage. The Computer Studies department taught theory on how a computer operates, logical and structure diagrams, simple computer programming and various applications for spreadsheet, database and desktop publishing purposes.

In 1994, the renamed Information Technology department introduced spreadsheet applications into its word processing courses. A new subject, Desktop Publishing was introduced by this department. Some overlap in the content of courses was beginning to develop and some tension between the two departments occurred.

The Head of Computer Studies left at the end of 1994, and a new Head of Computer Studies, familiar with both IBM and Apple computers was appointed.

Over the next few years, the Information Technology department introduced other new content and computer applications into its courses, such as databases, presentations programs, draw and paint programs and web page design. More overlap of content and applications used in the two departments and their subjects became evident.

At the beginning of 1997, an Information Technology Teacher who had left a year previously, returned to Orewa College to teach in the Computer Studies area. This teacher was the researcher. In 1998, the researcher began to teach in both the Information Technology and Computer Studies areas. A link between the two departments now existed. By the end of 1998, another Head of Computer Studies had resigned and the researcher that had formed the link between the two departments became the new Head of Computer Studies. The researcher also taught Business Studies and was qualified in Accounting and Economics. The Commerce department (including subjects such as Business Studies, Accounting and Economics) had reduced in size by the end of 2000 and the Head of Information Technology decided to step down from her position to focus more on classroom teaching. This gave opportunity for a merger of three departments. The Computer Studies, Information Technology and Commerce Departments, merged to form a new Business Department led by the researcher who had taught in all three departments.

Three teachers within this new Business Department, including the researcher, taught both Information Management (renamed from Information Technology) and Computer Studies. They could see the obvious overlap of content and applications within the courses and the need for change. Other staff, including the senior management team (SMT) wanted other curriculum areas to be able to book more time in the computer

laboratories. A call for integration of ICT across the curriculum came from some staff, from the Ministry of Education and from the SMT. Discussions took place in various Orewa College ICT committee meetings and full staff meetings regarding the future of ICT at Orewa College. It was time for Orewa College to look very carefully at how the students at this school would learn ICT skills and knowledge in the future.

The Problem Exemplified

During the period 1997-2003, the debate at Orewa College between the dominant perspectives on ICT education had surfaced. These dominant perspectives - *specialist subjects, integration and/or osmosis* - have been outlined earlier.

From 2001-2003, the senior management team (SMT) at Orewa College expressed a desire for increased access to ICTs for all students. At the beginning of 2003, some movement was made by members of the SMT towards reducing the number of courses and classes available to students in Information and Communication Technology (ICT) type subjects. An Introductory Information Management course that had previously been available to senior students in three option lines, was now offered in only two option lines, reducing student choice and therefore reducing the number of students opting for this course. One of five Year 10 Information Management classes was cancelled, despite demand, and these students were required to choose another subject. The only Year 13 Desktop Publishing class, one of two Year 13 Computer Studies classes and one of three Year 11 Information Management classes were also cancelled. These last three classes were comprised of 10 to 20 students each. The SMT required that one computer laboratory was to be available to other subjects at all times. This meant that some ICT classes had to be cancelled to make room for these other subjects to use the laboratories. Reasons for this include the fact that there was increasing competition amongst staff in varying subject areas to book into computer laboratories. Information Management and Computer Studies (IM/CS) classes use slightly more than half of the available time in these computer laboratories at present, as outlined in Figure 1 below.

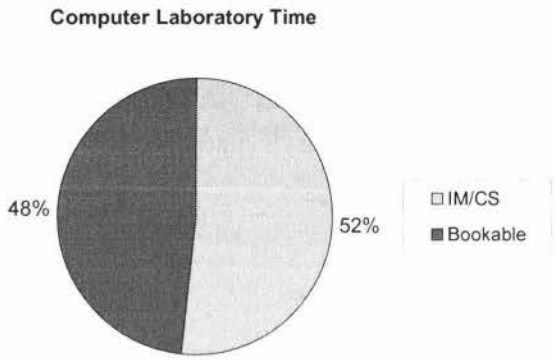

Figure 1 - Computer Laboratory Time
(This data was gained from the Orewa College Computer Booking Sheets 2003 – SEE APPENDIX A).

The cost of the computer equipment compared with the number of students that use a computer and the number of hours they use a computer for has been disproportionate. For example, Student A may take two specialist ICT options. This student would use a computer for 12 hours in a six-day cycle in these two subjects. In some cases this would be in addition to using a computer for some time in their other subjects. Student B, however, may not take any specialist ICT options and may not use a computer at school at all if the other subject teachers do not book Student B's classes into a computer lab. Because of this, the question of whether computers are better kept in laboratories or spread around the school in pods has been raised.

Another relevant issue is the shortage of teachers in the ICT field that has developed in recent years (V. Savidan, Personal Communication, February 2003; J. Chapman, Personal Communication, 8 September 2003; J.Edmonds, Personal Communication, August 2003). This shortage of ICT teachers was highlighted by the fact that while I was on study leave to complete this thesis, my original replacement resigned and left teaching. Although Orewa is a sought-after location in which to live and work, a second replacement was unable to be found and I had to return to my teaching position. A Mathematics teacher with ICT as a minor subject in her degree was found to replace me after a 10-week period.

The background outlined gave rise to the main research question and following sub-questions stated below.

Main Research Question

In what ways could ICT teaching and learning take place at Orewa College?
Osmosis, Integration and/or Specialist Subjects?

Research Sub-questions

The following three sub-questions should uncover both the Ministry's intentions in relation to ICT education and the Orewa College perspective, or swing, on the Ministry's perspective.

- **What is the intention of the Ministry of Education (1995b) Technology curriculum document in relation to ICT subjects?**

- **What is advocated by the "Digital Horizons - Learning through ICT" document put out by the Ministry of Education (2002) in relation to these subjects?**

- **How do the staff interpret the intention, usefulness and importance of the above two documents?**

- **What documents and policies does Orewa College already have in place regarding ICT and what values do they espouse?**

Orewa College students will go on to employment and/or further study after leaving secondary school. It is important to know what will be expected of them. As Courtenay (1994:23) stated: "If you don't know where you're going, how will you get there?" Hence the next two sub-questions:

- **What ICT knowledge and skills are tertiary institutions and employers looking for?**

- **How is ICT teaching and learning taking place in other schools? What are their plans for how their students will learn ICT skills and knowledge in the future?**

It is envisaged that important aspects of Orewa College and its unique culture will play a part in answering the following sub-questions:

- **What importance do students place on ICT? What level of student interest is there in ICT?**

- **What importance do parents place on ICT? What level of parent interest is there in ICT?**

- **What importance do staff place on ICT? What level of staff interest is there in ICT?**

Once it has been decided in what form(s) Orewa College students will learn ICT skills and knowledge, it follows to then decide what will be compulsory or optional. Hence, this final sub-question:

- **To what extent might some form of ICT learning be compulsory, or be an option for those interested?**

Methodology

An ethnographic case study approach has been chosen for this research. As stated previously, the Ministry of Education (1995b:29) believes that the ways in which ICT skills and knowledge are to be taught, or learned, in each school is to be based on the particular culture and character of the school. Deal and Kennedy (1983) support the belief that future change must be based on the culture of the school. Therefore it was necessary to use ethnographic data collection methods such as participant observation and interviews to uncover the particular culture and character of the school. Because this study is focussed solely on Orewa College, essentially it is an "intrinsic" case study (Berg, 2001:229) in which a wide range of participants have been surveyed to ensure that all relevant views have been combined to give a full view of this particular case.

Data collection methods for ethnography and case study are similar, but the ethnographic methods used have enabled the researcher to delve deeply to gain a more accurate picture of Orewa College and the needs of the students, staff and community in this case. The methodology used is outlined in detail in Chapter Three of this study.

I am aware that there is some repetition within this thesis, but this is largely a qualitative study and overlapping data has repeatedly emerged. Also, some repetition has been necessary in order for the chapters to stand alone to some extent for future reference by the Orewa College staff and community.

Outline of Thesis

This chapter has given an overview of ICT education and more specific insight into the problem currently facing Orewa College: In what ways could ICT teaching and learning take place at Orewa College?

The literature review in Chapter Two outlines an international perspective on ICT education and the various discourses within this worldview are debated. The New Zealand Government's view is also outlined, along with potential barriers to ICT learning and other issues. Factors to consider before undertaking change are also briefly discussed.

An ethnographic case study approach has been used for this research and this methodology is detailed in Chapter Three.

The results of observation, interviews, questionnaires and document analyses are outlined in Chapter Four. Due to the large amount of data gathered, Chapter Four has been divided into three parts. Part A outlines the interpretation of relevant documents from the researcher's and participants' perspectives. Part B reveals the ICT skills and knowledge that tertiary institutions and employers seek in school leavers. The ways in which ICT teaching and learning currently takes place in other North Shore schools is also investigated. Part C summarises the responses from the Orewa College students,

parents and staff in relation to ICT teaching and learning and also provides some insight into the culture and character of Orewa College.

Chapter Five then discusses the findings under each of the research sub-questions, before outlining the underlying themes that emerged in the process of answering the main research question.

Recommendations for Orewa College are outlined in Chapter Six, based on the findings of the research and the evolving pedagogy emerging from the identified themes. The researcher expects that the recommendations made may also be useful for other schools. Recommendations are also made for future research and implications for Orewa College, other schools, the Ministry of Education, the Education Review Office and the New Zealand Qualifications Authority that have transpired from the research are detailed.

The final chapter reiterates the purpose of the research and reflects on the significance of the themes that have emerged. The reader is reminded that this research is merely one small part of a continuous journey in the quest for constant improvement in ICT teaching and learning.

CHAPTER 2 - LITERATURE REVIEW

> ***"It is not about technology; it is about teaching and learning" (Cuban 2001a:134).***

Introduction

Within the context of this review, the researcher has used the phrase "ICT teaching and learning' to refer to teaching and learning about, with and through ICT and regards this teaching and learning as a cyclic process. There is currently considerable debate on ICT education including the questions of why and how ICT teaching and learning should take place. However, amongst the uncertainty and polarisation of opinions in the literature, common themes and ideas surface. These are discussed throughout this chapter and are brought together in the conclusion in an attempt to create clarity and direction in determining how ICT teaching and learning could take place at Orewa College. Questions arise from gaps identified in the literature throughout the discussion, and these have assisted the researcher in refining research questions and providing points of focus in the Discussion chapter of this study.

Firstly, the meaning of ICT is outlined, as it is discussed in the context of this study. Secondly, an international perspective on ICT education is examined and debated. Thirdly, the New Zealand Government's view is provided and the idea of continuous learning is brought to the forefront. Whether ICT teaching and learning should take place in specialist ICT subjects, integrated across the curriculum or absorbed in an osmosis-like process is then discussed. The concept of continuous learning is outlined and a collaborative style to ICT education is suggested. Related issues are then raised and possible barriers to ICT teaching and learning are identified. It is intended for this research to provide recommendations for change in the ways ICT teaching and learning takes place at Orewa College. Therefore, literature on culture and change has been reviewed in the final section of this chapter in order to provide some factors to consider before embarking on curriculum change. However, firstly, it is important to refocus on the purpose of the research.

The research question is:

In what ways could ICT teaching and learning take place at Orewa College?
Osmosis, Integration and/or Specialist Subjects?

Although it is the students, staff and community of Orewa College that this research is essentially based upon, an international perspective on ICT education must be taken into account as the students will eventually become a part of this wider community.

Interestingly, the expectation whilst exploring the literature was that there would be a debate regarding integration versus separation of ICT as a subject. Instead there was considerable support for integration of ICT skills and the use of ICT as a "tool" (MOE, 1991:1, 1998:4, 2002:2, 8; Christensen & Knezek, 2001:53, Bright, 2001:62; Johnson, 2001:19; Head & Mehrtens, 2001:xii; Abbott, 2001:44; Greaves, 2000:55). The most prominent theme was a noncommittal approach or non-mention of ICT as a subject in its own right. Eadie (2001:6) "pre-supposes that readers will already be well aware of the desirability of integrating computer use seamlessly into the school curriculum".

There are many viewpoints on how students should be educated *about* ICT, *with* ICT, or *through* ICT. However it seems that, although specialist ICT subjects are still being taught in most schools, the main focus, both nationally and internationally is on the broader view of learning *with* and *through* ICT across the curriculum, that is, within an integrated approach. Before reviewing this finding it is necessary to define ICT as it is being discussed in the context of this review.

Definitions of ICT

Review of both national and international literature reveals many definitions of ICT. The New Zealand Ministry of Education (MOE) definition of ICT includes:

> systems that enable the collection, structuring, manipulation, retrieval and communication of information in various forms. This includes audio and graphical communications, the use of electronic networks and interactive multimedia. (MOE, 1995b:12).

The New Zealand Ministry of Education ICT Strategy (1998) attempts to distinguish between Information Technology (IT) and Communication Technology (CT). The

definition of IT appears to be divided into hardware and software. The definition of CT is essentially "telecommunications equipment" including "computers". It seems that CT is already included in the definition of IT under the term "hardware". Savidan (2003:126-127) points out that the Ministry's definition is "technocentric" and "conceptually flawed". Also, CT has been very narrowly defined as "telecommunications equipment" when there are other modern communications technologies that exist that do not use the technology of the telephone or telephone lines. Examples include datashows and digital cameras.

According to Hunt (1996a:2), ICT is "a complex of artifacts, techniques and knowledge for solving human problems involving information and its communication. He defines the term further by stating that new ICTs "employ electronic rather than mechanical means for storing, processing and communicating information" and points out that ICT is commonly used to mean computer technology.

Most authors in this review seem to be referring to the use of computers and related software when discussing ICT, although Halliday (2001:44) did specifically mention other ICTs such as audio-conferencing equipment and the telephone. However, even she seemed to focus on the computer as the main form of ICT.

Definitions examined in this review reveal that the term ICT can refer to a very narrow definition (for example: computer applications) or a much wider definition including a variety of different technologies and the use of them. For the purpose of this research, the term ICT will refer to computer technology and related electronic technology (for example: datashows, digital cameras, digital video cameras, scanners) as well as the related skills and knowledge required for their use. However, it must be remembered that it is the use of these technologies (the relevant teaching and learning strategies) and the structure in which the learning takes place that forms the basis of this research. Teaching and learning strategies explored include those used in specialist subjects, strategies employed to integrate ICT across the curriculum, and those used in the acquisition of skills and knowledge via an osmosis-like process. It must also be noted that within the findings and discussion stages of this research (Chapters 4 and 5), the different components of ICT may need to be identified and separated. This will facilitate decisions as to where and how the learning of each component could take place. For example, basic or fundamental skills and knowledge may need to be identified and separated from more advanced or specialist skills and knowledge.

With the above understanding of the meaning of ICT in this research, the next step is an examination of the international perspective on the topic.

An International Perspective

The purpose of this section is to give a broad view of ICT teaching and learning before positioning the New Zealand Government's view within this wider perspective. It is the intention of this research to uncover an Orewa College perspective on future ICT teaching and learning, which must be placed within the New Zealand Government's view which, in turn, forms part of this wider international perspective.

Firstly, the underlying reasons as to why ICT teaching and learning should take place are discussed. Secondly, how this teaching and learning could take place is examined. Thirdly, the researcher questions the ideal society and culture for this learning to take place within and outlines four discourses suggested by Bigum and Kenway (1998:377-388) that exist within our current society and culture. Suggestions for a more collaborative culture amongst both teachers and students are then given. Finally, the specific role of the teacher is examined and the view that the teacher is no longer seen as the focal point of the classroom is outlined. The next section then discusses the New Zealand Government's perspective on ICT teaching and learning and attempts to position this within the wider international perspective.

Rationales for ICT Teaching and Learning in Schools

John Head and Ruth Mehrtens (2001:xii) distinguish two levels of the "schooling and teaching" of ICT. At one level, we need to teach computer skills, as career prospects for students will require these skills. At the second level, we need to prepare students for the new technological society. Students will need a variety of ICT skills to survive everyday life. They will need to be "technology competent" and possess basic ICT skills and knowledge regardless of career choice (Bigum & Kenway 1998:392). Hunt (1996b) agrees that students need ICT learning for employment or for general use in society, but he also points out that students need ICT skills to assist them in their present occupation as learners. It seems that the '3Rs' (Reading, wRiting and aRithmetic) are not enough anymore (Savidan, 2003). Students need information literacy and need to learn *how to learn*. The question this raises is should we be

assessing the process of learning, rather than just the content? This would mean assessing to find out if students are able to access information more easily, work more collaboratively, reflect and provide more thoughtful responses.

Some authors seem to be looking at ICT to improve outcomes in all curriculum areas (Cuban, 2001a; Clark, 1991). Cuban (2001b:201) states that there is no evidence to show "moderate to strong linkage" between use of ICTs and outcomes. However, no definition of outcomes is provided - either assessed or desired.

Clark's (1991:34) conclusion that there are very little, if any learning benefits from media has been substantiated many times. This gives rise to the following question: Are there, in fact, very little learning benefits *or* are inappropriate assessments being used that do not assess relevant ICT skills and knowledge outcomes in each subject, or curriculum area? It is possible that there are many learning benefits from media, but that inappropriate assessments do not reveal the benefits.

How Should ICTs Be Used in Schools?

Computer skills are not necessarily improved through integration (Schuck, 2001:6). Should computer skills, therefore, be taught in specialist modules or options?

There appears to be very little research into the occurrence of ICT teaching and learning (*about*, *with* or *through* ICT) in specialist subjects. This is discussed later in this chapter, but first I would like to outline the integration and osmosis views on ICT learning. It has been difficult to separate these two perspectives. All authors reviewed seem to espouse the belief that ICT education should be integrated across the curriculum, but very few discuss the actual teaching of ICT skills or learning *about* ICT. This seems to indicate a preference for an osmosis-like process of learning *with* and *through* ICT.

"Those least sympathetic to ICT [as a separate subject, or domain] see it as the modern-day equivalent of the pen or the printed book" to be used as a tool (Abbott, 2001:44). Eadie (2001:30) similarly concludes that "ICT facilities [are needed] in classrooms rather than laboratories" just like pens and textbooks. Reference to computers as *tools* to be used across the curriculum is common. A computer's place in a classroom has been compared to that of a blackboard (Burbules & Callister, 2000:1).

The key issues surround "*how* they are used, by whom and for what purpose" (Burbules & Callister, 2000:1). Viewing ICT as a tool has been labelled the "Instrumental View" of ICT by Burbules and Callister (2000:5). They discuss this "Instrumental View" along with a "Relational View" of ICT that is outlined later in this section.

Bigum and Kenway (1998:390) point out that, although the computer may be a tool with its own related skills, complementary skills also need to be taught. They use the calculator as an example and point out that skills of estimation need to be taught for the calculator to be a useful tool to students. ICTs started out as "presentation tools", moved into the role of "productivity tools" and are now being regarded more commonly as "thinking tools" (Savidan, 2003:139). Stratford (2000:9) similarly separates the tool discussion into the "handy tool" versus the "transformational tool".

Reference to the computer as a tool is not a new concept. Ryba and Anderson (1990:83) discussed spreadsheets as "tools for thinking". Boody (2001:11) recognises that technology used to be seen as a tool. He believes that we should return to this style of thinking.

Computer-based tools and learning environments are referred to as "mindtools" by Jonassen (2000:3-11). He defines mindtools as "critical thinking devices". In this discussion, a departure from traditional approaches to using computers in schools is promoted. Jonassen believes that these tools should instead be used to "engage and facilitate critical thinking and higher order learning". These mindtools "include (but are not necessarily limited to) databases, semantic networks (computer concept maps), spreadsheets, expert systems, systems modelling tools, microworlds, intentional information search engines, visualisation tools, multimedia publishing tools, live conversational environments and computer conferences".

Jonassen (2000:4-6) believes that "learning from computers" through computer-assisted instruction (CAI) is of limited benefit and raises the question: "Why not let learners assume responsibility for setting their own goals, determining their own strategies and monitoring their own learning?" Students would then gain more meaning from their learning. Jonassen, Peck and Wilson (1999:14) point out that computers can be used as "information access tools". An example of this is a case in which information was accessed through computer-mediated discussion with peers. This resulted in students making more thoughtful responses (Schuck, 2001:8). These

ideas support the constructivist approach to learning, discussed later in this chapter, in which students construct their own knowledge. Further ideas along similar paths arise below.

"Learning *about* computers" and "computer literacy" are no longer significant issues, according to Jonassen (2000:8), as students do not need to understand how a computer works to use it as a tool. He believes that "learning *with* computers" as mindtools, along with the change in role of the teacher to a learning partner, will result in the critical thinking and higher order learning that he promotes (Jonassen, 2000:9-11). He believes that the "tools will facilitate the learning and meaning-making processes" (Jonassen, 2000:10).

Burbules and Callister (2000:3) discuss a two-way relationship between the computer and the user. They point out that the computer can make us think of things and do things that we wouldn't otherwise have thought of or done had the computer not been there. This is the Relational View of ICT, as opposed to the Instrumental View outlined earlier. It seems to fit well with Jonassen's "mindtools" view. Burbules and Callister (2000:5) expand on this Relational View by discussing the role of technologies in education as "a potential collaborative space" and view technology as more than just the hardware. Designs and environments that engage learners are also perceived as being important.

Although the computer may be used as a tool for encouraging thinking processes, attention must also be paid to the three levels of ICT learning outlined by Hunt (1996b) earlier. Students need ICT skills, knowledge and tools for:

- Their current occupation as learners
- Their future occupations in employment
- For general use in society

Some students will need to gain more specialised skills for employment. However, *all* students will need to engage in ICT learning for both their current and future learning and for future use in society.

A Socio-Cultural Perspective

Technological literacy is needed in today's society, according to Le Court (2001:101-102), if our students are to become "critical citizens" offering "alternative visions of the world". If we are to look at the designs and environments that engage learners, we need to look at society and our culture in a broader perspective. Vygotsky (2004) recognised that "culture is the prime determinant of individual development" and that "every child develops in the context of a culture". Therefore, it seems important to discover the underlying values and beliefs that make up the culture of the school, so that any change in ICT teaching and learning can be based on this foundation. Vygotsky (2004) also discusses the significance of student "interactions with surrounding culture and social agents, such as parents and competent peers". This idea is supported later in the discussion regarding a more collaborative culture. However, it also seems that we must look to the future and ask: What is the ideal culture or environment for our learners? What ideal culture or environment do we wish to create through students' current and future learning?

According to Savidan (2003:139), educational policy needs a "more societally focussed role". She is supported by DeVaney (1998:568, 582) and Brown & Murray (2003:10) who believe that a more socio-cultural discussion is required around ICT education. If students are learning ICT skills and knowledge for socio-cultural purposes, then shouldn't we be assessing these skills in relevant socio-cultural scenarios in each curriculum area? Should we be encouraging more collaboration between teachers and planning cross-curricular units with appropriate themes? Should we have assessments that assess ICT skills and knowledge and the societal and cultural impact of these skills in the context of each subject area fitting in with the theme of each unit? It is envisaged that the analysis stage of this research (see Chapter 5) will uncover the ideal society and culture that Orewa College teachers, students and parents desire.

Bigum and Kenway (1998:377-388) outline four discourses evident among the societal views related to ICT in education. These four discourses are named: *Boosters*, *Anti-schoolers*, *Critics* and the *Doomsters*. These discourses are outlined below with the intention that the discourses of the participants in this study may later be considered within those evident within our wider society.

The Boosters are promoters of ICT in education and believe that education and society in general will improve because of the introduction of ICT. Boosters tend to focus on

how questions such as: How can we encourage teachers to use ICT? They believe that we are heading towards a totally wired world and that we need to socialise students into this. According to Hay (2001) there is no question of whether ICT should be implemented across the school. The debate is focused more on how to best manage the implementation of it. Hay (2001) focuses on the implementation of ICT through the whole school, not just the curriculum. This is a typical example of a Booster's view.

A sub-set of the Boosters is the Anti-schoolers. Those in this group hold similar beliefs to the Boosters, but predict that there will be no need for schools in the future as all learning will take place online (Bigum & Kenway, 1998:386). William West (2000), referred to by Eadie (2001), is an example of an Anti-schooler. He sees the future as a student only spending a few hours in a learning centre each day and doing much more self-directed learning at home.

The Critics believe that schools still offer the best solution for minding the young (Bigum & Kenway, 1998:386). They also believe that the implementation of technology is rushed. They tend to ask *why* and *what* questions, such as: Why should we use ICT in schools? In what ways can ICT be used to improve teaching and learning? They are not opposed to the implementation of ICT in schools, but believe that ICT learning should be based on a sound pedagogical base and urge caution.

Lastly, there are the Doomsters. This group "accepts, but regrets" the technology. They believe that students are being deskilled by using ICTs. Postman (1985; 1993) is a well-known Doomster and is cited by Bigum and Kenway (1998:387) as fearing that the internet will breed "a cop-out society ... by feeding fantasy, escapism and nostalgia". The Doomsters believe that there will be "social decline if technology is not reversed". They mainly ask *why* questions, such as: Why use technology to do a task if it can be done perfectly well manually?

Students today will need ICT skills and knowledge for the future. However, it is important to question the ways, means and motives for ICT teaching and learning to take place. The Doomster approach, although somewhat negative, reminds us that it is important for our students to be educated on the social impact of ICT on society. This is supported by the Ministry of Education (1995b:10) and is required to ensure that the social decline referred to by Postman (1985; 1993) does not occur.

Caution is urged by the Critics and they point out the need for a sound pedagogical base on which to build future ICT learning. The need for a more collaborative approach has arisen from previous pedagogical discussion that has focussed on an integrated and osmosis-like approach to teaching and learning. Savidan (2003:40) promotes the integration rather than insertion of ICT into the curriculum. However, insertion of ICT into the curriculum would ensure that teachers and students gain the basic skills and knowledge in ICT. Full integration of ICT into the curriculum should follow, if teachers and students are then encouraged to work in a more collaborative fashion. This is alluded to by Cuban (2001b:152) who believes that small steps will become larger steps in the pathway to change.

A More Collaborative Culture

There is much research into the benefits of a more collaborative culture, along with the importance of students learning how to learn and constructing their own learning. These ideas are outlined in more detail in this section.

Snyder (1993:64) states that word processors encourage the development of a collaborative, co-operative culture in the classroom, in addition to assisting students' production of more effective texts. Savidan (2003:135) supports this and believes that ICT encourages collaborative methods of learning and "is more aligned with constructivist learning theory".

Eadie (2001:34) believes that we need to rethink what is being taught, in all areas, get rid of "busy" work and develop higher order thinking skills. "A unifying force acknowledged by virtually all" is that the acquisition of knowledge is very complex involving students constructing their own knowledge (Salomon and Perkins, 1996:114-115). It has been suggested that "knowledge" is a verb meaning "access to information" (Salomon and Perkins, 1996:127). Should we, therefore, be emphasising process instead of content?

For a more collaborative, co-operative integrated style of ICT learning, activities and teaching and learning styles need to change (Lowe, 2002:170; Burbules & Callister, 2000:7). Hunt (1996c) believes the emphasis should be on the "information *process* and the intellectual and social interactions taking place". Selecting and evaluating information is more important than learning content (Hunt, 1996b:2). However,

Jonassen (2000:8) acknowledges that "some knowledge of any tool is required in order to use that tool". Students will need some basic ICT skills to be able to employ relevant tools to select and evaluate information. Perhaps some insertion of ICT skills and knowledge is needed in the curriculum before full integration of ICT can occur. This point is discussed in more detail in the *Specialist ICT Subjects* section later in this chapter.

When students select and evaluate information, they can construct knowledge. The term "communal constructivism" is used by Leask and Younie (2001:117) to describe a process in which students work in a group situation and "interact with the environment to construct knowledge for their learning community" (Holmes et al, 2001:1). Savidan (2003:135) refers to Dias (1999) who uses the term "learning communities" and believes that students will learn much more by working in a group situation. Leask and Younie (2001:117-131) give examples of communally constructive learning that can and have occurred in classrooms and discuss internationalising the curriculum and making use of wider learning communities. One example outlined comes under the topic of Geography and the Physical Environment. Teachers reported on the use of virtual field trips in which web cams were used to see the place and collect data. Websites were used to gain data on international weather and email exchanges took place to enable students to gain information on the place and its culture. Some teachers asked students to produce a tourist brochure on the country being studied in the language of that country. Leask and Younie suggest that students' work could be made available through on-line publishing and feedback could be gained from the external audience. "This new and communally created body of knowledge can be extended upon each year in a cyclical process as new students engage with the topic" (Leask and Younie, 2001:125).

Links to postmodern theory are made by Savidan (2003:136) who "sees curriculum constantly changing as students construct their own learning". Savidan believes that postmodernism espouses a "self-regulatory message" that fits in well with the constructivist learning approach that requires students to construct and evaluate their own learning. There is now a call for much more collaborative project-style work and the move is beyond technical skills and towards higher level thinking skills, according to Savidan (2003:132). However, as stated earlier, basic ICT skills will be needed before a move towards this more integrated style of learning can take place.

If learning activities are to change and become collaborative and students are to construct their own learning, how then would teachers assess the learning? How would they assess the learning *process* and the interactions taking place?

Jonassen, Howland, Moore and Marra (2003) provide "rubrics" for assessing this style of learning. These rubrics provide criteria for different levels of student achievement on different aspects of the learning activity. These appear very similar to the criteria that students must meet for each level of an Achievement Standard to gain credits towards the National Certificate in Educational Achievement (NZQA, 2003a). This criterion, or standards-based assessment, is not a new method of assessment in New Zealand. Ryba and Anderson (1990) used an observation schedule for assessing co-operative learning groups which is very similar to the rubrics suggested by Jonassen et al (2003) and the criteria used for assessing the current Achievement Standards. Assessment methods are available to assess the learning process and collaborative interactions, should teachers wish to do so.

Teaching Training, Professional Development and the Role of the Teacher

How teaching, learning and assessment take place is a decision primarily left up to the teacher. Although the student determines how actual learning occurs, the teacher is a gatekeeper to the learning experiences each student may have (Cuban, 2001a:125). Brown (1998:6) points out that "teachers make the difference" and are therefore the key to any future changes in ICT learning, but he also realises that there are many ideas of what constitutes a "good" teacher.

The Ministry of Education (1997b:21 - cited in Savidan, 2003) state that "... quality teachers can be seen as having ... the ability to use [ICT] effectively as an aid to teaching". However, Bracewell and Evans (1998:13 - cited in Savidan, 2003) point out that until 1998 there was "... no compulsory requirement to train [student teachers] in IT". Savidan (2003:133) believes that some teacher training institutes are continuing to graduate some teachers "who cannot incorporate ICT into their classroom practice". She believes that effective uses of ICT should be modelled by those training the teachers. If training and modelling effective uses of ICT is not occurring during teacher training, then how are teachers to gain these skills so that they, in turn, may model them for their students? "Strategies for encouraging (or requiring) whole staff take-up of integrated curriculum use of ICT, feature in the two to five year plans of almost all

schools and education districts" in the four countries visited by Eadie (2001:39). Stratford (2000:11) suggests encouraging "collaborative practices between teachers, such as mentoring" as one strategy to assist in developing "contemporary pedagogical practices and innovative ICT integration". He also states that "mentoring needs to be developed within other school-based initiatives for change". Mentoring may tie in well with the school's appraisal system. Stratford (2000:11) discusses Fullan and Hargreaves' (1992) observation that "high quality on-going mentoring" may be difficult to provide for all staff. Perhaps "lead teachers" (Ballard, 2000), or "master teachers" (ITAG, 2001) instead of mentors may therefore be a more appropriate way of encouraging the whole staff to integrate ICT into their students' learning.

An Information Technology Advisory Group (ITAG, 2001) discussion paper proposes a hierarchy of levels for teachers that includes "mentor teachers" and "master teachers". ITAG state that this hierarchy would "create opportunities for teachers to advance without giving up classroom instruction".

Ballard (2000) used a "train-the-trainer" programme which used "Technology Lead Teachers" (TLTs) to train and encourage other staff to integrate ICT into student learning. He felt that teachers would understand the needs of other teachers and be best able to satisfy their requirements.

The role of the teacher has been continually evolving. Muffoletto (2001:3) discusses a "decentring of the teacher as a voice of authority". Savidan (2003:132) supports this and says that teachers have moved from being advisor/demonstrator to manager and facilitator and are now moving on to become a consultant and co-learner. Schuck (2001:4) refers to the teacher as an "expert learner". This term seems inclusive and acceptable as the teacher is still thought of as an expert, but it is realised that they will be continually learning. Technology will continue to evolve and therefore, teachers will need to keep up-to-date with the changes.

Teachers' adoption of ICT is not linear, but iterative (Brown & Murray, 2003:11). How, then, should ICT professional development be structured for teachers? Should their professional development be structured? Or should teachers learn via an osmosis-like process? Should student learning programmes be designed for linear or iterate learning?

Bigum and Kenway (1998:393) believe that teachers need to "pull their heads out of their schools" to become "informed, critical and creative" in using ICT. However, Cuban (2001b:152) believes "small changes accumulating steadily will create a gradual transformation in how teachers teach".

This section first outlined why ICT should be used in schools. The main reasons that have emerged are as a tool for learning, for use in future employment and for general use in society. How ICTs should be used could then be based on *why* they should be used. There is considerable support for the use of ICT as a tool (examples: Abbott, 2001:44; Eadie, 2001:30; Bigum and Kenway, 1998:390). A large amount of discussion surrounds the type of society or ideal culture we wish to create (examples: Le Court, 2001:101-102; DeVaney, 1998:568, 582; Brown and Murray, 2003:10), but there is little discussion regarding specific skills or ICT learning for employment or for general use in society. A constructivist learning theory and a more collaborative culture between teachers and between students has been suggested in this section as an ideal pathway to follow towards the decentring of the teacher's role in the classroom and towards creating students with critical thinking skills.

The next section outlines the New Zealand Government's perspective on ICT in education and attempts to position it within the wider international perspective outlined previously.

The New Zealand Government's View

The New Zealand Government's view, seen in the Ministry of Education (MOE) documents (1991; 1993; 1995b; 1998; 2002), appears in line with the international perspective, that the integration of ICT as a tool to be used across the curriculum in order to encourage collaboration and critical thinking is ideal.

This section outlines the New Zealand Government's view in detail. The researcher attempts to uncover the Government's underlying reasons for the inclusion of ICT in the New Zealand curriculum through discussion of the ICT strategy document (MOE, 2002) and the Technology curriculum document (1995b). The intentions for ICT education in New Zealand are laid out quite clearly in both of these documents and ICT features strongly in the Technology curriculum as one of the main technological areas to be

integrated across the curriculum. Where and how the Government positions ICT within the New Zealand curriculum documents is then explained. The Ministry of Education's ICT strategy document is reviewed and the New Zealand Government's view is positioned within the wider international perspective.

The Technology curriculum document (MOE, 1995b) includes ICT as one of seven main areas of the Technology curriculum. The spirit of this document suggests that technological learning should be woven throughout the technological areas, but also throughout the entire school curriculum. However, there is flexibility for teachers to choose how they will deliver the curriculum, based on the particular culture and character of their school (MOE, 1995b:30).

There is repeated reference to teachers and students working "co-operatively and collaboratively" (MOE, 1995b:16, 28; MOE, 2002:3). A "whole school approach" is discussed as a means of integrating ICT into the curriculum and the "potential of ICT to encourage whole school innovation ... and outcomes across the curriculum" is emphasised (MOE, 2002:6-8).

New methods of assessment now seem more appropriate to assess the new methods of teaching (or facilitating). The Ministry of Education (1995b:24) believes that the "full picture" needs to be "built up" over time in the form of "portfolios".

Abbott (2001:124) questions whether the Government wants to dominate and lead the world in the field of ICT, or whether they place more emphasis on the use of ICT to communicate and co-operate with others in the world? His reasoning for this question is that the answer to this question will determine how ICT is taught in each country. The answer will be found in both subtle and more obvious ways and will be embedded in national ICT policies and approaches, according to Abbott (2001). The following excerpts are intended to answer the above question and provide an underlying reason for the inclusion of ICT in the New Zealand curriculum.

It seems that the New Zealand Government indicates a wish, at times, to dominate and lead. For example:

- "New Zealand is rich in ... resources ... which can be processed into higher value products through ideas and technologies yet to be developed" (MOE, 1995b:6)

- Citizens of the future will be expected to "contribute to New Zealand's social and economic development" (MOE, 1995b:7)

- Students will be required to use "existing technologies [to create] solutions to technological problems" (MOE, 1995b:7)

- The Ministry of Education (2002:3) refers to "the importance of specialist ICT skills to economic development" as one of a list of three items that our culture needs to recognise if we are to benefit from the expansion of ICT. This view is repeated again in the same document (2002:6).

However, the following excerpts seem to indicate an intention more focussed on communication and co-operation:

- Students should be engaged in "purposeful activities" and "community interactions" (MOE, 1995b:7)

- The learning of ICT should be "open to everyone" (MOE, 1995b:6)

- The Ministry wishes to promote "interactions with business and industry" (1995b:7)

- The *Interactive Education* (MOE, 1998) document seems to focus on the use of ICT to make life easier for students, schools and teachers.

Abbott (2001:95-104) discusses the desire of some governments to win the "race to connect" (referring to the internet). The New Zealand Ministry of Education (2002:13) outlines a plan "to deliver high-speed internet access to all schools". Abbott questions whether this "race" will have desirable outcomes for the students.

The Ministry of Education (2002:9) states that there is "no single model" for ICT in schools, but they do identify "key action areas" which include goals related to learners, teachers, leaders, Maori, families, communities, businesses and other stakeholders, curriculum and learning resources and infrastructure (2002:12-21).

It is stated (Ministry of Education, 1995b:24) that the "experiences ... outlined are ... neither exhaustive nor definitive". This implies that schools are free to choose how

they wish to deliver this Technology curriculum and the ICT component of it. Possible options for the delivery of this curriculum are outlined later in this chapter, in the *ICT Teaching and Learning Depends on the School* section.

Where Does ICT Fit Into the New Zealand Curriculum?

Technology is one of the seven Essential Learning Areas (ELAs) in the New Zealand Curriculum (MOE, 1995b:20-21). There are seven technological areas within the Technology curriculum (MOE,1995b:12). ICT is one of those areas, as stated earlier.

The New Zealand Curriculum also includes eight groupings of Essential Skills[1] that are to be learned by students across the school curriculum. Information Skills and Communication Skills are two of these Essential Skills (MOE, 1995b:18-19). However, whether teaching *about*, *with*, or *through* ICT, it is possible to include the other essential skills alongside ICT learning. These other essential skills are: problem-solving skills, social and co-operation skills, self-management and competitive skills, numeracy skills, physical skills, work and study skills. For these skills to be woven through the whole school curriculum there is a need for collaboration and co-operation in learning, as outlined in the international perspective on ICT education earlier. According to the MOE (1995a:8; 1998:13), attitudes and values should also be integrated into the students learning. Students are expected to "develop and clarify their own values and beliefs and respect others" (MOE, 1998:13). This is in line with the socio-cultural view of ICT outlined earlier.

As indicated earlier, the MOE emphasises the need for the essential skills to be taught across the curriculum in all national curriculum documents (MOE, 1992; 1993; 1994; 1997a; 1999; 2000). The integration of ICT into each curriculum is outlined below.

In the Mathematics document, use of the calculator is discussed as being particularly important (MOE, 1992:14). The Ministry also states that graphics calculators, graphing packages, spreadsheets and computer programs such as Logo could be used by students "to concentrate on mathematical ideas rather than on routine manipulation" (MOE, 1992:14). A "development band" is discussed for high achieving students and "access to a broader range of higher level resources is suggested for these students" (MOE, 1992:19).

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[1] For more information on the Essential Skills, see: http://www.tki.org.nz/r/governance/nzcf/ess_skills_e.php

The English curriculum document states that "competence in using information and communication technologies, essential for full participation in society and the world of work, is also part of the curriculum" (MOE, 1994:7). How these technologies can be integrated into the English curriculum is outlined throughout the document. Access to these technologies is important and "teachers should develop approaches and programmes" to ensure "equitable access"(MOE, 1994:18). Technologies specifically referred to include: word processing software, electronic spellcheckers and dictionaries, fax machine, video camera, tape recorder, CD-ROM, electronic display and presentation devices and "other computer technologies". In this document, "collaborative approaches to learning" are discussed and it is stated that "teachers should use these approaches and monitor" them (MOE, 1994:11). The library is referred to as a centre for the "development of information processing skills" (MOE, 1994:22).

Students are encouraged to "work co-operatively" in the Social Studies curriculum document (MOE, 1997a:7). The essential skills relationship is outlined, but there is no specific mention of ICTs, except in the range of resources that should be available to students. These range of resources include: radio interviews, films, TV programmes, the Internet, the World Wide Web and simulation software (MOE, 1997a:27).

The Arts curriculum document is divided into four parts: Dance, Drama, Music and Visual Arts (MOE, 2000). A variety of technologies, including ICTs are mentioned in all sections of this curriculum. As well as learning to use the different technologies in relation to the curriculum area, students are expected to develop an understanding of how these technologies "influence communication and interpretation in the arts" (MOE, 2000:11). Some ICTs mentioned are: video, sound, computers, film, recording equipment, computer mixing desks. Electronic Media and Film is a field within the Visual Arts curriculum (MOE, 2000:71).

"Science and technology" is a term repeatedly used in the Science curriculum document (For example: MOE, 1993:7). Students are expected to develop an "understanding of the interrelationship of science, society and technology". One strand of Science that is integrated through the science curriculum is "Making Sense of the Nature of Science and its Relationship to Technology". It seems that, in the Science curriculum the focus is on learning *about* ICTs. However higher order thinking skills are discussed and learning "*may*" include the use of computer spreadsheets,

calculation aids and measuring instruments (MOE, 1993:21,130). "Reporting in Science *may* include: using a wide range of media, including computers, videotape recording, audiotape recording, ..." (MOE, 1993:51).
The use of ICTs in the Health and Physical Education curriculum document (MOE, 1999) is mainly related to the recording of performances on video and the use of computer software to improve performance (MOE, 1999:8, 23, 25, 27). This is only briefly mentioned in the document. However, the Essential Skills are outlined and it is stated that students should "use up-to-date ICTs" and "use technologies to present information" (MOE, 1999:48-49).

Languages curriculum documents also include the use of ICTs. In both the Spanish and Japanese language curriculum documents there is encouragement to use ICT for "small group work and peer assessment" (MOE, 1995a:16; MOE, 1998:10). Both documents refer to word processing programs as tools and suggest the use of "interactive language-learning programs" (MOE, 1995a:16; MOE, 1998:10). It is suggested that the internet and email can be used to gain information about Japan and Spain and to carry out exchanges with other learners. A "Learning-how-to-learn Partnership" is discussed in the Spanish curriculum document in which "responsibility for learning is transferred progressively from teacher to learner" (MOE, 1995a:9). The Spanish document points out that "technology increases the mix of approaches teachers can use" (MOE, 1995a:7). Suggested learning activities within the two documents include some ICT based activities such as presenting a TV program about the local area, making a video with narrated commentary on "A Day in the Life of a New Zealand student" to send to an exchange school, watching videos, role playing a telephone call, using the computer to produce a "work wanted" advertisement in Spanish, writing passages on a computer in present tense and then swapping computers and putting another student's work into past tense.

Although there is not a major emphasis on ICT in many of the curriculum documents, the Ministry of Education published the *Digital Horizons* document in 2002 which promotes learning *through* ICT and strongly encourages integration of ICT across the curriculum in all learning areas (MOE, 2002). This is a strategy document for 2002-2004 in which the Ministry's vision for ICT in schools is outlined and goals are set. The document emphasises ICT as a "tool" and as "digital resources" (MOE, 2002:2). It provides a broad strategy as a base from which schools can tailor their own specific ICT strategy. Within the document it is stated that there is "no single model" for the use of ICTs in schools and that "partnerships between schools, government,

communities and business" will need to be created and included in individual schools' own planning (MOE, 2002:3,9). The primary vision includes students using ICT "to develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community" (MOE, 2002:3). "Higher order thinking and information skills" are focussed on, along with a "culture of collaboration" (MOE, 2002:3).

This overview of the Ministry of Education's perspective appears congruent with the international perspective outlined earlier, in terms of its emphasis on a more integrative approach focussing on higher order thinking and collaborative teaching and learning. However, is there also the space, or a need, for ICT to be taught in specialist subjects?

Specialist ICT Subjects

Within the latest strategy document previously outlined - *Digital Horizons* (MOE, 2002) - the Ministry states that schools, government and other stakeholders need to "work with secondary and tertiary sectors to investigate and extend options for senior students to access specialist studies in ICT" (MOE, 2002:12). The word "extend" here indicates that the government is intending to broaden the ICT specialist options available, not reduce them. The Ministry recognises the need for these specialist courses for some students.

Technology is implied as being a separate subject on a number of occasions in the curriculum document (MOE, 1995b:6, 10). Although ICT is one of the key areas of Technology, schools can choose to teach ICT as a part of Technology in an integrated fashion and/or as a separate subject. The overlapping framework of the diagram below, merging the technological areas with the three strands of the Technology curriculum and the contexts, implies that each technological area is still separate.

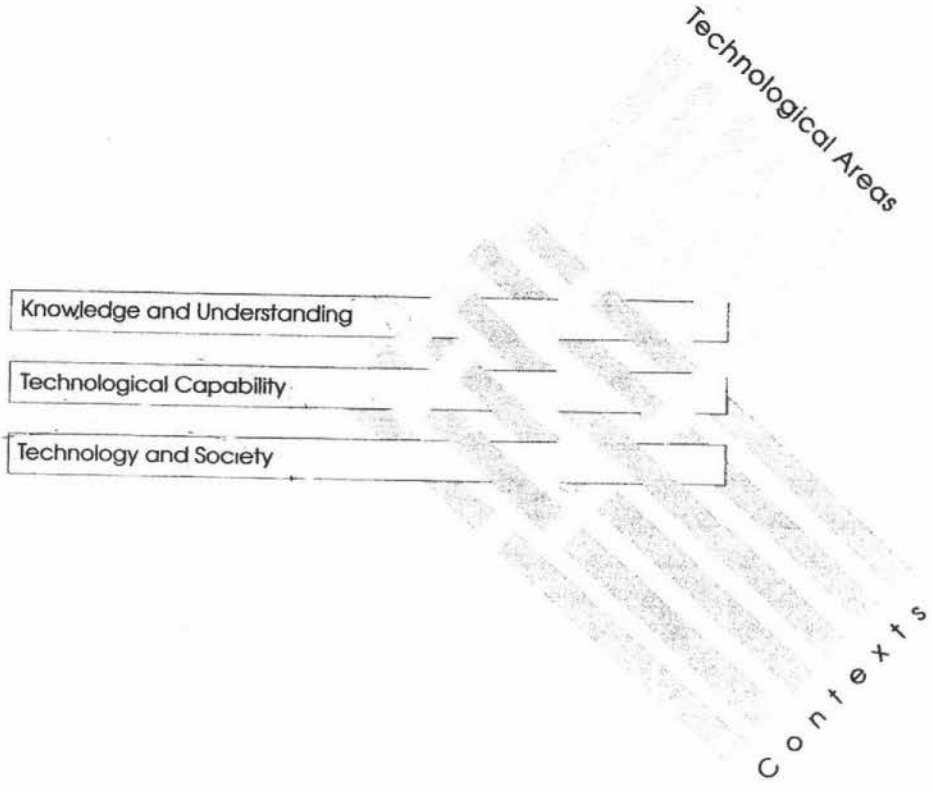

Figure 2 - The Framework for Technology Education (MOE, 1995b:13)

This position begs the question: Why bother having a Technology curriculum document (MOE, 1995b) if it is to be integrated across the curriculum? Why not include the objectives of Technology in the other subjects' curriculum documents instead? The spirit of the document implies that the reason is to provide flexibility for schools to deliver subjects as they see fit for the particular character of their school.

The Technology curriculum document states that "schools and teachers should develop learning approaches and technological activities within the technological areas" (MOE, 1995b:13). The word "within" implies that each technological area should be treated as a separate subject or course. However, it must be noted that it does not exclude the teaching or learning of ICT in other areas.

The Ministry stated that "students will need to be drawing on knowledge and skills developed in other areas of the curriculum" when working on Technology projects and that "technological activities contribute to the development of learning in other essential [learning] areas"(MOE, 1995b). This would, again, imply that Technology should be taught as an individual subject.

The Technology curriculum document states that "a unit of work in technology ... can also involve achievement objectives from other essential learning areas" (MOE, 1995b:25). However, it is pointed out that a "clear focus on a specific technological strand and objective" is needed "if assessment is to be reliable and valid". This points towards the necessity of assessing Technology, and the components of it, individually. Technology needs to be taught in "substantial sections rather than dissipated across the curriculum" (MOE, 1995b:29).

The Examples of Learning and Assessment given (MOE, 1995b) show that projects/topics/subjects/courses can cover three to four different technological areas, but they also show that a project/topic/subject/course can also focus on one particular technological area if desired.

The Technology curriculum document (MOE, 1995b) focuses on the processes that the students will go through, rather than itemising content that they will learn. The emphasis is on learning how to learn. There are no listed items of ICT content, but rather, the fundamentals of ICT and the skills that students will need to learn are embedded in the objectives of the three strands of Technology at each level: Technological Knowledge and Understanding, Technological Capabililty and Technology and Society (MOE, 1995b:31-43). This could be interpreted to mean that ICT skills may not have to be assessed, as such, but rather be used as tools for producing final products/projects. However, it is also possible to create ICT products/projects that students work on and it may be necessary or preferable to teach ICT modules prior to students embarking on these products/projects. As stated earlier, even Jonassen (2000), the promoter of computers as "mindtools", admits "some knowledge of any tool is required in order to use that tool" (Jonassen, 2000:8).

The Ministry of Education refers to "the importance of specialist ICT skills to economic development"(2002:3). Eadie (2001:36) reported on a Business Applications classroom in Nevada that is set up like an office to provide real-life experiences. Real-life experiences were being provided for students in all four countries that Eadie researched (Australia, USA, England and Hong Kong) in a variety of subject areas. Similar real-life experiences for Orewa College students, along with other school-business partnerships suggested by the Ministry of Education could contribute significantly to economic development (MOE, 2000:19).

In the area of ICT learning, "basic needs must be met" (Bigum and Kenway, 1998:392). This could be interpreted to mean that basic ICT competencies need to be met before students can use ICT as a tool for higher order thinking. Basic competencies, however, may change. What are deemed to be expert ICT skills currently, may be classed as basic ICT competencies in the near future. According to Cuban (2001b:177) more students are now taking computer keyboarding and elementary computer courses to fulfill current basic needs.

It seems that, although the main focus is on the integration of ICT across the curriculum, there is still a need for ICT to be taught as a specialist subject(s). It appears there is a need for a course covering basic ICT skills and computer keyboarding for all students to be brought up to the same level upon entering high school, as well as more specialised options at senior secondary school level. The questions that remain are: Should ICT skills and knowledge be integrated across the Technology curriculum or be taught as a separate technological area, timetabled as an individual subject? At which levels? With what content? What are the current basic needs for Orewa College students? How can continually changing basic needs be identified and met?

Specialist Teachers

Boody (2001:7-8) believes that trained teachers are best to teach ICT, not cheap "techies". Although the "techie" understood software in the case outlined by Boody, he "did not understand teaching at all" (Boody, 2001:7). All teachers should be able to integrate ICT skills into the students' learning in all learning areas. However, the learning of specialist ICT skills may require specialist teaching, bearing in mind that as new technologies are created, new specialist skills will need to be learned. What was once a specialist skill will be downgraded to a more common, or basic skill as alluded to earlier. This thought fits well with the idea of continuous learning that is outlined in the next section. The need for specialist teachers, however, poses a problem. Val Savidan, a Senior Lecturer at the Auckland College of Education (ACE), stated at a Commerce and Economics Teachers Association (CETA) Auckland branch meeting seminar early in 2003, that "there were fewer secondary pre-service teacher education students enrolling in specialist ICT/Information Management modules at Auckland College of Education (ACE) than in the '90s" (V. Savidan, Personal Communication,

February 2003). This statement was supported by statistics gained on teachers training at Massey University and ACE to teach ICT in secondary schools (J. Chapman, Personal Communication, 8 September 2003; J. Edmonds, Personal Communication, August 2003). How, then, will specialist ICT learning take place if there are not sufficient teachers available? Should the government encourage the recruitment and training of more specialist ICT teachers? Perhaps relationships between schools and tertiary institutions and businesses will need to be formed to overcome this dilemma, as suggested by the Ministry of Education (2000:12, 19). Perhaps online learning and/or teleconferencing facilities could be used to solve this problem. The purpose of this study is an attempt to answer some of these questions raised.

Continuous Learning

The idea of a "continuum" or "journey" of learning through the use of ICT is expressed by the Ministry of Education (2002:8) as learning about ICT, with ICT and then through ICT. This continuum is depicted in the figure below.

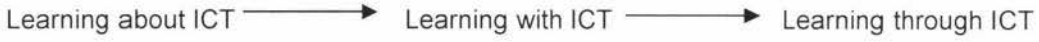

Figure 3 - Learning about, with and through ICT

Students are expected to develop positive attitudes towards "learning as a lifelong process" (MOE, 1998:13). It is apparent that both teachers and students will constantly need to learn *about* ICT and *with* ICT, so that they can continue to learn *through* ICT. This expands on Jonassen's (2000:8) belief, quoted earlier, that "some knowledge of any tool is required in order to use that tool". This idea is also in keeping with Brown and Murray's (2003:11) claim that teachers' learning of ICT is not linear, but iterative. This is probably partly due to the fact that ICT itself is constantly changing and being updated. Part of the reason may also be workload. Teachers may only learn what they feel is necessary for *now* and return to learning later when they believe it is, again, necessary.

Although the continuum depicted above is a robust conceptual approach, this may be better represented as a continuous cycle, rather than a continuum. Every time another

new technology is invented or improved upon, we need to learn *about* it, then *with* it, then *through* it. Even with existing technologies, while performing a task we may need to learn *about* ICT, then *with* ICT, then *through* ICT. Then, as new aspects of the task come to light, we may need to progress through this learning cycle again. As learners progress through each cycle, their knowledge, skills and understanding broaden. This seems to be a logical assimilation process shown below.

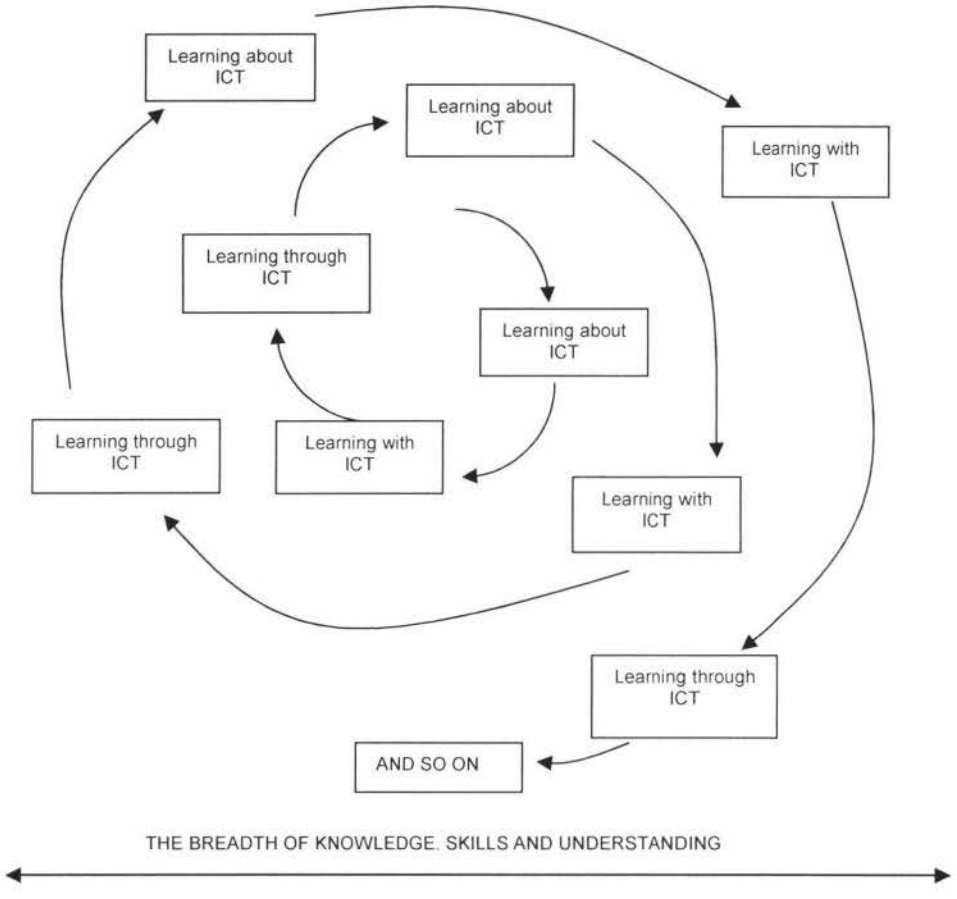

Figure 4 - The Cycle of Continuous Learning (adapted from a model by the MOE, 2002:8)

The question still remains in what ways this ICT education should take place. Assuming that students will constantly need to learn *about* ICT (ICT skills and knowledge), should this learning take place across the curriculum in an integrated form, or should it be taught in specialist subjects? Or, should we be leaving students to discover these skills and knowledge in an osmosis-like process in collaborative projects?

A Collaborative Style to ICT Education

Is there the space, or a need for, specialist ICT subjects *and* integration of ICT learning across the curriculum including learning in an osmosis-like process? According to Abbott (2001:46), "the issue of ICT as a domain or a set of tools remains unresolved". Therefore, why not compromise and have both?

The Ministry of Education (1998:18) points out that ICT has a place as a technological area under the Technology curriculum, but also explains that it has much wider implications as well. The opinion that seems to be being conveyed is that ICT can be a subject in its own right *and* have a more global impact at the same time.

A "provincial department of education" in Calgary, Canada "developed a curriculum for information technologies *and* mandated that ICT skills be part of the teaching of every subject at every level" (Hunter, 2001:24). The educational leaders in that province obviously saw the need for both.

Hunter (2001:26) uses a vignette that implies that an introductory information processing skills course is necessary before students can learn through ICT. The vignette illustrates that this introductory course should include computer-keyboarding skills, email, chat discussion groups, web browsers, copyright issues and file management. Hunter (2001) suggests that this course (and all/most others) can be online.

The conclusion emerging from the literature is that there is a need for at least some specialist ICT learning, in combination with the integration of some ICT learning across the curriculum. Perhaps there is the need to have some ICT skills and knowledge *taught* across the curriculum and some of this learning taking place via an osmosis-like process.

Other Issues

The Changing Role of the Librarian

One of the "key personnel" in relation to ICT teaching and learning discussed by Selby (2001:4) could be the librarian in the school. Hay (2001) discusses the role of the librarian as being important and recognises that it is a role that is evolving.

Todd (2001) agrees that the role of the teacher librarian is an important one. In discussing the internet, he recognises that students need to be able to "navigate this complex and often ambiguous information space" (Todd, 2001:3). The question arises: Who will teach them? Todd suggests a Partner-Leader model involving the classroom teacher and the teacher librarian. This leads to the inevitable question: In what ways could the librarian(s) be involved with ICT learning at Orewa College?

A "cybrarian" is referred to by Eadie (2001:26). She came across a number of different Media, Multimedia and Independent Learning Centres, in place of or attached to the traditional library, whilst undertaking her research. The role of the librarian and the library itself are definitely undergoing some major changes around the globe (Eadie, 2001:26). These changes are part of much broader changes in ICT learning that will require effective management.

ICT Leadership

Hay (2001:11) believes that "two separate groups of stakeholders still exist within the schools, i.e. both IT co-ordination teams and library resource centre teams". She believes that these two units should merge, but points out that it is a contentious issue. Effective information leadership will lead to effective integration of ICT across the school, according to Hay (2001:9).

"An information leader [is] a person who has:

- A whole school information philosophy;
- Understands the core issues of student learning and professional development;
- Whose understanding of technology is not necessarily technical, but rather a technological vision; and

- One who interprets educational and administration needs into technological solutions". (Hay, 2001:11)

Hay (2001:11) goes on to say: "a 'director' of ICT should be at the highest level of the organisation below that of a school's superintendent or school principal". The question is, what sub-leadership, or middle management, positions are needed below this 'director' position? The librarian is key, as alluded to earlier, but what other positions may be needed to direct or lead the way for future ICT learning at Orewa College?

The Need for Clear Policies and a Strategic Plan

The aim of the *Computing Across the Curriculum in Secondary Schools* (MOE, 1991) document was "to encourage schools to develop a policy that will enable staff and students to understand and explore the learning opportunities offered by computers" (MOE, 1991:1). Both the *Interactive Education* (MOE, 1998) and *Digital Horizons* (MOE, 2002) documents have followed on from this original document and give schools an outline of what should be included in their ICT strategy. The question that arises here is how are these documents being interpreted by the staff at Orewa College? Who are the key personnel at Orewa College that should be involved with updating the school's ICT strategy document?

With any strategic plan for ICT learning, there will be potential barriers. These are outlined below.

Barriers to ICT Teaching and Learning

Whether teachers take on the challenge of integrating ICT into the curriculum, teach ICT in specialist subjects and/or facilitate student learning of ICT via an osmosis-like process, perhaps in addition to using a more constructive approach to student learning in the classroom, they require support. The integration of ICT brings increased workload and stress for teachers, but expectations continue (Brown and Murray, 2003:12). Savidan (2003:138) believes teachers need a "collaborative online environment" in which they can pursue "principles of learning". Time is needed for teachers to review software (Stratford, 2000:9). Professional development is also required in the area of basic trouble-shooting skills and technical support staff must be provided (Savidan, 2003:130).

"Believing that implementation is a top-down approach, also disempowers teachers" (Savidan, 2003:131). If teachers feel that they have no input into how the implementation of proposed changes will take place, they may be less likely to buy into the proposed changes. As stated earlier, the teacher is the key to the integration of ICT in education. Instigation must come from them. However, Eadie (2001) states:

> where rigorous examination systems and prescribed learning outcomes control the curriculum, it is much harder for innovative use of technology in the curriculum to occur (Eadie, 2001:40).

Perhaps it is time to reduce the number of assessments and number of learning outcomes to gain more quality learning? The issue of assessment in secondary schools must be examined as a potential barrier to the integration of ICT in education. The recent New Zealand Curriculum Stocktake refers to a "crowded curriculum" (MOE, 2003a) and suggests reducing "the level of prescription in subsequent versions" of the curriculum (MOE, 2003b).

Access to ICT equipment, in particular computers, is a barrier for many (Hay, 2001:5). Greaves (2000) agrees and quotes Sherilee Walker, former assistant superintendent of Federal Way Washington School District as saying:

> continuous and personal technology access for every student, regardless of socioeconomic background is necessary for full integration of ICT into the curriculum (Greaves, 2000:54).

Greaves supports this statement and goes further to say that "computers must go home every day to make the desired impact" (2000:54). Whether computers actually need to go home every day, or not, access issues do have implications for effectiveness and the obvious question is: Do Orewa College students have computer access at home?

The access issue is being addressed, at least partially, by "Study Support Centres" that are provided at some schools for after school study (Ministry of Education, 2002:19). The question within this study is what access to ICT is provided at Orewa College for those students that don't have a computer at home? Additionally, what other access issues have arisen at Orewa College?

Interestingly, Halliday (2001:45-46) points out that Text and Information Management (TIM) and Computing rooms are barriers to ICT integration in other areas. Location, in general, of computers in the school can create obstacles to integration (Savidan, 2003:131). Schools need to decide whether to place computers in laboratories, pods, one computer per classroom, or discover other ideas for ensuring equitable access. However, Halliday (2001:46) purports that "until the structure of the secondary curriculum is addressed, teachers will only ever be able to assimilate the use of ICT and not reach a true level of integration".

The Ministry of Education expresses the need to "expand access to ICT" for teachers and learners as well as leaders (MOE, 2002:12, 14). The provision of laptops for principals is mentioned and subsidising laptops for teachers is discussed (MOE, 2002:16). Within this research the question emerges: Have the Orewa College principal and staff been provided with these laptops? Additionally, and perhaps more importantly, have the laptops made a difference to ICT learning in the school?

Cuban (2001a) suggests that it is possible that even with adequate access and support, the majority of teachers may still not appear to be successfully integrating ICT across the curriculum. He has identified alternative reasons, or barriers, that may be preventing widespread integration of ICT. These include cultural beliefs, a lack of consensus on the purpose of the school, cultures of teaching that may stem, at least partially, from teachers having observed their own teachers in the past, school structures (for example: the timetable and physical layout of the school) and the teachers' and students' individual knowledge and beliefs that all contribute to shaping classroom behaviour (Cuban, 2001a:127-131).

The literature also reveals that being a female may also be a barrier to learning through ICT. In 1995, Spender (cited by Brown, 1997:257) pointed out that "95% of Information Superhighway Cruisers are men". However, Onosaka (2003:95) noted that "from 1997 to 2001 the percentage of women online increased from 16.5 to 44.5 percent of all users" in a study carried out in Japan[2]. Shade (2002:1) also discovered "Summer 2000 headlines scream 'Wired Women Drive US Internet Group'; 'More Women Than Men Online in US, according to Nielsen Net Ratings'". However, even with the increase in female useage of the internet, Hunter (2001:28) points out that "males are drawn to the exploratory nature of ICT whereas the females are pragmatic in their use of ICT". The

[2] Onosaka (2003) gained this information from The Ministry of Public Management, Home Affairs, Post and Telecommunication, *Information and Communication in Japan.* p100.

"middle range student" is also, apparently, "not drawn to learning online" (Hunter, 2001:28).

If students lack basic ICT skills, this in itself can be a barrier to the integration of ICT across the curriculum (Stratford, 2000:9). However, "mentor students" can be used to assist those that lack the necessary skills (Stratford, 2000:10).

According to one Technology Co-ordinator/Teacher, "the most negative aspect of ICT may be that it creates an illusion of being easy" (Hunter, 2001:29). Students and teachers own attitudes and perceptions could prove to be a barrier to ICT teaching and learning (Savidan 2003:131). Appropriate support, such as professional development, problem solving, trouble shooting and technological assistance discussed earlier in this section could assist in overcoming this.

Eadie (2001:31) points out that the structure of the school timetable may be a barrier to delivering ICT in the desired manner. However, she believes that the timetable may need "rethinking" and that we may need to break out of the timetable "straitjacket". The researcher proposes that flexibility around timetable and resourcing is possible if the findings of this research indicate that is desirable.

Poor time management and/or self-management skills may also prove to be a barrier to online learning (one form of ICT delivery) (Hunter, 2001). Safety and security can additionally prove to be barriers to ICT learning (Savidan, 2003:131). Passwords are needed for access and user policies are needed for the use of the internal computer network and the internet to ensure that appropriate learning takes place.

It is essential that potential barriers to future ICT learning at Orewa College are identified and plans for overcoming, or minimising these barriers are included in the strategic plan.

Uncertainty and Rethinking

Another barrier to integrating ICT into the curriculum is the "professional uncertainty about what constitutes appropriate pedagogical approaches incorporating ICT" (Leask & Younie, 2001:130-131). It is from this uncertainty that the debate within this chapter arose. Polarisation that arises from debate can be detrimental. We need to move

beyond polarisation (Brown & Murray, 2003:10, 13; DeVaney, 1998:568). The debate needs to be viewed as an "activity system" that will lead to "shared understanding" (Jonassen, 2002:51) thereby enhancing outcomes overall. Burbules and Callister (2000:15-16) agree and suggest that "combinations of quantitative and qualitative research methods" may address this.

Boody (2001:20) believes that the main barrier to integration of ICT in schools is the acceptance of a "technological worldview". Despite polarisation that inevitably occurs within a debate, a shared understanding and move towards a more uniform international perspective is slowly evolving. Some main points that have surfaced from the debate are:

- There should be more focus on learning instead of teaching.
- More learning should take place in a collaborative environment with a constructivist approach and a socio-cultural focus.
- The main focus is on ICT as a tool, but there is still room for specialist options for those students that wish to pursue careers in the ICT field.
- The key to all of this is the teacher in the role of "expert learner" (Schuck, 2001:4)

We are currently in a "process of rethinking the means and ends of education, and not trying to find ways to do what we used to do better" (Burbules & Callister, 2000:17). As part of this process we must critique both content and pedagogy (Boody, 2001:7-11). Herein lays the essence of the debate itself. It appears from this debate that this part of the process is well under way.

What Are Other Schools Doing?

Many schools are still using computers mainly for word processing, but there are instances where cross-subject teaching is occurring with ICT skills and knowledge integrated across the curriculum (Cuban, 2001b:72, 79-80). Case studies of Flatland High School and Las Montanas High School, carried out by Cuban (2001b) are examples of these instances. However, he discovered only a small percentage of computer-using teachers (Cuban, 2001b:171). These teachers largely maintained existing classroom practices. Very few teachers and students across America use computers across the curriculum on a regular basis (Cuban, 2001b:71).

Las Montanas High School required all ninth grade students to take a course in computer productivity (Cuban, 2001b:77). In the context of this study, this raises the question of whether or not other North Shore secondary schools require students to take a prescribed ICT/computer course? If so, at what level? What is included in the course? What is the course's duration? This research study examines these questions because in order to assist in planning for the future of ICT learning at Orewa College, it has been necessary to look at what other schools are doing. Other North Shore secondary schools and contributing primary schools have been surveyed for this purpose. The methodology for this is outlined in Chapter Three of this study.

ICT Teaching and Learning Depends on the School

The Ministry of Education (1995b:24) has implied that schools are free to choose how they wish to deliver the Technology curriculum and the ICT component of it, by saying that the curriculum is neither comprehensive nor restrictive. Although ideas will be gained from surveying other schools, decisions regarding future ICT learning at Orewa College will be based on the particular character of this school.

Part of deciding how to deliver the ICT curriculum includes the setup of classrooms and the use of space. Eadie (2001) studied this aspect in depth and outlined a variety of different options that schools in Australia, USA, England and Hong Kong have implemented. There are numerous options, so rather than giving a detailed description, it is more useful to examine the most appropriate options for Orewa College. This is undertaken in the process of data analysis, described in Chapter 5.

The Ministry of Education clearly states that at "senior secondary school ... students may specialise in technological areas, undertake general courses in technology or do both" (MOE, 1995b:29). It is up to each individual school to decide.

Four possible options for delivering the Technology curriculum are outlined:

- A timetabled subject called technology (using teachers from a range of disciplines).
- A school approach involving integrated modules or total integration of the curriculum across the curriculum.
- A combination of the above two options.

- Suspending the timetable for a fixed period to focus on technology as a year group or whole school.

(Ministry of Education, 1995b:29)

The school's decision needs to take into account the type of school, the preferred organisational pattern, students ages and competencies, teaching strengths and community resources available (Ministry of Education, 1995b:29).

Factors to Consider When Making Recommendations for Curriculum Change

In effect the real purpose of this research is to make recommendations for curriculum change, or more specifically, the way in which the ICT curriculum should be taught or learned at Orewa College. This section firstly points out the need to identify and overcome potential barriers to any proposed change. Secondly, the importance of diagnosing and managing school culture in any change process is explained. Strategies for managing change are then outlined. Lastly, a recommendation to use the department, and individual teachers within the department, as the key focus for change is explained.

There are many factors to be considered when undergoing such changes. These factors include the participants involved in the change, the worldview on related topics and ensuring that we are not simply reinventing the wheel.

Other important factors to consider when undertaking change are the potential barriers. This could include various forms of resistance, general apathy or lack of support and commitment, and lack of resources (Everard and Morris, 1996:218). Other barriers have been outlined earlier in this chapter.

A change in the way the curriculum is delivered will also require a cultural shift. Culture is described by Schein (1992) as:

> a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems (Schein, 1992:12).

Schein (1992:2) believes that creating and managing culture is a huge part of a leader's role. However, any cultural change will need to be slow and involve indirect methods, except in extreme circumstances, because it involves changing values and beliefs (Hargreaves, 1999:59). In order for this to occur effectively, it is first necessary to have a solid understanding of those current values and beliefs.

There are "three major tasks in relation to school culture - diagnostic, directional and managerial" (Hargreaves, 1999:48). Deal and Kennedy (1983, cited in Stoll and Fink, 1996:100) outline three steps for schools to take in the diagnostic process before attempting any cultural change:

1. Get to know your culture - the spies, the heroines and other characters.
2. Consider how the school culture encourages or inhibits ... the accomplishment of school goals.
3. Arrange opportunities where people can discuss and re-examine their values.

According to Stoll and Fink (1996:100) "this third step appears simple, but is frequently neglected". Hargreaves (1999:48) supports this and states that "as many people as possible" should be involved in the cultural diagnosis as this "may motivate them to engage in a later development of, or change in, the school's culture". He provides the following typology, which may be used as a diagnostic device.

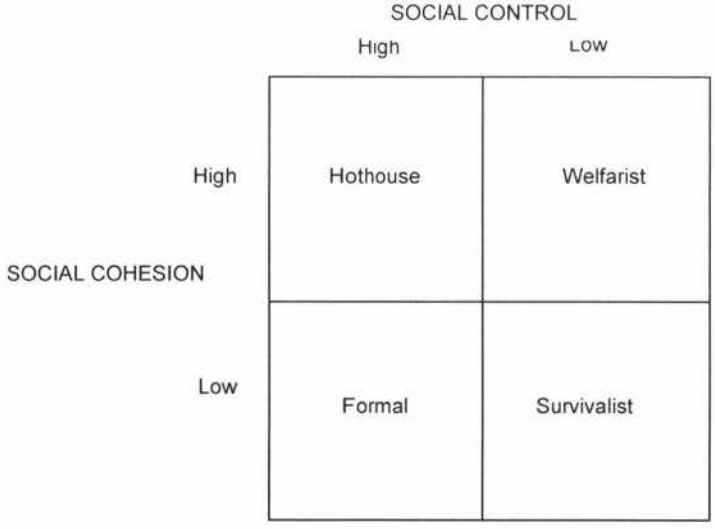

Figure 5 - A School Culture Typology (Hargreaves, 1999:51)

The above typology may be used by asking staff to individually indicate where they would currently place the school within the typology and where they would ideally like

to see it placed. Results can be collated and interpreted. Hargreaves (1999:57) notes that "homogeneity is not always a sign of strength. Elements of dissent and ambiguity within a culture are potentially healthy". This should be remembered when interpreting results.

An alternative two-by-two typology is provided by Stoll below (In Prosser, 1999:39) and can be used in a similar manner.

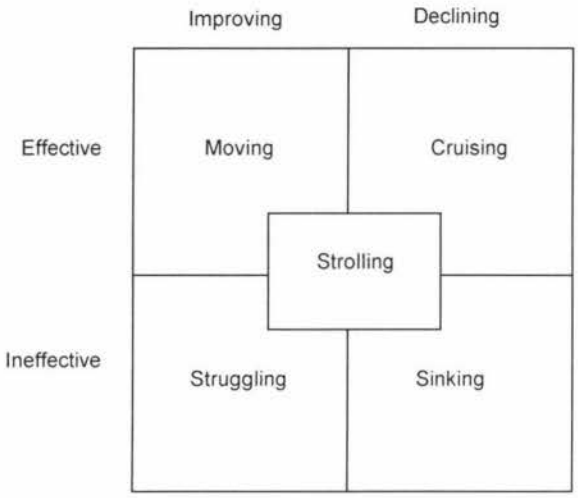

Figure 6 - A Typology of Schools (Stoll In Prosser, 1999:39)

The above typologies are useful not only for diagnosing the culture, but also for assisting with directional decisions. Strategies for managing change are then needed (Hargreaves, 1999:57).

Hargreaves (1999:61) offers the following steps to guide the change process:

- Choose your style
- Prioritise your focus
- Change behaviour
- Devise supportive structures
- Monitor the effects and penetration of cultural change
- Import assistance
- Be your own culture

Ten cultural norms that influence school improvement are provided by Stoll and Fink (1996:92-97):

- Shared goals
- Responsibility for success
- Collegiality
- Continuous improvement
- Lifelong learning
- Risk taking
- Support
- Mutual respect
- Openness
- Celebration and humour

Appropriate support throughout the change process has been emphasised by both Hargreaves (1999) and Stoll and Fink (1996) and is important to assist in minimising the effects of change which can include loss, incompetence, confusion and conflict (Evans, 1996:28-36). The change process can cause participants to feel a loss of structure and of control. They may have feelings of incompetence in dealing with new structures and possibly confusion if changes in structure and expectations are not clarified. There will usually be conflict between those that are promoting the change and those that are resistant to it. As stated earlier, change must be slow and involve indirect methods if these effects are to be minimised.

Brown, Rutherford and Boyle (2000:242) state that: "the department is the key focus for change within the school and ... heads of departments, with responsibility for a manageable group of people, can enable successful change within the group and thus contribute to whole school improvement". This concept is supported by Earley and Fletcher-Campbell (1989:215) who state that department and faculty heads are the keys to "improving the quality of the learning process". Fullan and Hargreaves (1992:21) purport that the teacher is the key and therefore any change must begin with the individual teacher. However, department heads, along with master teachers, will need to foster and encourage the teachers and the expected changes.

Conclusion

William West (2000) describes a future in which the student may only spend a few hours each day in a learning centre, and do much more self-directed learning at home. This vision, although provocative, is weak. In many families, both parents work and students still need looking after, especially the younger ones. The researcher believes that the social interaction and routines provided by schools are necessary for our growing teenagers to develop appropriate social norms, in addition to gaining academic motivation and inspiration from both their teachers and peers. This study will provide some direction for appropriate ICT learning environments for Orewa College in the near future.

As stated earlier, ICT in the discussion in this chapter has been used to mean computer technology and related electronic technologies such as data shows, digital cameras, digital video cameras, scanners and related skills and knowledge required for their use. Related teaching and learning strategies and the structures in which learning takes place are also very important.

There is considerable support for the use of ICT as a tool to assist students in the construction of their own learning in a collaborative environment (for example: Snyder, 1993; Salomon and Perkins, 1996; Hunt, 1996b; Leask and Younie; Lowe, 2002; Burbules and Callister, 2000; Jonassen, Howland, Moore and Marra, 2003). Emphasis is on the process of learning rather than the content. Students must learn how to learn.

Discussion regarding societal and cultural aspects of the curriculum has taken place, but the literature reveals that more socio-cultural discussion is needed. As Brown and Murray (2003:10) propose, this is a requirement if we are to ensure an ideal culture or environment for our students.

There is agreement that the teacher is the key to future changes in ICT learning (Brown, 1998:6; MOE, 1997b:21; Savidan, 2003:133). The role of the teacher has evolved. The teacher is now seen as an "expert learner" (Schuck, 2001:4).

The literature has indicated that obstacles to effective ICT learning environments exist. These barriers include timetable and resource issues, access, gender, time management skills, workload and stress, a lack of professional development, a lack of

a collaborative culture amongst teachers, teachers' attitudes and perceptions and general uncertainty.

The New Zealand Government, through the Ministry of Education, has introduced various initiatives to assist in overcoming these barriers, but there is still much to be done. The flexibility provided in the Technology curriculum (MOE, 1995b) and Digital Horizons (MOE, 2002) documents does, however, provide the opportunity for schools to tailor how ICT teaching and learning take place. Schools may be able to use this flexibility to overcome some of the potential barriers to change in terms of how ICT teaching and learning take place. The Technology curriculum document outlines possible options for the delivery of this curriculum (MOE, 1995b:29). ICT can be learned as an integrated component across the Technology curriculum *and* integrated across all Learning Areas as part of the Essential Skills *within* the aims of the Digital Horizons ICT Strategy document (MOE, 2002). ICT can *also* be learned as a stand-alone subject if desired and, in fact, the intention is for specialist options to be extended and made available to senior students (MOE, 2002:12). It has also been suggested that an introductory computing course is necessary before students can successfully use ICT as a tool (Hunter, 2001:26). However, there seems to be a shortage of specialist ICT teachers which limits this opportunity (V. Savidan, Personal Communication, February 2003; J. Chapman, Personal Communication, 8 September 2003; J. Edmonds, Personal Communication, August 2003). The Ministry (2002:12) discusses working with secondary and tertiary sectors to investigate access to specialist ICT learning for students. Links with communities and businesses may also assist in this area (MOE, 2002:19).

We are all now in a cycle of continuous learning. The roles of teachers and librarians are evolving. Strong ICT leadership is required in schools, along with clear policies and a regularly updated strategic plan to ensure that the continuous learning and evolving roles are guided appropriately for the school within its individual context.

To assist with future planning for ICT learning it is necessary to discover how this learning is taking place in other schools. Ideas gained may be combined with the culture and character of Orewa College to form a basis for ICT learning for the school that fits into the flexible framework provided by the Ministry of Education (1995b, 2002).

It is important to consider various factors before embarking upon any curriculum change. These factors include potential barriers, school culture, strategies for

managing change, and identifying a focus point from which to instigate change. If these factors are considered carefully the pathway for change will be a smoother one.

The literature reviewed in this chapter reveals that more research is required. Abbott (2001:98) indicates that exploration into how young people are currently using ICT and into what is being taught and what should be happening in this area is critical. He points out that it is the secondary sector that faces the most significant changes with the introduction of ICT (Abbott, 2001:123). Hence, the researcher has chosen to study the ways in which ICT teaching and learning could take place within a New Zealand secondary school, Orewa College. This research is an exciting opportunity to participate in the continuous challenging journey *about*, *with* and *through* ICT.

CHAPTER 3 - METHODOLOGY

> ***"In ethnography, people are not subjects; they are experts on what the ethnographer wants to find out about". (Burns, 1996:297)***

Introduction

In Chapters One and Two an overview of the study has been given and current literature on the topic has been reviewed and critiqued. A case study approach utilising ethnographic and quantitative methods has been selected to uncover the culture and character of Orewa College and the views of the participants. The methods used are outlined in this chapter. A brief background to the research is given and rationale for the approach selected is outlined. Participant involvement is justified and the data collection and interview processes are explained. Both qualitative and quantitative methods have been combined for the design of questionnaires and interview questions. Reasons for this are explained and justified. The process of data analysis is detailed and issues and ethical considerations are discussed. Steps taken to ensure validity and reliability of data are also outlined.

A Brief Background

There has been considerable debate over how ICT education should occur at Orewa College. Dominant perspectives on ICT education have surfaced amongst staff, students and the community of Orewa College. These dominant perspectives have also surfaced in the wider national and international debate surrounding whether ICT skills and knowledge are best learned by students in specialist ICT subjects, integrated across the curriculum, or learned via an osmosis-like process. Chapters One and Two of this study have outlined these perspectives in more depth.

It was felt, both by the senior management team (SMT) and myself that research was needed to decide how best to educate our students in ICT skills and knowledge for the future. As Head of the Business Department, which encompasses ICT subjects at the

school, it seemed appropriate to both myself and the SMT at Orewa College that I be the one to carry out this research.

Research Site

The site chosen for this study is a state secondary school in Orewa, New Zealand. Orewa is a town situated in the Rodney District. In 2003, Orewa College had 1502 students ranging from Years Nine to 13. In 2005, the school is to take over the neighbouring primary school buildings and will become a Year Seven to 13 school. The primary school will be relocated. Ethnic origin of the student population at Orewa College is shown in the graph below.

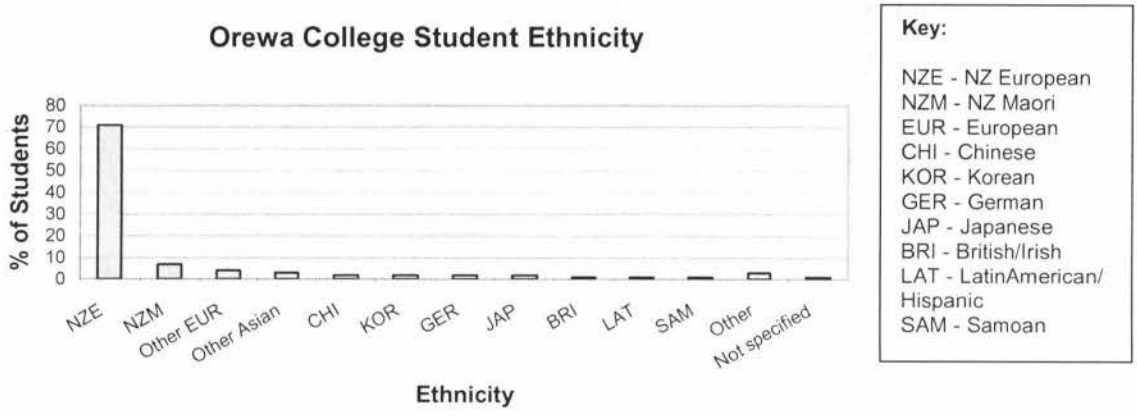

Figure 7 - Orewa College Student Ethnicity

The school employs 88 teaching staff and 44 support staff. Staff with responsibility for ICT teaching and learning within the school include:

Assistant Principal - one of the Assistant Principals is the ICT Co-ordinator and also teaches a Year 10 Information Management class.

Network Administrator/ Technician - is responsible for the maintenance of the computer network including installations and repairs to software and hardware. Advises on hardware, software and infrastructure for ICT teaching and learning. Reports to the ICT Co-ordinator.

ICT Committee	-	is currently the Head of Departments (HODs) Committee. This committee makes decisions regarding the future planning of ICT education at the school.
Head of Business (Is Also a Specialist ICT Teacher)	-	is the researcher and also a member of the ICT Committee. Responsible for specialist ICT subjects and for other business and commerce related subjects.
Three Other Specialist ICT teachers	-	One of these teachers teaches only specialist ICT subjects. The second teaches a combination of ICT and Social Science subjects. The third teaches only one specialist ICT class at Year 12 level and is the other Assistant Principal. (There were two Assistant Principals at Orewa College. A third Assistant Principal, not directly involved with ICT education at the school, was employed during the research period).

Orewa College is rated decile eight by the Ministry of Education. In New Zealand, schools are given a rating depending on the income and education level of the people located in the surrounding areas nearby. This 'decile' rating, ranges from one (lowest income districts) to 10 (highest income districts).[1] Businesses in the surrounding community are largely in the retail trade, construction, property and business services and manufacturing industries (see Appendix Ib). Many people in the local community are self-employed as shown in the figure below.

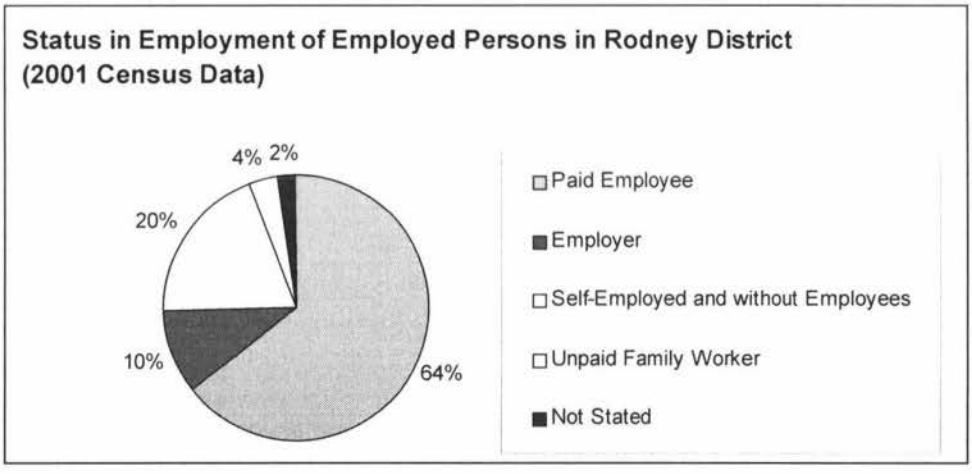

Figure 8 - Status in Employment of Employed Persons in Rodney District

[1] This information was obtained from the Whangaparaoa School website: http://www.wgp.school.nz/Story?Action=View&Story_id=1045

Rationale for an Ethnographic Case Study Approach

The purpose of this research is to recommend ways that Orewa College students can learn ICT skills and knowledge in the future. At this stage, there are no plans for the implementing and monitoring of these recommendations. In this case, I am asking more 'what' and 'how' questions which are most suited to case study (Burns, 1996:365). However, it is the views of the people in this case study that will form the basis of recommendations made. Therefore ethnographic methods are needed to bring to the surface these underlying views.

The literature review in Chapter Two raised questions that assisted in forming the main research question and research sub-questions that are outlined in Chapter One. These questions required research into the culture of Orewa College and the opinions of the staff, students, parents and community of the school. The research is focused specifically on Orewa College and the future learning of ICT skills and knowledge by the students of this school.

Ethnography

There are many definitions of ethnography. Burns (1996:297) says ethnography literally means "writing about people". He also states "in ethnography, people are not subjects; they are experts on what the ethnographer wants to find out about". Wilcox (1982:457-458) found that most agreed with Wolcott (1975) that ethnography is "the science of cultural description". However, Wilcox's (1982:462) own definition does more justice: "a naturalistic, observational, descriptive, contextual, open-ended, and in-depth approach to doing research".

Ethnography focuses on the cultural aspect of research. Everard & Morris (1996:150-152), Hoy & Miskell (1978:136-140), Freire (1996:133-135), Burns (1994:251) and Maxcy (1995:130-133) believe that culture consists of the fundamental, underlying beliefs and values in an organisation. Through the ethnographic case study methodology it is hoped that the underlying beliefs and shared understandings of the staff, students, parents and community of Orewa College will surface. "In-depth" research is required to flesh out these underlying beliefs and shared understandings (Wilcox, 1982:462). "Observation and interviews are the main data gathering

techniques" for ethnography (Burns, 1996:327) because these methods can be used to delve deeply for the fleshing out process to occur.

Ethnography is widely used in educational fields to solve problems or enhance practices rather than to better understand a situation, according to Spindler and Hammond (2000:46-47). However it seems that understanding of the situation is essential to enable problems to be solved or practices to be enhanced, and to ensure the credibility, transferability, dependability and confirmability of the data, as outlined later in this chapter (Denzin, In Denzin & Lincoln, 1994:508). The researcher has endeavoured to better understand the culture of Orewa College in order to solve the dilemma concerning the ways in which future ICT teaching and learning could take place at the school. The data collection techniques used to gain information to assist with this understanding are detailed later.

Burns (1994:274) points out that ethnography is a "reflexive" process and the researcher reflected on the methodology used throughout this study. This involves constantly reviewing and refining the methods used. Discussion with colleagues and reading of current literature on ICT education resulted in changes in the questionnaires and interview questions and even the re-wording of some research questions. The concept of *reflexivity* is discussed later in this chapter.

According to Spindler and Hammond (2000:41) a lengthy research period is needed for ethnography. The duration of the research period for this study was two years, however data collection took place during one annual school year. It was not practical to carry out the study over a longer period of time as class configurations change annually. Another reason for keeping the data collection period to one school year is that, with changes in staff and students, culture inevitably changes over time.

Case Study

It is difficult to define a case study, according to Atkinson and Delamont (1995), as there is no agreed subject matter, methods, theories or exemplars. However, Yin (1994:13) defines a case study as an "empirical inquiry". It copes with a particular situation in which there will be varying interests. Triangulation is used for data collection to ensure that these varying interests are merged to give an accurate picture of the situation or beliefs. The concept of *triangulation* is explained later in this chapter.

Cohen and Manion (1994:107) and Burns (1996:365) believe that case studies are the preferred research method for 'how', 'why' or 'what' questions. All of the research questions for this study, outlined in Chapter One, fit into these categories. Burns (1996:365) states that a case study focuses "on process rather than outcome, on discovery rather than confirmation". The purpose of this research is to *discover ways* in which Orewa College students can learn ICT skills and knowledge in the future.

A Combination of Two Methodologies

Brown (in Burns, 1997:257) states that "the solutions to ICT problems are always based on a particular set of beliefs, values and ideologies". The answers to the questions researched in this study are based on these underlying aspects of the culture of the school. It is the individuals both within Orewa College and the stakeholders in the surrounding community that make up the school culture. It was necessary to use ethnographic research methods to uncover this underlying culture. However, because this research is based on a single case and is so intrinsic, essentially it is a case study. As outlined in Chapter One, Berg (2001:229) states that "intrinsic case studies are undertaken when a researcher wants to better understand a particular case. It is not undertaken primarily because it represents other cases". This research is primarily focused on Orewa College and how the students at this school will learn ICT skills and knowledge in the future. Therefore, this is a case study in which ethnographic research methods have been used.

Although this exploratory case study is intrinsic in nature (Berg, 2001:229-230), it is envisaged that it will be instrumental in assisting other schools to plan how students will learn ICT skills and knowledge in the future. This outlines the scientific benefit of the case study to open the way for new discoveries, as discussed by Shaugnessy and Zechmeister (1990) and referred to by Berg (2001:231). Insights and hypotheses arising from this study may be pursued in future research (Berg, 2001:231).

The term *case study* is sometimes used incorrectly as a synonym for ethnography (Burns, 1996:364). This may be because many case studies are qualitative and participant observation is a commonly used data collection technique. Data collection techniques common to both ethnography and case study methodologies have been used in this research and are outlined in the next section of this chapter.

It must be noted that, although this research is concerned with ICT, the main source of data for the research comes from the people that form the culture of the school. What the research is *really* all about is the people - the students and what they will learn, the teachers and how they will facilitate their learning, the parents and the community and how they will benefit from what the students have learnt. This sentiment is best summed up by the answer to a common question posed by the indigenous people of New Zealand:

He aha te mea nui o tea ao?
What is the most significant/greatest thing in life?

He tangata, He tangata, He tangata
It is people, It is people, It is people.

The ethnographic case study methodology has been used to delve deeply to ensure that a representative voice of each group of participants has been heard. The data collection methods used are outlined below and describe how the participants' views have been gathered.

Methods of Data Collection

By employing the concept of triangulation and gathering data from a wide range of sources I believe I have fulfilled the 360° requirement of Edwards and Ewen (1996) and France (1997) for appraising or "appreciating" (Berg, 2001:139) any situation.

The Triangulation Concept

The *triangulation* concept has been used in the data collection process to increase the validity of responses (Burns, 1996:327). *Triangulation* is the term used to describe the use of "two or more methods of data collection" (Burns, 1994:272). Data collection for this research included the use of various qualitative methods. However, a quantitative approach has been used for some questions in the questionnaires. Justification for this is outlined later in this chapter. The methods used in this study include questionnaires, participant observation, structured email interviews and telephone interviews, partially-

structured face-to-face interviews and document analysis. Copies of questionnaires and interview questions are included in Appendices B, C and D. Before detailing these methods, participant involvement in the study is outlined.

Participant Involvement

The concept of triangulation (Burns, 1994:272) was also employed when selecting participants. This was to ensure, as stated earlier, that all persons that may be affected by the future delivery of ICT skills and knowledge at Orewa College had a representative voice.

Table 1 – Participants in this Research

PARTICIPANTS IN THIS RESEARCH			
	Total No.	**No. invited to participate**	**No. of respondents**
Questionnaires			
Students	1502	152	48
Past Students (this data was not included)	180	18	3
Parents	1502	152	40
Staff (teachers)	88	88	55
Hibiscus Coast Principals	11	11	2
Email Interviews			
North Shore Schools	16	16	5
Employers (Eastern Ward of Rodney District)	7686	145	25
Tertiary Institutions	8	8	2
Face-to-Face Interviews			
Careers and Transition Staff	2	2	2
Head of Technology	1	1	1
Network Manager/Technician	1	1	1
Senior Management Team	5	5	4
Librarian	1	1	1
Specialist ICT Teachers	4	4	3
Year Level Deans and Counsellors	12	12	11
Observations			
Observations were carried out throughout the school – a total of seven days over a period of a four weeks.			

Note: Although representatives from only five North Shore schools responded, information regarding another five of the schools was gained from their websites. One tertiary institution submitted two responses - one from the director of the institution and one group response from the teaching staff. Some respondents from North Shore schools chose to be interviewed face-to-face or via telephone rather than

participating in an email interview. Although one specialist ICT teacher was not interviewed, a teacher trainee at the school during the research period participated in the specialist ICT teacher interview. The majority of Orewa College staff that were interviewed, also responded to a staff questionnaire. The significance of the data gathered from participants, along with confidence levels and intervals is outlined in the Chapter Four Summary.

Participants within the college that were invited to participate included the four-member senior management team (SMT) and the 88 teaching staff. All SMT members were interviewed and all staff given the opportunity to complete a questionnaire and to participate in a document analysis. One hundred and fifty-two students were selected to participate out of a total roll of 1502. Ten percent of each year level of students was surveyed. A list of all students of each year level was printed showing gender and ethnicity. The paper was folded so that the students' names were not visible. Only the gender and ethnicity of each student could be seen by the researcher. The researcher then, randomly, highlighted the required number of males, females and different ethnicities to ensure a proportionate representation. The lists were then unfolded to reveal the students' names and those students whose gender and ethnicity had been highlighted were invited to participate in the research.

The researcher chose to survey the parents of each student surveyed because this ensured a representative proportion of different ethnicities. This enabled parents to have input into the future learning of their children. One hundred and fifty-two parents were invited to participate.

The students and staff of Orewa College were observed on seven randomly selected days over the period of four weeks. These observations assisted the researcher in the discovery of the culture and character of the school, upon which this research is based. Observation was also used, in combination with an analysis of the computer laboratories booking sheets, to discover the ways in which ICT was already being used at the school and the attitudes of the staff and students towards ICT learning. This is elaborated below.

Those outside of Orewa College who were invited to participate included representatives from tertiary institutions, North Shore secondary schools and Hibiscus Coast principals, as well as a proportional representation of parents, employers and past students.

The Careers Advisor provided me with a list of eight tertiary institutions that the majority of Orewa College students attend and representatives from these institutions were

interviewed via email. The reason for including these participants was to discover what ICT skills and knowledge tertiary institutions would like prospective students to possess.

Representatives from 16 North Shore secondary schools were invited to participate in an email interview. No response was received, so each school was telephoned. Five schools chose to participate in the research. Two of the representatives printed the emailed questions, wrote their answers on the printed sheets and posted them back. One school emailed back their response. The representative from one school chose instead to respond by telephone. Respondents from the fifth school requested instead to be interviewed in person. The representatives of these five schools were each presented with the same questions. The majority of the students at these schools have a similar socio-economic background to the students at Orewa College. Their responses are therefore considered to be potentially relevant to this research.

All eleven Hibiscus Coast Principals were surveyed. Most Orewa College students come from the schools that these principals lead. The intention was to discover what ICT learning was taking place at contributing primary schools. It is recognised that because this data came from the principals, it could be regarded as what they see as ideal rather than what is happening in practice. However, this prevented the need to survey Year Seven and Eight students and the ethical issues that would have been involved. The researcher believes that principals generally know their schools well and that this data will provide an insight into what is taking place at these primary schools in relation to ICT.

One hundred and forty-five local employers (two percent of the Eastern Ward of Rodney District) were invited to participate in an interview via email. A representative proportion of industry types was selected, according to data provided by the Rodney District Council from the 2001 Census (see Appendix Ia). This was an optimal way to estimate the industries that may employ Orewa College students.

To gain the views of past students, 10 per cent of a total of 180 Year 13 students from 2002 were surveyed. The purpose of surveying these students was to find out what ICT skills they had learnt over their years at Orewa College and which, if any, of these had been beneficial to them and how. They were also asked their opinions on the future delivery of ICT at the college from their retrospective view. However, as only three responses were received, responses from this group were not used.

All participants were given a Participant Information Sheet that outlined the research purpose. This information sheet included email addresses through which they could contact the researcher or supervisors, with any queries. All participants were given the opportunity to decline to participate.

Employers, tertiary institutions and North Shore secondary schools were sent an email asking them to nominate an appropriate person to be interviewed via email. A participant information sheet and a copy of the interview questions were attached for their perusal. However, as stated earlier, some North Shore secondary schools chose instead to be interviewed via telephone or face-to-face. Participant information sheets and consent forms were emailed to these participants and consent forms signed and returned to the researcher.

Questionnaires

Research questions often focus on participants' perceptions and interpretations of documents or events. This is the case with the research questions listed in Chapter One that endeavour to uncover the importance that students, parents and staff place on ICT and that ask for the staff interpretation of Ministry documents. Questions for the questionnaires developed naturally from the research questions.

Although questionnaires are usually thought of as a more quantitative data collection technique, the questionnaires for this study have been devised to gain more qualitative responses. In particular, one question was included in the student, staff and parent questionnaires to gain participants' views of the culture and character of Orewa College. This was to assist in determining the validity of observations and earlier studies of the culture of the school and of the Business Department (Ballantyne, May 2002; Ballantyne, July 2002).

Techniques were employed from William Foddy's (1993) book entitled *Constructing Questions for Interviews and Questionnaires - Theory and Practice in Social Research.* Questions requiring Yes/No responses were asked, as well as more open-ended questions (see Appendices B, C, D). Questions were worded in such a way as not to influence the participant's response, especially when a Yes/No response was required. The careful construction of questions ensured a more qualitative, open-ended part to

them, so that participants were free to "express themselves in their own words" (Foddy,1993:128). The reason for employing both quantitative and qualitative questioning techniques was to enable some quantitative comparison of the data, while allowing for qualitative in-depth analysis of responses. Foddy (1995:126-152) discusses the open vs closed question debate and points out that more easily quantified closed question responses may be needed to 'flesh out' the responses to the more qualitative open-ended questions. The questionnaires were piloted with the researcher's colleagues, who responded with critique that required restructuring and rewording of some questions prior to their use.

Staff were given questionnaires to complete during their regular staff meeting. The researcher was available for questions while staff filled in the questionnaire. Students were surveyed in year level groups and given a brief oral overview of the topic. Again, the researcher was available for questions while they filled in the questionnaire. Clear instructions were given on the front page of each questionnaire and at the beginning of questions that the researcher felt required clarification to enable a valid response. Questions in the questionnaires and interviews were placed in a similar order for ease of analysis in the next phase - data analysis.

Participant Observation

Participant observation was included because it is an integral part of ethnographic research. It enabled the researcher to gather some valuable data that did not arise in questionnaires or interviews. It also enabled some data gathered through other techniques to be supported and gave the researcher real-life experience of the situation. Burns (1996:309-317, 373-374), Gay and Airasian (2000:211-213), Gall, Borg and Gall (1996:366, 613) and Berg (2001:117-118) all discussed this data collection technique in detail. The type of observation carried out in this case is described as "participant-as-observer" (Burns, 1994:258) because of my close involvement with the participants and the disclosure of my identity as the researcher to them.

Staff and students of the college were observed frequently throughout the duration of the research period. The purpose was to give the researcher insight into the culture and character of the school and also, as stated earlier, to enable the ways in which ICT learning currently takes place at the school to be observed. Observations took place

on seven days, over a period of four weeks. Three of these days were spent observing classes in one of the computer labs which was set aside for cross-curricular ICT use. On two days, a Languages teacher was observed using ICT with students in a classroom. The researcher spent the remaining two days wandering the school looking for ICT use in the school. All classrooms were visited at least once during the two days. On the first of the two days, the researcher circulated the entire school twice. On the second day, the researcher did not circulate the entire school, but instead, stopped and observed ICT activities taking place in more detail. The researcher made field notes immediately following each observation. Findings are discussed in Chapter Four.

As mentioned earlier, the researcher recently carried out two small-scale cultural studies at Orewa College - one on the Business Department and one on the entire school (Ballantyne, 2002a; Ballantyne, 2002b). These have contributed to this study).

Interviews

Structured email interviews were carried out with representatives of tertiary institutions and employers. These participants were asked about the ICT skills and knowledge that they would like school leavers to possess. They were also asked about pre-requisites for entry to courses and employment and what ICT training they provided. The seven questions asked in these interviews are included in the appendix (see Appendix D).

A representative from each of the North Shore secondary schools was invited to participate in an email interview. However, as stated earlier, some participants chose instead to respond to the questions by telephone or in a face-to-face interview. Structured questions were to discover how they were delivering the Technology curriculum (Ministry of Education, 1995) and the ICT component of that curriculum. They were also asked about their future plans for ICT teaching and learning and for the implementation of the Technology curriculum as a whole. One question in particular asked whether the school's direction for ICT was more in line with the specialist subjects, integration and/or osmosis perspectives for ICT teaching and learning.

Semi-structured, face-to-face interviews (Gay and Airasian, 2000:221) were carried out with key staff of Orewa College. These key staff included the Senior Management

Team (SMT), the Head of Technology, the head librarian, the three specialist ICT teachers and the Network Administrator/Technician as the researcher considered their views pivotal to any future changes to the delivery of ICT at the college. The Deans of each year level, the Careers Advisor and Transition teacher were also interviewed face-to-face in a partially-structured style. These staff have a substantial influence on students' subject choice and therefore their opinions were considered influential in future changes to the way in which ICT learning is to take place at the college.

Interviews were recorded and transcribed. Names have been changed in the interview transcripts to protect the identity of personnel interviewed. Two general questions were used to start each face-to-face interview flowing. This was to prevent the tainting of participants' responses with the discourse of many pre-set questions. This made the analysis of responses more difficult but, I felt, increased the validity of the data. This partially structured, open-ended form of interview was used to make the interviewee more of an informant than a respondent (Burns, 1996:372).

The researcher was aware of the potential for personal bias to dominate interviews. Therefore questions were carefully worded to address this. Foddy's (1993:128) questioning techniques, outlined earlier in the *Questionnaires* section, were employed to ensure a more qualitative style to each response. A conscious effort was made to listen, and to question only when necessary and not to make statements. The face-to-face interviews took place in all instances in the interviewee's own work environment to ensure a non-threatening and comfortable atmosphere. Permission was gained to record the interviews on a standard cassette recorder.

Time is an issue when carrying out interviews. Spindler and Hammond (2000:46) point out the shortage of time in a teacher's day due to workload issues. All face-to-face and telephone interviews were carried out at a time specified by each interviewee and were kept within a 30 minute timeframe.

The researcher intended to transcribe all interviews herself on the day of interview. However, due to workload issues, four typists were employed to transcribe the interviews. These typists also assisted with data entry. Information from questionnaires was coded and entered into a spreadsheet for later analysis. Each typist was required to sign a confidentiality agreement to protect the privacy of participants. These confidentiality agreements are included in the appendix.

Participants were provided with a copy of the interview transcript for checking and any comment.

All transcripts, along with other primary data gathered for this research, will be destroyed upon completion of the research.

Document Analysis

The researcher gained permission from the Orewa College Board of Trustees and Principal to use a regular school staff meeting time to conduct a brief document analysis with staff and to give them time to fill in the questionnaire, mentioned earlier. The Board of Trustees was asked to provide food and drink for the staff at the meeting. Confectionery was provided at the beginning of the meeting to give staff a burst of energy at the end of a long day. A substantial afternoon tea was provided as a 'carrot' and a 'thank you' to those who chose to participate. This food and drink were provided at the suggestion of a head at Oldlea School, quoted by Wallace and Hall (1994:158). She felt that staff responses would be more forthcoming in a meeting if their basic needs had been met. The majority of staff stayed to complete the document analysis and fill in the questionnaire.

A brief overview of the topic was given by the researcher at the beginning of the staff meeting. Staff were then asked to conduct a brief document analysis of two relevant Ministry of Education documents - *Technology in the New Zealand Curriculum* (MOE, 1995b) and *Digital Horizons - Learning through ICT* (MOE, 2002). They were asked to divide themselves into ten groups. Each group was comprised of staff from a range of departments. A different section of one of the documents mentioned earlier was allocated to each group to analyse. Staff were given an information sheet which asked them to note down particular words, phrases or sentences from the section of the particular document they had been given that they felt espoused one of the dominant views on ICT education (see Appendix O2). These dominant views, as outlined in Chapters One and Two of this study propose the learning of ICT skills and knowledge in either *specialist subjects*, *integration* and/or an *osmosis*-like process. Staff were also invited to make any additional comments and to give their group's interpretation of the section they were analysing. Each group then nominated a leader who reported the group's findings back to the entire staff. As each leader reported their findings back to the rest of the staff, this led to further discussion.

The purpose of this document analysis was to give the staff an overview of the Ministry of Education's perspective on ICT education and the related curriculum requirements prior to filling in the questionnaire. An additional purpose was for the researcher to gain a general staff interpretation of the Ministry documents.

Other related documents were analysed by the researcher. These included the Orewa College Draft Strategic Plan for ICT for 2003-2007, a position paper on ICT at Orewa College written by the Deputy Principal at the college in 2001 and minutes of the last significant ICT planning meeting held at the college in June 2002. The purpose of analysing these documents was to gain further data on the Orewa College perspective on the future of ICT learning at the school. Another purpose of the analysis was to reveal the discourses used and any common themes in the documents. A copy of each of these documents is included in Appendices P, Q, R, and S.

Reflexivity

To conclude this section on data collection the concept of reflexivity that is used in ethnography is outlined.

Burns (1994:257-258) summarises the three phases of ethnographic data collection as:

a) Broad/general idea of research interests. Collect data with a view to exploring ideas.

b) Reformulate research ideas into more specific questions/hypotheses.

c) Collect data relevant to reformulation.

These phases are best summed up in Burns' (1994:253, Fig. 33) Research Cycle depicted below.

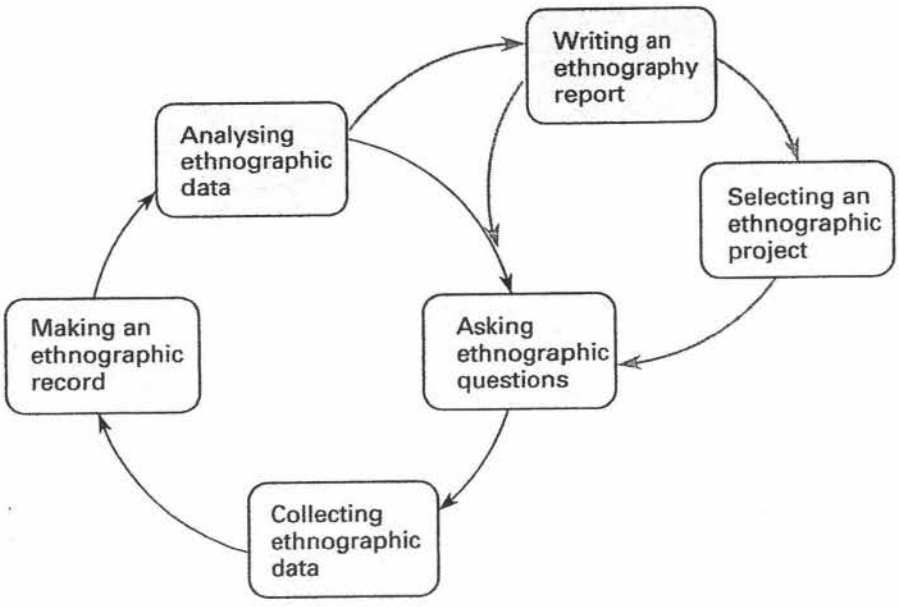

Figure 9 - The Research Cycle (Burns,1994:253, Fig. 33)

This continuous research cycle depicts the reflexivity that Burns (1994:274) discusses and the reflectivity that Berg (2001:139) endorses. The process of continually going through these phases has been named "progressive focussing" (Burns, 1996:309).

During this research process the researcher has progressed through these phases that Burns (1994) refers to in a cyclic motion. Firstly, an idea of what to research was formulated. The researcher then chatted with colleagues, reformulated ideas, took a research proposal to the Board of Trustees (BOT) and discussed ideas with them, reformulated the proposal, read relevant articles and conversed with knowledgeable people in the ICT field, reformulated ideas and research questions, carried out a document analysis and discussion with the staff and gathered in staff questionnaires, reformulated ideas .... in a continuing cycle.

Data Analysis

Once all data had been gathered, using the variety of methods outlined, a process of data analysis took place. Responses to questionnaires and notes from the document analyses were entered into an Excel spreadsheet for ease of analysis. Each participant's response was numbered. Interview notes and observation notes were

analysed to reveal common ideas and themes. Different coloured highlighters were used to select and group similar data to bring to the surface the common threads and underlying themes from participant responses.

Quantitative methods, such as graphs, were used to analyse Yes/No responses to specific questions and to collate responses according to types of respondents to show differing views between the groups surveyed.

If others assist in the analysis of data as well as assisting with the teacher's workload, different perspectives will be uncovered (Spindler and Hammond, 2000:46). Data analysis was undertaken solely by the researcher. However, the varying themes that surfaced were discussed with colleagues to gain insight into different perspectives on the data gathered. Neither the original data nor the identity of participants were divulged to these colleagues.

Research Issues

A major criticism of case study can be that valid generalisations cannot be drawn from the data (Burns, 1996:380). It is not, therefore, possible to draw generalisations from this case study because the purpose is to uncover the culture and beliefs of only *one* school. However, the researcher believes that internal generalisation of participant responses has been necessary in this case to form a holistic picture of the culture and character of Orewa College on which this research is based.

Ensuring a proportional representation of participants has been surveyed according to gender, ethnicity and type of industry (for employers) was an issue that has been addressed and outlined earlier in the Data Collection section. It was especially important to ensure that a proportional representation of each gender was surveyed due to the fact that "95% of Information Superhighway Cruisers are men" (Spender, 1995 cited by Brown In Burns, 1997:257). Although this statistic is now somewhat dated, it is possible that an imbalance of gender would have skewed results.

Burns (1994:226-227) pointed out that people's views change over time. A respondent's answers to interview questions could differ if asked the same questions a year or two later than originally asked. As indicated earlier, it was for this reason that

the research period has been kept relatively short (two years – although the data collection was kept to one school year).

Ethical Considerations

As stated earlier, the researcher has taken on the role of participant observer throughout the research period. However, this involvement was stated at the outset of the research to participants. Issues of bias and invisibility, related to participant observation, are discussed with other issues in the *Validity and Reliability* section later in this chapter.

Hulston (2000:41) believes that confidentiality is important for participants. All names have been kept confidential for this reason. Participants' names were not required on the questionnaires and specific emails have not been published in the appendix of this research for confidentiality purposes. Pseudonyms have been used where necessary. However, permission was gained from the Board of Trustees for the name of the college to be used. They were happy to grant this permission as they hope that Orewa College can lead the way for other schools in the future delivery of ICT knowledge and skills.

Whilst observing at the school, the researcher made a conscious effort to ignore any student behaviour that was not severe. As the researcher was present in an observer capacity, this was considered important to avoid role conflict, referred to by Burns (1996:311) affecting the observational data. No critical incidents were observed.

All participants (and their parents, in the case of students) were asked to give their informed consent by signing a consent form before participating in this research. In the case of email interviews, participants were advised that a response implied consent. Consent was gained to ensure that participants understood the details of the study and their rights as participants. Permission was gained to use the data they provided in this study. A copy of the consent forms and the participant information sheet are included in Appendices G and H.

Data protection was another issue of concern. For this reason, all data was backed-up on a daily basis and a passworded, electronic copy of data was kept both at home in a locked office and on a school computer in a locked office.

Permission to carry out this research was gained from the Principal and Board of Trustees of Orewa College. They were provided with a copy of my research proposal prior to research commencing to assure them that issues of validity, reliability and ethics were addressed.

The researcher has read the Massey University Human Ethics Committee (MUHEC) Code of Ethical Conduct for Teaching and Research Involving Human Subjects (April, 2002) and kept to its requirements. Permission to commence research was given by MUHEC (see Appendix T). This project has been reviewed and approved by the Massey University College of Education Ethics Committee (see Appendix U).

Validity and Reliability

Validity can be divided into internal and external validity. Internal validity questions whether the researcher is "actually measuring what I think I am measuring" (Burns, 1994:271-272). It also concerns the credibility of the informants (Miles and Huberman, 1994:278). External validity is concerned with whether the setting is typical (Burns, 1994:256). However, Denzin and Lincoln (1994:100) point out that the positivist terms of internal and external validity are replaced in postpositivist paradigms by the terms trustworthiness and authenticity. Denzin (In Denzin & Lincoln, 1994:508) divides trustworthiness into four components: credibility, transferability, dependability and confirmability. Outlined below are ways in which I have endeavoured to ensure data meets these criteria.

Despite the fact that this is a single case study of Orewa College, there may be conclusions drawn that will enable other schools to better understand their own situation. The methodology and demographics of the participants in my research have been outlined in detail to enable replication (Berg, 2001:276), or transferability (Denzin in Denzin & Lincoln, 1994:508), of this research. This, I feel, has ensured the "external validity" of the data (Berg, 2001:216).

However, according to Burns (1996:327), "replication is impossible due to the subjective and once-only nature of the data". When using ethnographic methodology, the researcher "cannot employ the conventional judgements of reliability and validity". The purpose of this research is to gain a current picture of Orewa College to enable planning for the future. The researcher is aware that if the research was replicated in the future, different outcomes would be produced.

Participants have been given the opportunity to read through the Findings chapter, prior to final publication, to confirm the validity of the cultural data gathered. This should also ensure the credibility of the data. Giving participants the opportunity to confirm the data and using the triangulation concept, outlined earlier in this chapter, have assisted in assuring the dependability of the data.

When employing participant-observation methodology, there is an issue of invisibility. As Berg (2001:147) points out, subjects may change their behaviour in the presence of the researcher. However, since observations have been carried out over the period of four weeks, usual behaviours should surface.

Bias is an issue with both ethnography and case study, especially with participant-observation (Burns, 1996:323, 379-380). In the earlier *Questionnaires* and *Interviews* sections of this chapter, ways in which bias has been reduced are outlined.

Berg (2001:140) purports that it is impossible to prevent bias distorting the analysis of findings, especially since the topic chosen is often based upon a particular interest or bias of the researcher, as is the case here. The triangulation of data collection methods, outlined earlier, and reflections on the methodology used throughout the final analysis of this data have assisted in reducing bias.

Spindler's (1999) suggestion of "cultural therapy" before embarking on ethnographic research can apparently assist in preventing the researcher's bias from distorting results too much. Cultural therapy, according to Spindler, involves "bringing one's own culture in its manifold forms to a level of awareness that permits one to perceive it as a potential bias". The role of the "cultural therapist" is to discover what the subject doesn't know and "then to help the subject to understand and reflect on these discoveries". Although in-depth cultural therapy has not been undertaken by the researcher, two unpublished cultural studies, mentioned earlier, that were carried out

on both the school and the Business department in the school, prior to this research assisted in reducing bias (Ballantyne, May 2002; Ballantyne, July 2002).

"One prevalent notion about a limitation of observational techniques [is] the idea that observational data cannot be quantified" (Burns, 1996:317). This is a misconception, according to Burns. However, he expands and says "this is not to imply that all observational data must be quantified". The researcher has attempted to quantify some observational data through the use of highlighters to group data and bring to the surface common threads and themes.

Conclusion

The common threads and themes found in the data come from the people and tell a story. It is the people that make up the culture and character of Orewa College. These are the people that this research is all about. This story is theirs.

The Ministry of Education (1995:29) recognises that schools need to plan their programmes to suit the needs of *their* students and *their* school. Firstly, the needs of the students, the staff, the parents and the community need to be understood before the problem at hand can begin to be solved. The ethnographic research methods have assisted in providing an understanding of these needs. The intrinsic nature of an individual case study combined nicely with these ethnographic methods. Hence, an ethnographic case study was chosen to reveal the ways in which Orewa College students could learn ICT skills and knowledge in the future.

CHAPTER 4 - FINDINGS

INTRODUCTION

> ***"Every person is a change agent (change is too important to leave to the experts)". (Everard and Morris, 1996:227)***

The findings in this chapter reflect the quality and richness of data collected from a wide range of willing participants, who the researcher wishes to acknowledge explicitly. Data collected from local tertiary institutions, employers, representatives of nearby schools, students, parents and staff of Orewa College has all been included because the researcher considers each and every one of them to be an agent for change and future ICT development in the school.

The intention of this chapter is to outline the findings of the research. It will, therefore, read as a collection of data, statements and opinions from the participants. In line with the spirit of ethnography, an abundance of participant quotes have been deliberately included to ensure that the voices of the various participants are heard.

The main research question is repeated below.

> **In what ways could ICT teaching and learning take place at Orewa College?**
> *Osmosis, Integration and/or Specialist Subjects?*

This chapter has been divided into three parts due to the large volume of data gathered. Results have been categorised under the research sub-questions that were devised for this study and stated in Chapter One. The first set of sub-questions attempt to uncover the Ministry of Education's intentions in relation to ICT education and the interpretation of these intentions by Orewa College staff. The second set of sub-questions focus on revealing the ICT knowledge and skills that local tertiary institutions and employers are looking for, and how ICT teaching and learning is currently taking place in nearby North Shore secondary schools. Discovery of plans for future change to ICT teaching and learning at these schools also occurs. The next set of sub-questions looks at the importance that students, parents and staff of Orewa College place on ICT and discovers their level of interest in ICT teaching and learning.

The final sub-question deals with the extent to which some form of ICT learning may be compulsory, or be an option for those interested.

A full outline of the methodology for this study has been given in Chapter Three. However, a summary of statistics in relation to participant responses and further information regarding the data in this chapter is outlined below.

A Brief Outline, Participant Information and Summary of Statistics

A table of participants in this study has been provided in the Methodology (Table 1, page 62) and the significance of related confidence levels and intervals are discussed in the summary of this Findings chapter. Part A of this chapter provides answers to the first set of sub-questions. It focuses on the analysis of relevant documents obtained from the Ministry of Education and Orewa College. The purpose of these documents and the values that emerge from them are outlined. Staff awareness of these documents is also discussed. Documents obtained from the MOE are:

Technology in the New Zealand Curriculum (MOE, 1995)
Digital Horizons - Learning through ICT (MOE, 2002)

Documents obtained from Orewa College are:

Orewa College ICT Strategic Plan (1999-2001)
Orewa College ICT Strategic Plan - Draft Strategy (2003-2007)
ICT Position Paper (Jones, 2001)
Minutes of ICT Committee Meeting (June, 2002)

Part B of this chapter outlines answers to the second set of sub-questions. ICT knowledge and skills that local tertiary institutions and employers are seeking in school leavers are revealed along with the ways in which nearby North Shore schools are undertaking teaching and learning in the field of ICT. The Orewa College Careers Advisor was consulted, and provided a list of eight tertiary institutions that the majority of Orewa College school leavers chose to attend in 2002. Representatives from two of these eight tertiary institutions responded to the email questionnaire sent to them. Findings from these representatives are described in Part B.

Data gathered from local employers is also described in Part B. Orewa College is situated in the eastern ward of Rodney District. Two per cent of local employers from this area were invited to participate in an email interview. Data was first obtained from the Rodney District Council to enable the researcher to deduce the percentage of employers in different types of industries in the Eastern Ward of the district, to ensure that a representative cross-section of employers was surveyed (see Appendix I). Twenty-five of the 145 invited to participate responded. This is depicted in Figure 10 below.

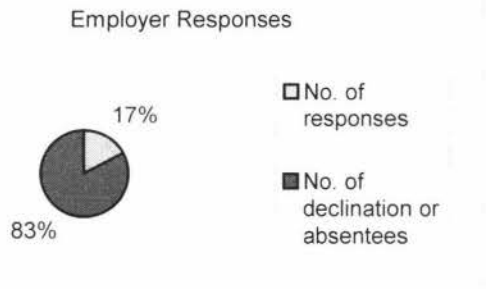

Figure 10 - Employer Responses

Part B also describes findings from data gathered from other local schools. Students at the majority of North Shore schools are predominantly NZ European/Pakeha. Other ethnicities included Maori, Asian, Chinese, Pacific Islander, South African, Middle Eastern, Polynesian, African, Taiwanese, Indian, Samoan and Tongan. Many of these North Shore secondary schools are of a similar decile and similar ethnic make-up to Orewa College. (Orewa College is rated decile 8). See Figures 11 and 12 below.

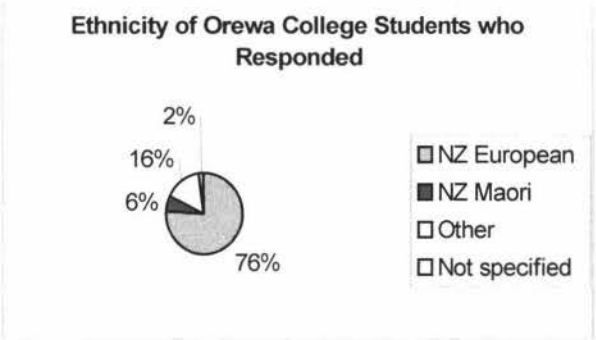

Figure 11 - Ethnicity of Current Students who responded

Other = 4% Japanese/Asian, 4% Malaysian/Chinese, 2% Pukena, 2% NZ European/Chinese, 2%Fijian, 2% Sri Lankan

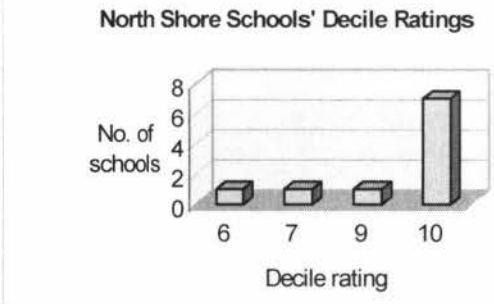

Figure 12 - Schools' Decile Ratings

The North Shore schools surveyed were also of similar size (1000 to 2000 students) to Orewa College and catered predominantly for Year Nine to 13 students. See Figure 14 below. Orewa College had a population of approximately 1700 students during the period of research and catered for Years Nine to 13, although plans are in place for the school to include Years Seven and Eight from 2005.

Due to the similarities outlined above, the researcher envisaged that the ways in which ICT teaching and learning takes place in these schools could provide ideas for the ways in which ICT teaching and learning could take place at Orewa College in the future. Participants from 16 North Shore secondary schools were invited to participate in this study. Participants from five schools responded. Some information on another five schools was gained from their websites. See Figure 13 below.

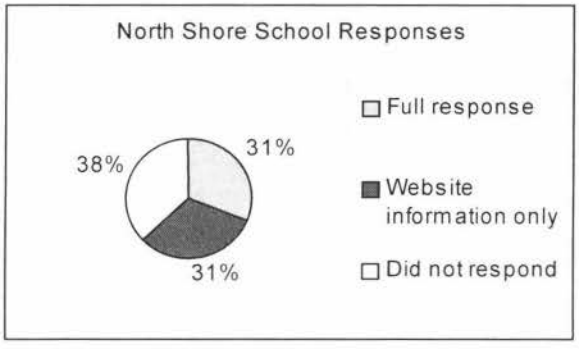

Figure 13 - North Shore School Responses

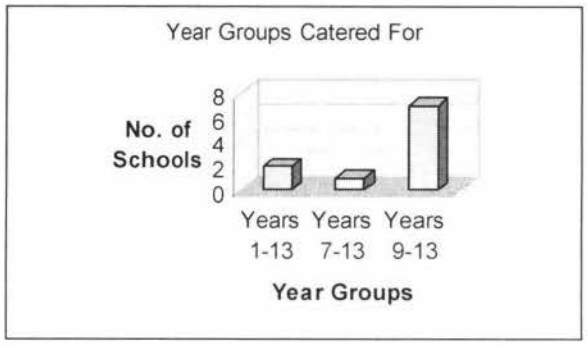

Figure 14 - Year Groups Catered For

Findings from Hibiscus Coast Schools are also described in Part B. Two of the eleven principals from contributing Hibiscus Coast schools responded to a questionnaire. One principal leads a decile eight, Year Seven to Eight school. The other is the principal of a decile seven, Year One to Eight school. These principals' views were considered important as future students of Orewa College currently study there.

Part C of this chapter goes on to describe the views on ICT teaching and learning from the students, parents and staff of Orewa College. The climate and culture of the school from the participants' perspective potentially informs and frames future changes at the school. Therefore the researcher has also provided a brief insight into the climate and culture of the school from the participants' perspective. To what extent some form of ICT might be compulsory, or be an option for those interested, is then described from their viewpoint.

One hundred and fifty-two students from Orewa College, representing 10 per cent of the entire student population were invited to complete a questionnaire. Forty-eight of the 152 students surveyed responded. Students' statistics are depicted in Figure 15 below.

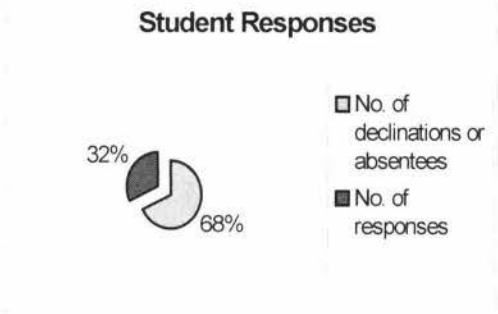

Figure 15 - Student Responses

One hundred and fifty-two parents were invited to complete a questionnaire. Forty of the 152 parents surveyed responded. This is depicted in Figure 16 below.

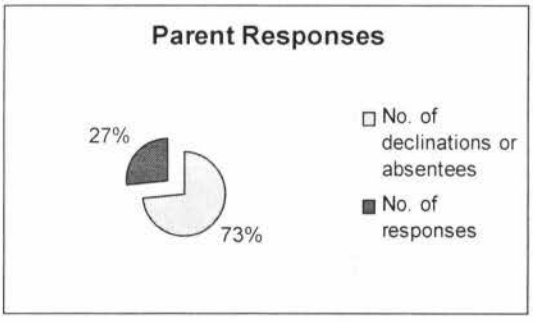

Figure 16 - Parent Responses

Findings from data gathered from teaching staff is also described in Part C. All 88 teaching staff at Orewa College were invited to complete a questionnaire. Fifty-five of the 88 staff surveyed responded. This is shown in Figure 17 below.

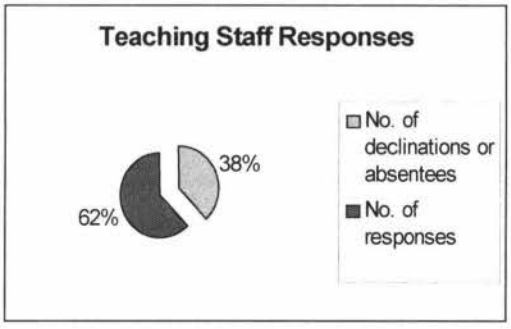

Figure 17 - Teaching Staff Responses

The data gathered has provided comprehensive and valuable findings related to the research question. As stated earlier, the findings are grouped under the three sets of sub-questions and are outlined in detail in the following three parts to this Chapter. The researcher has used participants' voices wherever possible in this chapter and has coded each participant response as outlined below. Answers to the sub-questions can therefore be heard through the voices of the participants which adds to the richness of the data.

Participant Coding

Questionnaires

Tertiary Institutions' Respondents - T1, T2a, T2b
Employers - E1-E25
North Shore Schools' Respondents - S1-S10
Hibiscus Coast Principals - P1, P2
Orewa College Students - ST1-ST48
Orewa College Parents - PA1-PA40
Orewa College Staff/Teachers - TE1-TE55

Interviews with Key Personnel

I1a-I1b, I2, I3, I4a-I4e, I5, I6a-I6c, I7a-I7k, I8

Document Analyses

Staff Groups - Staff Grp A to Staff Grp J

At the beginning of relevant sections in this Findings chapter, codes are given to indicate the questionnaires and question numbers from which responses are being summarised. For example, *(TE Q2; S Q8; P Q28)* refers to the Teacher Questionnaire, Question No. 2; North Shore Schools Questionnaire, Question No. 8; Parent Questionnaire, Question No. 28.

CHAPTER 4 - PART A

THE INTERPRETATION OF RELEVANT DOCUMENTS

> ***"All learners will use ICT confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community." (MOE, 2002:3)***
>
> ***"We need a learning culture that recognises ... the importance of specialist ICT skills to economic development."***
> ***(MOE, 2002:3)***

Introduction

The four research sub-questions outlined in this Part were used to uncover both the New Zealand Ministry of Education's intentions, in relation to ICT education, and the Orewa College perspective and the North Shore and Hibiscus Coast schools' perspective, or swing, on the Ministry's perspective. Although the Ministry's perspective has been outlined in the Literature Review in Chapter Two of this study, a document analysis of two relevant documents was undertaken by the researcher, the results of which are summarised below.

1. What is the intention of the Ministry of Education (1995b) Technology curriculum document in relation to ICT subjects?

1.1. Introduction

It is interesting to note that Computing, Information Management and Information and Communications Technology have not been specifically mentioned as separate or specialist subjects by the Ministry of Education (MOE) in this document. However, Information and Communication Technology is listed as one of the seven technological areas of Technology in the New Zealand Curriculum (MOE, 1995b:12). In this section the researcher intends to discover whether the Ministry's intentions are for students to learn ICT skills and knowledge in an osmosis-like process, or whether the teaching and

learning of ICT should be integrated across the curriculum or take place in specialist subjects. Other prominent themes emerging from this document are also outlined.

1.2. Osmosis, Integration and/or Specialist Subject(s)

The spirit of this document implies that the MOE is already well aware of the major benefits of ICT and intends for ICT to be fully integrated into the Technology curriculum. The integration theme is outlined in the statements that "these [technological] areas are not mutually exclusive" (MOE, 1995b:12) and "a topic ... will ... involve achievement objectives from other essential learning areas".

ICT is one of seven areas of the Technology curriculum. These areas of the Technology curriculum are to be interwoven across the curriculum, intertwined amongst a variety of contexts and the three strands of the Technology curriculum - "knowledge and understanding; technological capability; technology and society" (MOE, 1995:13). However, "it is essential that technology is taught in substantial sections rather than dissipated across the curriculum" (MOE, 1995b:29).

Integration is the main theme of the document, the emphasis is on *learning* rather than teaching. Technology education is purported to have an "open-ended, problem-solving approach" (MOE, 1995b:7). Students will be "involved in observing, examining and experiencing" (MOE, 1995b:16) and although "all students will be familiar with many technologies", they "may not have articulated their understandings, nor recognised their own skills". These ideas are in line with the osmosis style of learning - students may be learning ICT skills and knowledge without actually realising it. These views also appear to lean towards the constructivist style of learning outlined later in this section.

Despite the emphasis on integration and an osmosis style of learning Technology, it is still intended that students will participate in "technological activities related to a particular area", such as ICT (MOE, 1995b:14). It is proposed that at "senior secondary school ... students may specialise in technological areas, undertake general courses in technology, or do both" (MOE, 1995b:29). At Level 5 (NCEA Level 1) of the Technology curriculum, students are to "investigate a particular technological area" (MOE, 1995b:33) and at Levels 7 and 8 (NCEA Levels 2 and 3) "students may have developed strong interests in some areas or contexts of technology" (MOE, 1995b:80).

The intention, therefore, seems for Technology to be learned in an integrated fashion, but that specialist subject(s) are made available at senior secondary school level for students that have an interest in Technology, or in a particular area of Technology, such as ICT.

1.3. Flexibility and Choice

There is a strong emphasis on the flexibility of this curriculum which allows teachers to "select or devise content, contexts and learning approaches" that will "reflect the particular character of their school" (MOE, 1995b:15, 30). Possible options for how the curriculum could be implemented are outlined. However, "a school's decision [as to how the Technology curriculum will be implemented] will take into account the type of school, the preferred organisational pattern, the ages and competencies of the students, particular teaching strengths, and the availability of community resources" (MOE, 1995b:29).

1.4. Community, Business and Industry

The Technology curriculum document points to the "opportunities for interactions with business and industry" and outlines various "community and enterprise links" that may be used for "specialist input", "stimulus", "mentoring" and "technological work placements" (MOE, 1995b:7, 16, 17, 80). The "mutual benefit to schools and outside organisations" is mentioned (MOE, 1995b:17, 80). Resources include "people from tertiary institutions, business, agriculture and industry" (MOE, 1995b:80).

1.5. Technology and Society

It is clear that the Ministry's intention is to create the "technological innovators of the future" who will "contribute to New Zealand's social and economic development" (MOE, 1995b:5, 7). Students "should recognise the importance of meeting consumer needs and being responsive to the community" (MOE, 1995b:36). Technology and Society is one of the three main strands of the Technology curriculum. The main objectives of this strand of the curriculum are for students to study "the ways the beliefs, values, and ethics of individuals and groups promote or constrain technological development [and]

influence attitudes towards technological development" (MOE, 1995b:41). Also, students are to study the "impacts of technology on society and the environment in the past, present and possible future; in local, national and international settings".

1.6. Collaboration and Co-operation

A recurrent theme emerging from the document is that both teachers and students are expected to be working collaboratively and co-operatively. Students are to learn, and be assessed, both individually and in groups (MOE, 1995b:7, 82, 83). "Peer review" and "seeking opinion of peers" is expected of students (MOE, 1995b:24, 25). "Thoughtful planning and negotiation between students and teachers" is required. It is anticipated that teachers "will often work collaboratively to plan and deliver the curriculum" (MOE, 1995b:28). The theme of collaboration and co-operation also extends to include "community or business groups" and "other adults" (MOE, 1995b:16, 18), as mentioned earlier.

1.7. Constructivism and the Changing Role of the Teacher

The actual teaching of skills and knowledge is not mentioned in this document. Instead the focus is on student learning and "the teacher's role is to motivate, encourage, support and provide feedback to students" (MOE, 1995b:16). Students are expected to "explore", "investigate", "make choices", "develop" and "evaluate" and are to "take more responsibility for their own work" (MOE, 1995b: 16, 25, 31, 33).

1.8. Thinking Skills

The emphasis on student learning, rather than teaching, is expected to encourage students to "think critically, creatively, reflectively and logically" (MOE, 1995b:18). Technological Capability is one of the three strands of the Technology curriculum. "The aim of developing technological capability is closely linked with problem-solving skills" (MOE, 1995b:18). It is expected that students will be "exercising imagination, initiative and flexibility" during their technological learning.

1.9. Assessment

It is intended that there will be "continuous incremental development and testing" which assesses "both technological processes and outcomes" (MOE, 1995b:6, 24). This ties in with the Unit Standards and Achievement Standards currently available for assessment on the National Qualification Framework (see www.nzqa.govt.nz). However, "achievement by students in a particular objective will not necessarily be dependent on undertaking one specific unit or activity: rather a range of technological activities should be designed which will, together, enable particular achievement objectives to be met and assessed" (MOE, 1995b:28). This appears to be an extension of the integration theme outlined earlier. Both learning and assessment should include integrated strands of the curriculum, contexts and technological areas. Methods of assessment are suggested (MOE, 1995b:24), but flexibility is allowed for teachers to create their own assessments with varying contexts, covering different strands and technological areas of the curriculum.

1.10. Summary

Computing, Information Management and Information and Communications Technology have not been specifically mentioned as separate or specialist subjects and there is a strong emphasis on the integration of the learning, rather than teaching, of ICT skills and knowledge throughout the curriculum. Flexibility has been allowed to enable schools to deliver the curriculum in a manner best suited to their particular school. Schools are expected to engage community, business and industry resources to assist in the delivery of the curriculum. The Ministry intends to create students with innovative thinking that will create economic growth in the country. For this to happen, there is a need for collaboration and co-operation amongst students and teachers and students are expected to construct, and become more responsible for their own learning. The change in focus from teaching to learning and towards more collaborative learning will require creative and integrated assessment activities that will assess students both individually and in groups, across a variety of strands, contexts and technological areas.

2. What is advocated by the "Digital Horizons - Learning through ICT" document put out by the Ministry of Education (2002) in relation to these subjects?

Again, in this document, Computing, Information Management and Information and Communications Technology have been largely ignored as separate or specialist subjects. This document is a strategy document for schools for 2002-2004 and is intended as a "framework for action" aiming for students "learning through ICT" (MOE, 2002:5). There are four main areas that the document covers: "improving learning; supporting educators; increasing efficiency and effectiveness of educational management and administration; [and] developing partnerships with communities, businesses and other stakeholders" (MOE, 2002:8). "This strategy is an important strand in an overall framework", according to the Ministry (2002:2). It's main aim appears to be "to extend and enrich educational experiences across the curriculum" (MOE, 2002:8).

As with the previous document analysis, the researcher is attempting to discover from this document whether the Ministry perspective is leaning more towards an osmosis style of learning ICT skills and knowledge, or whether their intention is more inclined towards the integration of ICT skills and knowledge and/or specialist ICT subject(s). In addition, other emerging themes are outlined.

2.1. Osmosis, Integration and/or Specialist Subject(s)

The main emphasis of this document is a "whole-school approach" to integrating the *use* of ICT across the entire school curriculum to enhance student learning in all areas, along with increasing efficiency in management practices. Although the word "integration" is used repeatedly, the focus seems to be on using ICT as a "tool" and the assumption emerging is that students will learn the ICT knowledge, skills and attributes needed by simply being "in ICT-enriched learning environments" (MOE, 2002:13). This view appears in line with the osmosis style of learning, in which a student simply absorbs the necessary skills and knowledge. However, "the importance of *specialist* ICT skills to economic development" is acknowledged (MOE, 2002:3, 6). The MOE, in this document, also recognise that students need to first learn *about* ICT and *with* ICT, before being able to learn *through* ICT (2002:8). This would imply that some specialist teaching and/or learning would be required, at least at a basic level, to enable students

to use ICT for learning at a higher level. The Ministry also states that "schools, government and other stakeholders ... [are to] ... work with secondary and tertiary sectors to investigate and extend options to senior students to access specialist studies in ICT" (MOE, 2002:12).

2.2. Flexibility and Choice

As with the Technology curriculum document (MOE, 1995b), this ICT strategy document (MOE, 2002) provides schools with flexibility and choice. "Schools carry the responsibility for determining the priorities for development in their own settings" (MOE, 2002:6), and should take into account "socio-economic factors, cultural background, literacy and numeracy, individual skills, geographical location and other factors" (MOE, 2002:7).

2.3. Community, Business and Industry

"Economic development" is of importance to the Ministry (2002:3). Schools are expected to develop new partnerships and extend existing partnerships with "families, communities, businesses and other stakeholders" with a view to sharing both expertise and costs of ICT (MOE, 2002:3, 5, 7, 8, 12, 17, 19). "Successful initiatives such as NetDay, Computers-in-Homes, OtagoNet, School Web Challenge" have been built (MOE, 2002:5). These initiatives are intended to strengthen partnerships between schools and communities. "Workplace needs and patterns" need to be understood. "Schools, government and other stakeholders ... [are to] ... continue to encourage government agencies and businesses to donate surplus computers to schools through the recycling scheme operated by CANZ (Computer Access NZ)" (MOE, 2002:19).

2.4. Technology and Society

The Ministry states that "we need to ensure New Zealand continues to move forward as an innovative and thriving knowledge society" (MOE, 2002:2). There is also "a need to continually reaffirm our commitment to equity in education" (MOE, 2002:7). A "shared vision" is called for and importance placed on learners appreciating "how and why ICT is used in the workplace and society" (MOE, 2002:9, 13).

2.5. Continuous Learning

The idea of continuous learning emerges as a prominent theme throughout the document with reference to students, teachers and leaders needing to "continually enhance" their "skills and understandings" (MOE, 2002:10, 15, 17). "Learning *about* ICT, learning *with* ICT and learning *through* ICT" is referred to repeatedly throughout the document, with students learning *through* ICT being the main aim of the document (MOE, 2002:3, 8, 10, 11).

2.6. Collaboration and Co-operation

Two of the main strategies in the document are to create a "culture of collaboration" and to build "partnerships between schools, government, communities and business" (MOE, 2002:3). ICT professional development clusters are repeatedly referred to as a way of teachers and schools sharing information and upskilling (MOE, 2002: 3, 14, 15, 17). The school is referred to as a "community of learners" (MOE, 2002:16) and "online networks and communities of interest" are promoted as ways for students, teachers and leaders to network and collaborate (MOE, 2002:15).

2.7. Constructivism and the Changing Role of the Teacher

ICT is promoted as a tool which will assist in developing a "student-centred learning culture" in which students will construct and manage their own learning through "active, exploratory, inquiry-based learning" (MOE, 2002:5, 7, 8, 13). This strategy requires "changes to traditional relationships among teachers, learners and communities" (MOE, 2002:7). The implication is that the teacher will become more of a facilitator and guide.

2.8. Thinking Skills

The role of ICT is considered important in developing "higher-order thinking and information skills" (MOE, 2002:3). Students are expected to "develop skills in discrimination, interpretation and critical analysis" (MOE, 2002:5). The Ministry considers that "creativity and critical thinking are emerging as society's most valuable assets" (MOE, 2002:6).

2.9. Promotion of ICT through Provision of Resources

The Ministry has decided that the "integration of ICT [is] crucial" to develop the innovative and creative thinkers that will create a better economy. Throughout the document there is continual emphasis on "expanding access" to ICT resources and an outline of what resources will be provided by the government, along with resources that may be accessed from the wider community (MOE, 2002:3, 8, 9, 12, 13, 14, 16, 21).

2.10. Teacher Education

"Schools, government and other stakeholders" are to "ensure pre-service teacher graduates are equipped" to "use ICT effectively for teaching and learning" through working with the "Teachers Council and teacher education providers" (MOE, 2002:14). "Online communities" and "ICT conferences" along with "ICT cluster programmes", "ICT professional development programmes in schools" and increased "access to ICT tools and resources" are to equip those teachers already in schools. Teachers are expected to "experiment and explore ways ICT can help learners" and "develop strategies to manage learning using ICT" (MOE, 2002:15). They are expected to "continually enhance their ICT skills and understandings" (MOE, 2002:15).

2.11. Maori Students' Needs

The needs of Maori students are specifically mentioned (MOE, 2002:18) and partnerships with iwi are intended to "enhance ICT in schools". A bi-lingual website, "Te Kete Ipurangi" (www.tki.org.nz) has been created and ICT is intended to be used "to embrace tikanga and te reo Maori" and "to access Maori medium education" and "broaden curriculum options" (MOE, 2002:3, 18). "ICT cluster programmes" and "ICT conferences" are intended to assist teachers by providing "information about effective ICT practices for Maori students" (MOE, 2002:18).

2.12. Special Abilities and Special Needs

As well as assisting Maori students, ICT is purported to be a way of assisting "Pasifika students", "students with special needs", "'at-risk' students" and "students with special abilities" (MOE, 2002:7, 12). Detail as to how ICT will assist these students is not

given, other than brief statements suggesting "online learning" and building "on current work" (MOE, 2002:7, 12).

2.13. New Since 2003

Copies of this document had been depleted during 2003, so a revised edition was printed in December 2003. New information in the revised edition included:

- a strategic framework for ICT initiatives across the education sector
- nationally agreed standards for sector-wide interoperability of systems, infrastructure and services
- improved sector information access and security
- improved schools network infrastructure
- a video conferencing bridge to facilitate quality video conferencing between up to 200 schools
- an additional 20 ICT clusters
- laptops for teachers of years 7 and 8
- support for the activities of the Internet Safety Group.
- e-learning fellowships for five primary teachers and five secondary teachers for one year
- improved discovery and access through TKI to online resources
- an online professional development community for schools and teachers across New Zealand access to online information about software for learning at affordable prices (see: http://www.minedu.govt.nz/index.cfm?layout=document&documentid=6760&indexid=6918&indexparentid=1024)

2.14. Summary

Separate, or specialist, ICT subjects have, again, been largely ignored. The focus of this document is on the *use* of ICT across the whole school to enhance learning and increase efficiency. Flexibility is provided for schools to tailor their strategy to suit their particular school. Partnerships with community, business and industry are encouraged. A clear vision for creating "an innovative and thriving knowledge society" is stated (MOE, 2002:2). Students and teachers are expected to be continuously learning and the focus has changed to one of a "student-centred learning culture" (MOE, 2002:7) in which "creativity and critical thinking" are considered paramount (MOE, 2002:6).

There is a heavy emphasis on expanding access to ICT resources and providing support, mainly through ICT clusters, to ensure that ICT use is fully integrated. Special mention is made of Maori and Pasifika students, along with students with special abilities and special needs. Specific detail as to how ICT will assist these students is not given. In general, this document appears to be a promotional brochure advocating ICT as a tool that will greatly assist teaching

and learning across the curriculum. Various pilot projects in ICT undertaken by the Ministry are outlined and random quotes are inserted from teachers and principals promoting ICT use in schools. The main focus is on resources - those the government has already provided, those they will provide and how others could be accessed through partnerships with other schools, iwi, community, business and industry.

3. How do the staff interpret the intention, usefulness and importance of the above two documents?

Staff perceptions of both the Digital Horizons ICT Strategy document (MOE, 2002) and the Technology curriculum document (MOE, 1995b) were revealed through a document analysis carried out by the staff during a staff meeting and through the researcher's analysis of staff responses to a questionnaire. Their perceptions are outlined below and the methodology utilised was outlined in detail in Chapter Two of this study.

3.1. Technology Curriculum Document

In this section Orewa College staff and North Shore and Hibiscus Coast schools' awareness of the Technology curriculum document is outlined and discussed. What they see as the intention of this document is discovered and later, how they perceive the importance and usefulness of both this document and the Digital Horizons document is analysed.

3.1.1. Awareness of this document (TE Q2; S Q8; P Q28)

Forty-three per cent of Orewa College staff that responded were aware of this document. Three of the five North Shore schools' participants that responded were aware of this document. Both Hibiscus Coast Principals that responded were also aware of the document.

3.1.2. Intention of this document (TE Q3, S Q9, P Q29)

The document analysis carried out by Orewa College staff on this document indicated that the nature of the document emphasised the integration of technological learning. Staff indicated that there was some emphasis on an osmosis style of learning in which students would "draw on knowledge and skills developed in other areas of the curriculum" to construct their own learning and absorb information in the process (Staff Grp J selected this quote from MOE, 1995b:20). However, staff selected various phrases from the document that they felt indicated a need for specialist subjects for various technological areas. One example given by staff was the Ministry's intention for technology to be taught in "substantial sub-sections" (MOE, 1995b:29).

In responses to the staff questionnaire, what teachers saw as the intention of this document was divided into four main ideas. Firstly, they indicated that the document outlined the government's intentions as to how the curriculum should be delivered and a national standard is given at each level. Secondly, they felt the document's purpose is to increase awareness of what technology actually is and its usefulness to society. Thirdly, the document clearly indicates that technology is "not just computers" (T7). Lastly, teachers considered that the document emphasises the integration of technology across the curriculum and outlines how technology could fit into the general curriculum and gives examples of its use. This document was considered the technology "bible" by two teachers (T16, T50).

Responses from other schools were very brief. One North Shore school participant stated that the document outlined "how Technology should be incorporated into the curriculum" (S3). A Hibiscus Coast principal stated that it outlines "what needs to be covered as in any other curriculum area" (P1). The other Hibiscus Coast principal that responded ascertained that the document "informs and provides framework (P2).

3.1.3. Summary

There is agreement amongst Orewa College staff and other schools that the document provides a framework for the integration of technology into the curriculum. Orewa College staff pointed out the need for specialist subjects for the varying technological areas. "Nutrition", "food", "drawing" and "modelling" were specifically mentioned.

3.2. Digital Horizons Document

In this section Orewa College staff and other schools awareness of this document is outlined. Their perceived intentions of the document are then given, before the importance and usefulness of both this document and the Technology curriculum document, mentioned earlier is discussed.

3.2.1. Awareness of this document (TE Q2, S Q8, P Q28)

Thirty-six per cent of Orewa College staff that responded were aware of the Digital Horizons document. Four of the five participants from North Shore schools that responded were aware of the document. Both Hibiscus Coast principals that responded were also aware of this document.

3.2.2. Intention of this document (TE Q9, S Q9, P Q29)

Emerging from the Orewa College staff analysis of this document was a clear indication for ICT to be used as a tool and integrated across the entire school curriculum. They acknowledged the intention for students to manage their own learning, but also pointed out the need for specialist subjects, especially for "basic functions" and for "high levels of engagement" (Staff Grp D).

In responses to the Orewa College staff questionnaire, teachers considered this document to be a very general document that gives an indication, or brief outline, of the government's intended direction for ICT education. Schools are to determine in detail how ICT will be implemented. They felt that the government's main aim is for the integration of ICT across the curriculum. The document provides a "pathway [that] blends integration of ICT into the mainstream subjects" (T39).

A representative from School 5 stated that the Digital Horizons (MOE, 2002) "redefined the term ICT". Both people interviewed at this private secondary school stated: "Computing as a subject area has been left out in the breeze somewhere." "This school [School 5] is about integration. The Digital Horizons document has justified what this school has been doing using computing as a tool for the last 6-8 years ... Some people are still having to try and convince their Board of Trustees regarding ICT.

The government has taken a stance - we need to go with it. The document is pushing ICT phobic/ignorant management that are in some schools." One Hibiscus Coast principal stated: "this sets the scene for the digital age and broadband. It was actually a cutting edge document that has helped our school (P1).

3.2.3. Summary

This document promotes ICT as a tool and advocates the integration of ICT use across the entire school curriculum. A participant from one school noted the non-mention in the document of Computing as a subject area.

3.3. Importance and Usefulness of Both Documents

(TE Q4, S Q10, P Q30)

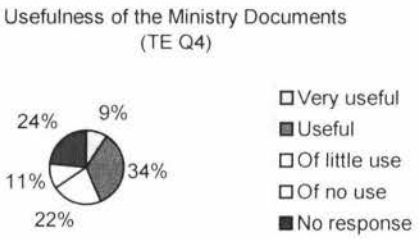

Figure 18 - Usefulness of the Ministry Documents

The majority of Orewa College teachers that responded regarded the Ministry documents, mentioned in Question 2 of this chapter, as useful. A common reason was that the documents give an "overview of the Ministry's intent" (TE3). However, "the documents are fairly comprehensive and specific, yet flexible enough to allow for individual interpretation" (TE38). The documents give "guidelines" and "help focus thinking" (TE44, TE49, TE29). They are "especially useful for technology departments" (TE22). The "whole underlying idea of technology" is expanded and "the need for integrating technology within all areas" is emphasised (TE1, TE28).

Teachers that felt the documents were of little, or no use felt that circulation of the documents had been limited and many teachers were not aware of the documents prior to this study. According to one teacher it "would be useful if each department had their own" (TE10). One teacher stated that "no one has time to read them" (TE25). Another teacher stated that the documents were "probably used when courses were initially set up, but are referred to very rarely [now]" (TE5). The documents would be "useful if we

are trained to use them across the board and subject specific, i.e. show us examples of use and integration" (TE27).

Those that did not respond to this question stated that they were either not aware of the documents prior to this study, or that they were a "new" teacher (TE39, TE10, TE15, TE24, TE48).

Only four North Shore schools' representatives responded to this question on the importance and usefulness of the Digital Horizons (MOE, 2002) and Technology curriculum (MOE, 1995b) documents. Their responses were:

Not really sure (S1); Useful (S2); Of little use (S5); Very useful (S4).

Reasons given were:

I have had little involvement in the implementation of ICT curriculum (S1).
It's nice to know where the government thinks we should be, but practicalities are different - resources are an issue (S2).
I can only comment on the Technology publication. I have found this very useful in planning and implementing Technology using ICT (S4).
It's nice to have positive reinforcement, but this school was following MLC, Xavier and other Navigator Schools in Australia since 1996. Approaches to learning are based on the Australian approaches. For example, components of learning from Glen Waverley School in Australia (S5).

Only one of the two Hibiscus Coast principals chose to comment, stating that the documents were of little use as they "haven't [been] used widely in [the] development of our programs" (P2).

3.4. How is the Technology curriculum currently being delivered?

In addition to revealing what staff saw as the intention of the Technology curriculum (MOE, 1995b) and Digital Horizons (MOE, 2002) documents, it seemed pertinent to investigate how Technology and ICT education is actually taking place in schools. The findings are outlined below.

3.4.1. Orewa College (TE Q11)

(Additional information was gained from the Orewa College Course Booklets and discussion with senior students).

The following Technology courses were offered at Orewa College in 2003:

Table 1 - Technology at Orewa College in 2003

OREWA COLLEGE TECHNOLOGY SUBJECTS (2003)	
Year 9	*Compulsory one term each of:* Food technology Materials technology (hard or soft - depends on staffing in each option line) Electronics Biotechnology
Year 10	*Optional subject choices:* Food technology Design technology: Materials - hard Design technology: Materials - soft Information Management - ICT Graphics (has own curriculum document)
Year 11	*Optional subject choices:* ACHIEVEMENT STANDARD COURSES: Food technology Design technology: Materials technology - hard Information Management: ICT Graphics (has own curriculum document) UNIT STANDARD COURSES: Engineering Automotive engineering Motorbody Carpentry COMBINED ACHIEVEMENT STANDARD AND UNIT STANDARD COURSES: Introductory Information Management: ICT Fabric technology: Materials technology - soft (fabric)
Year 12	Optional subject choices: ACHIEVEMENT STANDARD COURSES: Design technology: Materials – hard Business Studies: Generic technology Graphics (has own curriculum document) UNIT STANDARD COURSES: Information Management: ICT Computer Studies: ICT Engineering Automotive engineering Motorbody Carpentry Creative Pattern Making & Fashion Design (AUT course) Electronics COMBINED ACHIEVEMENT STANDARD AND UNIT STANDARD COURSES: Introductory Information Management: ICT Fabric technology: Materials - soft (fabric) Food technology
Year 13	UNIT STANDARD COURSES: Computer Studies: ICT Desktop Publishing: ICT (not running in 2003) Catering: Food Technology Cuisine (mainly for overseas students) Fashion Studies ACHIEVEMENT STANDARD COURSES: Graphics (has own curriculum document)

"Technology: ICT" (an achievement standards course) was offered as an option in Years 11 and 12 for 2003, but students did not choose the subject as they were put off by the large amount of theory content in the course.

A variety of ICT skills are currently being used across the curriculum in various departments. However, three departments specifically stated that they do not teach the skills, but expect students to use the equipment.

3.4.2. Other Schools (S Q14, P Q33)

One principal stated that technological learning is "integrated within the total learning" at their Year 1-8 school (P2). The principal of a Year 7-8 school stated that "we cover all strands over two years except biotech" (P1).
Five North Shore secondary schools offered information for this question. One school that included Years 7 and 8 had a compulsory Technology subject and a compulsory ICT subject.

At Year Nine level, two schools had a compulsory general Technology course. One school had a one-term general Technology module. One school had a core Technology rotation which included Text and Information Management, Materials Technology and Biotechnology.

At Year 10 level, all five schools offered a variety of optional Technology subjects including Food Technology, Textiles, Text and Information Management, Design Technology, Graphics, Fabric Technology and Hard Technology. Two schools specified that students must choose at least one Technology subject. One school specified that Technology subjects were two terms in duration. Other schools did not specify duration. One school stated that Year 9 and 10 students "can mix and match Technology options - students can choose three [Technology] subjects which run for a trimester each" (S2).

All five secondary schools offered a range of optional Technology subjects for senior students. One school offered Art Design as the traditional Design and Technology.

3.5 Summary

Overall, teachers saw that "essentially the aim [of both of the Ministry documents in this section] is for the integration of ICT throughout the curriculum" (TE53). They saw the documents' purpose as raising awareness, encouraging integration and providing a guide for the placement of ICT in the curriculum. One teacher saw the intentions of the documents being "to stress the importance of understanding technology as a process and to encourage us to think about best use - even if that use doesn't yet exist. 'Blue skies' thinking" (TE29) Another teacher saw the purpose as "informing, opening up and increasing discussion" (TE37).

Although Technology was being taught in all schools in some form, it did not seem that it was usually being taught in the integrated manner intended by the Technology curriculum document (MOE, 1995b). Schools had chosen instead to teach technological areas as stand-alone subjects or modules, with the exception of one primary school whose principal claimed that technological learning is totally integrated across the curriculum in his school.

4. What documents and policies does Orewa College already have in place regarding ICT and what values do they espouse?

After discussion with the Deputy Principal, who is also the ICT Co-ordinator and Chairperson of the ICT committee at Orewa College, the researcher discovered four main documents that seemed to be of importance at Orewa College, relevant to ICT in the school. The first two documents were the Orewa College ICT Strategic Plans for two time periods. A plan for 1999-2001 existed and a Draft Strategy for 2003-2007 had been partially written. The third document was an ICT Position Paper that had been written by a previous Deputy Principal in September 2001. He was also the ICT Co-ordinator and Chairperson of the ICT Committee. The ICT Committee had not been meeting regularly, but minutes of a June meeting in 2002 were located. This meeting was to brainstorm for a new strategic plan. Therefore these minutes became the fourth document to be analysed.

4.1. Strategic Plans

4.1.1. Purpose

1999-2001

The main purpose of this document was to plan for the development and implementation of ICT in the areas of curriculum, administration and communications.

2003-2007

The broad aims remain the same - to integrate ICT into the curriculum and administration systems as well as to develop a school-wide information network to improve communications.

4.1.2. Values

1999-2001

ICT is valued as tools to be used to develop research and ICT skills, an awareness of the world and to enable teachers and students to work smarter. Access to these tools is valued highly, as is technical support for the infrastructure. Relationships with external organisations and other schools are recognised as valuable in assisting decisions regarding the provision of this access. Staff training is also highly valued, and internet training for junior students is specifically mentioned. A need to continually refine the school's vision for ICT is recognised.

2003-2007

Orewa College has embraced the vision of the Ministry of Education (2002:3): "All learners will use ICT confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community". This vision is headlined in the document and the prominent values emerging from the entire document appear to be the enhancement of teaching and

learning processes and the development of skills for life-long learning. The use of a wide variety of technologies is intended to develop these skills for students, staff and members of the surrounding community.

4.2. Orewa College ICT Position Paper (Jones, 2001)

4.2.1. Purpose

The purpose of this document appeared to be to summarise the history of schoolwide ICT use and infrastructure in the school and to outline issues for the future of ICT use at the school.

4.2.2. Values

The value of ICT to enhance learning has again been embraced in this document. There is focus on the learning process and the application of knowledge by students. The document's main focus is on access and infrastructure, which are valued highly as it is envisaged that these are of prime importance for ICT to be fully integrated.

The value of subjects such as Word Processing and Computer Keyboarding are questioned in the current environment, especially as these classes are perceived as creating a barrier to access for other curriculum areas. The pods versus labs debate is discussed, but it is stated that staff currently prefer to teach students in class groups in labs. Learning processes emerged as a prominent theme and a desire for staff to undertake professional development in areas of metacognition, epistemology and pedagogy was evident. However, training for staff in the basic ICT skills was also desired.

An intranet is considered a priority for administration and for the sharing of information. To meet changing needs, the ICT Co-ordinator has endeavoured to keep ICT costs the same each year, but divide spending differently. He espoused that infrastructure was becoming more stable and suggested, therefore, that a shift in focus to curriculum useage of ICT was needed, along with using ICT to enhance thinking and learning skills.

4.3. Minutes of Orewa College ICT Committee Meeting - June 2002

4.3.1. Purpose

The two purposes of this meeting were to establish a new ICT committee at the school and to begin the development of a new strategic plan.

4.3.2. Values

The opinions of the school's wider community were obviously valued as a wide variety of personnel were present at the meeting, including two staff from two of the contributing schools, two ICT business representatives, a Board of Trustees representative and a Ministry of Education representative as well as both teaching and administration staff.

Again, the prominent value emerging was the use of ICT as a tool to enhance learning. Access to these tools was again raised as an important issue and a desire was expressed for the creation of a staff culture within which ICT use was prevalent.

A change in staff pedagogy was called for as a constructivist approach to student learning was valued. The integration of ICT across the curriculum was compared to the intended integration of the Technology curriculum. It was suggested that the approach(es) espoused by the Technology curriculum should be considered in relation to the integration of ICT.

Staff training was, again, considered important and, along with training in the basics of ICT, compulsory tertiary study involving ICT pedagogy was suggested as one possible professional development approach.

Intranet development was considered important to lessen administration demands on staff (eg meetings and filling in forms).

4.4. Staff Awareness of these Documents *(TE Q5)*

The majority of teachers were not aware of any ICT documents that Orewa College has in place. The reason for some teachers being unaware was that they had only recently

been employed by the school. Eight teachers stated that the Digital Horizons (MOE, 2002) and Technology in the New Zealand Curriculum (MOE, 1995b) documents were in place at the school. Another four teachers were confident that the ICT Committee had plans and strategies in place. A further six teachers stated that curriculum statements and schemes were in place regarding ICT. Other documents that two teachers referred to included the 'Essential Skills', the 'ICT Policy' or statement, the 'User Agreement' for staff and students and the 'Laptop User Agreement'. One teacher mentioned an 'Internet Driving Licence' that students used to attain before being allowed to use a computer at the school (TE49).

4.5. Values Perceived by Staff from These Documents *(TE Q6)*

Only twelve teachers responded to this question. One teacher felt the documents espoused the need "to provide experience and knowledge of ICT to both teachers and students" (TE10). Four teachers saw the emphasis on increased integration of ICT teaching and learning processes, as appropriate. One teacher indicated that the ICT user document encouraged "collegiality and flexibility" (TE36). The 'licence' that students used to sit before using the computer room was for "safe useage of computers", according to one teacher (TE49). The purpose of the laptop user document was "to encourage teachers to feel 'at home' while using ICT in daily work" (TE53). The Ministry documents, mentioned earlier, were intended to expose and emphasise certain skills, concepts and abilities and encouraged "speedy and well thought out improvement and development" (TE55).

4.6. Summary

The Orewa College ICT documents espouse similar values to the Ministry documents. The emphasis is on the integration and use of ICT across the curriculum to enhance thinking skills and continuous learning. The aim is for student-centred learning to take place with a constructivist approach. Emphasis, up until now, has mainly been on ensuring access and infrastructure so that the focus can now become more on changing pedagogy and focusing on the learning processes.

It is evident, however, that the vision for Orewa College that is espoused in its documents and shared with the Ministry of Education, has not been shared with the staff of Orewa College. Many staff remain unaware of the documents that exist at the school in relation to ICT and the values that they are based on.

5. Summary of Part A

Part A of this chapter has outlined the Ministry's intention to integrate the learning of ICT skills across the curriculum to assists in the creation of creative, innovative thinkers. Although the MOE intends for specialist subjects to be provided for senior students, very little mention is made of specialist ICT subjects. Families, businesses and communities are expected to be involved with ICT teaching and learning.

Staff at Orewa College and other schools that were aware of the MOE documents perceived them as providing a framework for the integration of ICT across the curriculum. They also considered that the documents instigated pedagogical discussion. However the Technology curriculum (MOE, 1995b) appears, in practice, to be taught only within specialist technological areas such as Graphics, Food Technology and ICT subjects, with the exception of one primary school who integrated technology "within the total learning" (P2).

Underlying values evident in the Orewa College documents analysed appeared in line with the MOE aims for ICT teaching and learning. Focus is now on teaching and learning processes and skills for life-long learning. A need for increasing pedagogical discussion was evident.

CHAPTER 4 - PART B

FINDINGS FROM THE EXTERNAL PARTICIPANTS - TERTIARY INSTITUTIONS, EMPLOYERS AND OTHER SCHOOLS

"There is a tendency to 'throw one's hands up in horror' when the technology fails and defer to the 'guru' when [employees] could in fact investigate further and discover the problem". (E2)

"The subjects and topics are immaterial". (E18)

"Process needs to be taught rather than skills". (S5)

Introduction

As stated in Chapter One of this study, Orewa College students will go on to employment and/or further study after leaving secondary school. It is important to know what ICT skills and knowledge will be expected of them. As Courtenay (1994:23) stated: "If you don't know where you're going, how will you get there?"

In this part of the Findings, the researcher outlines the ICT knowledge and skills that tertiary institutions and employers desire their students and employees of the future to possess. How other North Shore and Hibiscus Coast schools are currently transferring to these desired ICT knowledge students and skills is reviewed and the schools' plans for future changes to the delivery of ICT skills and knowledge is discussed.

Local employers and nearby schools were surveyed, as outlined in the methodology chapter and summarised in the introduction to this chapter. The Careers Advisor at Orewa College provided the researcher with a list of eight of the most common tertiary institutions that Orewa College students chose to attend in 2002. Representatives of these eight institutions were invited to participate in this research. Responses were only received from representatives of two of these institutions. However, the researcher considered that the responses added to the richness of data gathered from the employers and chose to include them. The coding of participant responses has been outlined in the Introduction to this chapter and is also included in Appendix E.

The purpose of this thesis is to make recommendations for the ways in which future ICT teaching and learning could take place at Orewa College. What ICT skills and knowledge is required must first be decided - and who better to ask than representatives from the institutions and workplaces in which these students will eventually be working or studying?

1. What ICT knowledge and skills are tertiary institutions and employers looking for?

Representatives of tertiary institutions and employers were asked a range of questions to enable the researcher to provide a detailed answer to the above question. A variety of ICT knowledge and skills was sought, however common responses are outlined.

1.1. ICT Skills Held by the Majority of Current School Leavers *(T Q1)*

Only tertiary institutions, not employers, were asked about the ICT skills that school leavers possess. The first institution identified that the majority of school leavers came to them with only internet, email and word processing skills. Respondents from the other institution added PowerPoint, Excel and Publisher skills, openness to using computers and knowledge of the Microsoft Windows operating system. However, T2b acknowledged that "the range of ICT knowledge and skills incoming students have varies considerably". Some students attending the second tertiary institution arrived there with only basic ICT skills.

1.2. ICT Skills Required/Desired by Tertiary Institutions and Employers *(T Q2, Q7; E Q 1, Q2, Q7)*

Representatives from both tertiary institutions wanted future students to begin at their institution with the skills that current students have arrived with (see 1.1), but they added that they would also like to see students coming to them with digital camera skills, both still and video. Touch keyboarding and file management skills were also desired, along with "an awareness of ergonomics" (T2a). "A willingness to learn and apply new applications" was also identified as important (T2b).

ICT knowledge and skills that employers want prospective employees to have eventually are listed in the table below. The word 'eventual' has been used because these skills and knowledge could be acquired through on-the-job training if an employee does not already possess these skills and knowledge.

Table 3 - Eventual Knowledge and Skills Desired by Employers

Eventual Knowledge and Skills Desired by Employers	*No. of Employers that Specified*
Word processing (MS Word)	12
Excel	10
Ability to use our own specialised computer software (medical; house sales; reservation software - THS; fully integrated point-of-sale accounting system; library automation software; specialised subscription databases)	8
Email	6
Internet	5
Computer keyboarding/typing (one specified 25 words per minute)	4
Telephone skills/Ability to use sophisticated telephone system	3
Powerpoint	3
Fax machine	2
Scanner	2
Ability to print forms and reports	2
Outlook	2
Publisher	2
Other one-off responses included: data input, headers, mobile phone use, texting, basic windows applications, ability to write competent reports, ability to spell correctly, set out reports, retrieve data, a willingness to acquire further skills, troubleshooting hardware problems - eg printer jam; replace ink cartridge, Visio, Access, financial packages, mastery of MS Windows, file management/directory structure, a basic understanding of networks and operating systems, an understanding of general computer workings, some staff may require skills in CAD, PageMaker, CorelDraw.	

Seven employers indicated that all of the knowledge and skills listed above in Table 2 would be ideal for prospective employees to have eventually. However,

other employers indicated the priorities outlined in Table 3 below were essentials prior to employment.

Table 4 - Prior ICT Knowledge and Skills Desired by Employers

Prior ICT Knowledge and Skills Desired by Employers	*No. of Employers that Specified*
Touch typing/computer keyboarding	6
Word	6
Excel	6
A general understanding of the computer and common programs	4
The ability to use the telephone/telephone systems	2
File management and an understanding of directory structure	2
Internet	2
Email	2
Outlook	2
Powerpoint	2
Other one-off responses included: the ability to use office equipment competently; voicemail; fax; photocopying; the ability to operate ticketing system and membership lists; mastery of MS Windows; know what delete, backspace and tab keys do; an understanding of the logical processes of programming and, therefore, a basic understanding of the system; how to do upgrades; the importance of backups; hammer in to them to "read the screen"; good communication skills; a basic understanding of printers, networks and bureaus; the ability to teach other staff; the ability to learn how to learn.	

Pre-requisites required by tertiary institutions depend on the course studied. Only basic ICT knowledge and skills are required for some courses. Basic word processing skills and a reasonable computer keyboarding speed were specifically mentioned. More advanced skills and qualifications are required for entry to other courses

Nine employers did not specify any minimum ICT experience or qualifications. However, three employers conceded that those with ICT experience or qualifications have an advantage and one employer stated that they would "inquire at an interview" (E23). Five employers required minimum experience or qualifications in ICT and three other employers stated that they would specify minimum requirements "if the position we were filling depended on such skills" (E8). One employer stated that they have minimum ICT requirements for administration staff, but not for sales staff. Minimum

requirements commonly included general computer and printing knowledge and knowledge of Word, Excel, the internet and email. One employer gives prospective employees a typing and spreadsheet test. Another employer required basic experience with Freehand, Photoshop and Flash, in addition to other commonly used programs. One employer specified that prospective employees must have experience with a mobile phone and voicemail. "It is inappropriate for applicants not to have any skills in a computer environment nowadays", stated one employer (E5).

1.3. The Need for ICT to be Taught as Separate Subject/s at Secondary School Level *(T Q3, Q4; E Q4, Q5)*

There was disagreement amongst responses to this question from tertiary institutions. T1 did not see a need for separate ICT subjects at secondary school level. However, T2a stated that there should be an optional ICT subject available at secondary school level. T2b saw the need for specialised areas such as programming and graphic design to be taught in isolation. However, he indicated that other computer skills should be taught in context to ensure that learning is meaningful.

T1 indicated that there was no need for separate ICT subjects as ICT skills and knowledge should be integrated across the entire curriculum. However, T2a were concerned that there may be a lack of focus on the learning of specific ICT skills and knowledge if ICT was not maintained as a separate subject area. They stated that qualified specialist teachers should be teaching these ICT skills and knowledge. As stated earlier, T2b believes that programming and graphic design should be taught in isolation, but that other ICT skills and knowledge should be integrated across the curriculum to ensure that learning takes place in context. Employer responses are depicted in the figure below.

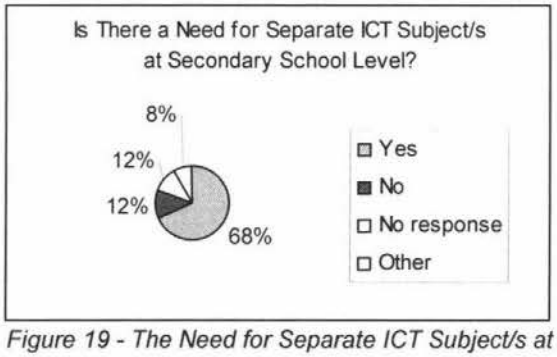

Figure 19 - The Need for Separate ICT Subject/s at Secondary School Level - Employers Responses

Twelve of the employers that responded "yes" indicated that the main reason for separate ICT subject/s is that ICT skills and knowledge are required in almost all occupations today. Six employers considered that students would need these skills for general use in society. "There is enough in this [ICT] area to warrant a totally separate subject" (E25). If ICT skills and knowledge are not taught in separate subject/s, this "would restrict the country's growth", according to one employer (E4).

"The greater the skills, the more confident the prospective employee is about applying for a job" (E1). ICT skills are an "essential requirement" and one employer stated that ICT should be an "examinable subject" (E5, E6). Another employer considered that students without a computer at home will be disadvantaged if separate ICT subject/s are not available (E23). "A business can be made more competitive by utilising the technology available", therefore students with ICT skills and knowledge will have an advantage (E8). ICT skills and knowledge are becoming more important in New Zealand as the country "in general, seems to be moving away from a manufacturing type environment" (E16).

One employer considered that "learning by 'osmosis' is inadequate" (E23). Another stated that "an understanding of the logical processes of programming, and therefore a basic understanding of the system" is needed (E21). Some indicated that it was important for students to gain confidence and acquire ICT skills and knowledge at an early age so that they will "find it easier to learn more in-depth subjects required later in their jobs or tertiary studies" (E6).

The ability to learn how to learn is far more important than the content learned, according to one employer. However, the majority agreed that separate ICT subject/s are needed. Some stated that the teacher should be "facilitator and mentor" and that students should choose their own "topics or games" and do their own experimentation and learning of how to learn (E18, E2). Any teacher that had learned how to learn should be able to assess the students' progress. However, the same employer stated: "The problem is that anyone with that skill is worth a lot of money and unfortunately the government is not prepared to pay teachers without that skill what they are worth, let alone those with it. Neither is our community prepared to force the government to pay" (E18).

One employer considered that only "an intense grounding in the basics" is needed in separate ICT subject/s and then students should "apply" the skills and knowledge

learned to other subjects to demonstrate the "usefulness" of what they have learned (E2). Another employer considered that only basic ICT skills are needed in most occupations and therefore separate ICT subject/s are not necessary. However, the same employer stated that separate ICT subject/s should be available as a "choice" for students interested in pursuing a career in ICT (E8). It would be "more interesting to have [ICT] incorporated into all subject learning", considered another employer (E22).

1.4. Suggested ICT Subjects and Topics *(T Q5; E Q5)*

Respondents from tertiary institutions believed the following subjects or topics should be taught: file management, word processing, spreadsheets, database, basic technical knowledge of the computer, computer programming and graphic design.

Subjects, or topics, that employers wanted taught are outlined in the table below.

Table 5 - ICT Subjects/Topics That Should Be Taught

ICT Subject or Topic	*No. of Employers Who Specified*
A sampling of all areas, the basics of hardware, software, how it all fits together	6
Word Processing/Information Management	5
Microsoft Office	3
Spreadsheets (Excel)	3
Desktop Publishing	3
Database/Database Management (One employer specified Basic SQL)	3
Computer keyboarding	
Web Page Design	2
Animation	2
Email	2
Graphics/Graphic Design	2
Computer Studies	2
Other one-off responses: Fundamentals of Computer Science; Electronic commerce - usability and design; Basic accounting; Computer architecture; Basic Windows applications; Film and media studies; Programming; File management; Telecommunications; Networking; Illustration; Photography; Fundamentals of security - passwords, backing up, etc; Internet searching; Communications technology; Training in dealing with the public/clients; Mobile phone use and voicemail; Publisher; Music; Administration.	2

One employer wanted "better prepared users" that can see the "overall big picture" (E3). The same employer emphasised the importance of "problem-solving skills". Another employer considered that future employees need "better face-to-face communication skills; the computer is too easy to hide behind" (E4).

1.5. ICT Training, or Subjects, Offered by Tertiary Institutions and Employers *(T Q6; E Q6)*

Tertiary institutions offered a variety of ICT subjects. The most common form of training provided by employers was in-house training on in-house software. External providers were commonly used, as was training in Microsoft applications. Other "one-off" training was provided on a "one-on-one" basis.

1.6. Summary

Employers and participants from tertiary institutions have shown a genuine interest in the future of ICT education. Employers and respondents from tertiary institutions desire school leavers to possess computer keyboarding, word processing and spreadsheet skills. Other skills desired include file management, internet, email, PowerPoint, the ability to use a variety of office technologies (including systems), good communication skills and the ability to learn how to learn and apply skills learned. Representatives from tertiary institutions and employers consider that school leavers with ICT qualifications and experience have an advantage in employment and tertiary education.

External providers were used to provide In-house training on in-house software and common Microsoft applications at some places of employment and a variety of ICT subjects were offered by tertiary institutions. However, the majority of employers and respondents from tertiary institutions indicated that there is still a need for separate ICT subject(s) at secondary school level. Reasons were many and varied. However, some considered that learning how to learn was more of a priority. The most common ICT subjects, or topics, desired were file management, an understanding of hardware and software basics, word processing, spreadsheets, database, knowledge of Microsoft Office applications and desktop publishing. A variety of other subjects, or topics, were

suggested, but computer keyboarding, web page design, animation, email, graphics/graphic design and computer studies were all mentioned by two employers each.

2. How is ICT teaching and learning taking place in other schools? What are their plans for how their students will learn ICT skills and knowledge in the future?

This section will reveal how other schools are currently transferring ICT skills and knowledge to their students. Plans for future change in ICT education in these schools is also investigated. However, firstly the respondents' definitions of ICT and perspective on the importance of ICT skills are outined. Participant codes used in this section have been outlined in the Introduction to this chapter and also in Appendix E.

2.1. Definitions of ICT *(P Q3; S Q7)*

One principal considered that "ICT means new ways of gathering, processing and presenting information - fax, phones, computers, data show, digital still and movie cameras, internet and intranet" (P1). ICT was simply defined by another principal as the "use of technology to access and present information" (P2).

Three respondents from North Shore schools indicated that ICT meant "any activity that uses electronic communication as a tool, and the integration of it into the curriculum" (S1, S4, S5). One respondent specified that ICT is "primarily computerised" (S1). Two respondents regarded ICT as equipment - "any information or communication medium - eg mobile phones, computers, phones, fax, photocopier, digital camera (still and video) and their usage" (S2, S3).

2.2. The Importance of ICT Skills *(P Q4, Q5)*

The two Hibiscus Coast principals were asked to rate the importance of ICT skills. The range given was: Very Important, Important, Reasonably Important, Not Very

Important. One principal regarded ICT skills as very important, while the other regarded them as important (P1, P2).

The first principal stated that "ICT is becoming the basis of all forms of gathering, processing, communication and presentation of information. ICT skills are now an integral part of a repertoire of communication skills a person needs to live and function effectively in the modern world" (P1). The other principal indicated that "as a primary school our role is to ensure that children have a solid grounding in the basics. ICT is a tool for learning" (P2).

2.3. ICT Skills and Knowledge Taught in Separate Subjects in North Shore and Hibiscus Coast Schools *(S Q11)*

Separate ICT subjects were not taught in the two Hibiscus Coast schools surveyed. Subjects that include ICT skills and knowledge and are taught at North Shore schools are outlined below.

Years 7 and 8

Two private schools indicated that Technology, ICT and Thinking Skills were compulsory at this level. One private school indicated that new students to the school (at any level) were required to study a half-year course covering an introduction to their laptop.

Year 9

Nine of the ten North Shore Schools had a compulsory ICT course for Year 9 students. The other school had a one-term compulsory Technology course and a one term optional ICT course. Four of the nine schools' compulsory courses were for 10 weeks duration (one term). Other schools' course duration varied - one trimester; 35 periods; a half-year. Two schools did not state the duration of their Year 9 course. The majority of compulsory courses covered computer keyboarding, file management, an introduction to word processing and spreadsheets, and an introduction to the internet. One school also included Publisher and another school specified that they covered desktop publishing and research skills. One private school indicated that they covered "thinking skills, technology and information technology". Three schools offered an

extended, optional ICT course in addition to their compulsory course for those students that wished to extend themselves. These extended, optional courses covered a variety of areas: more Word and Excel, Access, PowerPoint, Frontpage, principles of Technology and Information Technology, ethics, programming, file management, networking and hardware.

Year 10

One school did not offer an ICT subject at this level. Five schools offered one optional ICT subject. Two schools offered two optional ICT subjects. One school offered three optional ICT subjects. One school included compulsory thinking skills at this level. The majority of courses at this level were traditional Text and Information Management courses covering common applications software, design and layout principles and computer keyboarding. Most courses were two terms in duration, although one school offered a full year course. One school's course included database training. Another school stated that they offered Pitman and CETA qualifications as an option for students. Another school offered Cambridge examinations. Two schools offered a more advanced option for students at this level. One of these two schools offered Level 2 Achievement Standards in ICT to Year 10 students. Another school covered ethics, programming, robotics, LEGO mindstorms, advanced functions of common applications and the creation of games in JavaScript. One school specified that students can only choose one Technology subject - of which Information Technology is one. Another school specified that one of the three student options at this level must be a Technology subject.

Year 11

Seven of the ten schools offered a full year, optional, Text and Information Management course covering NCEA Level 1 Information Management Achievement Standards. Two private schools offered Information Technology with students sitting Cambridge examinations. One of these schools specified that entry to the course was subject to negotiation with the Principal and Head of Faculty. One school offered a full year Information Technology course which included 18 credits of Level 2 Unit Standards towards a National Certificate in Business Computing. This course included programming, multimedia and video editing. One school offered an ESOL Computing and Information Technology course (for students with English as a Second Language)

which included 31 credits of Unit Standards. Another school offered a full year Introductory Text and Information Management course.

Year 12

A wide variety of courses were offered at this level. Titles of the courses, the number of schools offering each course and other details, including forms of assessment, are outlined in the table below.

Table 6 - Year 12 ICT Courses at North Shore Schools

Course Title	*No. of schools*	*Content and Other Details*
Text and Information Management	4	Three schools offered Level 2 Achievement Standards in this course. One school offered a combination of Unit Standards and Achievement Standards - 24 credits total.
International Computer Driving Licence (ICDL)	2	Seven modules - basic concepts, using the computer, word processing, spreadsheets, databases, presentations software, internet and email.
Print Design	2	One of these schools specified that their course was sourced through Natcoll, an external provider. The other school specified that they taught to Unit Standards - 85 credits total.
Computing	1	Sixth Form Certificate - including word processing, desktop publishing, web publishing, internet searching techniques, database, spreadsheets, programming, computer science and social implications.
Computer Applications	2	One school taught to Unit Standards - 25 credits - emphasis on the computer as a tool. Students can develop further in one of three areas - desktop publishing, photographic imaging or CAD. The second school did not specify content of the course.
Information Technology in a Global Society (ITGS)	1	IB Year 1 (International Baccalaurette) - a humanities based course. Students develop a product to solve a need, but look at ethics and impact on society, amongst other aspects. The respondent from this school stated that 800-900 schools around the world offer this course.
Introductory Text and Information Management	1	Content not specified.
Computer Studies	1	Level 2 Achievement Standards - 30 credits towards the National Certificate in Computing Level 2.
Office Systems	1	Unit Standards - 20 credits.
Office Functions	1	Content not specified.
Information Technology	1	Cambridge Examinations.
ESOL Computing and Information Technology	1	For students with English as a Second Language. Unit Standards - 31 credits.
Computing and Web Design	1	Unit Standards - 27 credits.
National Certificate in Computing	1	Levels 2 and 3 Unit Standards - 59 credits. A self-paced course that students may study over two years, completing in Year 13.

All ICT courses at this level were full year and optional. Two schools offered four ICT courses at this level. One school offered three ICT courses at this level, while two

schools offered two ICT courses at this level. Three schools only offered one ICT course at this level. A recently formed school did not teach any Year 12 students as yet.

Year 13

Table 7 - Year 13 ICT Courses at North Shore Schools

Course Title	*No. of Schools*	*Content and Other Details*
Text and Information Management	4	One school assessed this course using Level 3 Achievement Standards, while another schools' course was assessed only for Higher School Certificate. The remaining two schools did not specify qualifications or forms of assessment.
International Computer Driving Licence (ICDL)	1	Offered for students to complete this qualification if they did not complete it in Year 12.
Computing	1	Level 2 and 3 Unit Standards - includes word processing, spreadsheets, database, web publishing, basic concepts, network principles, graphics, presentations.
Computer Applications	1	Content not specified.
Information Technology	1	Cambridge examinations.
ESOL Computing and Information Technology	1	For students with English as a Second Language. Unit Standards - 31 credits.
National Certificate in Computing Levels 2 and 3	1	Unit Standards - 59 credits. This course is self-paced and completed over two years. Students begin this course in Year 12 and complete it in Year 13.
Computing/Web Design	1	Unit Standards - 27 credits.
Computing/Design and Printing	1	Unit Standards - 85 credits.
Untitled as yet	1	Level 3 and 4 Unit Standards. A new course for 2004 focusing on animation, capturing and editing digital sound and video.

One school did not offer an ICT course at this level. One recently formed school did not offer any courses at Year 13 level as yet.

Other information gained from school websites:

School 6 - Computer Applications can be picked up at any level - Year 10, 12 or 13. The school has a ratio of 1:5 computers to students.
School 7 - Cambridge exams available in some subjects, by invitation only. Sixth Form Certificate in other subjects at Year 12.
School 8 - Habitats of mind (intelligent behaviours) and multiple intelligence theories are interwoven through all lessons in Years 7 and 8.
School 9 - Year 7-10 - There is a Technology subject, but there is also an integrated proramme of thinking and learning skills to develop problem-solving (direct teaching of

this is in the core curriculum). To improve student-centred learning and to accelerate lateral and creative thinking.
School 10 - More able students take one Year 11 subject while in Year 10. There are extension classes in videomaking and other things.

2.4. ICT Skills and Knowledge Currently Provided Across the Curriculum in Other Schools *(P Q6, Q8, Q9; S Q12)*

The two Hibiscus Coast principals stated that the following skills and knowledge are learned by students across the curriculum at their schools:

> Word processing, spreadsheeting, Powerpoint - searching on the internet, video editing, email, scanner, digital cameras (still & video), use of datashow (P1).
>
> Keyboarding, word processing, spreadsheets, internet, email (P2).

The first principal stated that various ICT skills are taught "on a need-to-know basis". There was no structured program for teaching ICT skills and knowledge at this school (P1). The other principal indicated that, in addition to the skills stated above, teachers at his school are also working towards getting students to use PowerPoint and create web pages (P2).

North Shore schools' respondents provided very little detail regarding ICT skills and knowledge learned across the curriculum in their schools. However, in Mathematics classes some schools were using Excel, graphing, Maths Online and a data projector. In Accounting, Excel and graphing were used in one school. Social Studies and Geography were making use of Powerpoint in two schools. Graphics and Design made use of CAD software in two schools. Year 13 Cuisine used a digital camera in one school to publish an online gallery of photographs of meals prepared. English and Media Studies express ideas through multimedia.

Respondents from two North Shore schools indicated that ICT is used across the curriculum in most subjects at all levels. However, one school admitted that there was "limited ICT use in other areas in the school". Other ICT skills used across the curriculum included word processing, research techniques, spreadsheets, accounting software, graphics manipulation, electronic music composition, desktop publishing and video editing.

A private school emphasised the use of laptops for examination preparation and research. Their emphasis was on the use of laptops as tools. An intranet was available to students of this school remotely. This school has developed a skills matrix to integrate ICT across the curriculum. This skills matrix was developed from MYP (a junior version of IB - mentioned earlier) and is tied in with the New Zealand Essential Skills Across the Curriculum. A respondent from this school stated:

> This school decided what skills they wanted the students to have eg being able to use MIMIO [electronic whiteboard]. The skills matrix is tracked and followed for each student. The teachers are aware of which skills students have learned. Training is provided for students in skills to enable them to make an informed decision about what the best tool for the job is. For example, students can choose to use pen and paper or the computer for mind-mapping. Other skills include Data Processing and Data Presentation. These skills are tied in with an ethical approach which the school considers to be very important. This includes the legalities of copyright/plagiarism. A major area of IP (intellectual properties) is taught - students are taught not to plagiarise, etc. This is tied in with the ICT programme. NCEA Information Management Achievement Standards 1.2, 1.3 and 1.4 are taught and assessed across the curriculum for all Year 10 students. These are overlaid over existing assignments. For example, English includes a film study for AS[1] 1.3. 1.2 is examined in a 1.5 hour examination online for all students. 1.4 - students are given a brief to create posters, etc as part of a subject. This means that Year 10 students can enter Year 11 having already gained 10 credits from NCEA Level 1 in Year 10 (S5).

2.5. Should ICT skills be *taught*? *(P Q19, Q20; S Q15)*

One of the Hibiscus Coast Principals said "yes", the nother said "no" (P1, P2). Both of these principals believe that some ICT skills, at least, can be picked up via an osmosis-like process. The principal that responded "no" considered that a combination of some teaching and some discovery learning is best and pointed out that "teaching provides a structure and meets the needs of children with limited access at home or who just use the computer for games" (P2). Both principals agreed that some ICT should be used in all, or most subjects. One suggested that some formal teaching of ICT is needed and that "integrated learning modules are best for this approach" (P1). The other principal indicated that ICTs are tools to be used across the various subject areas (P2).

Four schools participants from North Shore schools believed that ICT skills should be taught. One school responded "Yes and No" (S5). Respondents from all five schools

[1] AS=Achievement Standard

indicated that ICT skills could be picked up via an osmosis-like process, at least some of the time.

The participants from all five North Shore schools agreed that there is a need for some teaching of ICT skills and some osmosis-like discovery learning. One respondent suggested that "introductory basic skills" and "specific skills for complex programs" need to be taught (S2). "Transmission of skills is easier if taught" and we should be teaching "process ... rather than skills" (S5). Another respondent stated that skills should be taught first, then students should "experiment and apply those skills to suit a need" (S4). Two respondents indicated that "students may not pick up best practices nor learn the full capabilities" of programs through discovery learning (S3). Whether teaching or osmosis styles of learning are employed "depends very much on the individual learner" according to one respondent (S1).

It seems that some teaching and some osmosis-like discovery of ICT skills and knowledge is desirable. It has been suggested that introductory basic skills are taught and then more advanced, complex skills can be taught later as needed. The importance of learning how to learn and applying skills and knowledge learned has, again, been emphasised. A clear need for separate, or specialist, ICT subjects for basic skills at junior levels and for specialised options at senior levels is evident. In addition, ICT skills and knowledge should be integrated across all curriculum areas.

2.6. Should ICT Subjects be Taught by Specialist Teachers?

(P Q15; S Q16)

Respondents that previously stated that ICT skills should be taught were asked if they felt these skills should be taught by specialist teachers. One Hibiscus Coast principal indicated that specialist teachers were not required as ICT should be integrated across the entire curriculum by all teachers (P1). The other principal saw the need for lead teachers to encourage and facilitate the use of ICT across the curriculum, but also suggested that specialist teachers are needed to teach ICT skills and knowledge to students from Year 7 onwards (P2).

Representatives from North Shore schools considered that specialist ICT teachers are sometimes needed, especially to ensure that "best practice" is taught with "uniform

delivery" (S1, S3). However, there was an awareness amongst these respondents that all teachers must become competent teachers of ICT.

2.7. The Need for Separate ICT Subjects *(P Q16, Q17)*

Both Hibiscus Coast principals agreed that there is a need for separate ICT subjects in a Year 7-13 school. However P1 also stated that "ICT should be part of the learning experience in all classes."

A list of topics was given for the respondents to tick. One principal indicated that the following topics should be included in separate ICT subjects:

Layout and design of documents, word processing, spreadsheets, creating computer graphics, presentations, use of peripherals, internet, email, web page design and computer animation (P1). The other principal agreed on the above topics and also added computing keyboarding, data bases, standard operating procedures and file management, draw/paint applications, ergonomics, operating systems, the impact on ICT on society, networks - how they work, general problem solving and decision making (P2).

2.8. Current ICT Learning Environments *(S Q19)*

Computer laboratories and pods are most commonly used in North Shore schools. One school has a specialist multimedia centre with other ICT equipment available. Responses are below.

> Mainly computer labs x 3 each has 25-30 machines. A few specialist pods eg Music, Graphics about 6-10 machine (S1).

> The school has a multimedia centre with PCs, data projection, scanning, printing, video photography and editing. Computers are mainly used in labs. Half of the staff have laptops. Some rooms have 2-3 computers, but these are mainly for staff use. Viewlet software from QARBON.com creates flash movies of what you do (S2).

> Mainly computer labs and pods - we have four computer labs where students are 1 to 1 with a computer, and there are a number (7) of pods scattered around where students either work collaboratively or have turns. Many of our classrooms have at least one computer - all of these have Internet access (S3).

Dedicated rooms. Specialist ICT teachers use for ICT and other curriculum areas book. Pods in curriculum areas (S4).

Individual student laptops are used by all students from Years 7-13. The junior school use labs. Administration have PCs. The library has some PCs. Some specialist machines are available for working with high-end graphics. Programmable sewing machines. Computerised lathe. Data logging gear. Remote sampling gear. The school's ski lodge in Whakapapa and a satellite of this in Wanaka are both connected to the school's network. The school has a hanging system for cabling that rolls out across the room from the ceiling. There are plugs around the side of some classrooms and vertical poles in others (S5).

2.9. Pros and Cons of Current ICT Learning Environments *(S Q20)*

Computer Labs - The most common advantage of labs is that each student has their own computer to work on. One respondent stated that they "can plan ahead and book a lab for a whole module - more effective. Classroom management is easier" (S2). Disadvantages included "issues with booking, behaviour and equipment management" (S1).

Pods - "Students are working collaboratively which may be good. For some subjects and in many circumstances, pods are fine" (S3). Pods are "ideal for small senior specialist groups" and are "useful if [there are] different levels of students in the class" (S1, S2). Disadvantages included:

Harder for technician to maintain, not always enough machines (S1).

There are not enough computers to make it useful. The computers in pods usually gather dust. To make good use of pods you need to rotate students through the pod constantly. Classroom management not as easy (S2).

One person usually 'hogs' the time using the computer which means only he gets maximum benefit, or with the time on the computer rationed there tends to be wasted waiting time. Pods are more suited to the flexible type of timetable that primary schools enjoy rather than the inflexible period structure that exists in most secondary schools (S3).

Pods often mean that the class is split and the computers in the pod areas are often of lesser specifications and often hardware/software faults occur (S4).

2.10. Plans for Change in ICT Teaching and Learning in North Shore Schools *(S Q17)*

The following responses were made in regard to planned change in ICT Teaching and Learning in North Shore Schools. School 1 had no plans for change.

> In 2005, computer skills will be taught in two streams. An IM stream and an Advanced Computing stream. The Advanced Computing stream will cover such things as databases, website design, programming. Our school is looking at providers such as Natcoll to provide these courses. It's too much work for the school to start these courses from scratch themselves. The school is also looking to increase student access. They intend to increase the number of labs as the computer room usage is at a maximum currently. There are three labs used full time and one lab that is bookable into. Student access will be increased through the use of laptops (COWs[2]) that can be plugged into "strips" in each room. These strips will have cabling, etc to them to allow the laptops to connect to the network (S2).
>
> We are likely to be offering the Cambridge qualifications and possibly also the ICDL (S3).
>
> There are several options being looked at, the main option being that at senior level a Technology subject would be offered to students with specialist teachers available. Students would then elect to (especially at Year 13) the area of Technology they may pursue for each of the Achievement Standards under the guidance of the 'specialist' in that area of Technology. This would include ICT (S4).
>
> A new course is planned for Year 13 in 2004. This will focus on animation, capturing and editing digital sound and video. Four Level 3 and 4 unit standards worth 10 credits each will be covered. The school is developing an intranet product - to be used as a learning management system and communication and collaboration tool. Fifty to sixty have access from home already. The whole school will have access by the beginning of 2004. Parent logins for the intranet are planned for. The school will have wireless capability on the network when improvements to wireless networking are made. They won't get rid of fixed cabling though. Powering the laptops is an issue with wireless networking. Changes are continual in the area of ICT (S5).

2.11. Plans for Change in the Delivery of the Technology Curriculum *(S Q18)*

No changes were planned for the delivery of the Technology curriculum, other than the introduction of Levels 2 and 3 NCEA Technology. School 2 indicated that there are some changes planned for their Design Technology course, but no detail was given.

[2] COWs = computers on wheels

2.12. Use of Rooms and Equipment *(S Q21, Q22)*

Three schools indicated that they have a computerised booking system for labs and equipment. One respondent stated that "specialist classes use the ICT dedicated rooms for six periods of a six day timetable, leaving one period free [in each option line] for other curriculum areas to use the rooms. ICT classes are then timetabled into a pod room for "theory" work [for one period per cycle]" (S4).

One school did not have any use made of rooms outside school hours. ICT night classes made use of computer rooms outside school hours for community education in three schools surveyed. One school makes computer labs available to students during examination time outside school hours (S2). A private school stated that room useage outside school hours is by "interest groups only really. The prefects at this private school produce a video each week for assembly. Some students are producing animations for TV (NZ on Air project). Summer school classes. Lunchtime clubs" (S5).

2.13. Summary

The majority of respondents defined ICT as computers and related technologies. ICT skills were regarded as important for students by both primary and secondary respondents. This was evident in the wide variety of separate/specialist subjects that are currently provided for students across all levels (Years 7-13). Thinking skills are also specifically taught by two schools at junior levels. Some schools offered advanced/extended ICT options for students, in addition to usual options. Text and Information Management courses covering common applications, design and layout principles and computer keyboarding were common at junior level. This type of course was also very common at Year 11. Four schools continue to offer this type of course at Years 12 and 13. For Year 12 and 13 students, a wide variety of ICT subjects are offered for students to specialise in.

ICT skills and knowledge are provided in various forms across the curriculum in all schools, but on a very ad hoc basis. Only one school mentioned a skills matrix that is used by their school to track student progress in ICT across the curriculum. It seems that some teaching and some osmosis-like discovery of ICT skills and knowledge is desirable. It has been suggested that introductory basic skills are taught and then

more advanced, complex skills can be taught later as needed. The importance of learning how to learn has, again, been emphasised. A clear need for separate ICT subjects for basic skills at junior levels and for specialised options at senior levels is evident. In addition, ICT skills and knowledge should be integrated across all curriculum areas. Specialist ICT teachers are sometimes needed, especially to ensure that best practice is taught. However, there is an awareness that all teachers must become competent teachers of ICT.

Computer laboratories (labs) and pods are the preferred forms of learning ICT. Labs are preferred because each student has their own computer to work on, but there are "issues with booking, behaviour and equipment management". Pods are considered "ideal for small, senior, specialist groups", but issues with pods include maintenance, wasted waiting time and split classes.

Four of the five North Shore schools are planning for future changes to their delivery of ICT skills and knowledge. Planned changes include new qualifications and more advanced skills. Very little change is planned for the delivery of the Technology curriculum at North Shore schools in the near future.

Computerised booking systems were common for labs and equipment. One school timetabled one theory period per cycle for ICT specialist subjects to enable classes from other curriculum areas to gain access to computer labs. Computer rooms were not greatly used outside school hours, other than for community education night classes.

3. Summary of Part B

Employers and respondents from tertiary institutions have revealed the ICT skills and knowledge that they desire school leavers to possess including computer keyboarding, word processing, spreadsheets, file management, internet and email, along with good communication skills. However, some participants considered that learning how to learn and the application of knowledge to be more important than the content of courses, or the actual skills and knowledge learned. Although North Shore school respondents provided detail on how ICT teaching and learning is, and will be, taking place in their schools they also emphasised the need for students to learn how to learn

and apply knowledge and skills. Thinking skills were specifically taught by some schools.

There was an evident desire for some actual teaching of ICT skills and knowledge, balanced with some more osmosis-like discovery learning by students. There was also a desire for some learning in computer labs and some in pods. Computerised booking sheets were commonly used for labs and equipment and one school timetabled specialist ICT classes out of labs for one theory lesson per cycle to allow more access for other classes.

CHAPTER 4 - PART C

FINDINGS FROM THE INTERNAL PARTICIPANTS - OREWA COLLEGE STAFF STUDENTS AND PARENTS

"Real improvement cannot come from anywhere other than within schools themselves." (Stoll, 1999:47)

Introduction

In believing that school improvement comes from within, it is therefore important to consult staff, students and parents for their views on ICT teaching and learning.

The methodology for this study is outlined in Chapter Three and statistics related to responses were graphed in the introduction to this chapter. The coding of participant responses is explained in both the Introduction to this chapter and in Appendix E.

In this Part of Chapter Four, data gained from questionnaires, interviews, observations and computer booking sheets has been grouped under various headings to give an overview of the findings of this study. Participants' definitions of ICT are outlined and the importance that they place on ICT is highlighted. Participants' prior, current and preferred forms of learning ICT skills and knowledge are summarised. The level of interest shown by participants in student learning of ICT skills and knowledge is examined. Views on whether ICT skills and knowledge should be taught, or learned in an osmosis-like process are fleshed out. The need for specialist ICT teachers and specialist ICT subjects is questioned. Possible topics for ICT subjects or modules, suggested by participants, are outlined. The need for ICT skills and knowledge to be integrated, or inserted, across the various learning areas is then examined and related issues and possible barriers to ICT teaching and learning at Orewa College are summarised.

In the second sub-question in this Part, participants' views regarding whether some form of ICT teaching and learning should be compulsory at Orewa College are outlined.

Views of the school climate and culture are provided from the participants' perspective to enable the results to be placed within an overall framework. Important aspects of the unique culture at Orewa College have played a part in answering the following sub-question to this research.

1. The Importance of ICT Teaching and Learning and the Level of Interest Shown by the Internal Participants

Before attempting to uncover various views and opinions of ICT teaching and learning it was important to determine the participants' definition of ICT. Respondents were asked to each give their definition of ICT. A summary of their responses is given below.

1.1. Definitions of ICT *(ST Q2; PA Q1; TE Q8)*

Students

The majority of students referred to ICT as computers, computing, hardware and software. Computer peripherals or other electronic devices were referred to by ten students. Five students expanded the definition to encompass information, communication, research and/or presentation skills, with two students referring to the learning of software needed in today's businesses. Isolated students referred to technology skills and knowledge, how computers or other technologies work and preparing for the future.

Parents

Most parents indicated that, to them, ICT meant computers and computer-related technologies and activities. This was expanded by some to include all electronic and communication technologies (including video, television, data systems, AV systems, telephone, phone, fax, fibre-optic systems, networks, cellphones, satellite systems, internet, books and people) used to access, store or communicate information. Other comments included:

> Progress in and lack of work (PA11).
> Including technological delivery systems/tools in the educational research, delivery and

exploration of all subjects where direct experience is limited or unavailable (PA12).
The future (PA25).
The art of discriminations, qualification in visual and electronic formats through rapid retrieve and interpretation of systems. State of the art mechanical and electronic components (PA31).
The use of computers being incorporated into all facets of our lives - i.e. used as a tool to retrieve information (through the internet), email to be in touch with friends and advertise business, used in businesses to speed up accounting etc, used in industry for complete control of process (PA23).
Learning how to use and become competent with modern instruments of communication (PA16).

Staff

Half of the teachers who responded to this question defined ICT as computing and other digital or electronic equipment. Their definition included all computer applications, email, graphics, web design, programming, keyboarding skills, the use of microwave ovens for cooking and the effects of computers and related technology on society. One teacher indicated that, "prior to [a recent] PD[1] session" ICT, to them, meant computers and related technology (TE48).

The other half of the teachers expanded the definition of ICT to include all technology and parts of the syllabus that focus on enhancing communication. They referred specifically to the phone, fax, internet, word processing, datashows, videos, overhead projectors (OHPs), cellphones, email, computer keyboarding skills and media technology. The difference in these responses was that they also referred to a wider definition of technology that included accessing information, processing knowledge and communicating results as well as "problem-solving and systems" to develop "essential learning skills across the curriculum" (Examples: TE6, TE17, TE38, TE48, TE33). "Written, graphic and spoken communications" were referred to including "art work" (TE45). One teacher stated that ICT meant "using technology to increase the availability value of the learning experience for students" (TE44). Another saw ICT as "a more logical and comprehensive approach to gathering and ordering information, leading to better, and more robust, decision making. Improved technical expertise in hardware, software and new applications" (TE47).

[1] PD = professional development

Summary

The majority of respondents defined ICT as computers and related technologies. However, many widened this definition to include a variety of technologies and systems and their impact on society.

1.2. Importance of ICT *(ST Q3; PA Q2; TE Q9)*

In this section, the researcher attempted to understand the importance of ICT teaching and learning to the Orewa College students, parents and staff. In addition to asking participants to rank the importance of ICT skills, questions were posed to participants in an effort to uncover their definitions of 'academic' and whether or not they considered ICT skills to be academic. This question was added because in discussions amongst staff at Orewa College during the observation period, it was evident that the word 'academic' was used for the attribution of status to the more traditional subjects, such as English, Mathematics and Science. It was therefore of interest to gauge the academic status of ICT learning in the eyes of participants.

Students

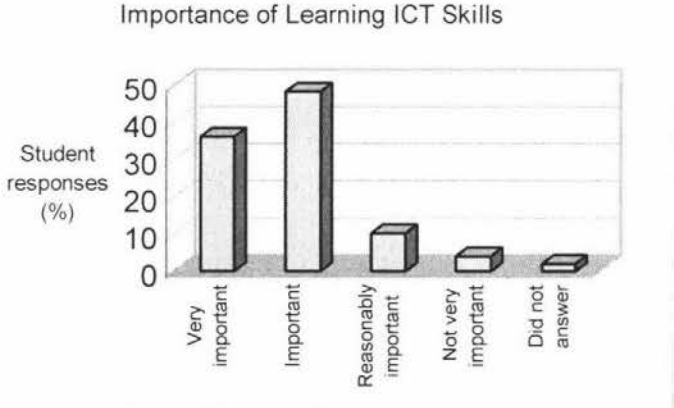

Figure 20 - Importance of Learning ICT Skills - Students

The two main reasons given by students for the importance of learning ICT skills were for future employment (44 per cent) and for general use in society after leaving school (27 per cent). Other reasons given included for communication purposes and to "make money" (ST33). Two students felt that they already knew a lot about ICT, however one

student pointed out that "people already know computers, but computers are getting more stuff in" (ST47). Two students indicated that it is important for everyone to learn basic ICT skills, but not everyone needs more advanced skills.

Parents

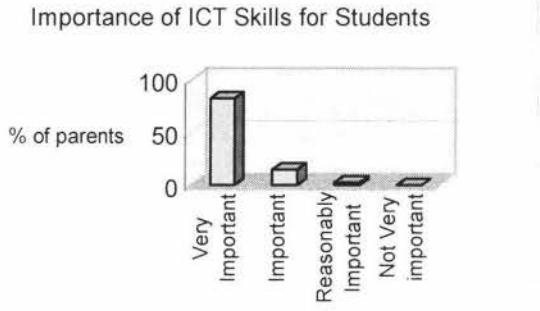

Figure 21 - Importance of ICT Skills for Students - Parents

Parents provided a variety of reasons for the importance of ICT skills. The majority of parents however, felt that ICT skills were important for students for future use in society (55 per cent) and for use in future employment (28 per cent). Eighteen per cent of parents stated that it was important for students to be able to communicate quickly and efficiently. Some parents (eight per cent) indicated that ICT skills were important for students for current and future learning.

Staff

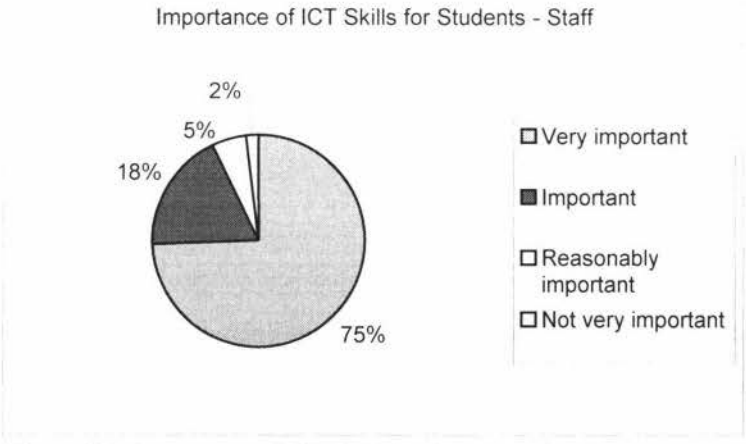

Figure 22 - Importance of ICT Skills for Students - Staff

A substantial majority of teachers felt that it is very important for students to learn ICT skills. Reasons given were varied, but included an opinion that "today's society demands fast, accurate information" (TE52). Fifty-one per cent of teachers stated that

ICT skills were important for general use in society especially for social interaction. Thirty-one per cent believed that ICT skills would be necessary for all students for use in the workforce while one teacher purported that "it will be the skills, not the specific school content that future employees will use from school" (TE40). Other common reasons given for the importance of learning ICT skills were for current and future learning and "to assist learning and understanding" (TE15). One teacher actually quoted Agazzi (1998) and stated that the following quote summed up ICT for them: "In proportion to the growth of the power of technology, human - yes, humankind's - responsibility must grow at the same pace". Some other key comments were:

> Students need to be able to use technologies in multiple contexts (TE27).
>
> Schools seem to lag behind society (TE46).
>
> If I was better equipped with ICT skills I would save a lot of time in my present job and be a better teacher (TE9).
>
> Students need to know how information arrives in front of them and the dangers [involved] (TE16).
>
> Students need to learn how to communicate and learn electronically while still using more traditional methods (eg books) (TE20).
>
> Along with these skills comes innovation and creating - these serve to enhance classroom based activities and facilitate different thought (TE23).
>
> In an increasingly networked world, everyone has to be ICT skilled. The challenge is to use this technology not just to access knowledge but to teach how to manipulate, engage with, assimilate and process this knowledge (TE25).
>
> ICT skills are important when combined with specific curriculum knowledge" (TE39).
>
> "Not everyone needs to know, or use, [ICT] but they need to know what the capabilities are so they can get help when they need to use it (TE49).

1.2.1. Are ICT Skills Considered to be Academic?
(ST Q20, Q21; PA Q17, Q18; TE Q28, Q29)

During interviews and observations it became apparent that some participants felt that academic subjects were more important than other subjects. In this section the researcher explored the term "academic" in an effort to uncover what it meant to the participants and explored whether the participants consider ICT skills to be academic. The status of ICT skills and knowledge and their importance to the participants - will be discovered.

On reflection the words "ICT skills and knowledge" or "ICT teaching and learning" rather than simply "ICT skills" should have been used in this question to the

participants. However, the richness of the information gained has enabled clear insight into the participants' thinking.

Students

Sixteen students felt that 'academic' meant learning and retaining knowledge, subjects and skills at a school or educational institution, possibly for a higher education. Six students stated that 'academic' meant "knowledgeable", "intelligent" or "smart" (ST1, ST6, ST8, ST22, ST25, ST32, ST40). Other definitions included "thinking and comprehending", and "requiring a high level of learning and understanding" (ST13, ST19). Some students indicated that 'academic' included "theory", "subjects like English", "not PE", "not manual subjects - ie computers, Art, PE", "research oriented", "older, more advanced school subject", "clever, try hard" and "interested in learning" (ST26, ST44, ST33, ST30, ST13, ST38, ST41, ST42).

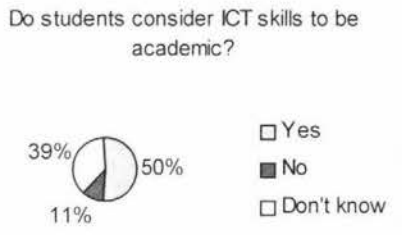

Figure 23 - Do students consider ICT skills to be academic?

Common reasons for students believing that ICT skills are academic, was because "you are learning", gaining "a skill", or require intelligence to use a computer (Examples: ST1, ST31, ST2, ST10, ST20, ST29, ST40). One student stated that "no one can just come along and learn it and be at the same level as someone else" (ST25). Another respondent believed that "ICT skills would definitely help with studies at University or College and help [students to] achieve at a higher level" (ST36).

Those students that believe that ICT skills are not academic, espoused that "anyone can learn the basic ICT skills" and that "computing [skills] are just learned and remembered and not involving intelligence to do [so]" (ST13). Other reasons included because ICT is "practical" and "can be applied to multiple fields" (ST24, ST30).

A significant number of students responded *"don't know"* either because they were unsure of the meaning of 'academic' or because they felt "it depends on what you will

be learning [in ICT]" and "how you look at it as an individual" (ST7, ST35). One student stated "some ICT subjects are more academic than others, eg computer programming is academic, whereas word processing is more a skill" (ST19). Another student stated "you are using your brain to do school work. Yet the skills being used outside of school, eg work place, would not be considered academic" (ST23).

Parents

Parents provided various comments, however common responses are outlined. Ten parents suggested the meaning of 'academic' to be a very intelligent, knowledgeable or skillful person who probably teaches, researches or learns in a tertiary institution. A further eight parents indicated that 'academic' meant studies, researching, learning, or the process of learning. Manual or applied subjects were excluded from the meaning by four parents. However, two parents considered that the definition included both theory and the application of practical skills, while another four parents suggested that thinking and the ability to analyse were also included. Reading, writing, understanding and arithmetic rated highly in three parents' responses.

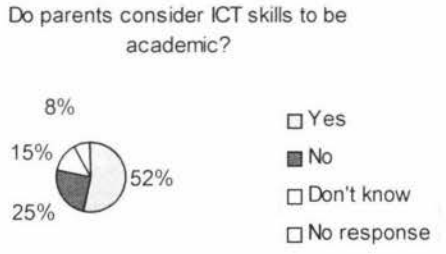

Figure 24 - Do parents consider ICT skills to be academic?

A slight majority of parents considered ICT skills to be academic. Reasons given included "a certain amount of academic knowledge is required [to learn and use ICT skills]" and "if you have the skills you are intelligent in that field" (PA2, PA17). "You are studying, learning and improving your skills" and ICT includes both "theory and practical work" (PA7, PA10). One parent stated that you needed to use your "mental ability" for ICT learning while another considered ICT academic "because computer skills are hard sometimes" (PA24, PA11). Another parent indicated that some students need to specialise and learn ICT skills and knowledge to a high level if they are to do well in "ICT inflicted subjects" (PA9).

A common reason given by parents that did not consider ICT to be 'academic' was that "ICT is about tools" and the "practical application" of those tools (PA1, PA3). Skills were not considered to be academic. Isolated responses revealed that ICT skills are "an essential skill like time management" and "practical skills for practical people" (PA22, PA12). One parent implied that the teaching of ICT skills was unnecessary and stated that "we don't need to teach our children to eat" (PA33).

Parents that were unsure whether they considered ICT skills to be 'academic' gave the reason that both theory and practical skills are included in ICT learning. They considered some ICT skills, such as programming, to be academic while others such as computer keyboarding were not.

Staff

Teacher responses to this question were easily grouped into three main categories. The first, and largest, group considered 'academic' to be defined as a process of thinking and theorising, learning and gaining useful knowledge, both technical and analytical. "Mental rather than physical activity" and "scholarly rather than practical" knowledge, such as that learned in "traditional subjects" was included (TE3, TE5, TE49). One teacher indicated that 'academic' was a "high level of knowledge, not easily attainable by all", while another considered the meaning to be "gain of knowledge for knowledge's sake - not for a practical purpose necessarily" (TE44, TE17).

The second, smaller group suggested that 'academic' included both theoretical and practical learning (Examples: TE37, TE19). They considered the application of learning "in a variety of different ways" and in "complex situations" to be 'academic' (TE23, TE33).

The third and smallest group suggested that an 'academic' is a person. "Someone who has a 'degree' not an equivalent" (TE11). Someone who is "learned", a "high achiever", is "well-educated" and has "the ability to learn and study in various areas" and can apply that knowledge (TE25, TE30, TE48, TE18).

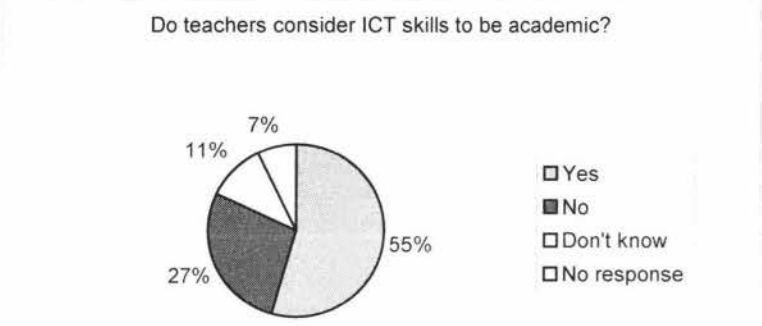

Figure 25 - Do teachers consider ICT skills to be academic?

Teachers who thought that ICT skills were academic thought so because the learning required comprehending and processing of information, in the same manner as all other subjects in the academic realm (Examples: TE48, TE26, TE21). Although one member of staff considered ICT to be a "tool", they recognised that it "takes brilliant people to do brilliant things with computers" (TE49). "Many aspects [of ICT] require deeper insight and understanding", such as "computer programming", "animation" and "formulae" (TE34, TE44, TE45, TE50). Two teachers considered that senior and tertiary courses in ICT would definitely be regarded as 'academic'.

Teachers that did not consider ICT to be 'academic' indicated that ICT included "mostly skills", and they did not consider skills to be academic, but rather a practical facilitation process (TE15, TE35, TE38, TE40, TE44, TE7). One respondent considered that ICT is "for everyone irrespective of mental capabilities" (TE15). "Tradition" ruled ICT out of being regarded as 'academic' according to one teacher, while another suggested that ICT skills are "not academic, so much as professional" (TE36, TE47).

1.2.2. Summary

A variety of reasons were given for the importance of learning ICT skills. Parents and staff indicated that the main reason for learning ICT skills is for future use in society and a smaller proportion indicated that these skills were also important for future use in employment. Students, however, saw future employment as the main reason for learning ICT skills. For general use in society was rated as important by a smaller

proportion of students. The majority of participants regarded ICT learning as academic, although the more practical ICT skills such as word processing were not. The majority also considered the learning of ICT skills to be very important.

1.3. Prior, Current and Future ICT Learning

In this section information gained from participants on prior, current and preferred forms of learning ICT is outlined. Staff confidence teaching ICT and their opinions on the use of glide time to provide more access to computer laboratories are also revealed.

1.3.1. Prior Learning and the Benefits
(ST Q5, Q6, Q7; PA Q4, Q5; TE Q30, Q31)

In this section students itemise the ICT skills and knowledge that they acquired prior to commencing study at Orewa College. This information will be useful in determining future ICT learning for these students. Parents and staff have also outlined prior ICT study that they have undertaken and the benefits that they feel they gained from this learning, so that an understanding of possible future benefits for students may be obtained.

Students

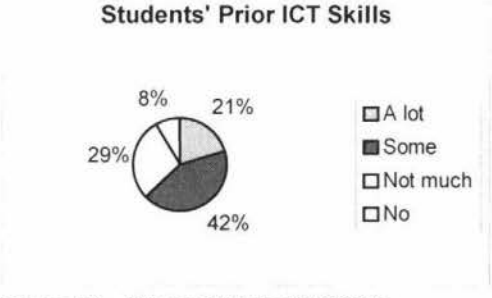

Figure 26 - Students' Prior ICT Skills

The table below shows the range of programs that students had used prior to commencing study at Orewa College, whether at a basic, intermediate or advanced level. However, very few students outlined the level of their knowledge of the programs. Those that did indicate their level of knowledge included five students who stated that they knew PowerPoint very well, four who

considered themselves competent at word processing and two who stated that they knew Excel to a reasonably high level. One student (ST13) stated that she knew Publisher very well and another student (ST34) indicated that he knew HTML to a reasonable level.

Table 8 - Students' Prior Knowledge of ICT Skills

Prior knowledge of ICT skills	
Program or skills learned	*No. of students*
Word Processing	36
Powerpoint	24
Internet	18
Spreadsheets	14
Keyboarding	6
No response	5
Operating Procedures	4
HTML	4
Animation	3
Programming	2
Web Design	2
Digital Camera	2
Photoshop	2
Windows	2
Corel Draw	1
Freehand	1
Design software	1
Digital Imagery	1
Networks	1
Scanner	1
Digital Video Camera	1
Publisher	1
Email	1
Installing Software	1
Integration of Data	1
MYOB	1
BIOS	1
Building computers	1
Case programming	1
Most programs	1
What most keys meant	1

It was interesting to note that very few students mentioned prior use of computer peripherals (for example: digital cameras, scanners). However, the wording of this question may have caused students to assume that only prior learning of computer applications was being asked for.

A combination of home and school learning was most common for prior learning as shown in the graph below. Two of the four students that stated they had no prior knowledge of ICT skills, revealed that they did not have a computer at home. Another of the four students stated that they did not have the technology for ICT learning at their previous school. The fourth student was from Korea and had not undertaken ICT learning there.

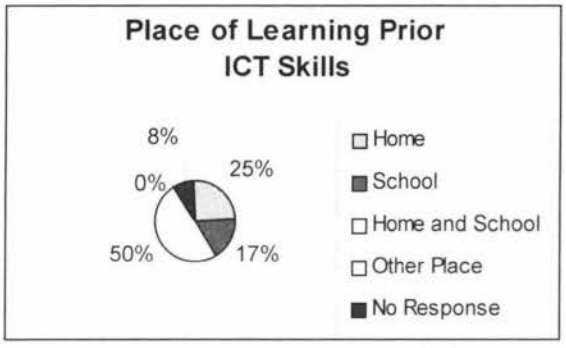

Figure 27 - Place of Learning Prior ICT Skills

Students were asked if they had previously studied an ICT subject, either at Orewa College or another school. Responses are depicted in the graph below. Two students that responded "yes" also indicated "not much" and one student responded "a lot".

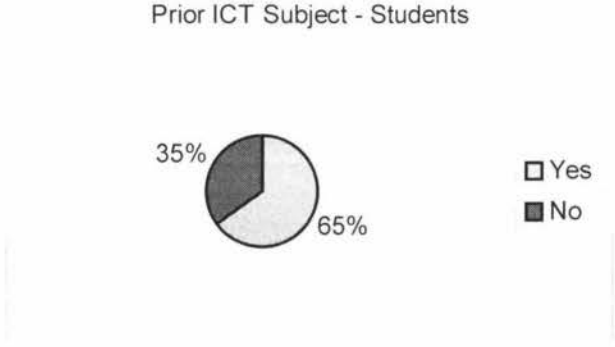

Figure 28 - Prior ICT Subject - Students

The ICT subjects that students stated they had studied previously, and the level that they studied them at are shown in the table below. One student indicated that they studied Information Management in Years Seven and Eight, but "not as a full time subject" (ST8). It was also interesting to note that one student had studied Information Management in Years Six, Seven, Eight and Nine, and had studied Computer Studies in Years Seven and Eight, but opted to study *Introductory* Information Management in Year 11 (ST40). Nineteen students did not respond to this question.

Table 9 - Prior Study of ICT Subjects

Subject Studied	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13
Information Management	1	3	2	9	14	5	12	0
Computer Studies	0	4	3	2	0	0	5	1
Desktop Publishing	0	1	1	1	1	0	0	0
Introductory Information Management	0	0	0	1	0	2	0	0
Internet Skills	0	1	1	0	0	0	0	0
Computer Skills	0	1	0	1	0	0	0	0
Powerpoint Presentation	0	0	1	0	0	0	0	0
Website	0	0	1	0	0	0	0	0

Parents

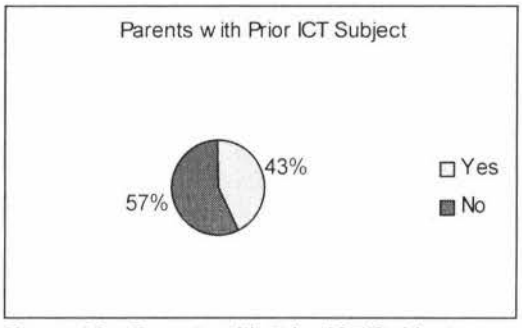

Figure 29 - Parents with Prior ICT Subject

The majority of parents surveyed had never studied an ICT subject. Those that had, however, outlined various benefits resulting from their prior study including the expansion of career options and the "ability to work in a wide variety of jobs" (PA7, PA10). Parents reported that prior learning facilitated their own ongoing learning and personal growth, removed the "fear factor" and facilitated their ability to participate in their children's learning (PA14, PA17, PA19, PA34, PA35, PA38, PA23, PA25, PA26).

Staff

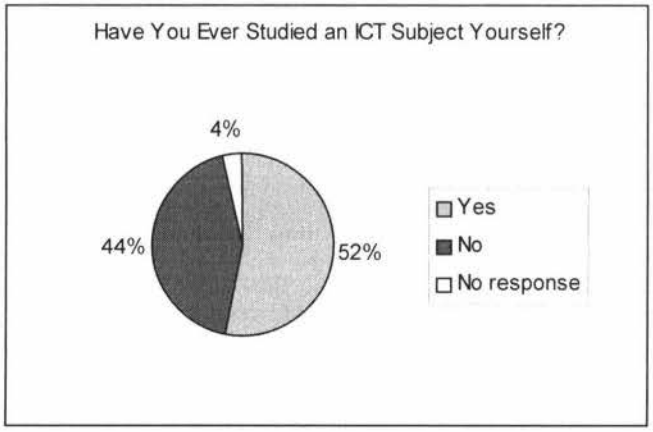

Figure 30 - Have You Ever Studied an ICT Subject Yourself? - Staff

Just over half of the teaching staff had previously studied an ICT subject. Detail of the subjects is given in the table below.

Table 10 - ICT Subjects Previously Studied by Teachers

Subject	*No. of teachers that studied*	*Level of Study*
Information Management	10	All studied after leaving school. One studied through personal learning.
Computer Studies	16	Fourteen studied after leaving school. One of these studied at night class. One studied in Years 9 and 10. One studied in Years 10 and 13.
Desktop Publishing	4	All studied after leaving school. One studied at night class.
Introductory Information Management	9	All studied after leaving school. One studied only part-year.
Other subjects studied: Online communication E-education Database Computer papers - stage 1 Computers in education - stage 3 Database management Basic word processing Keyboarding skills Computer language Programming Typing iMovie MS Office - advanced MS Project - advanced Pitmans typing Computing in schools CAD	 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2	The teacher that studied a computer language did so in a night class. The teacher that studied "Typing" did so in Year 9. All others studied after leaving school.

Thirty out of 55 teachers responded to this question. The most common benefit, indicated by teachers, was that they had gained confidence in using software and technology in general and they had eliminated their fear of technology. Another common benefit was that teachers were able to make more efficient and effective use of technology, employ different styles of learning in their classrooms and further develop their career (Examples: TE11, TE12, TE17, TE52, TE55, TE37). Two teachers considered that the base of skills they acquired in high school formed a base for them to study at tertiary level and enabled them "to keep up with the latest developments" (TE27, TE42).

Although most respondents experienced beneficial outcomes from previous ICT study, five teachers considered that they either gained nothing, or very little, from it. They had either "forgotten" what they had learned or gained nothing "other than a piece of paper" (TE32, TE53). Two other teachers revealed a wish to have gained keyboarding and desktop publishing skills earlier, as they felt these would have been of benefit to them.

1.3.2. Staff Confidence Teaching ICT Cross-curricular (TE12)

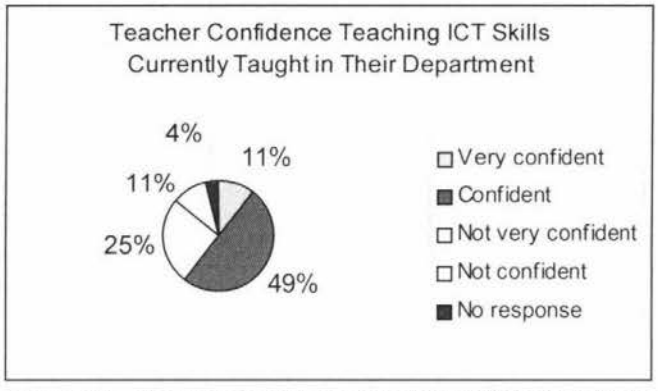

Figure 31 - Teacher Confidence Teaching ICT in Their Subject Area

Sixty per cent of staff surveyed stated that they were confident, or very confident, teaching ICT skills. A lack of prior learning possibly contributed to thirty-six percent of staff feeling less confident. In the interviews carried out with various key personnel at the school, there was a common request for specialist ICT teachers to be available in other curriculum classes to assist with ICT teaching and learning. A staff member indicated that this would make sure that ICT learning is directly relevant to each subject area (TE50). There was a suggestion that staff need to work more collaboratively. Three staff suggested that a specialist ICT teacher could remove students lacking ICT skills from classes, to work with them in a small group or in a one-to-one situation as needed. This, according to two staff members interviewed, would mean that staff could expect students to be able to use ICT as a tool and could assume they had the skills to use the tool already.

Some teachers conceded that they did not feel comfortable teaching ICT as students would know more than they did (I3). There is an evident need for staff professional development (PD) in ICT as "many teachers" are apparently "too scared" and "shy away" from using ICT (I5). There are PD courses offered currently at Orewa College

that staff can choose to opt into. These courses are run by other staff after school in a time usually allocated for a PD meeting. Some staff indicated that these courses have been useful.

Three more senior staff members indicated that they were not comfortable teaching ICT unless "specialist one-on-one tuition" was going to be provided for them (I7e I7f, I7h). Younger staff stated they were more confident teaching ICT skills, but in addition to training, they felt that staff needed time to "try things and do things" ICT related (I7b).

Classroom management was an issue that some teachers were concerned about if they were to have some students working on computers while other students worked on other tasks. This concern had affected the confidence of some staff and dissuaded them from using ICT in their classrooms.

A member of the SMT felt that schools are currently in a "transition period" and that "the next generation of teachers will have a lot of the skills required to teach [ICT] as an integrated model" (I4b).

1.3.3. Cross-curricular Teaching of ICT (TE Q11, Q13)

ICT subjects, or topics, currently taught in various departments at Orewa College are summarised in the table below. The researcher observed that ICTs in subjects other than specialist ICT subjects were mainly used as research and presentation tools. No actual teaching of ICT skills other than in specialist ICT subjects was observed.

Although the table below indicates a wide range of ICT use across the curriculum, observations and experiences in the school suggest that most subjects would use the ICTs outlined in the table for, perhaps, a period now and then, or for a one-week topic in a year's programme. It is possible that a lack of staff confidence, discussed in the previous section, may be part of the reason for this limited use of ICT. Typical ICT use appeared to consist of two to three students sent to use a computer to research, or a whole class taken to a computer lab to either research using the internet, or to create a PowerPoint presentation on a topic relevant to the subject. Other ICT use, such as the use of specialist computer applications for various subjects did occur, but usually only for a small period of time in a year's programme.

Table 11 - ICT Skills Taught in Various Departments

Department	*ICT Skills Taught Within That Department*
Maths	Spreadsheets, graphing, databases, managing files, desktop publishing, internet use, calculators, graphic calculators, computer skills (when computers available), formulae, Year 13 time series graphs, networks, general problem solving and decision making. (When time, when computers/servers are working ok. When staff have the confidence in their skills).
Health & PE	Publishing, digital camera, digital videos, research, Powerpoint, bones/muscles software to go with worksheets, internet (year 12), impact of ICT on society, peripherals, impact of technology on specific aspects of our subject. (We use the equipment, but don't teach ICT skills).
Business (includes specialist ICT subjects)	Computer keyboarding, desktop publishing, word processing, spreadsheets, databases, programming, computer graphics, presentation, etc - the only one not really taught is computer animation.
Science	Internet (for research), CD-ROMs (science activities), word processing (prepare experiment reports), Draw application, general problem solving and decision making, desktop publishing, spreadsheets, standard operating procedures, peripherals, impact of ICT on society, research on computers in society, research on telecommunications in society, research skills, email, using specialist programs eg crocodile clips, video. We don't really "teach", but help those who can't. (When and if we can actually take a class to the room and if it is set up for what we need).
Social Science	Word processing, internet research, Powerpoint, graphing, Publisher, spreadsheets, email, keyboarding, general problem solving, using graphics, using overhead projector (OHP).
Student Support Centre	Computer keyboarding skills, word processing, saving work and finding it again, downloading, alphasmart keyboards, tools to enlarge, spellcheck, email, internet, CCTVs, video camera, cassette tapes, telephone skills, creating computer graphics, Draw/Paint, ergonomics, library skills, Unit Standard (US) 101 Employment Skills, very basic skills. Specialist computer programs for students with special learning needs eg talking computer programs for Maths and English.
Technology	Use of CAD, computer modelling systems, research on the internet, graphics work, all skills listed in question 19.
English	Internet, research a film being studied, webquests, use of digital cameras, video cameras, data projector, desktop publishing, email, word processing, Powerpoint, media skills, computer graphics, computer animation, iMovie. (A webquest was organised for Year 9, but information was not downloaded onto intranet as asked. Some staff lacked confidence to use this without training.)
Languages	Word processing, spreadsheets, Powerpoint, internet, email, video camera, presentations, collecting, analysing, interpreting, evaluating verbal and visual information. (We don't teach them, but rather utilise them. If students don't know how to use them, we show them individually).
Maori	Powerpoint, publishing, iMovie, internet, reserarch, saving documents.
Departments not specified	All; Digital recording, computer specialist programs; Language development.

Year 13 Art Design students used computers frequently throughout the year for internet research and to use Adobe Photoshop. Their learning appeared to be self-paced and largely self-constructed. The learning of Adobe Photoshop by these students seemed to be mostly self-taught or absorbed in an osmosis-like process. Students wrote their own brief and could choose a theme of interest. It was common for 10-12 students

from this class to work on their own in the computer lab, while the rest of the class worked back in a standard Art room.

Some ICT skills are not currently taught in some departments, but staff have indicated that they would like them to be. These are outined in the table below.

Table 12 - ICT Skills That Teachers Want Taught in their Department

Department	*ICT Skills That Teachers Want Taught in Their Department*
Mathematics	Spreadsheets, graphs, formulae taught progressively through Year 9 to Year 11; PowerPoint displays of topics where relevant; Spreadsheets, formulae taught as the need arises during lessons rather than as a "special" week or so out of context; Programming, the use of some mathematical languages.
Health & Physical Education	PowerPoint presentations for seminars; Use of electronic equipment such as heart rate monitors; Use of peripherals and programs associated with data analysis, problem solving and decision making.
Business	Digital cameras, scanners, etc used more in a wider age range. Desktop Publishing - not an essential skill, but there is still a demand for it.
Science	Presentations possibly - for internal assessments for some subjects in the department, or just for variety in work; Use of DVDs; Need time to prepare and gear needs to be available and easy to get; Databases - manage student information/equipment, etc, Computer graphics - develop our resources, Email - more efficient and total information delivery, Computer animation for resources.
Social Science	PowerPoint; Reliable internet access for all students in class; Desktop Publishing; Computer Keyboarding.
Student Support Centre	Desktop publishing for presentation work, Draw/Paint applications - students could produce more professional looking work and increase pride and self-esteem, Computers in the department now are not user friendly and I don't have skills; English skills grouped - could use computers for research and for production - would be ideal in the student support centre.
Technology	Graphics could cover Desktop Publishing, CAD through to documentation in an office.
English	Use of computers (that work) for research, internet rather than intranet for research as usually have open topics; Designing web pages; Word processing, basic computer stuff, shortcuts.
Languages	Using CD programs for grammatical exercises; Word processing in Japanese using Japanese script; Using the internet effectively.
Maori	Setting out work.
Department not specified	Further technological developments that are available.

It is interesting that most departments see the need for an increase in ICT skills taught in their department. Desktop publishing and presentations applications were skills identified by three to four departments as being skills needed in their subject area. Also of interest is that many skills that teachers stated *were not* currently taught in their department, but should be, were the same skills earlier stated, perhaps by different

teachers, as taught in their department already. However, some teachers specified a desire for skills to be taught progressively through the year levels, suggesting that this does not currently occur.

1.3.4. Plans for Future ICT Learning (ST Q10; PA Q6, Q7; TE Q32, Q33)

Students, parents and staff were asked to indicate their intention to undertake future learning in the field of ICT. Responses are outlined below.

Students

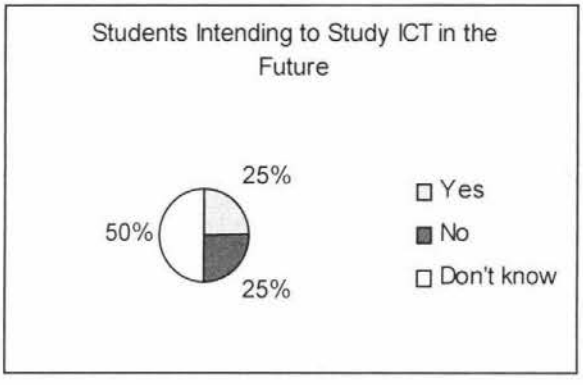

Figure 32 - Students Intending to Study ICT in the Future

Fifty per cent of students did not know if they would study an ICT subject in the future. The 25 per cent of students intending to study ICT subject/s in the future indicated that they would study the following subjects at the levels shown.

Table 13 - No. of students that Intend to Study an ICT Subject in the Future

Subject Student Intends to Study	Y10	Y11	Y12	Y13	Tertiary
Information Management	1	6	4	2	4
Computer Studies	1	3	4	2	4
Desktop Publishing	1	3	4	3	1
Introductory Information Management	0	0	0	0	1
Programming	0	0	0	0	1
Animation	0	0	0	0	1

Parents

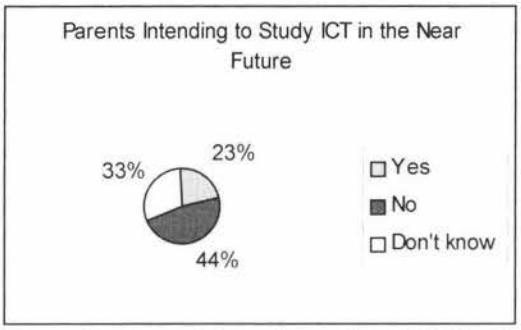

Figure 33 - Parents Intending to Study ICT in the Near Future

Seven of the nine parents intending to study an ICT subject in the future elaborated on their answer. Courses they intend to study and their duration are outlined below.

Table 14 - ICT Subjects Parents Intend to Study

Subject	*Duration of Course*
Communications Management Strategic Planning for Information Systems Network Management	Six months Six months Six months
Library and Information Management	One year full-time, 2-4 years part-time
E-fax Accounting software	Approximately four weeks Approximately four weeks
Subject not yet chosen	
Computer Studies	Ongoing
Online Learning	Ongoing updates
Computer Skills	Ongoing upskilling at work

Staff

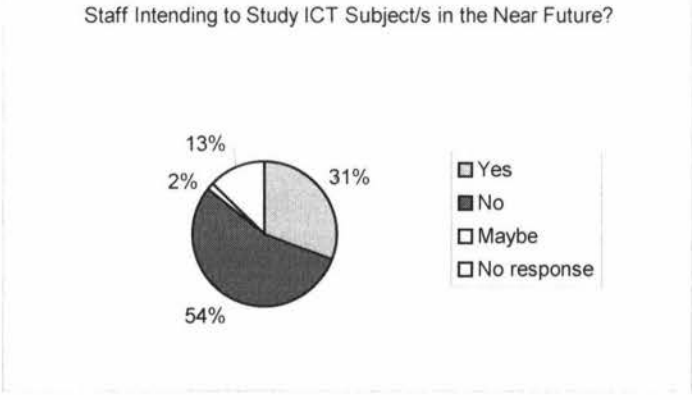

Figure 34 - Staff Intending to Study ICT Subject/s in the Near Future

The majority of staff did not intend to undertake the study of any ICT subject in the future. Some of those that did intend to undertake some study gave further detail of their intentions, outlined in the table below.

Table 15 - Subjects Teachers Intend to Study

Subject Teacher Intends to Study	*Duration of Course*
Business Management - Graduate Diploma	Unknown
Dreamweaver	Unknown
Postgraduate Certificate in E-Education	1-2 years
ICT Diploma - Unitec/AUT	Unknown
International Computer Driving Licence (ICDL)	Unknown
Publishing	Two weeks

Only six teachers provided details on what they intended to study (shown above). Two teachers considered that they would like to learn more about ICT, but lack the time. A lack of time was a significant factor for fourteen other teachers who did not intend to study ICT subject/s in the future. Two of these teachers stated that they were "too busy with school stuff" and "NCEA" (TE32, TE44). Four teachers teach themselves as the need arises. Other reasons for not planning future ICT study vary from a basic lack of interest to an apparent lack of commitment or awareness (TE3, TE51, TE48, TE26, TE22, TE7, TE37, TE43).

Four teachers that did intend to study ICT subject/s in the near future indicated it was "important to keep up-skilled" and not "fall behind in education" (TE10, TE21). Two teachers acknowledged that ICT would assist them in the teaching of their students (TE10, TE14). Other comments included, "I am continually gaining skills in ICT" and "I am always needing to know more" (TE17, TE34). One teacher had not decided what direction to follow for future study yet (TE53). A publishing course was going to assist one teacher with study towards a Master of Arts qualification (TE55).

1.3.5. Current Environments for ICT Learning

Online Learning

The main form of online learning observed by the researcher was students researching on the internet. The only other forms of online learning that occurred were Year 9 and 10 Mathematics students participating in an international online census (statistics

gained from the census were to be used by students at a later date) and Languages department students using an 'extranet'[2] set up for Languages teachers and students which included various educational activities and resources. Opportunities were available on this 'extranet' for teachers and students to collaborate and share knowledge and resources.

Laptops

All full-time permanent teaching staff in the school had been provided with a laptop funded by the Ministry of Education and the school's Board of Trustees. Observations indicate that these laptops were largely used for administrative tasks by staff and were occasionally used as a presentation tool when connected to a data projector. In one classroom a teacher was observed using the laptop to play relaxing, background music while students worked quietly.

Pods

Figure 35 – Photograph of a Computer Pod in the Orewa College Library

The booking sheets for the computer laboratories had been set up to enable partial booking of the laboratories. Single computers, or pods of computers within labs, within classrooms or in the library were used mainly for internet research by students from various subjects or for the use of Photoshop by Year 13 Art Design students. Students

[2] An extranet is an intranet that is available via a username and password to users outside of the local area network (externally). For example, students, parents and teachers could access a school's intranet from home, thus making it an extranet.

occasionally used the computers for other applications such as word processing, subject specific software or email.

Labs

Four computer labs existed in the school. The two IBM compatible computer labs were mainly used for specialist ICT subjects (mainly Information Management). However, one of these labs was left available for subjects to book into in four out of the six option lines in the timetable. Subjects that booked into these two labs during the year included Years 9-11 Social Studies, Year 12 New Zealand Studies, Year 9 English, Year 11 Alternative English, Year 10 Economics, Year 12 Business Studies, Year 12 and 13 Graphics, Employment Skills and ESOL classes, including a Foundation Immersion Class. The Lion Nathan Business Experience had also booked in for a short period. However, many gaps remained in the booking sheets. The labs were not fully utilised, although the researcher observed that at times a teacher would not use the booking sheets and would, instead, simply turn up with their class to use a lab.

Approximately half of the time in one of the iMac labs was used by specialist ICT subjects (mainly Computer Studies, but some Information Management). Other subject teachers were able to book in to the remaining time. The second iMac lab was left fully available for other subject areas to book in to. Subjects that booked into these two labs included Year 13 Art Design, Year 12 Business Studies, Years 12 and 13 Accounting, Years 10 and 12 Economics, Years 9 and 10 English, Year 11 Alternative English, Year 12 Music, Years 9 and 12 Maori, Years 9 and 12 Japanese, Year 11 Spanish, Year 13 French, Year 9 Materials Technology, Year 13 Mathematics with Statistics, Years 11 and 12 Employment Skills and Work Focus, Years 9-13 Social Studies, Geography, History and New Zealand Studies classes and Years 9-12 Science classes. The Lion Nathan Business Experience and the Warkworth Alternative Programme had also booked in for a short period each. Even during busy periods (for example: Weeks 5 and 6, Term 2; Weeks 6 and 7, Term 1) at least two periods of iMac lab time was not used during a five period day. Observations also indicated that the booking sheets were not always used and teachers did, at times, just turn up to use labs when they were available. However, the labs still appeared to be under-utilised during periods of observation for this study.

Observations further implied that subjects, other than specialist ICT subjects, main use of the computer laboratories was for internet research and creating PowerPoint

presentations. There was also some use of word processing and spreadsheet applications. Other subject classes occasionally used subject-specific software. Adobe Photoshop was used throughout the year by Year 13 Art Design students and graphics applications were used by senior Graphics classes for significant blocks of time during the year.

Figure 36 – An iMac Computer Laboratory at Orewa College

The researcher observed more noisy, collaborative behaviour in the colourful iMac labs, with purple walls and blue computers. It seemed that the lower height of these computers made communication easier for students. Students in the IBM compatible labs were usually working more quietly on their own. The height of the computers in these IBM compatible labs made communication more difficult. These labs were painted in more conservative peach and cream colours.

Figure 37 – An IBM Compatible Computer Laboratory at Orewa College

Modular Courses

During interviews some staff recalled past use of an 'Internet Driving Licence' that all junior students were required to gain. This involved students learning a module of efficient use of the internet and sitting a basic test. This licensing was no longer occurring during the period of research, but some staff indicated that a modular course and licence covering the basics in all aspects of computing would be desirable.

The ICDL (International Computer Driving Licence) was offered to students and staff during 2003. A CD (compact disc) could be purchased by students and staff which included modular courses on word processing, spreadsheets, databases, presentations software, internet and email, basic concepts of computing and file management. Staff and students could learn from the CD at their own pace, in their own time, and sit tests when they felt they were ready. Only two students and one staff member opted to undertake this qualification. It is possible that the cost of this course and a lack of available time to study may have affected demand. During the period of research the two students passed a module, or two, each. The staff member completed the qualification.

Staff PD (professional development) in ICT occurred during the period of research each Wednesday after school in a modular form. Courses were available each week on a variety of topics and staff could choose whether to attend and which courses to attend. The courses operated on a rotational basis.

Other ICT Learning

The Mathematics department possess a class set of graphics calculators that are used with senior Mathematics classes. The Technology department possess a class set of electronic sewing machines and an embroidery machine with a scanner. Designs can be scanned and then embroidered onto fabric.

Digital video cameras, belonging to the English department, are mainly used for Film and Media Studies, although a PE class was observed downloading digital video of themselves playing golf to analyse their movements. Digital cameras (still) were used by Health and Physical Education classes, specialist ICT classes and English classes.

A data projector was used in a Year 11 Japanese class and the researcher was told that PowerPoint presentations created in various subjects during the observation period would be presented later using a data projector.

Scanners were available for use in the library and in the computer labs. The researcher observed these being used only in specialist ICT subjects.

1.3.6. Current Styles of ICT Learning

During periods of observation by the researcher, different styles of student learning took place. In specialist ICT classes there was a large amount of teacher directed learning taking place. The teacher would spend approximately a quarter of a one hour lesson teaching from the front of the classroom and students would then practise and consolidate skills by working on various tasks. The teacher would circulate and assist students, providing feedback as required. There was some collaboration between students in pairs, or in threes, but most work was carried out individually.

Students from various other learning areas were observed using the computer labs, or pods of computers in the library. These students appeared to be working much more collaboratively in pairs, threes or fours. Learning was more student-centred and some learning was actually self-constructed by these students.

An example of collaboration was in a Year 9 English class. Students were working on a Shakespeare webquest. Students were divided into groups. Each group member had a role (for example: a historian, an actor, a critic). The historians from each group then gathered together to research from a historical perspective, the actors from an actor's perspective, and so forth. The students were to research using three different types of media, one of which was to be the internet. The original groups of one historian, one actor, one critic, then re-grouped and prepared, together, a presentation of their findings using PowerPoint.

Examples of students constructing their own learning were observed in four classes. In three of these classes, the learning was still largely teacher-constructed, but with some student input. However, in a Year 13 Art Design class, students were required to write their own brief, select a business or conference on which to base the theme of their work and plan their time to design various pieces of art. Students observed appeared

to enjoy the flexibility and freedom of choice and expression that this style of learning allowed them. However, occasionally some students were observed off-task and lacking motivation during class time. Off-task activities included email, random surfing of the internet or irrelevant conversations with classmates.

1.3.7. Preferred Environments for ICT Learning (ST Q18, Q19; PA Q15, Q16; TE Q25, Q26)

Students

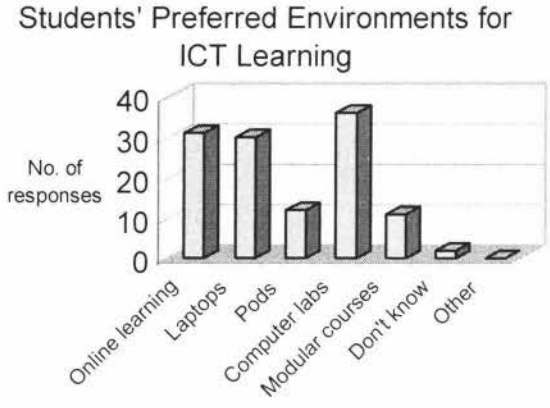

Figure 38 - Students' Preferred Environments for ICT Learning

Reasons given for *online learning* included being able to learn at school and from home and students being able to learn when they choose. It is a "fun way" to learn and a "limitless source of information" (ST7, ST18). Students can learn faster as they are learning at their own pace. However, a fast enough internet connection is needed. Students can communicate with their friends and assist each other. This form of learning ensures that students are learning to navigate around the internet and one student stated it is "almost like having a personal tutor" (ST40). It provides "a different and maybe more enjoyable" learning experience and "there is more to explore and learn about" (ST26, ST22). One student stated that "the whole world is online these days" and implied that therefore students should be online when they are learning (ST20).

Individual student laptops were favoured by a large number of students, however four students pointed out that they may be too expensive for the average person. Advantages given for the use of student laptops included students being able to "feel a responsibility" for the equipment and data, being able to take work home and keep their

own documents private (ST23). Students would not have to move to a computer room to use a computer and would have more opportunity to "learn more about the whole ICT unit" (ST35). One student felt it important that students would be able to personalise their laptops (eg desktops) without being disciplined (ST23). Students would not have to crowd around one computer between four or five people and would be able to do their own work on the computer. They would be able to learn "computer skills at the same time" as learning other "school work" (ST45). Although laptops may be considered costly, other resources such as text books and photocopies may not be needed (ST46).

Pods of computers in departments was not as popular an option for ICT learning. However, some students felt that pods would be useful for researching in particular subjects, especially when computer rooms were booked. One student stated that "computers in some specialist rooms, such as Graphics, is an advantage over computer labs" (ST20).

Learning in *computer laboratories* was the most favoured form of learning, although online learning and individual student laptops were not far behind. Reasons for the preference for laboratories included each student being able to work on a computer on their own, being able to interact with and assist friends, the efficiency of being able to teach a whole class at once and working in a similar environment to an office. One student classed computer laboratories as a "must have" (ST26).

The students that favoured *modular courses* gave few reasons, but felt that they could learn more in this fashion. One student classed modular courses as a "must have" (ST26).

Learning "*individually with a tutor*" was regarded as the most efficient method of learning by one student, but this student also pointed out that in a computer laboratory they "get to interact with other students" and "learn a different learning technique" (ST36).

The majority of students indicated a preference for a *variety of access* to computers. They felt that a choice of how ICT learning could take place was needed. One student stated that "computers should be available for students to use in all subjects as well as in ICT" (ST29). Five students chose not to respond to this question.

Parents

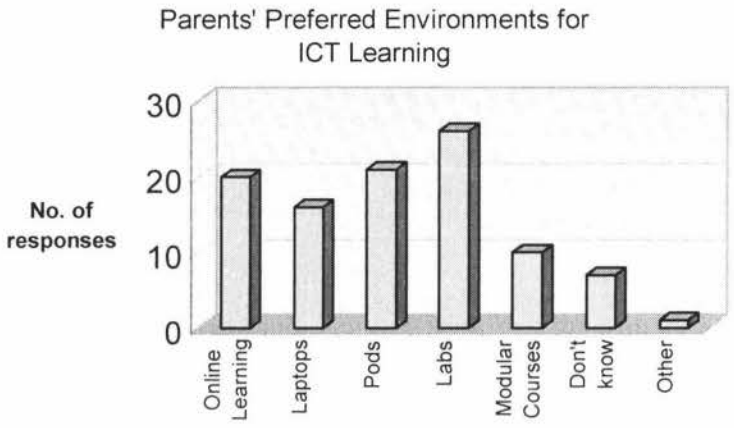

Figure 39 - Parents' Preferred Environments for ICT Learning

The one *other* form or learning that a parent indicated they were in favour of was "integrated classroom learning in all subject areas" (PA37).

Online learning was a favoured form of learning amongst parents. Reasons given included the fact that there are "good online tutorials" available and that "online learning for subjects [is] not [currently] taught at school" (PA4, PA38). This form of learning could be "interesting and motivating" for students (PA1). One parent stated that this form of learning is good "for those capable of learning without assistance" (PA5).

Learning with *individual student laptops* was not as favoured, mainly due to the cost factor and the concern that students would be segregated into the "haves" and the "have nots" (PA14). One parent stated that laptops would become "outdated too quickly" (PA10). Another parent was concerned that students may not assist each other if working individually on laptops (PA1). However, reasons given for using laptops included students being more responsible for their own work. Student work would be kept private and they would be able to store their own information and take their computer with them. One parent stated: "They all have cellphones. Why not laptops?" (PA40).

Reasons given for favouring *pods of computers in departments* included the opinion that pods could be "readily accessible" providing "wider access to more students" and "students are more likely to help each ... [and they] ... learn a lot from each other" (PA14, PA1).

Computer laboratories was the most favoured environment for ICT learning. Parents indicated "a need for a large number of students to use a computer at once" in most subjects for some time (PA17). One parent pointed out that several computer laboratories would be needed as all subjects would use them (PA23). Two parents suggested that access to computer laboratories was especially useful for students that did not have computers at home (PA5).

No reasons were given for *modular courses*. This was not a highly favoured choice. The majority of parents indicated a need for a *variety of access* for "a range of environments and possible learning styles" (PA3). This would also "give choice to students and teachers" (PA19).

Staff

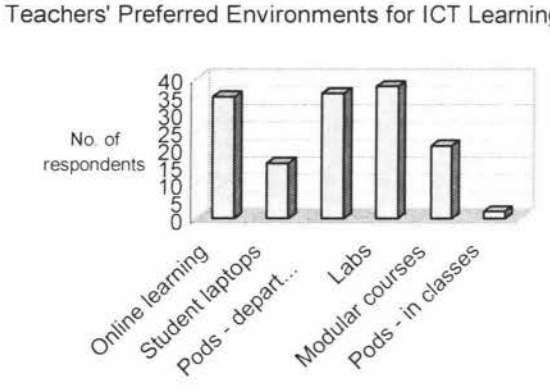

Figure 40 – Teachers' Preferred Environments for ICT Learning

Online learning - This form of learning was highly favoured. Teachers saw advantages in providing "another learning style", "another source of information" and students being able to "learn at their own pace", "extend themselves" and "work independently" (TE5, TE26, TE1). One teacher stated it would be "good for learning centre[3] students" (TE49). However, another suggested that truancy may be a problem with this form of learning as students may choose not attend class and instead get their notes from the internet (TE32). The insinuation made was that students may not see a need to attend school.

[3] A centre for Special Education, predominantly for assisting students with a physical or mental disability.

Individual student laptops was not as popular a form of learning. Common reasons were the "cost to parents", "security" and that "not everyone can afford one" (TE5, TE32, TE30). Some teachers thought that laptops were just not practical or feasible to manage (TE22, TE53, TE23). However, those in favour of this form of learning saw advantages in teachers being "forced to create lesson plans around the laptops", students having "the tools to be taught ICT in context" and being able to "access sites and information", "work on their own" and "have their own space" (TE13, TE21). One teacher saw advantages in being able to tailor individual exercises for students (TE21).

Pods of computers in departments was highly favoured by those who saw the potential for better access and convenience due to equipment being "handy to departments" (TE36). Pods would be useful for "supportive learning" and more "independent learning" at students "own level" and "own pace" (TE12, TE1). Teachers felt that pods of computers would increase the options for how they structured their classes and increase the utilisation of computers (TE32, TE3, TE17). However, two concerns raised were that "initial costs may be prohibitive" and pods are "usually too small to be useful for instruction" (TE23, TE53). One teacher stated that pods are better for "seniors [who can be] trusted to use time wisely and not vandalise the machines" (TE9).

Computer labs were the most popular form of learning. Teachers saw advantages for "whole class instruction", "assessment" purposes and "modular courses" (TE1). Other comments included that labs are "good for specialised classes", more practical and more cost-efficient (TE16, TE38). They allow for "total class participation with minimum fuss and distribution" (TE48). However, three teachers indicated a need for easier access and more time to be available for booking classes (TE2, TE6, TE32).

Some teachers saw modular courses as "the most efficient way to teach segments of ICT as students are ready and need them" (TE1, TE31). Another teacher saw modular courses as useful for "particular skills ... taught in manageable groups" (TE54). However, another was concerned that "school resources don't permit modular courses for all students" (TE22).

The two teachers that preferred pods in classes made the following comments:

> Two computers per class (that students can rotate to when necessary - for group-work activities and individual support and extension material as required) (TE17).
>
> Access to a pod in class, so students can independently access them to achieve set objectives, either group or individual (TE25).

In terms of other forms of ICT learning, a significant majority of teachers indicated the need for "convenient access" in "a variety of contexts" (Examples: TE6, TE23, TE25, TE49). Many stated, or implied, that a variety of forms of learning are needed. "Different options suit different learning needs" and, therefore "ICT should be used as a part of a range of teaching methods" (TE14, TE17). One teacher made a request for more peripheral equipment to be available, such as cameras and data projectors (TE26). Another stated that "computers that work [are needed] in sufficient numbers for classes of up to 34" (TE45).

1.3.8. Summary

A significant proportion of students had used word processing applications, presentations applications (usually PowerPoint), spreadsheet applications and the internet prior to commencing study at Orewa College. This prior learning took place both in students' homes and in school. Year 10 and Year 12 Information Management appeared to have been the most popular specialist ICT subjects studied at Orewa College. It must be noted, however, that no specialist ICT subject has been offered to Year Nine students at Orewa College for some years.

Most parents surveyed had not studied an ICT subject. Those that had indicated benefits that included the "ability to work in a variety of jobs" and the loss of the "fear factor" along with "some basic skills to build on" (PA10, PA14). The majority of staff had studied an ICT subject. Generic Computer Studies and Information Management courses were most commonly studied. Sixty per cent of staff felt confident to teach ICT skills in their departments. Some staff suggested that a specialist ICT teacher could work with students and teachers on a one-to-one basis to ensure that a basic skill level is reached by all, and to support and assist staff in the classroom. Classroom management was raised as a concern by staff if future plans for ICT mean that some students in a class will be working on computers while other students work on other tasks.

A wide range of ICT skills are used across the departments, but it seems that very little teaching of these skills takes place. ICTs are used mainly as research and presentation tools across the curriculum, but it must be noted that most departments indicated a desire to expand on the ICT skills taught in their departments. However, a clear need was expressed for an increase in the confidence of some staff using ICT before any expansion of skills taught can take place.

The majority of students were unsure if they would study an ICT subject in the future. Most parents and staff did not intend to study ICT subjects in the future. However, it is possible that the wording of the question may have been interpreted by participants to only be asking about plans for formal study. Plans for any self-directed study at home were not divulged by participants. A significant proportion of teachers indicated that they lacked the time for ICT study.

The main form of online learning currently occurring at Orewa College was through the use of the internet as a research tool. However, both the Mathematics and Languages departments had taken steps towards using the internet as a means of sharing knowledge and resources with students and teachers elsewhere. Staff laptops appeared to be predominantly used for administrative tasks and were occasionally used as a presentation tool. Pods of computers, or individual computers, within labs or in department resource areas or classrooms were mainly used for internet research or for the use of Photoshop by Year 13 Art Design students. Word processing, subject specific software and email were occasionally used.

Fifty-two percent of the four computer laboratories' time was used for specialist ICT subjects (see Chapter 1, Figure 1). The remaining time was available for booking by other subject areas. This available time in the labs appeared to be under-utilised. Staff professional development in ICT was carried out in a modular form with a choice of options. Staff recalled an 'Internet Driving Licence' which students gained in previous years after completing a module learning efficient use of the internet and sitting a test. One staff member and two students chose to work through ICDL modules at their own pace, in their own time. Year 12 Film and Media Studies used digital video cameras and a pod of computers for film creation and editing. Various other ICTs are used as the need arises (for example: digital video cameras, digital still cameras, data projectors, VCRs).

Computer labs was the most favoured environment for future learning by all participants. However, the under-utilisation of current time available in the labs, evident from the booking sheets (see Appendix A) needs to be addressed. Online learning was also popular with all participants. Students and parents were keen to see students learning with laptops, but were aware of issues such as cost. Student laptops were not as popular with the staff due to cost, security and management issues. Pods of computers in departments were popular with parents and staff. Parents saw potential for pods being used for co-operative and collaborative learning, whereas staff saw pods being used for more independent, self-paced learning.

All participant groups emphasised the need for a variety in forms of learning ICT skills, indicating that all of the stated ICT environments should be available to allow for student and teacher choice.

1.4. Glide Time *(TE Q17)*

To allow for more efficient use of computers in the school, staff were asked if they would consider teaching a class for an hour after school in exchange for an hour off before school or during the day. Responses are depicted in the graph below.

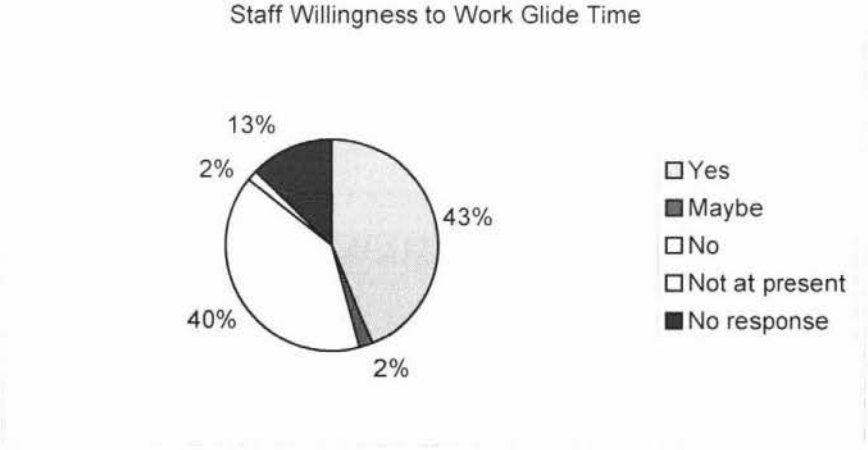

Figure 41 - Staff Willingness to Work Glide Tiime

Comments made by those that responded "yes" or "maybe" included that "a change is as good as a holiday" and that this "would be a much more efficient use of an expensive resource and would give a wider availability of resources" (TE38, TE5). One teacher considered that this would be better than not running courses, or turning students away from courses (TE11). Others wanted to "know more" before committing

and would want training in what they were to teach (TE33, TE53). One teacher asked for a "guarantee" that extra relief would not be given during the resulting hour off during the day (TE51). Two others indicated that, although they were keen, that this may interfere with after school meetings and extra-curricular activities (TE30, TE44). Two teachers were prepared to do this only if "rarely" or "once in a six day cycle" (TE9, TE16).

Those that responded "no", mainly did so due to family, extra-curricular and other commitments. Seven teachers considered that the day was "already too long" for teachers and life was "hectic already" (TE17, TE7, TE3, TE23, TE37, TE48,TE10). Five teachers stated that they already worked late and that time after school was needed for uninterrupted teacher work (TE3, TE17, TE25, TE26, TE44). Other isolated responses referred to the length of the school day being too long for students already and "students wouldn't be very willing" (TE9). Others stated that it may be dangerous to set a "precedent", implying that the school day may lengthen for all subjects/all days (TE23, TE43). Another teacher suggested that "surely some timetable changes within the existing system could be worked on" (TE48). It was also mentioned that after school buses may prove to be a barrier to the possibility of glide time (TE43).

1.5. The Level of Interest in ICT Teaching and Learning

The large number of responses to Orewa College staff questionnaires (62 per cent) for this research, and the willingness of participants to be interviewed and observed has revealed the high level of interest in ICT teaching and learning shown by teachers. Although only 32 per cent of students and 27 per cent of parents invited to participate, chose to respond, the rich quality of data provided has shown a high level of interest from those that responded. This section of the research explores whether participants believe that ICT skills should be taught in specialist subjects, and/or across the curriculum - or if they should simply be absorbed in an osmosis-like process. Participants' views on the need for and role of, specialist ICT teachers is outlined, along with participant interest in specialist ICT subjects and possible topics. Issues and barriers to ICT teaching and learning at Orewa College, arising from observations and participant comments, are then outlined.

*1.5.1. The Need for ICT Skills To Be **Taught**? (TE Q15)*

At the time of data collection, a decision was made to confine some questions to only the teachers as it was considered that they would have the most knowledge of whether ICT skills should be *taught* or not. In hindsight, it seems that other participants' input here may have been valuable. Responses from teachers are outlined below.

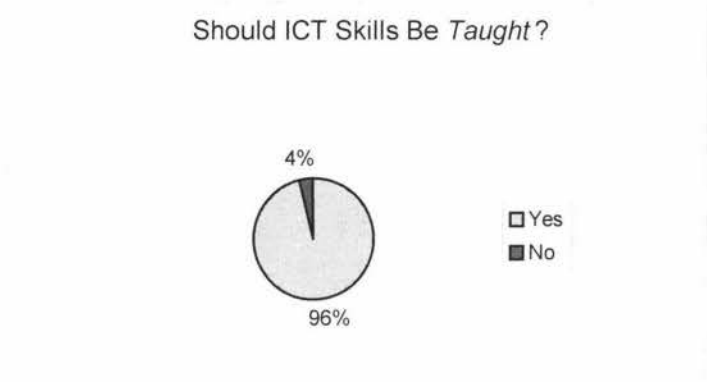

*Figure 42 - Should ICT Skills Be **Taught**?*

Teachers were also asked if they believed that ICT skills could be picked up in an osmosis-like discovery style of learning in which a student simply absorbs information, with no actual teaching. Responses are outlined in the figure below.

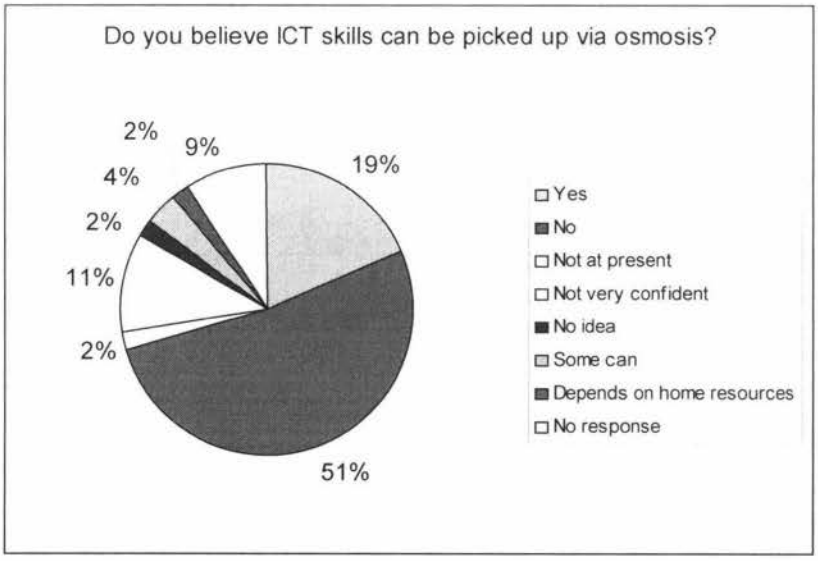

Figure 43 - Do you believe ICT skills can be picked up via osmosis?

The majority of teachers were either not in favour of learning via osmosis, or were not very confident in this style of learning. Although some teachers believe that some skills

can be learned this way, the majority considered the osmosis style of learning to be too time consuming, frustrating and inefficient (Examples: TE50, TE7, TE15). It does not seem to be "purposeful or logical" and "can disadvantage some students with different home/school backgrounds" due to the unpredictability of prior knowledge (TE7, TE47, TE6). Teachers felt that the osmosis method of learning was inconsistent and inefficient due to the different learning styles and personalities of individual students (TE1, TE17, TE7, TE15). One teacher considered that osmosis is "not an acceptable form of learning if the learning has to be assessed" (TE27).

Some teachers felt that osmosis was appropriate in some circumstances, however. These include when the need and desire to learn arises from the student themselves, perhaps in the absence of appropriate skills in the teacher, or when peers with the appropriate skills are available to assist (TE25, TE55, I5, I6a, I5). As one teacher stated, "there is usually a 'geek' in the class to assist" (I7k).

One teacher suggested that Year 7 and 8 students could learn ICT by osmosis across the curriculum, but that more senior students should be taught (I7c). However, another interview revealed that in many cases, especially in junior levels, ICT skills were being used to "beautify" work, rather than present it (I5). Also, the ICT skills used across the curriculum were often not assessed in these various subject areas. A question that arises is how, then, do teachers know if the ICT skills and knowledge have actually been absorbed?

Those that are in favour of ICT skills being *taught* indicate that at least "the basics" should be taught "to increase confidence and competence" before students develop skills further (Examples: TE52, TE36, TE48, TE1, TE2, TE4, TE50, TE54). Some believe that "desired outcomes and processes" need to be modelled and that students will achieve "better understanding if taught by specialists, rather than being self-taught" (TE27, TE12). Teachers who felt that ICT should be taught expressed the belief that students should be encouraged to expand their knowledge base with specific attention to ICT even when the basic skills are already there (TE41, TE5, TE2, TE22, TE36, TE40).

One teacher stated that "the things that are needed in a computer literate society can't be taught by people who only have specialist knowledge in [one field]" (I2). This teacher was suggesting that a graphics teacher can teach a graphics application, but that teacher doesn't have an overview of all ICT skills that a student will need to enter

an ICT literate society. It follows that someone with a broad knowledge of secondary school curriculum in the various learning areas would be needed to co-ordinate the teaching and learning of ICT skills and knowledge and must fill the gaps.

Teachers who thought that ICT should be taught expressed a variety of opinions. However, many considered that some form of basic instruction ot all students is necessary to prevent damage to equipment and to ensure they use equipment efficiently (I7, I3). Some suggested that insertion, rather than integration, of ICT into the curriculum may be a compromise, with some formal ICT teaching taking place on a regular basis, enabling ICT to be used as a tool in other subjects (I6a, I7c, I7f).

"Guided discovery" may be a compromise between teaching and osmosis, whereby students learn from online tutorials or "manuals" and get "guidance" from the teacher (TE50, TE29, TE44). Teachers, however, also need to be taught as "teachers are too busy to motivate themselves to learn. They need to be confident to pass on knowledge" (TE4).

1.5.2. The Need for Specialist ICT Teachers (TE Q16)

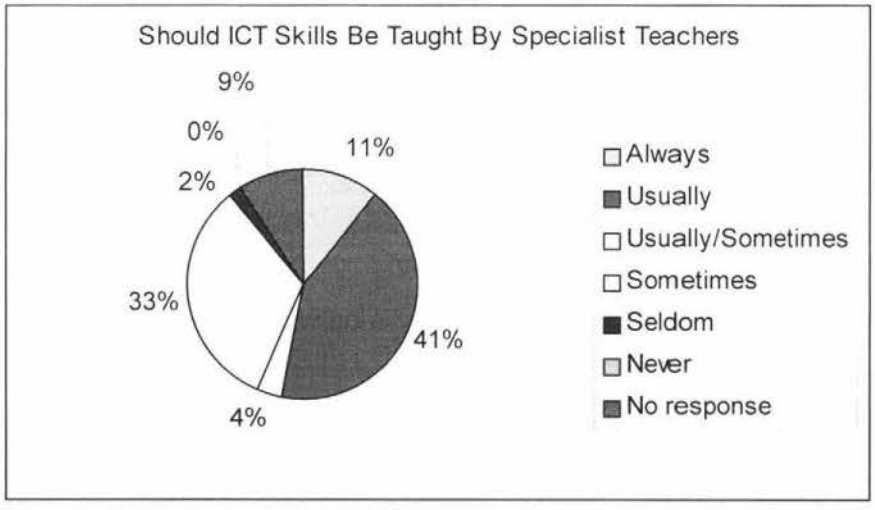

Figure 44 - Should ICT Skills Be Taught By Specialist Teachers?

The majority of those teachers who believe that ICT skills should be *taught*, believe they should *usually* be taught by specialist teachers. Many indicate that specialist teachers are needed to provide a good foundation in the basics and so that skills can then be applied in other subjects (Examples: TE33, TE5, TE32). However, some believe that specialist teachers are necessary throughout the levels to teach more

technical/specialist skills "particularly in the senior school where specialist/vocational skills are required" (TE36). Teachers consider that specialist teachers have more time, knowledge and skills and that the use of specialist teachers would make "far more economical use of teacher and student time and of rooms and hardware" (TE6, TE46, TE26, TE40, I1a).

Some non-specialist teachers did not consider themselves confident or capable of teaching ICT skills. They were clearly in favour of specialist teaching and appeared to be measuring their own skills against those of the students, or specialist ICT teachers (TE37, TE9, TE29. TE7). Specialist teachers would ensure that teaching of ICT skills was "simple and direct" and "consistent throughout the school" (TE15, TE22). They are "better able to troubleshoot" (TE7). "Some specialist teachers would be helpful, supported by others who may be more smart" or "who have an interest or hobby in the field" (TE47, TE23). Specialist teaching can take place "but integrated into another task" to provide context (TE25). However "the extent of [the specialist teachers'] knowledge of other subjects is under question" (TE52).

Some teachers have reservations about specialist teachers being used the majority of the time. One teacher stated that "sometimes they go too quickly because they think people know it" (TE41). Some felt that they needed to learn the skills themselves and that this would assist them in knowing how best to pass them on to students, as needed and in context (TE41, TE51, TE29, TE40, TE43). It was recognized that if specialist ICT teachers were not to teach the skills, then other teachers would require training. (TE44, TE18).

During the interviews of key personnel a common desire was expressed for all students to be taught to the same basic level of ICT. In addition, it was suggested that a specialist ICT teacher be available in other curriculum classes to assist students and teachers. As outlined earlier, this specialist teacher should also spend time one-on-one with individual students out of class to bring them up to speed as necessary.

1.5.3. Interest in Specialist ICT Subjects (ST Q11; PA Q8, TE Q18)

Students

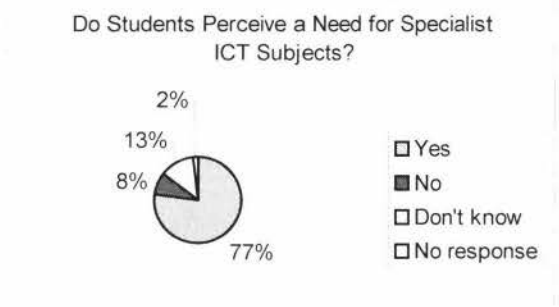

Figure 45 - Do Students Perceive a Need for Specialist ICT Subjects?

The words "separate subjects" used in this question was interpreted by some students to mean other curriculum areas, rather than separate or specialist, ICT subjects. However, from the responses it was evident that the majority of students felt that separate ICT subject(s) are necessary for at least some students. Many students felt that all students needed the basics of ICT to be taught in a specialist ICT subject. These students indicated that other ICT skills could subsequently be taught in other curriculum areas as necessary, in addition to specialist ICT subject(s) being provided for those that wish to further their ICT knowledge and skills for tertiary study, employment or personal interest. Some interesting comments included:

> Students need to know how to use computers, not just know how to type (ST46).
>
> Because if other subjects are made to teach it, it lessens their time to teach other things. Also people who take that subject may not be interested in computing (ST24).
>
> Because I think everyone should be able to have computer skills and being taught it is much better than osmosis (ST29).

One student indicated that if ICT skills are taught in separate ICT subjects, in addition to being taught in other curriculum areas, that the teaching of some skills and knowledge may be unnecessarily repeated. No other reasons were given.

Parents

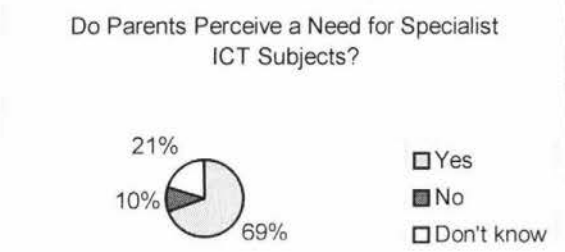

Figure 46 - Do Parents Perceive a Need for Specialist ICT Subjects?

The majority of parents indicated that ICT should be taught in a separate subject, or subjects. Reasons given were varied. Two parents indicated that the basics, at least, should be covered in a separate subject at junior level so that skills can be used at a higher level. Other reasons given were for a "more intense focus" to gain "a full understanding", "the subject is so large and important" and "students will be confident and quicker using ICT in other subjects" (PA5, PA35, PA17, PA16). Two parents felt that students should learn as much ICT as possible while at school (PA32, PA3). Those that stated "no" ICT should not be taught in separate subject(s) indicated that skills would be more relevant and meaningful if taught in context in other subject areas. One parent stated that "daily news, homework, and games are done by 'IT'. The skills could be improved in daily life, rather than a course in school" (PA33).

Three parents indicated that their "no" selection meant that they were actually in favour of separate ICT subject(s) for those students that choose to study in that area, but that ICT should also be taught in other subject areas (PA5, PA7, PA31).

Staff

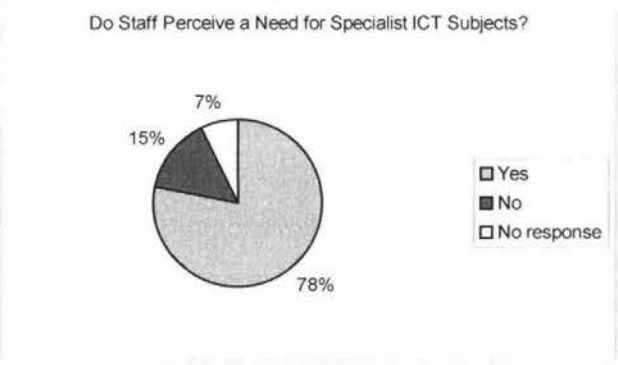

Figure 47 - Do Staff Perceive a Need for Specialist ICT Subjects?

The majority of teachers expressed a desire for ICT to be taught in specialist ICT subject(s). Common responses espoused that basic skills, including computer keyboarding should be taught in an "intense instruction" period by specialist teachers in the junior school (TE1). Three teachers indicated they were in favour of both specialist ICT subjects and an integrated approach (TE7, TE26, TE9). These teachers agreed that students could be taught skills in specialist subjects and then apply the skills and knowledge learned in context in other subject areas. For example, one teacher stated: "Why spend a whole module on learning to use calculators if you can't make the appropriate connections through practical applications" (TE15). Specialist ICT subject(s) for this instruction would ensure "consistency" and "more in-depth learning" from teachers that "have the best knowledge of how to do this" (TE22, TE31, TE6).

Many teachers considered that interested students should have the opportunity of studying specialist ICT subjects in the senior school for use both in the workforce and in tertiary study (Examples: TE20, TE32, TE3). One teacher was concerned that if these specialist subject(s) were not available that "some skills may be overlooked within the context of other subjects" (TE8). Another teacher pointed out that specialist ICT subject(s) are needed as "students have different levels of ability, different needs and interests" (TE2).

It was suggested by one teacher that upskilling of teachers is needed before specialist ICT subjects can be replaced by integration of these skills and knowledge (TE50). Some teachers believe ICT will take up too much time out of other subjects' courses (Examples: TE30, TE32). Specialist subjects could be interrelated with other subjects, rather than taught in complete isolation (TE14).

Six teachers did not see a need for specialist ICT subjects. They made few comments. Suggestions included an ICT section in each subject and co-ordination of the various skills and knowledge across the curriculum (TE21, TE39). One wondered "at the need to teach what seems almost second nature to students" whilst another teacher was concerned with how ICT would fit into an already crowded curriculum (TE35, TE25). However, another teacher stated that teachers "need to get up to speed or the vital reinforcement, that can only occur if it is taught in every subject, will not occur" (TE39).

In interviews with key personnel, two staff members indicated that prior testing of students was needed to discover the level of skills that students possess upon entry to the school (I1a, I1b). Streaming these students to teach further skills, and/or using a

specialist teacher to give one-on-one tuition to bring students to the same level as their peers were options suggested that may then be considered. A "taste" of specialist ICT options at junior levels was suggested by one staff member (I6b). A need for specialist ICT options for senior students was indicated by some staff interviewed. "Talent and interest" would need to be identified before deciding on topics/subjects for these specialist options (I1a).

One staff member indicated that it is "cheaper for students to study [ICT] at school" (I1a). However, another key teacher pointed out that there are now various free tertiary courses provided for students in ICT skills due to current government funding available to tertiary providers in this subject area (I6b).

1.5.4. Topics to be Included in Specialist ICT Subjects (ST Q12; PA Q9; TE Q19)

Participants that stated that specialist ICT subjects should be taught were asked to list ICT topics, or subjects, that they thought should be taught. Thirty-six students, 28 parents and 41 staff responded to this question. It is interesting to note that the parents surveyed did not rate Web Page Design or Computer Animation as highly as the students and staff rated these topics/subjects. It must also be noted that Layout and Design of Documents would have been ranked much higher if it had not been inadvertently left out of the staff questionnaire.

During interviews with key personnel on the staff, a desire for an entry level basic ICT course was expressed, along with a need for specialist ICT options in the senior school. Topics suggested for a 'basics' course included computer keyboarding, file management, word processing, design and layout skills and fundamentals such as setting margins and choosing printers. The ICDL was an option recommended for providing students with these basic skills. One key teacher considered that two levels of ICT should be offered - an academic option, including programming and game development, and a less academic option, including word processing, spreadsheets and general skills for all workplaces. The detailed results provided by participants are summarised and compared in the table below.

Table 16 - Preferred ICT Topics/Subjects

TOPIC/SUBJECT	NO. OF RESPONSES			
	Students	Parents	Staff	Total Ranked
Computer Keyboarding	26	21	30	77
Word Processing	23	23	30	76
Spreadsheets	20	20	25	65
Internet	20	19	22	61
Databases	18	21	21	60
Standard operating procedures and file management	22	17	20	59
Web Page Design	21	14	23	58
Email	17	20	20	57
Presentations (eg Powerpoint)	17	21	16	54
Use of Peripherals	20	17	16	53
Creating computer graphics	19	16	16	51
Networks	15	20	15	50
Operating Systems	15	15	18	48
Computer Programming - Languages	15	12	20	47
Computer Animation	17	7	21	45
Ergonomics	14	17	11	42
Layout and Design of Documents	20	18	Inadvertently left out of staff questionnaire	38
General problems solving and decision making	10	11	15	36
Draw/Paint applications	5	11	18	34
The Impact of ICT on Society	7	11	11	29
Macros	5	9	15	29
Research on Computers in Society	4	10	10	24
Research on Telecommunications on Society	5	9	10	24
Other/s	Hardware/computer creation		Social learning - ie ask partner, help options, etc	

Computer Studies and Information Management teachers conceded that the curriculum of some current specialist ICT options needed revamping, in particular the Year 13 Computer Studies and Year 10 Information Management courses. A desire for more challenging and interesting courses was expressed. It was suggested that some Level One and Two NCEA Unit and Achievement Standards in ICT (Information Management

and Generic Computing) would be achievable by Year 10 students should they be made available to them. The existing Year 11 and 12 ICT courses had recently been revamped and teachers believed that students were being challenged and enjoyed those courses.

1.5.5. Level of Interest in an Integrated Approach to ICT Teaching (ST Q14, Q15; PA Q11, Q12; TE Q21, Q22)

Students

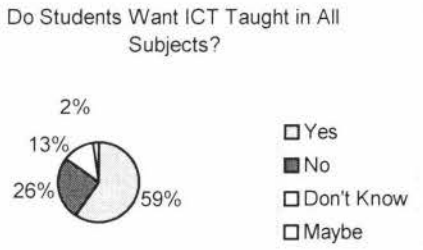

Figure 48 - Do Students Want ICT Taught in All Subjects?

The majority of students indicated that ICT skills should be taught in all, or most, subject areas. Reasons included the need for ICT skills for employment and for use in general society in the future. Reinforcement of learning across the curriculum would assist students' learning and enable students to present professional work more efficiently. One student indicated that both specialist subjects and integration across the curriculum are desirable "to ensure that ICT is integrated into all learning and not viewed as an isolated unimportant skill [and] to provide practical learning experiences in subjects they are familiar in" (ST42). Another student felt it important that "each subject has an influence on what parts of ICT are being taught" (ST8).

Some students believe it is necessary to learn the basics across the curriculum, as the need arises (Examples: ST13, ST18, ST44). However, they noted that specialist subjects should be provided for those that wish to learn more. Some students also noted that ICT is not as necessary in some subjects (eg junior Art and PE). Seven students preferred ICT skills to only be taught in specialist ICT subjects. Some felt that focus on one particular subject at a time is necessary.

Concerns raised included that ICT skills may be forgotten if not focussed on in a specialist ICT subject and that time used in other subjects to teach ICT skills may mean that less content in that other subject would be taught. One student suggested that ICT skills should be taught in all subject areas in the junior school, but only in specialist ICT subjects in the senior school (ST19).

Parents

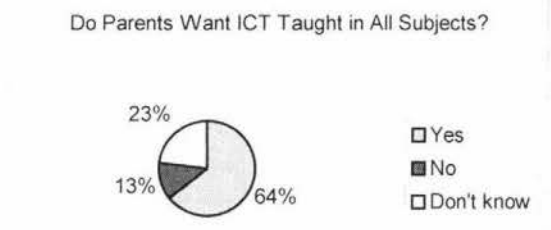

Figure 49 - Do Parents Want ICT Taught in All Subjects?

A significant proportion of parents indicated that ICT should be taught in all or some subjects, but only when necessary and relevant to that subject. This would enable students to use computers as a learning tool and to see how they can be utilised in the business world. Learning ICT in this way would enhance the other subjects and make learning more meaningful. Some parents indicated that most subjects now require the use of a computer as ICT is used in all areas of study and employment. One parent indicated that specialist ICT skills are necessary for specific subjects - eg DesignCAD for Graphics - and should, therefore be taught in those subjects (PA31). Parents that did not think that ICT should be taught in all, or most, subjects indicated that it wouldn't be practical, but suggested it may be easier for teaching staff. One parent indicated that there was little time to get through the curriculum already (PA23).

Staff

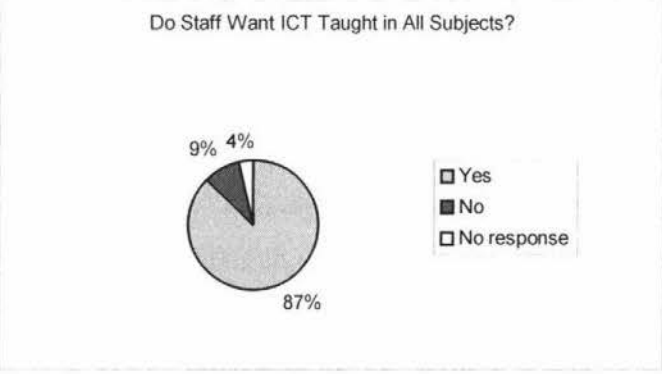

Figure 50 - Is There a Need for ICT to be Taught in All, or Most, Subjects?

The vast majority of teachers indicated that most subjects would be enhanced by ICT, but many stated, or implied, that ICT skills should only be taught/used if, and when, appropriate, "as the need arises" and "not for the sake of it" (TE37, TE22). Some believed that ICT should be taught in specialist subjects and utilised in other subjects, to ensure repeated reinforcement and authentic application (TE32, TE46, TE47, TE33, TE7).

ICT was considered to provide a technological link across the curriculum and was compared to literacy across the curriculum (TE5, TE26, TE21). Some teachers suggested that students needed to gain a broad ICT skill base from a variety of subject areas as students will be exposed to ICT in all areas of life (TE43, TE7, TE18, TE25, TE28, TE14).

"What is useful in one subject may not be useful in another", implying that some aspects of ICT may not be taught at all if all subjects do not teach the ICT skills that are relevant to their subject (TE44). The statement also implies that students may be learning ICT skills out of context that are not relevant to students' learning if taught in separate/specialist subject(s).

One teacher stated that "kids like [ICT] and it motivates them to learn" (TE4). One example was given in an interview. An English class was "not producing much with pen and paper", but when their teacher took them to a computer lab they simply "flew" (I6a). Another teacher indicated that ICT use in all, or most subjects, was needed to provide variety for students. "Some things all teachers should learn", stated one teacher, implying that all teachers should then be passing what they have learned onto their students (TE51). Teaching ICT in all, or most subjects "gives students the message that ICT is important in all areas of school life" and is important to show students "the most efficient way to do a job" (TE48, TE5). One teacher stated that "if ICT is to be integrated and embraced, all subjects need to include teaching of the skills required" (TE24).

During interviews with key staff members a common belief emerged that learning should be in context, not in isolation, if learning is to be more meaningful. A desire was expressed by several staff for a specialist ICT teacher to be available to support staff and to work with students individually as required. Some staff, however, would like the specialist teacher to teach the ICT skills in modules, so that students can then apply the skills learned through the use of ICT tools within their other classes. There was a

desire for more *insertion* rather than *integration* of ICT into the curriculum in which a specialist teacher would go into classes and teach ICT skills when they were required, perhaps at the beginning of a topic that required some use of particular ICT skills.

A key staff member was concerned that if ICT skills were not taught in specialist subjects, or blocks of time, by a specialist teacher that transferral of these skills would not occur as intended. This teacher compared the situation to the Government's wish to have Maori language and culture and the values of the Treaty of Waitangi integrated into the curriculum. this has not occurred as intended, according to this staff member, because there was not enough focus (I7e). Insertion rather than integration of ICT skills into the curriculum would ensure that focus was maintained.

1.6. Issues and Barriers to ICT Teaching and Learning at Orewa College

Issues and barriers to ICT teaching and learning at Orewa College that emerged from responses to the staff questionnaire and interviews with key personnel as well as those evident in observations are outlined in this section.

There was some concern that there is not ready access to ICT classrooms or equipment. Many staff queried, or debated, the need for pods of computers versus the need for labs, mobile computers, pods in the library and/or computers in classrooms. One teacher indicated that computer labs are not big enough for large Year Nine classes currently. Responses regarding the use of pods of computers in classrooms raised the issue of classroom management - the difficulty of dealing with students working on different tasks in the same room, or in different rooms. One key member of staff stated that some schools that have had pods of computers in classrooms have now removed them. A concern was raised as to whether there was space for pods, and where they would be placed. It was also considered that pods may not be ideal for the use of community education night classes. The majority of staff felt that a variety of access to ICT equipment is needed and the importance of this equipment working properly was also emphasised.

There's got to be a "buy-in" by staff and they need to "feel comfortable" if ICT is to be successfully integrated across the curriculum (I1a, TE53). A specialist ICT teacher available to assist teachers of other subjects was suggested as a way of increasing teacher confidence and their willingness to integrate ICT skills and knowledge. It was

pointed out that this specialist couldn't be too tied in to a timetable. However, two teachers in one classroom - a specialist ICT teacher with another teacher - raised a funding issue, according to one teacher. Teachers need to collaborate more if successful integration of ICT is to occur. Staff need "one-on-one tuition", according to two more senior, key personnel (I7e, I7f).

Both the librarian and the senior management team discussed the evolution of the library and its role in ICT teaching and learning. More collaboration is needed between library and other specialist ICT staff (I4, I5). Common approaches are needed to ICT teaching and learning. Standard rules and procedures are needed regarding usage of equipment. "A smaller ICT committee is needed to thrash out these issues" (I5). Another teacher observed, mentioned to the researcher that staff PD is needed on research skills across the curriculum so that staff are teaching students to research in the same way (Observation Notes, 16-9-03).

Students enter Orewa College with "a huge range of abilities", therefore pre-testing of students upon entry to the college is suggested to ensure that prior ICT learning is not repeated and that needs are identified (I1b). "Students can get into a downward spiral because their mates know more, so they turn off" (I1b). "People assume all kids are computer enthusiastic or computer literate" (I2). One specialist ICT teacher felt that some students regarded Information Management courses as an "easy option" (I6b). A need for more challenging courses was expressed. However, one teacher recognised that not all students have a computer with the internet at home and therefore may be lacking in basic skills. "You can't have a class with one student learning to use a mouse and another doing web design", according to one staff member. Two staff suggested streaming students before each topic in ICT subjects and in other subjects (I1a, I1b). A key staff member suggested that a two-pronged approach to the teaching of ICT subjects is needed - an academic and a less academic option (I5).

"Younger and younger children are gaining better ICT skills" (I1a). One teacher questioned whether this was a "good thing" and felt that learning ICT skills at pre-school may be "stifling creativity" (I6a). This teacher felt that a computer could not replace experiences such as finger-painting. One teacher pointed out that even cellphones are now a computer and that many Orewa College students now own a cellphone (I1a). This teacher seemed to be implying that the students already have the technology, so we should be teaching them how to use it.

Literacy and numeracy have suffered because of too much time spent on ICT, according to some staff. In Mathematics, one staff member indicated that students are not learning basic skills because of reliance on calculators and computers. "Mathematics is too computerised in New Zealand now. Asians and Indians do more mental arithmetic." There is "too much focus on computer skills now", according to this teacher (I6c). "These ICT skills can be picked up quickly when students need them - for example, in a six month night class course" (I6c).

"Staff often know less than the students" when teaching ICT skills and knowledge, according to two staff members (TE37, I3, I4b). Some staff lacked the confidence to teach ICT skills and knowledge in their classes because of this.

It was suggested that "for each year level, we need to identify essential ICT skills in each learning area" (I1a). There "needs to be a flexible, adaptable programme" (I1a). The following questions need to be answered: "What do all kids need to know? What do some kids need to know?" (I2). The answers to these questions will change as technology changes (I1a).

One staff member stated that "taking on Years Seven and Eight will put us a step forward", implying an opportunity to better prepare students in Years Seven and Eight. (Orewa College changes from a Year 9-13 to a Year 7-13 school at the beginning of 2005).

Careers and transition staff suggested that feedback from past students on what ICT learning had proved to be useful was needed, along with links with tertiary institutions to ensure that students are well prepared for these. (I1a, I1b). However, another staff member pointed out that "past students are different to students of today" (I4b). He recognised that "students entering Orewa College in the future will be different again".

The ongoing cost of ICT was referred to as "an endless big hole" by a senior management member (I4b). Staff are constantly needing to update skills, especially specialist ICT teachers, and this is also a cost issue. Security was also recognised as an issue if one to two computers were to be placed in each classroom. One staff member was concerned about the possible abuse of equipment (TE9). Cost would again become an issue.

Orewa College currently has both iMacs and IBM compatible computers running on the same network. A key staff member questioned whether the school should upgrade the existing iMacs to ensure smooth running of the network, or whether the school should change to all IBM compatible computers (I3). If hardware changes are to take place, software changes would also be needed and this would incur additional cost.

As stated earlier in this chapter, tokenism was an issue raised by a staff member (I7e). This staff member indicated a strong desire for ICT skills to be taught, as he person felt that learning ICT skills by osmosis would gain only token attention for vital ICT skills across the curriculum. This potential situation was compared with the Government intention for Maori language and culture and the values of the Treaty of Waitangi to be integrated into the classroom in previous years. There was not enough focus, according to this teacher, and therefore the integration did not occur as intended. One younger staff member supported this and suggested that "if we are going to do anything, it needs to be something quite big" (I7b).

The professional development of staff was regarded as "a challenge" by a senior management member (I4b). Teacher skill level and staff apathy were regarded as barriers by this member of staff. "Educating the non-computer staff - and this includes most staff - is a priority" (I4b). Another senior management member indicated that staff training has to take priority before ICT can be integrated into student programmes. "This needs to be the focus for the next two to three years" (I4d). She acknowledged that learning in context is ideal, but also recognised that "it is difficult for staff to be able to learn in context". One staff member felt that clarification of the "PD - ICT link" is needed, implying that some staff felt that PD and ICT were now one and the same thing (I5).

"The style of teaching is changing", according to a senior management member (I4e). "If students are to learn more by osmosis, teachers will need time to spend with students", according to another staff member (I5). The same teacher was concerned about learning by osmosis causing gaps in student learning. Another teacher was concerned with students wasting time surfing the internet and suggested that more guidance is needed with this type of activity (I6c).

A possible "holistic" approach to the curriculum and integrating ICT was suggested (I2). However, it was also noted that the "physical distance between teachers" may prove to be a barrier to the collaboration required between teachers (I2). An elitism notion by

some staff was also suggested as a possible barrier to a more holistic approach to student learning. It was suggested that one department was being "protective" of their subjects and that they may not wish to "weaken their position" by "relinquishing these subjects" to others to teach part, or all of the subjects (I2). During observations by the researcher, another department also appeared to be protective of their subjects. Teachers were concerned that subjects from their department may be taught by others.

A senior management member recognised that it is "difficult to plan for the future when we don't really know about future use [of ICT]" (I4d).

1.7. The Climate and Culture of Orewa College - A Foundation for Change *(ST Q23; PA Q20; TE Q34)*

The intention of this section is to provide a frame of the school's climate and culture, as it is within this frame that any changes in the teaching and learning of ICT must take place. A brief overview of the school's values system is given and relevant comments from an earlier cultural study of Orewa College are included. Students, parents and staff were asked in a questionnaire to describe the culture of the school. Their responses are summarised and tied in with responses to the 'Other Comments' section of the questionnaire and various comments made in interviews by key staff.

As mentioned earlier in this study, 'Manaaki Orewa' is the name that represents the Orewa College values system and the school spirit. 'Manaaki' means "to embrace, to foster, to journey together. The changes in ICT at the school that have taken place, and those that will take place in the future, are a part of the journey on which the school and its community are travelling on. Respect is also a significant part of the Manaaki Orewa values and it is through respect of the school community that all of the participants were invited to be involved in this study and to give their general views of the school.

In an earlier cultural study of Orewa College a relatively new member of staff stated that "this school seemed, four years ago, like it was waiting for something to happen, but I think it is definitely going somewhere now" (Ballantyne, 2002a:21). A longer-serving staff member, at the time, indicated that "we were quite a stagnant school - now we're moving ahead" (Ballantyne, 2002a:20). These comments were reiterated by staff in this study. However, as would be expected in any school, students, parents

and staff came up with a variety of strengths and weaknesses that they saw in the school. Parents pointed out more negatives than positives, mainly in regard to discipline, results and participation rates in sport, but strengths and weaknesses commented on by staff and students were fairly balanced.

Some participants indicated that the school was "too academic", while others regarded the school as "not very academic". Two parents and a staff member indicated that the school was trying too hard to become an academic school like other Auckland colleges (PA23, PA37, TE43). The staff member regarded the school population as "too varied" for the school to become academic (TE43). Another parent saw the school as "not strictly academic" and suggested that this was a strength of the school (PA3).

The school was considered to have a laid back, casual atmosphere by a significant group of participants who also stated that the school was lacking in vision. However others felt that a well-balanced education was provided with a wide variety of opportunities available and "an emphasis on achievement and involvement" (PA37). One student felt that the school provided "few opportunities for the 'average' student" (ST40). Another student pointed out that, within the school, Computer Studies [and other ICT subjects] don't get heard about very often" (ST32).

Many staff were pleased with the supportive and collegial environment and with the staff ICT training. The school was seen by staff as "progressive" and "striving to improve" (TE23, TE36, TE30). However, concern was expressed by some regarding the perceived "autocratic" leadership style in the school and the "lack of communication" and lack of a "systematic approach" to change (TE46, TE33, TE5, TE16, TE19, TE44, TE45, TE50). One staff member saw change taking place in the school as "reactionary" (TE12).

A few staff felt that some subjects were seen as more important than others both within the school and by the government. The current "G3 issue"[4] was mentioned as an example of this (TE11). A desire for more "integration of ideas" was expressed (TE5). It was also noticed that "some staff do lots, some do nothing" (TE28).

[4] Teachers classed as 'G3 teachers' are currently not paid at the top of the pay scale because they have practical tertiary qualifications in their subject field that were not gained as a university and are not currently regarded the same as a degree.

Two students expressed gratitude at being able to have input into change in the school through the questionnaire they had been invited to complete for this study.

Once it has been decided in what form(s) Orewa College students will learn ICT skills and knowledge, it follows to then decide what will be compulsory or optional. Hence, this final sub-question:

2. To what extent might some form of ICT learning be compulsory, or be an option for those interested?

(ST Q16, Q17; PA Q13, Q14; TE Q23, Q24; P Q21, Q22)

The majority of participants have agreed that some form of ICT learning is essential. However, this section discovers whether this ICT learning should be compulsory for all students, and if so, at what level and in what form? The views of students, parents, staff and Hibiscus Coast principals are outlined below.

Students

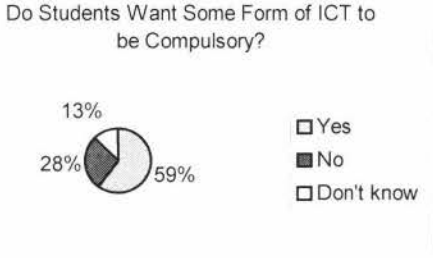

Figure 51 - Do Students Want Some Form of ICT to be Compulsory?

The majority of students felt that ICT learning should be compulsory in some form. The main reasons given for compulsory ICT learning were for future use in employment, for future use in society in general and for use in their current occupation as learners. Most students indicated that 'the basics' should be compulsory, while some specified that compulsory learning should only occur at junior levels.

Parents

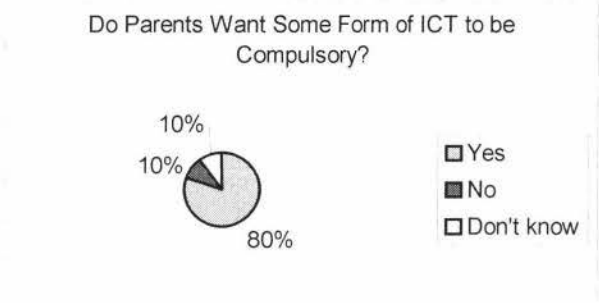

Figure 52 - Do Parents Want Some Form of ICT to be Compulsory?

The majority of parents stated that ICT should be compulsory in some form. The main reasons given were for general use in society, especially for communication, and for use in future employment - "to be able to operate efficiently in the workplace" (PA35). Other reasons given included the need for students to be exposed to ICT skills so that they were aware of the benefits and could choose to specialise in ICT later if they wished. Some students may not have a computer at home and therefore may not get the opportunity for much ICT learning. Pre-testing students for streaming ICT learning was suggested by two parents, to avoid bored students or leaving some students behind.

Staff

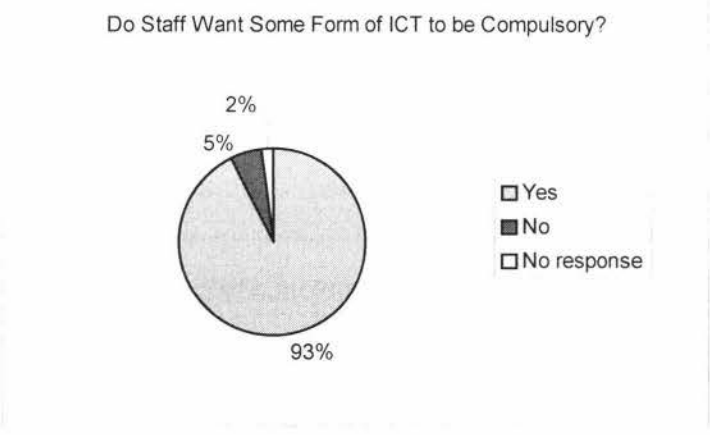

Figure 53 - Do Staff Want Some Form of ICT to be Compulsory?

The vast majority of teachers indicated that ICT should be compulsory in some form because all students will need ICT skills to participate fully in society, including being able "to access information" (TE52, TE25). Two teachers stated that ICT skills would be needed for employment and one teacher indicated they would be needed for tertiary

study. Compulsory ICT learning, at least in the junior school, would ensure consistency and equity, facilitate better learning outcomes and eliminate fear of technology (TE5, TE14, TE2, TE7). However, one teacher suggested the need for basic ICT learning "might change as even more students gain access to these skills at primary school or at home or through other subjects" (TE50). ICT "is an essential learning area", "a curriculum requirement" and a "necessary skill", concluded three teachers (TE25, TE27, TE12). One teacher stated that ICT "is already [compulsory] and should remain so" (TE29).

During interviews with key personnel it was evident that the majority of staff desired integration, or insertion, of ICT skills and knowledge across the curriculum in Years 7-10 for all students. However, there were suggestions of pre-testing students upon entry to the school at Year 7 and teaching a basics, or fundamental, course, perhaps in modular form with yearly refreshers to ensure that all students were brought up to the same level of ability with ICT. Some teachers indicated a desire for students to be taught ICT skills by a specialist teacher so that they could simply *use* the ICT tools in various subject areas.

Rather than having compulsory teaching or learning of ICT skills and knowledge, some felt that it should be compulsory that all students meet a set level of ICT skills and knowledge. Those that did not meet the level set, when tested, could be assisted individually by a specialist ICT teacher in a similar manner to how students are currently assisted by a specialist teacher for literacy. However, some staff suggested that even students who had a high level of ICT skills and knowledge already, may not necessarily be using the equipment and applications in the most efficient manner. These staff were in favour of one basics course for all students.

Most staff were in favour of specialist options only for senior students, although one staff member suggested a compulsory ICT module each year for all students, indicating that new skills would be needed as they progressed through the school and on to tertiary study.

Only one staff member indicated a belief that "eventually ICT subjects will be abolished" and therefore, according to this senior management member, integration of all ICT skills across the curriculum will be necessary (I4b).

Hibiscus Coast Principals

Both Hibiscus Coast principals that responded agreed that some basic level of ICT skills and knowledge should be compulsory for all students as they will all need these skills in both the workplace and their personal lives.

Summary

An overwhelming majority of parents and staff and a significant majority of students indicated a desire for some form of ICT teaching and learning to be compulsory. Reasons given included the need for students to use ICT skills and knowledge in future employment, in society in general and in their current learning. A popular opinion was for a basic grounding in ICT skills and knowledge in junior levels, with more specialised, optional subjects in senior levels. Pre-testing for existing ICT skills and knowledge was suggested by some participants to ensure that student learning is appropriately catered for.

3. Summary of Part C

A significant amount of interest in ICT teaching and learning has been shown by Orewa College students, parents and staff. Some ICT skills were considered more academic than others, however almost all participants considered ICT skills important, or very important, in student learning. Participants have provided a wealth of data on what ICT teaching and learning could take place and in what ways. Their opinions and ideas are summarised in the Chapter 4 Summary that follows this three-part Findings chapter.

CHAPTER 4 – FINDINGS SUMMARY

ANSWERING THE RESEARCH QUESTIONS

> ***"The subject is so large and important"*** *(PA17).*

This part of Chapter Four provides a summary of material from the Findings that answers the research sub-questions and provides an answer to the main research question. Quantitative data has been outlined in tables and figures throughout Chapter Four. A table of participants in this research has also been displayed in Chapter Three (Table 1, page 62). A confidence level of 95 per cent gives confidence intervals of +/- 13.9 per cent for students, +/- 15.3 per cent for parents, +/- 8.2 per cent for staff, and +/- 19.5 per cent for employers. These confidence intervals are large and those for other data, if calculated, would be larger. However, quantitative data has been combined with a wealth of qualitative data from interviews and observations, outlined earlier and summarised below. The triangulation of data collection methods and the wide range of participants included in this study have greatly increased the validity of data and its significance for this case study within an ethnographic paradigm outlined in Chapter Three.

The four common themes that have emerged from the various data, statements and opinions evident in this study are:

- Flexibility and choice
- Continuous learning
- An evolving pedagogy for ICT teaching and learning
- The role of society and the school community in ICT education

These themes emerged from the qualitative data summarised under sub-headings below that are related to each sub-question. In the following chapter, these dominant themes are discussed and compared with themes that arose in the Literature Review in Chapter Two.

An "open-ended, problem-solving approach" (MOE, 1995b:7)

Research Sub-question 1: What is the intention of the Ministry of Education (1995b) Technology curriculum document in relation to ICT subjects?

The Ministry of Education has made it very clear in the Technology curriculum document (MOE, 1995b) that each school must tailor the Technology curriculum to suit the particular character and culture of their own school. This intended flexibility and choice is evident throughout the document. It seems that Computing, Information Management and ICT have been deliberately ignored in this document as separate subjects. Choice is included for schools to offer specialist ICT subjects if they deem them appropriate for their school.

ICT is one of seven areas of the Technology curriculum. Integration of the Technology curriculum throughout all subject areas, as well as integration of ICT throughout all areas of the Technology curriculum is emphasised. There is an intention for students to become more independent learners and take responsibility for the construction of their own learning. The role of the teacher appears to be more one of facilitation and guidance, and collaboration and co-operation is encouraged amongst students and teachers. Schools are also expected to utilise community, business and industry resources to enrich student learning.

It is clear that the Ministry intends to develop economic growth in the country and wishes to provide for a better society by developing students with critical thinking skills through the implementation of this curriculum.

"Learning *through* ICT" (MOE, 2002)

Research Sub-question 2: What is advocated by the "Digital Horizons - Learning through ICT" document put out by the Ministry of Education (2002) in relation to these subjects?

Digital Horizons – Learning through ICT (MOE, 2002) is an ICT strategy for schools for 2002-2004. The intention is to improve student learning across all areas of the curriculum and to develop more efficient and effective school management and administration through the use of ICT as a tool. The Ministry recognised in this document that students need to learn *about* ICT and *with* ICT before learning *through* ICT. The Ministry sees this journey of learning as a continuum which implies that there will come a point where students will have learned the *about* and the *with* and will then be able to learn *through* ICT by simply using ICT as a tool. These terms are defined below:

> Learning *about* ICT - exploring what can be done with ICT.
> Learning *with* ICT - using ICT to supplement normal processes or resources.
> Learning *through* ICT - using ICT to support new ways of teaching and learning.
> (MOE, 2002:8)

Similar themes to those found in the Technology curriculum document (MOE, 1995a) outlined above, were evident in the *Digital Horizons* document (MOE, 2002). The Ministry again emphasised flexibility and choice for schools to determine how ICT learning should take place in their particular schools. There is acknowledgement that every community, and therefore every school is different. The Ministry has empowered schools and communities to tailor learning for their students' needs.

The Ministry outlined the importance of "economic development" and espoused a desire to develop "an innovative and thriving knowledge society" (MOE, 2002:2-3). Learning will need to be tailored to students' needs, as outlined above, if innovation is to be nurtured. A "student-centred learning culture" which includes the development of "creativity and critical thinking" is to be developed (MOE, 2002:6-7).

A heavy emphasis on expanding access to ICT resources exists in the *Digital Horizons* document (MOE, 2002), along with the provision of support for teachers, particularly through ICT clusters. These clusters consist of teachers from various schools collaborating and supporting each other in the provision of ICT education. The Ministry expects schools and "families, communities, businesses and other stakeholders" to be develop and extend relationships with one another to enable students to gain access to a variety of expertise and to enable schools to gain support for the provision of ICT skills and knowledge in their schools (MOE, 2002:3, 5, 7 8, 12, 17, 19).

Schools are required to consider the needs of minority groups. The Ministry claims that the needs of Maori students can be improved through the use of ICT and refers to Te Kete Ipurangi, the bilingual website that has been created for this purpose. ICT is also purported to assist Pasifika students and other "at risk" students, in addition to students with special abilities and special needs. Specifically how these students will be assisted is not discussed. This could be perceived as an element of tokenism, as these students are only mentioned very briefly within the document. However, the entire document is very succinct and is intended only as a broad strategy. The mere mention of these students therefore is important enough that Orewa College will need

to particularly consider how to identify these students at their school and identify ways in which "their needs can be addressed" in regards to ICT teaching and learning (MOE, 2002:12).

"Blue skies thinking" (TE29)

Research Sub-question 3: ***How do the staff interpret the intention, usefulness and importance of the above two documents?***

Two-thirds of Orewa College staff were unaware of either the Technology curriculum document (MOE, 1995) or the Digital Horizons ICT Strategy document (MOE, 2002) discussed below. This is disturbing as staff from Orewa College and other schools deduced that both of these documents contain information that is pertinent for the integration of Technology and ICT across the entire school curriculum. One staff member suggested that all teachers should have a copy of these documents, indicating that they currently do not. This also is concerning, since these documents were deemed important for the Ministry to produce, and were intended for all staff, it would follow that all staff should have been provided with a copy. One of the positive, unexpected outcomes of undertaking this study is that most staff at Orewa College are now aware of these documents, as they were involved in an analysis of them as a part of the research process. Additional copies of the documents were obtained from Learning Media in Wellington, since there were inadequate numbers available in the school for the staff groups to analyse them. At the time of the document analysis, the researcher advised staff how they could gain their own copy of each of the documents if they desired.

Staff noted that it is intended for students studying Technology to use knowledge and skills from other learning areas to construct their own learning and absorb information in the process. They determined that there is a place for specialist Technology subjects and recognised that Technology does not only include computers.

The Digital Horizons document indicated to staff that ICT is to be used as a tool across the curriculum, but that there is a need for specialist ICT subjects for the acquisition of basic skills and for learning advanced functions within programs. Participants from another school, however, felt that Computing as a subject area had been forgotten. As discussed earlier, it seems that computing as a subject area was deliberately ignored in these documents to empower schools with the flexibility and choice to offer a curriculum best suited to their particular students.

The majority of Orewa College staff that were aware of the documents felt that the documents were generally useful, however responses from other schools were mixed. One private school indicated that they had already been doing what the Ministry was now espousing for quite some time because they have modelled their programmes on those run by ICT Navigator schools in Australia. It could be construed from this that the Ministry of Education is slowly following behind leading schools in other countries in ICT education, rather than leading the way in this field.

One teacher saw the purpose of the above-mentioned documents as "informing, opening up and increasing discussion", while another teacher indicated that the documents encourage "blue-skies thinking" (TE37, TE29). Ongoing discussion and innovative thinking will be required to continually improve ICT education in New Zealand, and specifically at Orewa College.

Enhancement of "teaching and learning processes"

(A quotation from the Orewa College Draft ICT Strategy - 2003-2007)

Research Sub-question 4: What documents and policies does Orewa College already have in place regarding ICT and what values do they espouse?

Documents that existed at Orewa College that related to ICT education at the time of this study included an ICT Strategic Plan for 1999-2001, an ICT Position Paper, written by a previous Deputy Principal (Jones, 2001), Minutes of an ICT committee meeting held in June 2002, and a Draft ICT Strategy for 2003-2007. The researcher analysed these documents to discover the following underlying values in relation to ICT at the school, as Neville acknowledged that "a school rests on its values" (1998:81). In other words, these values form the base for future growth and change within the school.

ICTs are valued in the above-mentioned documents as tools to enhance learning and enable students to develop an awareness of the world around them. These tools are valued as a means of enabling students and teachers to learn in more efficient and effective ways. In the two earlier documents, access and infrastructure were a high priority, as was technical support for the infrastructure.

Other values emerging from the documents included recognition that at least junior students will require training in the use of these tools, particularly in efficient use of the internet. Staff espoused that ICT training of this nature is best managed in computer labs, valuing the class learning as a whole unit. To lessen administration demands on

staff, a need was acknowledged for more efficient administration and sharing of information through the use of ICT.

Cost and specialist subjects were both seen as a barrier to ICT teaching and learning. It was acknowledged that ICT costs are substantial, however despite this there was a clear intention to keep ICT spending the same each year, but to divide the spending differently. The value of subjects such as Word Processing and Computer Keyboarding were questioned in the ICT Position Paper (Jones, 2001), especially as these classes were perceived as creating a barrier to access to computers for other classes. This perceived barrier and possible solutions are discussed later in this chapter.

An appreciation was evident in these documents for the need to continually refine the school's vision for ICT. The opinions of the school's wider community were obviously valued, as they were included in the development of the school's ICT vision. A wide variety of personnel were present at the meeting to brainstorm a new ICT strategy.

Within the new Orewa College Draft ICT Strategy (2003-2007), importance was placed on the enhancement of "teaching and learning processes" and on the development of "skills for lifelong learning". Recognition of a new pedagogy for ICT learning was espoused, although not elaborated in detail. It was suggested that staff should undertake training in ICT pedagogy. A climate of staff using ICT was desired.

Other Orewa College documents identified by staff in regard to ICT at the school included the Ministry documents analysed in this study, curriculum statements and schemes of work, the Essential Skills[1], the school's ICT policy, the ICT user agreement for staff and students, the laptop user document and a computer licence that students in the past were required to pass before being allowed to use the computers in the school. One teacher indicated that the teaching and learning process that staff and students went through for students to gain the computer licence encouraged "collegiality and flexibility" amongst staff. The licence also encouraged "safe usage of computers" according to one teacher.

[1] For more information on the Essential Skills, see: http://www.tki.org.nz/r/governance/nzcf/ess_skills_e.php

"The subjects and topics are immaterial" (E18)

Research Sub-question 5: ***What ICT knowledge and skills are tertiary institutions and employers looking for?***

The majority of respondents from tertiary institutions and employers expressed a desire for students to leave school with at least computer keyboarding, spreadsheet and word processing skills. The ability to use communications technology such as telephone systems, internet, email, Outlook and PowerPoint were also considered important. Additionally, a basic understanding of the computer and file management skills were desired.

A significant majority of respondents indicated a need for specialist ICT subjects at secondary school level, especially for senior students wanting to specialise in an area of ICT for future employment. One employer pointed out that students without a computer at home might be disadvantaged if these subjects were not offered at school.

Learning how to learn and applying knowledge was considered by some respondents to be more important than learning content. Respondents also acknowledged the importance of communication skills, problem-solving and trouble-shooting skills.

"Process needs to be taught rather than skills" (S5)

Research Sub-question 6: ***How is ICT teaching and learning taking place in other schools? What are their plans for how their students will learn ICT skills and knowledge in the future?***

The majority of respondents from contributing schools and other North Shore secondary schools defined ICT as computers and related technologies. ICT teaching and learning was integrated across the curriculum in pre-secondary school education in the two Hibiscus Coast schools that responded. ICT equipment was considered by the two Hibiscus Coast principals to be tools for use in learning. It seemed that most ICT learning in these two schools occurred in an osmosis-like process in which students simply absorbed knowledge and skills as they used the equipment. Any actual teaching of the knowledge or skills happened on a need-to-know basis. Specialist ICT subjects did not exist at these schools.

Respondents from other North Shore secondary schools provided very little evidence of integration of ICT teaching and learning. Examples given of ICT across the curriculum indicated that ICT is used as a tool in other subjects. However, it does not seem that any actual teaching, or structured learning of ICT knowledge and skills was

taking place across the curriculum, with the exception of one private school that used a skills matrix to track the teaching and learning of ICT skills and knowledge across the curriculum. This implies inefficient and ineffective use of ICT tools that in turn, may result in inefficient and ineffective learning.

All schools offered specialist ICT subjects at most levels. Courses were fairly standard, with most schools offering a Text and Information Management course to junior students and Year 11. This course included computer keyboarding, common applications software, design and layout principles. Two schools included thinking skills in Years 7 and 8 courses. One school included thinking skills in Year 9 and 10 courses. Thinking skills were not apparent in any senior courses. There was more variation in specialist ICT courses offered to senior students, especially at Years 12 and 13. This implies that at these levels students need to specialise in order to prepare for employment or tertiary study

Very little innovation in the area of ICT teaching and learning was evident in any of the schools responses, with the exception of School 5, a private school offering education from pre-school through to Year 13. Students at this school had individual laptops from Year Seven and, as mentioned previously, a skills matrix was used to track their learning of ICT skills and knowledge. This school offered Level 1 Information Management Achievement Standards to Year 10 students. Assessments for these standards were overlaid over existing assignments in various subjects in Year 10. Orewa College could consider also doing this to enable students to enter Year 11 having already gained some Level One credits towards their NCEA. School 5 also incorporated a major area of intellectual properties, including plagiarism within an ICT programme. It seems that this information should necessarily be provided to all students.

Plans for the future included one school planning two streams of specialist ICT subjects at each level. This school intended to use external providers for the more advanced stream. Increased student access was planned. One school was planning an additional computer lab, while another was planning an extranet (intranet available externally) for use by students, parents and staff. Schools had identified a need to plan for access to ICT resources from home for staff and students. There were plans within a private school to offer a new course for Year 13 students focusing on animation, capturing and editing digital sound and video. There was an evident focus on learning how to learn and recognition that up-to-date content will be needed to captivate student

interest. It was recognised that new courses will need to be developed each year at this level as the world of ICT continues to expand and advance.

The majority of schools had a computerised booking system for ICT labs and equipment. School 2 also had staff register online for professional development sessions. Very little use was made of computer labs outside of school hours, with the exception of some community education night classes. During the school day, specialist ICT classes in one school were timetabled into a non-ICT classroom for one period per cycle to do theory work to enable other classes to use the computer labs. A significant number of Orewa College staff have indicated that they would consider working glide time to enable more efficient use of computer labs.

Computer labs and pods were the most common environment in which ICT teaching and learning occurred at other schools surveyed. Pods were used mainly for collaborative learning, or for individual learning with students taking turns using the computers. There were advantages and disadvantages in each situation, however classroom management was considered easier in labs.

One school had a specialist multimedia centre with other ICT equipment available. Specific detail on this multimedia centre was not given. It is therefore not clear whether students go to the multimedia centre to use, or learn about multimedia, or about current topics they are studying *or* whether students would access equipment from the multimedia centre and physically take the equipment elsewhere to use in their learning. The first scenario, in which students go to the multimedia centre, seems to isolate ICT learning from the rest of student learning. The second scenario appears more in line with the Ministry's intention for ICT to be integrated into all learning. However, a possibility for both scenarios could exist. Students could perhaps go sometimes to the multimedia centre for learning and, at other times, take equipment away for use in their learning elsewhere in the school.

Respondents from these other schools believe that some ICT skills and knowledge should be taught and others should be learned in a more osmosis-like discovery manner. Some respondents believe that specialist ICT teachers will be needed to act as lead teachers in encouraging other staff in the integration of ICT teaching and learning across the curriculum. They will also be needed, at times, to ensure that 'best practice' is taught.

"The subject is so large and important" (PA17)

Research Sub-question 7: ***What importance do students, parents and staff place on ICT? What level of student, parent and staff interest is there in ICT?***

Students and parents defined ICT largely as computer-related technologies, whereas staff were more inclined to widen the definition to include a much wider range of ICT equipment, activities and processes. Responses indicated that the majority of internal participants regard ICT as very important or important for employment, for general use in society and for current and future learning. Most participants considered ICT skills to be academic, although definitions of academic tended to vary. Some suggested that skills such as word processing were not academic, but that higher order thinking skills such as computer programming were academic.

Many students began in Year Nine at Orewa College having already gained skills in word processing and PowerPoint. Additionally, some had gained internet and spreadsheet skills. There was an evident variety in levels of prior ICT learning by students. Very few students had gained other ICT skills and more than a third of students had very little, or no prior ICT learning upon entering Orewa College. The majority of students surveyed had studied an ICT subject during their time at Orewa College. The most popular subject was Information Management at Year 10 and at Year 12. Benefits of prior ICT study, according to students, parents and staff, included increased confidence and efficient and effective use of technology. However, more than a third of Orewa College staff lacked the confidence to teach ICT skills in their department at the time they were surveyed.

ICT use across the curriculum at Orewa College appeared to consist mainly of internet research or the creation of PowerPoint presentations. Subject-specific computer applications were sometimes used. Staff expressed a desire for more ICT skills to be taught in their department. Some suggested that a specialist ICT teacher should be available to assist other staff. Actual teaching of ICT skills and knowledge did not occur during observations in these other subjects. Some teachers conceded that ICT was used, but not taught in their subjects. Usage typically occurred for a period or two, now and then, or in a block of one to two weeks during the period of a year. It was also of interest that some teachers desired ICT skills to be taught in their subject area, that other teachers had indicated were already included. This indicated to the researcher a current lack of consistency in ICT teaching and learning across the curriculum. Other

teachers espoused a desire for ICT skills to be taught progressively through the year levels in their subjects, indicating that they are not currently.

Many students were unsure whether they would study ICT in the future. Only a quarter intended to study an ICT subject in the future in Years 11 and 12. The number of students intending to study an ICT subject in Year 13 decreased further to 12.5 per cent. Possible reasons for this are discussed in the following chapter. The majority of staff and parents did not intend to study ICT in the future. However, the researcher concedes that the question posed did not allow participants to state plans for any self-directed study.

Current ICT learning at Orewa College takes place mainly in computer labs. Labs were also the most preferred environment for future ICT learning, although many participants expressed the desire for a variety in forms of ICT learning. Specialist ICT subjects currently use approximately half of lab time. Remaining lab time appeared to be under-utilised. Little use seemed to be made of ICT equipment other than computers. However, digital cameras - still and video, scanners, data projectors and VCRs were sometimes used.

In specialist ICT classes observed, there was usually teacher-directed learning at the beginning of a lesson, with students then working individually on set tasks, requesting assistance when needed. Students from other subjects using computers usually worked much more collaboratively in pairs, threes or fours. Learning was more student-centred. However, during observations it was identified that a difference in environment resulted in a difference in student behaviour and learning style. Students in the IBM compatible labs, which were conservatively painted in grey, cream and peach colours were usually very quiet and working mostly individually. This may have been partially due to the computer monitors being positioned on top of the system unit, making it more difficult for students to see each other. Students in the iMac labs, which were painted in a brighter purple colour and had dark blue computers were usually more noisy and appeared to be working much more collaboratively. The computers in the iMac labs were an all-in-one unit that did not sit as high on the desk, enabling students to see each other over the computers. Consideration of these factors will need to occur as part of future planning various styles of ICT teaching and learning.

Although teacher-directed learning appeared predominant at Orewa College, some student-centred learning and collaborative learning were observed. There was one class in which students largely self-constructed their learning for the year.

The majority of teachers stated that ICT skills should be *taught*. A significant proportion of teachers were very uneasy about students learning via an osmosis-like process, although some conceded that there may be occasions when learning through discovery is appropriate. Specialist teachers were preferred to teach these skills to the students usually, or at least sometimes, by the majority of staff. Very few were confident enough to state a belief that ICT skills could be acquired by students in a osmosis-like process of learning. The rest of the staff were concerned that inefficient learning may occur and students may miss some crucial aspects in their learning if ICT learning was left to occur in an osmosis-like process with students simply using the equipment and absorbing necessary skills and knowledge as they worked. Some staff however, indicated that there was a time and a place for discovery learning, with students assisting each other.

An overwhelming number of students, parents and staff indicated a wish for separate ICT subjects. Basic skills were desired at junior levels, with more advanced options available at senior levels. A variety of topics/subjects were suggested and these are outlined in Table 16, page 172.

Additionally, most students, parents and staff, wanted ICT skills and knowledge to be taught in all, or most, subjects when relevant. It was suggested by some participants that learning ICT skills in context would make the learning more meaningful. Some staff indicated a desire for a specialist teacher to be available to assist staff and to tutor students on a one-to-one basis when necessary.

A multitude of issues and barriers to ICT teaching and learning at Orewa College were identified. The most significant barrier to ICT teaching and learning emerging from participant responses appeared to be the lack of staff confidence in leading the learning of ICT in their classrooms. Suggestions for overcoming these barriers and coping with some issues are given in the following Discussion and Recommendations chapters.

A brief outline of the school's climate and culture was given in Chapter Four to provide a frame within which future changes may take place. Participants provided a balance

of both positive and negative comments about the school. However, the interest shown in this research and the thoughtful responses provided by participants are encouraging.

ICT "is an essential learning area" (TE25; MOE, 1995b:20-21)

Research Sub-question 8: To what extent might some form of ICT learning be compulsory, or be an option for those interested?

The majority of participants wanted some compulsory ICT teaching and learning in Years 7 to 10, with specialist ICT options available for senior students. In addition to specialist ICT subjects, a need to include ICT learning in all, or most, subjects was revealed. Insertion rather than integration of this learning has been suggested by some staff as a starting point. This would involve the insertion of a module of ICT learning in various subjects, for example a spreadsheet module in Mathematics, a word processing module in English, a PowerPoint module in Social Science. Two possible models are evident from suggestions given by respondents. The first Insertion Model appears to be an alternative, to a stand-alone ICT Module at each year level as suggested by some staff. Respondents have suggested "the basics" could be taught at Year Seven in this stand-alone ICT Module and a higher level of ICT learning could take place at each year level, with students applying their ICT learning in their other subjects.

Participants have outlined advantages and disadvantages of each of the two models stated above. One advantage of the Insertion Model is that students could learn ICT skills in a subject directly related to the software or ICT skills they are learning. For example, they could learn spreadsheets in Mathematics, with the Mathematics teacher being the expert on the various formulae and types of charts available for use in the spreadsheet software. However, caution would need to be exercised in using this model, since each teacher would need to be completely confident in the knowledge of ICT in their subject area. This confidence has not been evident in this research. Another matter for discussion with the Insertion Model is that various software and ICT equipment and skills are used in a variety of subject areas. Spreadsheets are not only used in Mathematics. They are also used in many other subjects, for example in Social Science for collating and graphing data. PowerPoint is used in many subjects for presenting information, as is word processing software. It would be more difficult to track the ICT skills and knowledge learned by individual students in this model. A very detailed skills matrix would be required.

Although students would not be learning ICT skills and knowledge in context, a stand-alone ICT Module at each year level has the advantage of easily identifying the ICT skills and knowledge learned by students each year, and specifying when they are learned. For example a teacher would know that the class in front of them had all been taught particular spreadsheet skills in the ICT Module, and therefore be able to use spreadsheets in their lesson, simply guiding and assisting students as required. Another advantage is that specialist ICT teachers could be used to ensure that best practice is taught. More consistency in student learning would be easier to achieve with this model and students would still apply learned ICT skills and knowledge in context in their other subjects.

Some staff suggested that a specialist ICT teacher is needed to teach a module of ICT skills and knowledge at each year level. It was also suggested that a specialist ICT teacher could be available in other classes to assist teachers and students. This suggestion included the idea that they could be used to provide one-to-one tuition to students, as necessary, if some students appeared to be weaker in the same skill set as their peers. This suggestion has merit, because support from specialist ICT teachers would assist in raising staff confidence and encouraging more integration of ICT across the curriculum. The specialist ICT teachers could assist staff with the planning of lessons incorporating ICT and provide one-to-one tuition for staff as required, which was a desire indicated by some staff.

A Combined Approach

The findings within this chapter have provided some answers to the main research question shown below:

In what ways could ICT teaching and learning take place at Orewa College?
Osmosis, Integration and/or Specialist Subjects?

The participants and the documents analyses have revealed that a combination of some specialist ICT subjects, some integration of ICT across the curriculum, and some more osmosis-like discovery learning is ideal. Dominant themes that have emerged in relation to ICT teaching and learning are discussed and compared in the following chapter with themes that arose from international discussion in the Literature Review of this study to provide a pathway for ICT teaching and learning for the future.

CHAPTER 5 - DISCUSSION

"Creativity and critical thinking are emerging as society's most valuable assets" (MOE, 2002:6)

So, What is New?

The findings in the previous chapter have revealed that there is a place for specialist ICT subjects *and* a place for the integration of ICT skills and knowledge across the curriculum, with some teaching and learning taking place in a more osmosis-like discovery style of learning. Basic ICT skills and knowledge need to be taught, ideally within the context of other learning areas, so that ICTs can be used as tools and so that a foundation is formed for students wishing to specialise in ICT learning later. Higher order learning can take place in this context within all subjects, including specialist ICT subjects in the senior school. However, a greater discovery has been a new and evolving pedagogy for ICT teaching and learning. Essentially this entails that ICT teaching and learning needs to take place within the paradigm of this evolving pedagogy - it should be integrated into all subjects, including the teaching and learning that takes place within specialist ICT subjects. Traditionally, teachers of specialist ICT subjects have employed mainly teacher-centred approaches to learning. Flexibility and choice is desired in the styles of learning, environments for ICT learning and the specialist ICT subjects available to students. Continuous learning should be modelled for students especially by teachers, whose role has evolved into that of an expert learner. More constructivist, inquiry-based learning is required within ICT specialist subjects and in other subjects, to encourage more creative, innovative thinking. Experts within the school's wider community need to be utilised to enhance student learning. Businesses within the wider community could also be approached to assist with funding for ICT learning. A new pathway for ICT teaching and learning is provided within the discussion of this chapter under the following four themes that have arisen from the findings:

- Flexibility and Choice
- Continuous Learning
- An Evolving Pedagogy for ICT Teaching and Learning
- The Role of Society and the School Community in ICT Education

Within this chapter these themes merge with those evident in the Literature Review in Chapter Two to form a holistic picture for ICT teaching and learning, from within which recommendations have been made in Chapter Six. Firstly, however, a framework comprised of the participants' views of the climate and culture of Orewa College is given, as it is within this framework that future change at the school will take place.

A Framework for Discussion

In the spirit of Manaaki Orewa[1], the participants have embraced the opportunity to participate in this study and their many voices have been heard. Through their participation they have assisted in providing a possible pathway for their ongoing journey of learning together.

As stated earlier in Chapter Three, it is the people in this study that this research is all about - the students and how they could learn, the teachers and how they could facilitate the learning, the parents, and the community, including tertiary institutions and businesses. This research is intended to explore how all these components interact in a mutually beneficial way for the ultimate aim of betterment of the society in which we live, learn and work in for future generations.

The community of Orewa College sees their school culture as somewhere between "academic" and "not very academic". Interpretation of "academic" as used by the participants, seems to mean 'elite', or placing more importance on traditional subjects, such as English, Mathematics and Science. However, when asked in a questionnaire, the majority of participants considered ICT skills and knowledge to also be regarded as academic.

Many participants indicated that the school had a "laid back and casual" atmosphere and that a "well-balanced" education was provided with a "wide variety" of opportunities for students. The criticism of the school being "not very academic" was made by some participants. This criticism could be related to the perception from these participants that the balance between academic learning, sports and other co-curricular activities in

[1] Manaaki Orewa is the name given to Orewa College's values system that emphasises respect for self, others, the community and environment. Manaaki has three meanings: to embrace, to foster, to journey together. (See Appendix V).

the school's approach to education was inappropriate. However, the majority of participants seem generally happy with the school, despite some concerns from parents on various issues not directly related to this study. Some staff also voiced concerns, but despite the concerns expressed, it is clear that no school is perfect. In the main however, the participant responses indicate a sense of pride in the *normality* of the school and a sense of satisfaction that the school seems to be striving to improve.

The views of the participants in this study appear largely in line with the *Critics* discourse outlined by Bigum and Kenway (1998:377-388) in the Literature Review of this study. It appears that the participants, in general, are in favour of ICT learning at Orewa College but believe that this learning should be based on a sound pedagogical foundation, and they urge caution when planning change in how ICT teaching and learning will take place. A pedagogical framework from within which the school may choose to continue improvement is outlined under the four themes below.

Flexibility and Choice

Both Ministry documents analysed in the previous chapter have emphasised the need for flexibility and choice for schools to determine ICT teaching and learning needs for their students, based on the particular culture and character of their school (MOE, 1995b; MOE, 2002). The Ministry has deliberately ignored Computing subjects in these documents in order to allow schools to tailor learning needs to suit the needs of their own communities. There is "no single model" for the use of ICTs in schools (MOE, 2002:3). In the previous chapter, the apparent disregard of Computing as a subject area in the Ministry documents was identified and analysed. The researcher suggested that this indicated an intention by the Ministry to provide flexibility and choice for schools to tailor ICT learning in a manner best suited to their students' needs. "Senior secondary school ... students may specialize in technological areas, undertake general courses in technology or do both" (MOE, 1995b:29). However, this framework leads to a situation wherein students cannot currently achieve in their ICT learning to the same level on the NZQA framework as they can in their other subjects, limiting their choice. This limitation was outlined in participant responses that revealed one quarter of students intended to study an ICT subject in the future in Years 11 and 12. However, the number of students intending to study an ICT subject in Year 13 dropped to 12.5 per cent. There may be two main reasons for this. One reason may

be that some students choose to leave school at the end of Year 12. The other reason may be that Level 3 Unit Standards from the Generic Computing domain on the NZQA framework have only recently been added to the list of "Approved Subjects" for university entrance in New Zealand (NZQA, 2003c). Students cannot gain Merit or Excellence in Unit Standards. Although ICT can be assessed using Technology Achievement Standards to enable students to gain Merit or Excellence, these are not currently on the Approved Subjects list. Flexibility and choice for students, therefore, seems to be limited within this approach as it currently stands. The Ministry (2002:12) and the participants in this study have emphasised the importance of providing choice for senior students to study specialist ICT subjects if they wish to specialise in this field, it therefore follows students should be able to achieve in this field. Assessment is driving curriculum, or at least student choice within the curriculum – this needs to change.

Subjects, or topics within ICT subjects that participants desire are outlined in Table 16, page 172, in the previous chapter. It was revealed that "the basics" course at junior levels should include computer keyboarding, file management, word processing, design and layout skills and fundamentals such as setting margins and choosing printers. Senior courses will need to be flexible and be updated annually to reflect student choice. The International Computer Driving Licence (ICDL) was suggested by some staff as an option that may fulfill basic needs for ICT teaching and learning. It is valid that courseware available for such qualifications as the ICDL may be useful. However, this research focuses on ICT teaching and learning that is appropriate for Orewa College students. The ICDL is one method of assessing ICT learning. Future research focussed on assessment possibilities is recommended in the next chapter.

As stated in the Findings, one suggestion given by a staff member was to split the desired ICT subjects or topics (see Table 16, page 172) into two groups to create two options for senior students. One option would be a more academic approach including computer programming, and the other option a less academic option, including building on prior learning in word processing, spreadsheets and general computing skills for all workplaces and future learning. However, Table 16 indicates many possibilities for the academic option, in addition to computer programming, which may result in the need for more than one academic subject.

How ICT teaching, learning and assessment takes place is primarily left up to teacher choice. Cuban (2001a:125) and Brown (1998:6) pointed out that the teacher is the

gatekeeper to student learning and makes the difference. However, teachers will need to pass more choice onto the students regarding their own learning if the constructivist approach to student learning, outlined below, is to occur.

Participants have also expressed a desire for a variety of ICT environments to be available for teaching and learning, allowing choice for students and teachers. Some ICT teaching and learning could then take place in computer labs, some in pods, some using COWs (computers on wheels) and some learning could take place with the use of other ICT equipment such as digital cameras (video and still) and scanners. A specialist multi-media centre with a co-ordinator was suggested as a means of co-ordinating these resources. The traditional librarian, referred to as a "cybarian" by Eadie (2001:26) may be ideal. This idea is discussed in more detail later in this chapter.

Glide time and the use of innovative computer booking sheets are suggested as ways to provide more flexibility in the access to ICT equipment. This flexibility and choice in regard to ICT environments and access to equipment will also provide for more flexibility and choice of learning styles espoused by the evolving pedagogy for ICT teaching and learning discussed below. It has also emerged that this flexibility and choice may provide solutions to the perceived barrier of specialist ICT classes using a significant amount of time in computer labs. Creative timetabling will also need to be employed to ensure equitable and desirable access (Eadie, 2001:31).

Continuous Learning

The idea of continuous learning is repeatedly emphasised throughout the *Digital Horizons* document (Examples: MOE, 2002:10, 15, 17). Although the Ministry implied that ICT learning takes place on a continuum, there is an evident need for continual learning in a cyclic process as shown in Figure 2 in the Literature Review. Learners will need to progress continually through a cycle of learning *about* ICT, then *with* ICT, then *through* ICT. This is in line with Brown and Murray's (2003:11) claim that teachers' learning of ICT is not linear, but iterative. New and improved ICTs are continually being invented necessitating this continual learning and reiteration. New ICT courses may be required and older courses may need reviewing or may become obsolete. Leask and Younie (2001:125) support the idea of continual learning and suggested that a "communally created body of knowledge can be extended upon each

year in a cyclical process as new students engage with the topic". It is clearly important that students are kept up-to-date with latest developments - new technologies and new versions of technologies - so that they are continually challenged and do not resign themselves to having learned it all already. It is obvious that what may be deemed advanced in the area of ICT, may be deemed as a basic skill in the near future. Some knowledge and skills may thus need to be learned earlier in future. ICT subjects, and the topics within them, will need to be reviewed and updated annually.

This research has revealed that some staff are not confident in teaching ICT, as they fear that students will know more than them. Staff noted that students seem to learn well from each other and one teacher indicated that there is usually a student highly skilled in ICT in each class who is keen to assist the teacher and other students when difficulties arise. Participants have suggested that specialist ICT teachers, lead teachers and students identified as possessing a high level of ability in the field of ICT could be utilised to assist teachers and encourage the use of ICTs and the integration of ICT learning throughout all learning areas. This is supported by Ballard (2000) who suggests the use of "lead teachers" or "master teachers". Stratford uses the term "mentors" and states that they can be used to assist in developing "contemporary pedagogical practices and innovative ICT integration. Feltham (2004) reported a *Tech Angels* programme at Wellington Girls' High School that identified students with a high level of ICT skills and knowledge and utilised them for this purpose. The Mathematics curriculum document suggested a "development band" for high achievers in Mathematics. A development band for students with a high ability in ICT could be created and these students could be used as "mentor students", as described by Stratford (2000:10) in a similar manner to the Tech Angels reported by Feltham (2004).

Students, as discussed earlier, undertake some ICT learning at home and teach themselves a variety of ICT skills and knowledge from the internet. As was revealed in the previous chapter, the role of the teacher has changed to more of a guide, or "expert-learner" (Schuck, 2001:4). Teachers are experts in learning, but cannot be expected to be experts in all content, especially in the area of ICT since the field of knowledge is huge, and continually expanding. Once teachers acknowledge their change in role to expert-learner, the fear or shame of knowing less than some students will disappear. Students can still be learning ICT in a structured manner with some discovery learning, but with structured guidance from the teacher enabling the learning of ICT skills and knowledge to be tracked for each student. However, a significant

number of teachers believe that at least "the basics" of ICT should be taught before students use ICT skills and knowledge in pursuit of higher order learning. The Orewa College Draft Strategy (2003-2007) aimed for the development of "skills for lifelong learning". In addition to the teacher's role evolving into one of an expert learner, schools are referred to by the Ministry as a "community of learners" (MOE, 2002:16). Hence we are all a part of this continual learning process.

Benefits of prior ICT learning have been outlined by parents and teachers, however very few of them intended to undertake future ICT learning. This was disappointing since it is the opinion of the researcher that they need to model continuous ICT learning so that students are encouraged to undertake learning in the field of ICT for the sake of both their current and for the benefit of their future roles in society and employment.

This research itself is part of a continual process of improving ICT teaching and learning. A need to regularly review the school strategies for ICT education has been identified. Ongoing discussion, evaluation and scrutiny is required in order for the emergence of new and better ways for ICT teaching and learning to take place.

An Evolving Pedagogy for ICT Teaching and Learning

An evolving pedagogy comprised of elements of constructivism and inquiry-based learning is desired and outlined in this section. The most significant barrier to ICT teaching and learning has emerged as professional uncertainty regarding educational pedagogy incorporating ICT, also identified by Leask and Younie (2001:130-131). Participant responses confirmed this professional uncertainty, however it is hoped and intended that pedagogical discussion within this study may continue amongst the staff of Orewa College and begin to address it in some manner.

Participants expressed a need for integration of ICT teaching and learning across the curriculum in addition to specialist ICT subjects. Both Ministry documents analysed (MOE, 1995a; MOE, 2002) promoted the integration of learning ICT across all areas of the curriculum. The Technology curriculum document went further to suggest that learning from all areas of the curriculum could be integrated into thematic units (MOE, 1995a). Staff indicated that these documents increased pedagogical discussion surrounding ICT teaching and learning.

The Orewa College documents (1999-2001; 2003-2007) espouse the same vision as the Ministry documents. There was a shift in focus within these documents from access and infrastructure to an emphasis on pedagogy and the learning process. However, it follows that there is a need to communicate this to the staff of Orewa College if desired pedagogical discussion is to occur since many staff remain unaware of the documents or the vision.

ICT for Future Citizens

Participants consider that ICT teaching and learning is required for students' current and future roles as learners, for future use in employment and for use in society in general. Head and Mehrtens (2001:xii) and Hunt (1996b) also support these reasons for ICT learning. Some students will need specialised skills for employment, however *all* students will need some ICT learning for continual learning and for their future role in society if they are to become "critical citizens" offering "alternative visions of the world" (Le Court, 2001:101-102).

An Emphasis on Learning Rather than Teaching

Participants within this study identified that students need to learn how to learn with ICTs. This was supported by the Ministry's intention for students to become the future innovative, creative, critical thinkers of the future so that they may contribute to the economic development of the country (MOE, 1995a:7; MOE 2002:6). Savidan (2003) agreed that information literacy and learning how to learn are important and purported that the '3Rs' (Reading, wRiting and aRithmetic) are no longer enough. Employers have also revealed the need for students to develop communication skills, problem-solving and trouble-shooting skills.

Some participants concluded that learning how to learn is now of more importance than the actual content learned. The Technology curriculum document (MOE, 1995b) supports this and focuses on the learning processes students will progress through, rather than itemising content they will learn. The Ministry (2002:6) stated that "creativity and critical thinking are emerging as society's most valuable assets", again emphasising the importance of developing higher order thinking skills, rather than learning a wealth of content. A "Learning-how-to-learn Partnership" is discussed in the

Spanish curriculum document in which responsibility for learning is transferred from the teacher to the learner (MOE, 1995a:9).

There was considerable support from participants and from authors reviewed in Chapter Two for the integration of ICT skills and knowledge and the use of ICT as a "tool" (MOE, 1991:1, 1998:4, 2002:2, 8; Christensen & Knezek, 2001:53, Bright, 2001:62; Johnson, 2001:19; Head & Mehrtens, 2001:xii; Abbott, 2001:44; Greaves, 2000:55). Some learning of content is still necessary, however, to provide context for learning, to captivate student interest and to provide skills to enable efficient use of learning tools. Jonassen (2000:8) acknowledged that "some knowledge of any tool is required in order to use that tool", and he is supported by Bigum and Kenway (1998:392) who believe that "basic needs must be met" before students can use a tool for higher order thinking. This supports the earlier claim that continual ICT learning takes place in a cyclic process - students need to learn about ICT, before learning with and through ICT. With new, or improved, technologies, students will once again learn about, then with, then through these ICTs. Students need to apply knowledge in context in order to develop higher order thinking skills. The learning of content should be secondary to the learning of higher thinking processes - perhaps in all learning, not just ICT learning.

Pruning of the Crowded Curriculum

Participants identified that the insertion or integration of ICT into the curriculum may mean that less content is covered in other learning areas. However, the recent New Zealand Curriculum Stocktake refers to a "crowded curriculum" (MOE, 2003a) and suggests reducing "the level of prescription in subsequent versions" of the curriculum to make room for the learning of higher order thinking skills, facilitated by ICTs (MOE, 2003b). This indicates that there may be a need to revise and restructure existing curriculum across all learning areas for a true level of integration of ICT to be reached (Halliday, 2001:46). Eadie (2001:40) supports this and believes that rigorous assessment and "prescribed learning outcomes" create a barrier to innovative use of technology.

A Constructivist Approach Within a Collaborative Environment, With a Socio-Cultural Focus

Employers, particularly, wanted a constructivist approach to learning in order to create future problem solvers. Thinking skills, aligned with a constructivist approach to learning, were only included in junior students' learning programmes in the other Hibiscus Coast and North Shore schools surveyed. This raised the question: wouldn't students also need thinking skills for employment or further study? Earlier discussion concluded that thinking skills and learning how to learn are more important than learning content. Admittedly, senior students will need more specialist content to prepare them for a specific career path, but shouldn't they also still be furthering their thinking skills and continuing to learn how to learn? The Ministry intention for students to take more responsibility for their own learning and become more independent learners capable of constructing their own learning is in line with this view (MOE, 1995b). This is supported by the referral to ICTs as thinking tools by Ryba and Anderson (1990:83), Boody (2001:11), Savidan (2003:13) and Jonassen (2000:3-11). Jonassen believes that these tools should be used to "engage and facilitate critical thinking and higher order learning". He also espouses that students should be allowed to take responsibility for their own learning by setting their own goals and evaluating their own learning. Hunt (1996b:2) also supports this and emphasises selection and evaluation as important parts of student learning.

Computers can be used as "information access tools" within a constructivist approach to learning (Jonassen, Peck & Wilson, 1999:14). Savidan (2003:135) agrees, and believes that ICT encourages collaborative methods of learning and "is more aligned with constructivist learning theory". She also believes this fits well with a "self-regulatory message" espoused by postmodernism. Eadie (2001:34) also agrees and states that teachers need to get rid of "busy" work in the classrooms. The Essential Skills (MOE, 1995b:18-19) to be integrated across the curriculum appear to support this constructivist approach, as they include skills in information, communication, problem-solving, social and co-operation, self-management and competitive skills. Repeated reference is made by the Ministry to students working "co-operatively and collaboratively" and the interrelationships between learning areas are also referred to in the curriculum documents of other learning areas (MOE, 1995b:16, 28; MOE, 2002:3; MOE, 1994:11; MOE, 1997a:7; MOE, 1993:7; MOE, 1995a:16; MOE, 1998:10).

Vygotsky (2004) recognized the significance of student "interactions with surrounding culture and social agents, such as parents and competent peers". Collaboration and co-operation amongst students and amongst teachers is encouraged in the Technology curriculum document (1995b). Involvement of families and the wider school community in student ICT learning is discussed below, however computer-mediated discussion with peers was suggested by Schuck (2001:8) as a means for students to collaborate with each other and construct more meaningful learning. Leask and Younie (2001:117-131) also see opportunities for internationalising the curriculum and gaining feedback from an external audience.

For more collaborative learning to occur, Eadie (2001:30) concluded that "ICT facilities [are needed] in classrooms rather than laboratories". Participants in this study supported this idea, but expressed a desire for a variety of environments for ICT learning, including labs, pods of computers in classrooms and online learning. They also suggested a combination of some specialist ICT modules or subjects, some integration and some osmosis-like discovery learning. This is in line with the idea of flexibility and choice in teaching and learning outlined earlier. The intention is for integrated ICT learning to evolve, at times, into more discovery learning, with students absorbing knowledge and skills in an osmosis-like manner. This occurs as they go through the learning process and construct new learning for themselves, with the assistance of the teacher, who has engaged in their new role as expert learner. However, the insertion of ICT modules into the curriculum, suggested by some participants and supported by Savidan (2003:40) may be a wise step to take prior to attempting full integration of ICT learning throughout other learning areas since some staff currently lack the confidence to teach ICT skills in their subject areas.

Assessment

If students are to be learning in collaborative environments with a constructivist approach, creative means of assessment will be needed. This is supported by the Ministry (MOE, 1995b:24) who believes that the "full picture" needs to be "built up" over time in the form of "portfolios". Other methods for assessing this type of learning have been discussed earlier in the Literature Review, as suggested by Jonassen, Howland, Moore and Marra (2003) and Ryba and Anderson (1990). Their methods are similar to the current Achievement Standards used to assess learning for the National Certificate in Educational Achievement (NZQA, 2003a). However, this research is not focussed

on assessment and recommendations for research into appropriate assessment is made in the following chapter.

The Role of the Teacher

As was alluded to earlier, the role of the teacher has become decentred so that the teacher is now regarded as an expert learner, as outlined earlier (Muffoletto, 2001:3; Savidan, 2003:132; Schuck, 2001:4). Jonassen (2000:9-11) believes that this change in role of the teacher to a learning partner will result in the critical thinking and higher order learning that is promoted by this new pedagogy. Teachers are experts in learning, but cannot all be expected to be experts in ICT. Even specialist ICT teachers can no longer be experts in every aspect of ICT as the field of knowledge is extensive. The current shortage of specialist ICT teachers alluded to by Savidan (Personal Communication, February 2003) implies that schools may require all teachers to take on the role of expert learner by default, and to ensure that ICT learning takes place in the current environment. All teachers are expected to be continually learning with their students and guiding them through the process of learning.

Although current pedagogy espouses more collaborative learning, the researcher believes that some teacher-directed learning will be needed at times to convey 'best practice' of skills in the most efficient manner. When teacher-directed learning is required, some suggestions arise from the observations in this study. These are in classes that a teacher would like to coordinate in a more teacher-directed, or individual, student-centred manner, perhaps with self-paced learning should use the IBM compatible labs that appear more conducive to individual learning. Teachers wishing to engage students in more collaborative ICT learning would use the iMac labs or various pods around the school that seem more suited to students working together in pairs or groups.

Participants' responses have confirmed Savidan's (2003:133) belief that some teachers are not confident, or able, to incorporate ICT into their classroom practice. Further professional development for staff is needed in the variety of ICT tools available, but professional development in current educational pedagogy is also necessary if staff are to utilise ICT on a regular basis in the pursuit of teaching students how to learn, how to construct their own learning, and collaboratively develop higher order thinking skills. Co-ordination of ICT teaching and learning across the curriculum is also vital, as it appears that there is currently no tracking of student learning in ICT through the year

levels in various subject areas. A skills matrix similar to that utilised by School 5, outlined earlier, may be of use.

Some occurrence of students constructing their own learning was observed in a Year Nine English class and in a Year 13 Art Design class as outlined in the previous chapter. The researcher suggests that teachers such as these that seem to be already engaging in the pedagogy that is emerging as ideal, could be used as lead teachers to encourage other teachers in the use of these learning styles in their classrooms.

Co-ordination of ICT Teaching and Learning

In Chapter Two of this study, the changing role of the library and librarian were discussed. The librarian was referred to as a "cybrarian" and regarded as a central figure to ICT (Eadie, 2001:26). In keeping with this view, the Librarian seems to be an ideal person to co-ordinate ICT resources and take responsibility for a multimedia centre that could include the library. However, as also previously suggested, a leader of ICT is needed at the highest level of school management to co-ordinate the teaching and learning of ICT across the school (Hay, 2001:11). Orewa College currently has an Assistant Principal employed in this capacity who could be the bridge between the Heads of Department who have the responsibility for curriculum, and the Librarian who would have responsibility for ICT resources and support for those resources. Specialist ICT teachers could also be used to support teachers of other subjects in ICT learning in their subject areas in addition to a Partner-Leader model involving the classroom teacher and the librarian suggested by Todd (2001). Hay (2001:11) recommends a merger of ICT teachers, ICT co-ordinators and the library resource team into one ICT co-ordination team to oversee ICT teaching and learning.

An Inclusive Pedagogy

Participants suggested that self-paced, online learning may provide an opportunity for students with high ability to extend their learning. This form of learning was also regarded as especially appropriate for students with special needs. The Ministry (2002:12) has also specifically mentioned that the needs of minority groups such as Maori and Pasifika students, other "at risk" students and students with special abilities and special needs need to be considered within this new pedagogy and included in

strategies for change. Their needs are considered in recommendations made in the following chapter.

The Role of Society and the School Community in ICT Education

Resources are needed for continuous ICT learning and the desired collaboration and co-operation outlined in the previous section extends to the wider school community. Savidan (2003:139) suggested that educational policy needs a "more societally focused role". A move in this direction seems evident within the *Digital Horizons* document in which there is an expectation for the development of relationships between schools and their surrounding community, families, businesses and industry (MOE, 2002). This is logical, since the students will eventually become a part of this wider community. Schools are expected to access expertise within their communities as well as ICT resources to enhance ICT teaching and learning for their students and to assist students in developing an awareness of the world around them. Participants from North Shore school suggested that external providers can be used for specialist ICT courses, lessening the demands on teachers. This idea is supported by the Ministry (MOE, 2002:12) who states that schools, government and other stakeholders need to "work with secondary and tertiary sectors to investigate and extend options for senior students to access specialist studies in ICT". The Ministry have suggested that schools could share the cost of ICT resources with members of the community, implying that these resources could be made available for community use (MOE, 2002:17, 19). Communication with families and communities can be encouraged through the use of an extranet. Earlier discussion has also indicated that improved relationships between schools and their communities could assist in ensuring that students are involved in up-to-date ICT learning.

The earlier Technology curriculum document recommended that students should be engaged in "purposeful activities" and "community interactions", including "interactions with business and industry" (MOE, 1995b:7). This is supported by Leask and Younie (2001:117) who use the term "communal constructivism" to describe a process in which students work in a group situation. Holmes et al (2001:1) agree and believe that students need to "interact with the environment to construct knowledge for their learning community". Eadie (2001:36) described a Business Applications classroom in Nevada that was set up to provide real-life business experiences. The Ministry (MOE,

2000:19) suggests that school-business partnerships could contribute significantly to economic development, suggesting an opportunity for real-life experiences. Experts, traditionally, have been invited into schools to speak on various topics. Families and businesses have been involved in school activities such as coaching and sponsoring sports teams. Various community groups such as the Rodney District Council and the Lions' Club, have provided scholarships for students and have worked in partnership with students for various causes, such as protecting the local environment.

It appears that through this Digital Horizons strategy document (MOE, 2002), the Ministry is reminding schools of the resources available to them and suggesting that these resources can be tapped to assist with ICT teaching and learning. The Ministry also intends for the various partners in these relationships to share the cost of ICT within schools and communities (MOE, 2002:17, 19). The researcher believes, however, that schools need to be cautious when developing these external relationships as the "self-serving market philosophy which is influencing so many schools" may develop (Neville, 1998:82). Schools should be providing an impartial education for students and need to be careful not to compromise this for the sake of money or equipment. As previously discussed, the ongoing cost of ICT resources in schools is huge. Equipment and software become outdated quickly. The Ministry has suggested that "schools, government and other stakeholders" should encourage "government agencies and businesses to donate surplus computers" to schools (MOE, 2002:19). However, surplus computers would usually mean out-of-date computers. This begs the question: If we are to be keeping our students abreast of new technologies, do we want their learning to be taking place on out-of-date equipment? This research has revealed that content is less important than the process of learning. However, it seems that the process of learning could be enhanced through the use of up-to-date equipment.

Conclusion

The participants' sense of pride in the normality of their school – the way it is - is evident in their responses, and it is clear that in the main, drastic changes in ICT teaching and learning are not desired, or required. All respondents indicated a high level of interest in the future of ICT education for Orewa College students.

Professional uncertainty has emerged as the main barrier to the integration of ICT teaching and learning, however it is envisaged that the discussion resulting from this study may assist in alleviating some of this uncertainty.

The themes emerging from this research are in line with those in the Ministry documents analysed (MOE, 1995a; MOE, 2002). Furthermore, even though the two Ministry documents were produced seven years apart, the dominant themes were largely the same. The commonality of thought amongst the participants and the authors reviewed in Chapter Two, evident in the themes discussed in this chapter, is not surprising in an era in which we have the internet which provides us with the opportunity to collaborate and discuss such pedagogy with ease. However, there are still some aspects of the new pedagogy that do not seem to have filtered through so easily. For example, some teachers have yet to grasp the reality of their changing role to expert learner. It was evident from responses that some teachers still prefer to be the expert, or leave the teaching to someone else if they are not confident teaching IcT skills and knowledge. Learning alongside students and guiding their learning will be a new experience for many.

Recommendations for how ICT teaching and learning could take place at Orewa College are outlined in the following chapter, and include a combination of specialist modules and subjects, integration and insertion and some osmosis-like discovery learning, within a framework of the evolving pedagogy outlined within this chapter.

CHAPTER 6 - FACTORS TO CONSIDER, RECOMMENDATIONS AND IMPLICATIONS

> ***"Change often requires the creation of development structures, such as working parties and task groups charged with a particular mission - rather than trying to use maintenance structures, such as standing committees, where the culture and social dynamics are often directed to preservation of the status quo" (Hargreaves, 1999:63).***

Introduction

Recommendations for change in the ways that ICT teaching and learning take place at Orewa College are outlined in this chapter, along with recommendations for other schools. Suggestions for future research are also included. From the recommendations several implications emerged for various organisations, including Orewa College, other schools, the Ministry of Education (MOE), the Education Review Office (ERO) and the New Zealand Qualifications Authority (NZQA). These are addressed later in this chapter. However, before any recommendations can be implemented, the senior management team of Orewa College will need to consider various factors that are discussed below.

Factors to Consider Prior to Implementing Curriculum Change

A section of the Literature Review in Chapter Two outlined a number of factors that should be considered before and during curriculum change. Some of these factors have been addressed by this research; others will need to be addressed before, and during, the implementation of any change. Factors that have been addressed, and those that still need to be addressed are outlined below.

The participants in this study will play a significant role in any changes in ICT teaching and learning at Orewa College. These participants have had considerable input into

this research and it is envisaged that this will provide them with some ownership of any resulting change that may occur.

Before any change can be implemented, a cultural shift is required. Hargreaves (1999:59) believes that cultural change needs to be "slow and involve indirect methods". Prior to this study, changes have been taking place slowly. Some discussion and planning for future ICT teaching and learning has occurred within the school. This study has revealed underlying values and beliefs from the Orewa College and Ministry documents and from participant responses. It is from this base of values and beliefs that future growth and change will occur. Pedagogical discussion based on these underlying values and surrounding the evolving pedagogy evident in previous discussion needs to occur before any changes are implemented.

The Orewa College management and the school community can decide upon the completion of this study what change is to occur. Whatever change does occur will require guidance by the SMT. They will need to employ structured steps to guide the change process as suggested by Hargreaves (1999:61) and Stoll and Fink (1996:92-97) as outlined in Chapter Two of this study. This structured, slow and indirect approach to change should minimise any negative effects of change on the classroom teachers especially, as they are the key to any change (Fullan and Hargreaves, 1992:21).

Hargreaves (1999:63) suggests that a working party should be formed, as existing committees will probably be more concerned with preserving the status quo. The working party will charged with the implementation of changes in ICT teaching and learning at Orewa College. Department heads and lead teachers will support and encourage classroom teachers through the implementation process. Specialist teachers could assist with support of classroom teachers as outlined earlier. This supportive and encouraging environment should ensure that changes occur with minimal negative effects on the classroom teacher. Recommended changes are outlined below.

Recommendations for Orewa College

1. *Develop A Pedagogical Framework*

Present the Findings and Discussion from this research to the staff of Orewa College, along with the reasons for ICT teaching and learning - for use in society, for use in employment and for use in students' current and future occupation as learners. Pedagogical discussion should be encouraged. Although constructivism and thinking skills have been emphasised in this research, staff must be reminded that a *variety* of learning styles is ideal and that their new role is one of expert learner.

Make staff aware of the resources and communication channels available to them, such as Te Kete Ipurangi, other useful websites, listservs, professional development seminars and cluster groups. School-based ICT professional development should focus on uses of ICT other than for research and presentation of work and on professional development on current educational pedagogy.

Staff and parents should be encouraged to continue with ICT learning so that they are acting as role models for their students as well as gaining benefits for themselves. They should be reminded that they are also continuous learners.

2. *Devise An Inclusive Strategy*

Form a working party to devise a draft ICT strategy for the school and to initiate the implementation of change in ICT teaching and learning. This working party should ideally include community, business and industry representatives, so that the relationships suggested by the MOE, to assist with expertise and cost, may be developed and expanded (MOE, 2002). Develop relationships with contributing primary schools and include representatives from those schools in the working party to develop a seamless link in ICT teaching and learning from primary to secondary school. Within the school's ICT strategy, specific needs of Maori and Pasifika students at Orewa College will need to be identified and addressed, as stated in the ICT strategy document (MOE, 2002). Pre-testing of all students for prior learning on entry to the College at Year Seven would provide valuable data for planning. If this was done at the end of Year Six, this would allow teachers the time to plan for the next year and ICT learning could be tai-

lored to student needs. High ability students could be utilised as "Tech Angels", assisting staff and fellow students with technical ICT problems (Feltham, 2004: 6-7).

Provide a copy of the draft strategy to all staff, for comment. Revise the strategy after they have had time to comment. A copy of the completed strategy should then also be provided to all staff. Provide appropriate support and resources for staff as part of the strategy. Refine and review the strategy document regularly. The researcher suggests an annual review with a partially-new working party each year. Some members from the last working party would assist with continuity, while new faces would ensure movement forward.

3. *Implement Modular ICT Teaching and Learning in Years 7-10*

Students in Years Seven to 10 will study a compulsory, specialist ICT module, taught by a specialist ICT teacher. This module is to include basic competencies in: computer keyboarding, file management, spreadsheet, word processing, design and layout skills, fundamentals such as setting margins and choosing printers, communication skills including telephone systems, outlook, email and PowerPoint as well as basic understanding of the computer. Intellectual properties topics, such as plagiarism and copyright, as well as problem-solving and troubleshooting skills should also be included. There are a myriad of ways that this module could be implemented. Two examples are: full-time for a set number of weeks, or an hour a day for a term.

As stated in the previous Discussion chapter, the researcher believes that the Insertion Model, in which spreadsheet skills would be taught in Mathematics, word processing skills in English, and so forth, would be ideal. However, this study revealed a lack of staff confidence at present. The researcher therefore suggests a stand-alone ICT module at each year level suggested above, for now. The Insertion Model can be implemented at a later date as it is expected that staff confidence will increase as a result of pedagogical discussion and professional development.

Use an ICT matrix, such as the partial example in Table 17 below, to assist with planning at which level ICT skills and knowledge will be taught. The matrix could be more detailed to show which week of the year particular skills and knowledge woud be taught and could assist with the tracking of student learning of ICT skills and knowledge.

Table 17 – Partial Example of an ICT Matrix

ICT MATRIX			
	Skills and Knowledge to be Learned		
	Year 7	*Year 8*	*Year 9*
Word Processing Skills	Open, Close, Cut, Copy, Paste	Tables, Simple Formatting	Tabs
Spreadsheet Skills	As above, plus basic formulae - SUM, AVERAGE	Pie Graphs	Column Graphs

Integration of ICT learning at this stage would involve the use of skills learned in the stand-alone ICT Module, applied in context across the curriculum. This means that at junior levels, ICT learning would be taking place in three ways: some learning in specialist subjects (the stand-alone ICT module); some integrated reinforcement of ICT learning across the curriculum; and some osmosis-like discovery learning of ICT skills and knowledge across the curriculum when and where appropriate.

A wide variety of assessment possibilities exists for ICT learning. This is a topic recommended for future research. However, the researcher believes that some Level 1 Information Management Achievement Standards could be introduced at Year 10, overlaid across the existing curriculum, as School 5 in this research has done. Information Management Achievement Standards 90032 and 90033[1] are both research-based standards that could easily be assessed in this manner. ICT skills and knowledge needed would be taught in the stand-alone ICT module prior to students attempting the standards.

4. *New Specialist ICT Subjects for Years 11-13*

Specialist ICT subjects are necessary for Years 11-13 students wishing to specialise in this area. At least two specialist ICT subjects should be available at each of Years 11, 12 and 13. These courses will need to be creatively designed using the information provided in Table 16 in Chapter 4 with "approved subjects" in mind (NZQA, 2003c). A more 'academic' course including subjects and domains from the approved subject list

[1] Achievement Standards can be found by searching the New Zealand Qualification Framework online at: http://www.nzqa.govt.nz/framework/search/index.do

could be provided, along with "less academic" course(s), perhaps with specific industry focus. Student demand and resource and timetable constraints will determine what courses are ultimately offered.

A stand-alone ICT Module in Years 11-13 would also be desirable if glide time and creative timetabling allow for this. Higher level skills in applications such as word processing and spreadsheets could be taught. This learning of skills could be integrated across the curriculum in the future as outlined in the Insertion Model.

ICT learning in the senior school should also take place in four ways: mostly in specialist subjects; in a specialist module if resources allow; some reinforcement of ICT learning across the curriculum; and some more osmosis-like discovery learning across the curriculum.

5. *Use Time and Resources Creatively*

Develop a flexible system in regard to the use of ICT equipment, particularly computers, for the most efficient and effective use of ICT resources. Glide time, timetabled theory periods, a variety of learning environments, and creative use of booking sheets which could be made available to students and staff on the intranet/extranet are suggestions.

Develop the school intranet/extranet further to allow student, parent and staff access from home to encourage increased communication, collaboration and enable staff to contribute to a shared resource bank if they prefer to work from home.

6. *Utilise Specialist ICT Teachers*

Utilise specialist ICT teachers to teach the stand-alone ICT Modules as they are the experts in this learning area. These teachers could also provide support and assistance to teachers and students in the classroom when ICT learning is taking place. These same teachers could provide assistance with planning of ICT teaching and learning and give one-on-one tuition to teachers and students as necessary.

7. *Create a Teaching and Learning Centre (TLC)*

It seems logical that the library, the traditional centre of learning should continue to be a central part of learning. The researcher is aware that there are currently four pods of four computers in the library and that some other ICT equipment, such as data projectors, is stored in the library and booked through the librarian. It seems that for full use of all ICT equipment to be made, all portable equipment should be stored in this central location and booked through the librarian. Booking of equipment, including labs and pods, could be done through the school's intranet/extranet. Students and staff could browse from a computer anywhere in the school and check what equipment is available. There could be a choice whether to use the equipment in the library or take it away for use elsewhere in the school. Purchase of Computers on Wheels (COWs - laptop computers stored in mobile pods) is suggested and these could be stored here also.

Considering the evolving role, it seems appropriate that the new centre for teaching, learning and multimedia should have a new name. Librarian and library may no longer be appropriate. Eadie (2001:26) suggested "cybrarian" as a new name for the librarian. The Teaching and Learning Centre (TLC) could be a new name for this central part of the school.

8. *ICT Leadership and Co-ordination*

Leadership and co-ordination of the suggested changes is required. The researcher suggests that the Assistant Principal currently leading ICT in the school should work more closely with the librarian, specialist ICT teachers and a working party to co-ordinate ICT teaching and learning across the curriculum. Detailed strategies, regular reviews of progress made and a structured staffing approach to these changes will be required. The 'Factors to Consider' outlined earlier will also need careful consideration.

Recommendations for Other Schools

Although this research is an intrinsic case study focussed on future ICT teaching and learning at Orewa College, some recommendations that have been made above may also be considered for other similar schools. However, to ensure that planned changes

in other schools are pertinent to those schools, they may wish to undertake similar research in their own schools and communities, utilising the methodology outlined in Chapter Three of this study.

Implications for Orewa College and Other Schools

1. *Constant Renewal*

New courses will need to be developed each year, especially at senior level as the world of ICT changes. Older courses may evolve, be taught at lower levels or no longer be needed.

2. *Focus on Pedagogy and Collaboration*

Orewa College and other schools need to focus professional development on pedagogy and introduce staff to the various online Ministry initiatives that are there to support them and to provide opportunities for collaborative discussion with their colleagues.

3. *Community Relationships*

Schools cannot exist in a vacuum and will need to consider how to build and extend relationships between themselves and their communities including tertiary institutions and businesses to enhance ICT teaching and learning for their students. A community liaison person may be required, or strategies devised to ensure that relationships are built through current staffing structures.

Implications for the Ministry of Education

1. *More Effective Communication for an Evolving Pedagogy*

The Ministry should, in future, allocate individual copies of strategic documents to each teacher and ensure that teachers have the opportunity to read and discuss documents such as these, so that a pedagogical base for implementation of proposed strategies can be developed. Less than half of Orewa College staff were aware of the MOE documents in this study. The Ministry should also instigate more conferences, cluster groups and online discussion groups for teachers to assist in continuing pedagogical discussion. The classroom teacher is the gatekeeper and must be involved more in plans for future change if they are expected to 'buy in' to planned changes.

2. *Strategy and Resources Are Required*

A strategy is now needed to encourage more use of Ministry innovations by teachers. The Ministry has introduced various initiatives such as Te Kete Ipurangi (TKI) and the ICT Professional Development Clusters to provide resources for teachers and to encourage collaboration and ongoing pedagogical discussion. It is essential that full use of these resources is made by teachers to assist with the implementation of the Ministry's vision for ICT teaching and learning. Resources and support are also required to enable teachers to evolve easily into their new role as expert learner, so that they can encourage students to construct their own learning and become the more independent learners that the Ministry desires.

3. *Achievement in ICT Education*

It is vital that for our students to achieve in ICT education, the Ministry must ensure that our students can achieve in this area of education. Although Generic Computing Unit Standards are on the Approved Subject List for university entrance, students cannot gain Merit or Excellence in these standards. Alternatively students can possibly gain Merit or Excellence in Technology Achievement Standards, however these standards are not on the approved subject list. It seems that if it is important for our students to undertake future ICT learning, which the Ministry and participants of this study have

deemed that it is, then students should be able to achieve in ICT education to the same levels that they can in more traditional subjects such as English or Mathematics.

4. *Specialist ICT Subjects*

The Ministry has scarcely mentioned specialist ICT subjects in either of the documents analysed in this research (MOE, 1995a; MOE, 2002). The researcher believes that the Ministry should take a stand on this issue and provide a national curriculum statement containing aims and objectives for ICT learning. This research has revealed commonly desired basic competencies in this area of learning, along with desired areas of specialisation for senior learning. It would be possible to determine this nationally. Content (knowledge and skills) would need be continually updated and the level that various knowledge and skills should be taught at would change, however, the broad aims for learning would remain the same.

5. *A Shortage of Specialist ICT Teachers*

An evident shortage of specialist ICT teachers was discussed in the Literature Review of this study (V. Savidan, Personal Communication, February 2003). Creative strategies for recruitment and training of future teachers in this field will need to be considered, in addition to alternative options such as online learning and teleconferencing facilities to overcome this problem.

6. *Trainee Teachers Need Role Models and Appropriate Training*

The Ministry of Education needs to ensure that student teachers are graduating equipped to implement the Ministry's espoused aim to integrate ICT across the curriculum. Savidan (2003:133) believes that appropriate training and modelling of the integration of ICT is not occurring at teacher training institutions. Trainers that are currently teaching the teachers should be modelling best practice with ICT and leading by example with the integration of ICT into teacher training programmes.

7. *Valuing Teachers*

The "G3 issue" has divided teachers into classes, or levels, according to their various qualifications, and teachers are paid accordingly. Many specialist ICT teachers are currently classed as "G3 teachers" due to their degree-equivalent qualifications, usually gained at a polytech or other technical institute. Other staff with university degrees are paid a higher rate. Some staff classed as "G3" indicated in this study that they felt under-valued. They had gained the impression from the management of Orewa College and from the Ministry of Education that some subjects were considered more important than others, with an implication that ICT subjects were regarded less important. One teacher specifically used the current "G3 issue" to illustrate this impression.

Implications for the Education Review Office

It follows from the Ministry's desire for all students to undertake some form of ICT teaching and learning, that schools should form achievement policies for ICT education. It would also then follow that the Education Review Office should be reviewing these achievement policies for ICT education to ensure that the intended ICT teaching and learning is taking place and that students are gaining required ICT skills and knowledge.

Implications for the New Zealand Qualifications Authority (NZQA)

Emerging from this research is an emphasis on more collaborative, co-operative, student-constructed learning involving the use of higher order thinking skills. This means that more learning will take place in group situations, rather than individually. Therefore, it is valid that some assessment should also occur in group situations. NZQA will need to creatively explore how group assessments can assess not only the knowledge and skills, but also the level of collaboration and co-operation that students are working at, along with their level of thinking. Although comparability of assessment is needed between schools, it is the opinion of the researcher that the teacher's judgement may need to be trusted more to allow this type of assessment.

Recommendations for Future Research

1. *Other Case Studies*

This research focussed on one co-educational, state secondary school and has revealed the ways in which ICT teaching and learning could take place at Orewa College. It may be valuable to extend this research by studying one of the following:

- The ways ICT teaching and learning takes place at a private co-educational secondary school
- Comparison of ICT teaching and learning at a boys' secondary school with ICT teaching and learning at a girls' secondary school.

2. *Thinking Skills and the Learning Process*

Future research could investigate the specific thinking skills that students require and the ways in which learning takes place. A formula for integrating these thinking skills and learning how to learn into the school curriculum could be devised.

3. *Continual Research is Needed*

Future action research could involve the implementation and evaluation of suggestions and recommendations from this study. This same research could be repeated in three years as part of a review of the school's ICT strategy. There are many elements in this topic of research that will change continually and therefore research is needed on a regular basis to ensure that we are adjusting the learning to suit continually changing student needs.

4. *Assessment Methods for ICT Learning*

There is a need for further research into the assessment of ICT teaching and learning. The International Computer Driving Licence (ICDL) was suggested by some teachers

in this research as a way of assessing basic competencies in ICT. However, there are many other possibilities including the Microsoft's IC^3 qualification (International Core Computing Certification), Unit Standards, Achievement Standards, and more that could also be considered.

5. *Environments for ICT Teaching and Learning*

Future research could investigate the different environments in which ICT teaching and learning takes place in other schools within New Zealand and internationally. Research could specifically focus on whether learning in computer labs is more effective for student learning than learning in pods of computers, or research could remain broad and look at a variety of environments and the advantages and disadvantages of each.

6. *ICT Teaching and Learning at Pre-school Level*

Future research could study the advantages and disadvantages of pre-school ICT learning. Discussion arose in an interview as part of this research surrounding the fact that children are learning ICT skills and knowledge from a very young age. Two teachers questioned whether ICT teaching and learning at pre-school level was advantageous to the children, or whether they were missing out on other, perhaps more important, learning experiences.

CHAPTER 7 – CONCLUSION

MANAAKI OREWA

RESPECT for yourself, RESPECT for others, RESPECT for the community and environment.
Manaaki has three meanings: to EMBRACE, to FOSTER, to JOURNEY TOGETHER.
(These words are quoted from a "Manaaki Card" that is used as part of a reward-based, values system in place at Orewa College – see Appendix V).

This research began by asking whether ICT teaching and learning could take place in specialist subjects and/or integrated and/or in an osmosis-like discovery manner at Orewa College. Despite continuing debate surrounding the place of ICT within the New Zealand curriculum, the answer has emerged as a combination of all three of these ways. However, more significantly, the importance of ICT teaching and learning for students of today has been revealed. ICT needs a prominent place within the New Zealand curriculum. A new pedagogy within which teaching and learning should occur has also emerged. This is an exciting time to be a teacher! It is a time when we are beginning to focus more on the learners and their specific needs and interests. This new pedagogy recognises that there is now so much knowledge in the world that we, as teachers, can never expect to know it all, or impart it all upon our students. Instead, teachers are evolving into expert learners, learning alongside students, and guiding them in creative and innovative thinking as they learn how to learn, and construct their own meanings from the learning. Students are able to work collaboratively and decide the path for their own learning. The freedom and choice that this creates in student learning must surely result in increased student motivation for learning and satisfaction in the accumulation of knowledge that is of specific interest to them.

Although many interesting findings, pedagogical discussion and specific recommendations and implications have resulted from this research, it must be noted that this study is only part of an ongoing journey, particularly the journey of the people of Orewa College, towards continual improvement in ICT teaching and learning within the ever-changing cultural environment. New and improved ICTs will be invented, as will new and more effective ways of teaching and learning. The journey will continue, as was stated in the beginning ... "to infinity and beyond" ... (Buzz Lightyear In Toy Story, 1994).

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LIST OF APPENDICES

Computer Laboratory Usage by Computer Studies and Information Management Classes								
(In hours - based on term one useage)								
iMac Labs				IBM Compat Labs				
Room 66		Room 65		Room 67		Room 69		
Lab 1		**Lab 2**		**Lab 1**		**Lab 2**		
IM/CS	**Bookable**	**IM/CS**	**Bookable**	**IM/CS**	**Bookable**	**IM/CS**	**Bookable**	
113	97	0	210	182	28	139	71	
54%	**46%**	**0%**	**100%**	**87%**	**13%**	**66%**	**34%**	
210	TOTAL HOURS							
TOTAL USEAGE								
IM/CS	**Bookable**							
434	406							
52%	48%							
840	TOTAL HOURS							

	Day		ROOM 66 (iMacs)				ROOM 65 (iMacs)				ROOM 67 (IBM Compatible)				ROOM 69 (IBM Compatible)			
	No.		Computer Studies classes mainly				Cross-curricular mainly				Cross-curricular AND IM classes				IM classes mainly			
			1-2 pods avail some periods				imovie/photoshop=10				Some opt lines/some pods avail				1-2 pods avail some periods			
(+1 tchr machine)			26 + 1 tchr machine				27 + 1 tchr machine				24 + 1 tchr machine				24 + 1 tchr machine			
Date	Day	Period	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4
3-2	4	1	12CS1Th (35)								10TXIM1Wa (22)							
Wk 1	Mon	2									11IM1Wa (32)							
		3	12CS2Cm (27)								11IM3Wa (30)				12INM1Re (23)			
		4	13CM1Cm (17)								12IM1Wa (22)							
		5													11IM1Cm (22)			
4-2	5	1									11IM2Wa (23)				12IM2Cm (32)			
	Tue	2	12CS1Th (35)												10TXIM2Cm (20)			
		3									11INM1Wa (32)							
		4	12CS2Cm (27)								11IM3Wa (30)				12INM1Re (23)			
		5	13CM1Cm (17)								12IM1Wa (22)							
5-2	6	1	10TXIM1X (25)								10TXIM3Wa (27)				11IM1Cm (22)			
	Wed	2									11IM2Wa (23)				12IM2Cm (32)			
		3	12CS1Th (35)				EmpSkJC (17)				10TXIM1Wa (22)							
		4									11INM1Wa (32)							
		5	12CS2Cm (27)								11IM3Wa (30)				12INM1Re (23)			
7-2	1	1	13CM1Cm (17)								12IM1Wa (22)							
	Fri	2													11IM1Cm (22)			
		3	11IM2Wa (23)								11IM2Wa (23)				12IM2Cm (32)			
		4	12CS2Cm (27)				EmpSkJC (17)				10TXIM1Wa (22)							
		5	Yr11ScWo (25)								11INM1Wa (32)							

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		5	[illegible]	EmpSkJC (17)						[illegible]
11-2	3	1	10TXIM2Cm (28)			[illegible]				[illegible]
	Tu	2	[illegible]	12INIM1Re (23)		[illegible]				[illegible]
		3	[illegible]			[illegible]				
		4	[illegible]	10TXIM3Wa (27)		10TXIM3Wa (27)				[illegible]
		5		1IM2Wa (23)		[illegible]				[illegible]
12-2	4	1	[illegible]	EmpSkJC (17)		[illegible]				
	Wed	2				[illegible]				
		3	[illegible]	12INIM1Re (23)		[illegible]				[illegible]
		4	[illegible]			[illegible]				
		5								[illegible]
13-2	5	1	11IM2Wa (23)			[illegible]				[illegible]
	Thu	2	[illegible]	EmpSkJC (17)						[illegible]
		3	Yr12ScMu			[illegible]				
		4	[illegible]	12INIM1Re (23)		[illegible]				[illegible]
		5	[illegible]			[illegible]				

Wk4	Mon	2	Year11WkFoBMa (15)				Yr9En4Wh (30)								11IM1Cm (22)			
		3									11IM2Wa (23)				12IM2Cm (32)			
		4	12CS2Cm (27)				EmpSkJC (17)				10TXIM1Wa (22)							
		5									11NIM1Wa (32)							
18-2	2	1	12CS2Cm (27)								11IM3Wa (30)				12NM1Pe (23)			
	Tue	2	10CM1Cm (17)								12IM1Wa (22)							
		3	11TX1Dr (35)				Yr9En4Wh (30)				10TXIM3Wa (27)				11IM1Cm (22)			
		4					9En8Fi (31)				11M2Wa (23)				12IM2Cm (32)			
		5	12CS1Th (35)				EmpSkJC (17)								10TXIM2Gn (28)			
19-2	3	1									11NIM1Wa (32)				10TXIM3Ch (28)			
	Wed	2	12CS2Cm (27)				9En8Fi (31)				11IM3Wa (30)				12IM1Pe (23)			
		3	10CM1Cm (17)								12IM1Wa (22)							
		4	10TXIM2X (28)				Yr9En4Wh (30)				10TXIM3Wa (27)				11IM1Cm (22)			
		5									11M2Wa (23)				12IM2Cm (32)			
20-2	4	1	12CS1Th (35)				EmpSkJC (17)				10TXIM1Wa (22)				9En9Gt (30)			
	Thu	2									11NIM1Wa (32)							
		3	12CS2Cm (27)				9En8Fi (31)				11IM3Wa (30)				12NM1Pe (23)			
		4	10CM1Cm (17)								12IM1Wa (22)							
		5					Yr11WkFoMa (15)								11IM1Cm (22)			

21-2	5	1				11IM2Wa (23)	12IM2Cm (32)
	Fri	2	12CS1Th (35)	EmpSkJC (17)		9En9Gt (30)	10TXIM2Cm (28)
		3				11NIM1Wa (32)	
		4	12CS2Cm (27)			11IM3Wa (30)	12INIM1Re (23)
		5	13CM1Cm (17)			12IM1Wa (22)	
24-2	6	1	10TXIM4X (26)			10TXIM3Wa (27)	11IM1Cm (22)
Wk5	Mon	2				11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (35)	EmpSkJC (17)		10TXIM1Wa (22)	9En9Gt (30)
		4				11NIM1Wa (32)	
		5	12CS2Cm (27)			11IM3Wa (30)	12INIM1Re (23)
25-2	1	1	13CM1Cm (17)			12IM1Wa (22)	
	Tue	2	Year11WkFoBMa (15)	Yr9En2Pr (30)			11IM1Cm (22)
		3		Yr13ArtDesign		11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)	EmpSkJC (17)	13GeoBL	10TXIM1Wa (22)	9En10Rd (30)
		5				11NIM1Wa (32)	
26-2	2	1	12CS2Cm (27)			11IM3Wa (30)	12INIM1Re (23)
	Wed	2	13CM1Cm (17)			12IM1Wa (22)	
		3	10TXIM4X (26)	Yr9En2Pr (30)		10TXIM3Wa (27)	11IM1Cm (22)
		4		Yr13ArtDesign		11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)	EmpSkJC (17)	13GeoBL	9En10Rd (30)	10TXIM2Cm (28)
27-2	3	1				11NIM1Wa (32)	10TXIM2Cm (28)
	Thu	2	12CS2Cm (27)	Yr9En7Ke (30)		11IM3Wa (30)	12INIM1Re (23)
		3	13CM1Cm (17)			12IM1Wa (22)	
		4	10TXIM4X (26)	Yr9En2Pr (30)		10TXIM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign		11IM2Wa (23)	12IM2Cm (32)

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28-2	4	1	[illegible]	EmpSkJC (17)	[illegible]	9En10Rd (30)
	Fri	2				
		3	[illegible]	Yr9En7Ke (30)	[illegible]	[illegible]
		4	[illegible]		[illegible]	
		5				[illegible]
3-3	5	1		Yr13ArtDesign	[illegible]	[illegible]
Wk6	Mon	2	[illegible]	Yr11WkFoMa (15)		[illegible]
		3		EmpSkJC (17)	[illegible]	
		4	12OS2Om (27)	Yr9En7Ke (30)	11IM3We (30)	12INM1Re (23)
		5	[illegible]		[illegible]	
4-3	6	1	[illegible]		[illegible]	[illegible]
	Tue	2		Yr13ArtDesign		
		3	[illegible]	Yr12GeoFN	[illegible]	
		4		EmpSkJC (17)		
		5	[illegible]	Yr13 Hist (23)	[illegible]	[illegible]
5-3	1	1	[illegible]	Yr9MaoriPi	[illegible]	
	Wed	2	Year11WkFoBMa (15)	Yr9En1Ol (30)		[illegible]
		3		Yr13ArtDesign	[illegible]	
		4	[illegible]	Yr12GeoFN		
		5		Yr11/12 Comp SkillsJC		
6-3	2	1	[illegible]	Yr13 Hist (23)	[illegible]	[illegible]
	Thu	2	[illegible]	Yr9MaoriPi		
		3	[illegible]	Yr9En1Ol (30)	[illegible]	[illegible]
		4		Yr13ArtDesign	[illegible]	
		5	[illegible]	Yr12GeoFN		[illegible]

7-3	3	1	Yr12SciMu	Yr11/12 Comp SkillsJC		
	Fri	2		Yr9EngtHw (30)		
		3		FnEBu(20)		
		4		Yr9En1Ol (30)		
		5		Yr13ArtDesign		
10-3	4	1		9En11Fz (30)		
Wk7	Mon	2	Yr12SciMu	EmpSkJC (17)		
		3		Yr9EngtHw (30)		
		4		Yr9MaoriPi		
		5				
11-3	5	1	Yr10SocStudTh(31)	Yr13ArtDesign		
	Tue	2		Yr11WkFoMa (15)		
		3				
		4		Yr9SocStud1Sc		
		5				
12-3	6	1				
	Wed	2	Yr9SocStud1Sc	Yr13ArtDesign		
		3		Yr13GeoBl(28)		
		4				
		5		Yr13 Hist (23)		
13-3	1	1		Yr9SocStud1Sc		
	Thu	2	Year11WkFoBMa (15)	Yr9SocStud1Sc		
		3		Yr13ArtDesign		
		4		Yr13GeoBl(27)		
		5		EmpSkJC (17)		

		5	12CS1Th (35)			10TXIM2Cm (28)
17-3	3	1		EmpSkJC (17)	11NIM1Wa (32)	10TXIM2Cm (28)
Wk8	Mon	2	12CS2Cm (27)	Yr9Eng5Yo	11IM3Wa (30)	12NIM1Re (23)
		3			12IM1Wa (22)	13CM1Cm (17)
		4	10TXIM4X (26)	Yr9Eng3Yo	10TXIM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
18-3	4	1	12CS1Th (35)	Yr9EnHd (30)	10TXIM1Wa (22)	
	Tue	2		EmpSkJC (17)	11NIM1Wa (32)	
		3	12CS2Cm (27)	Yr9Eng5Yo	11IM3Wa (30)	12NIM1Re (23)
		4	9Sott1 Sc		12IM1Wa (22)	13CM1Cm (17)
		5	9Sott1 Sc	Yr11WkFoMa (15)		11IM1Cm (22)
19-3	5	1	Yr12Maori	Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
	Wed	2	12CS1Th (35)	Yr9EnHd (30)		10TXIM2Cm (28)
		3			11NIM1Wa (32)	
		4	12CS2Cm (27)	Yr9Eng5Yo	11IM3Wa (30)	12NIM1Re (23)
		5			12IM1Wa (22)	13CM1Cm (17)
20-36	6	1	10TXIM4X (26)		10TXIM2Wa (27)	11IM1Cm (22)
	Thu	2		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (35)	Yr9EnHd (30)	10TXIM1Wa (22)	ESOLBuckwell
		4			11NIM1Wa (32)	
		5	12CS2Cm (27)	9Sott1 Sc	11IM3Wa (30)	12NIM1Re

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21-3	1	1			12IM1Wa (22)	13CM1Cm (17)
	Fri	2	Year11WkFoBMa (15)			11IM1Cm (22)
		3	ESOL Buckwell	Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXIM1Wa (22)	
		5		EmpSkJC (17)	11NIM1Wa (32)	
24-3	2	1	12CS2Cm (27)	IELTSMp	11IM3Wa (30)	12NIM1Re (23)
Wk9	Mon	2	Yr12TechKe		12IM1Wa (22)	13CM1Cm (17)
		3	10TXIM4X (26)	Yr9 Eng 10 OL	10TXIM3Wa (22)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)	Yr13Geo Bl		10TXIM2Cm (28)
25-3	3	1	Science Mr	EmpSkJC (17)	11NIM1Wa (32)	10TXIM2Cm (28)
	Tue	2	12CS2Cm (27)	9Eng6Wt	11IM3Wa (30)	12NIM1Re (23)
		3	Yr12TechKe		12IM1Wa (22)	13CM1Cm (17)
		4	10TXIM4X (26)	Yr9 Eng 10 OL	10TXIM3Wa (22)	11IM1Cm (22)
		5		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
26-3	4	1	12CS1Th (35)		10TXIM1Wa (22)	
	Wed	2		EmpSkJC (17)	11NIM1Wa (32)	
		3	12CS2Cm (27)	9Eng6Wt	11IM3Wa (30)	12NIM1Re (23)
		4	Yr12TechKe		12IM1Wa (22)	13CM1Cm (17)
		5	Yr12Geo Mo (31)	Yr9 Eng 10 OL		11IM1Cm (22)
27-3	5	1		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
	Thu	2	12CS1Th (35)	Yr11WkFoMa (15)		10TXIM2Cm (28)
		3	Yr10 SS Mo (29)		11NIM1Wa (32)	
		4	12CS2Cm (27)	9Eng6Wt	11IM3Wa (30)	12NIM1Re (23)
		5	Yr12TechKe	IELTSGr	12IM1Wa (22)	13CM1Cm (17)

Wk10	Mon	2	Year11WkFoBMa (15)																	
		3					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)					
		4	12CS2Cm (27)								10TXIM1Wa (22)									
		5					EmpSkJC (17)				11NIM1Wa (32)									
1-4	2	1	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)					
	Tue	2	Yr12TechKe				11ALTGr				12IM1Wa (22)				9CM1Cm (17)					
		3	10TXIM1X (26)				Yr12Geo Mo (31)				10TXIM2Wa (29)				11IM1Cm (22)					
		4					Yr13ArtDesign				11IM3Wa (30)				12IM2Cm (32)					
		5	12CS1Cm (25)												10TXIM2Cm (25)					
2-4	3	1					EmpSkJC (17)				11NIM1Wa (32)				10TXIM2Cm (25)					
	Wed	2	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)					
		3	Yr12TechKe								12IM1Wa (22)				9CM1Cm (17)					
		4	10TXIM1X (26)				WkFocMa				10TXIM3Wa (27)				11IM1Cm (22)					
		5					Yr13ArtDesign				12IM2Wa (23)				12IM2Cm (32)					

Total Hours.
210

IM/CS Classes

113/210 hrs.

0/210hrs

182/210hrs.

139/210 hrs.

0/0 Time.

210
- 28
182

USD

5-5 Wk2	4 Mon	1	12CS1Th (35)		10TXIM1Wa (22)	
		2		11 ES Cn	11NIM1Wa (32)	Yr12Graphics Ab
		3	12CS2Cm (27)	Yr 13 French CS	11IM3Wa (30)	12INM1Re (23)
		4	13CM1Cm (17)		12IM1Wa (22)	Yr13 Graphics Ab
		5				11IM1Cm (22)
6-5	5 Tue	1	Yr9 MT Ab	Yr13ArtDesign	11IM2(Wa (23)	12IM2Cm (32)
		2	12CS1Th (35)	Yr11WkFoMa (15)		10TXIM2Cm (28)
		3		11 ES Cn	11INIM1Wa (32)	Yr12Graphics Ab
		4	12CS2Cm (27)		11IM3Wa (30)	12INIM1Re (23)
		5	13CM1Cm (17)		12IM1Wa (22)	Yr13 Graphics Ab
7-5	6 Wed	1	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
		2		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (35)		10TXIM1Wa (22)	
		4		11 ES Cn	11NIM1Wa (32)	Yr12Graphics Ab
		5	12CS2Cm (27)		11IM3Wa (30)	12INIM1Re (23)
8-5	1 Thur	1	13CM1Cm (17)	11 SocStud Breddy	12IM1Wa (22)	
		2	Year11WkFoBMa (15)			11IM1Cm (22)
		3	Yr9 MT Ab	Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXIM1Wa (22)	
		5			11NIM1Wa (32)	Yr12Graphics Ab

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9-5	2	1				
	Fri	2				13BU.FIC
		3				
		4		Yr13ArtDesign		
		5				
12-5	3	1		11 ES Cn		
Wk3	Mon	2		Yr9SocStud Paterson		
		3				
		4		WkFoc Ma		
		5	Yr9SocStud Paterson	Yr13ArtDesign		
13-5	4	1		12ESCa		
	Tue	2		11ESCa		Yr12Graphics Ab
		3		Yr9SocStud Paterson		
		4				
		5	Yr11Alt Gr	Yr9SocStud Paterson		
14-5	5	1		Yr13ArtDesign		
	Wed	2		Yr11WkFoMa (15)	12ESCa	
		3		11 ES Cn		Yr12Graphics Ab
		4		Yr9SocStud Paterson		
		5				
15-5	6	1				
	Thur	2	Yr9SocStud Paterson	Yr13ArtDesign		
		3		12ESCa		13BU.FIC
		4		11 ES Cn		Yr12Graphics Ab
		5		Yr9SocStud Paterson		

16-5	1	1				
	Fri	2	12 Computer Studies Exam	12Computer Studies Exam	Yr9SocStud Paterson	
		3				
		4				
		5		11ESCa		Yr12Graphics Ab
19-5	2	1				
Wk 4	Mon	2				13BU.FIC
		3		Yr9 SS Breddy		
		4		11 Employment Skills	12 Information Management	12 Information Management
		5	Yr10IM Cm	Exam	Exam	Exam
20-5	3	1		11ESCa		
	Tue	2				
		3				13BU.FIC
		4				
		5		Yr13ArtDesign		
21-5	4	1		11 Emp Skills Jc/Ca		
	Wed	2		Exam	11 Intro IM Exam	12 Intro IM Exam
		3				
		4		Yr9 SS Breddy		
		5				

22-5	5	1		Yr10 En We		12IM2Cm (32)
	Thur	2	12CS1Th (35)	Yr11WkFoMa (15)		10TXIM2Cm (28)
		3		11 ES Cn	11 IM Exam am/pm	Yr12Graphics Ab
		4	12CS2Cm (27)	Yr13 Stats Mk		11 IM Exam
		5	13CM1Cm (17)	Yr13 Stats Cp		
23-5	6	1	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
	Fri	2	R Brosnahan	Yr10 En We	11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (35)	12ESCa	10TXIM1Wa (22)	13BU.FIC
		4		11 ES Cn	11INIM1Wa (32)	Yr12Graphics Ab
		5	12CS2Cm (27)	Yr13 Stats Mk	11IM3Wa (30)	12INIM1Re (23)
26-5	1	1	13CM1Cm (17)	Yr13 Stats Cp	12IM1Wa (29)	
Wk5	Mon	2	Year11WkFoBMa (15)	Y13 Stats Lt		11IM1Cm (22)
		3	Warkworth Alt Programme Ca	Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		4	12CS1Th (35)	Warkworth Alt Programme Ca	10TXIM1Wa (22)	
		5		11ESCa	11INIM1Wa (32)	Yr12Graphics Ab
27-5	2	1	12CS2Cm (27)	Yr13 Stats Mk	11IM3Wa (30)	12INIM1Re (23)
	Tue	2	13CM1Cm (17)	Yr13 Stats Cp	12IM1Wa (22)	
		3	10TXIM4X (26)	Y13 Stats Lt	10TXIM3Wa (27)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)			10TXIM2Cm (28)
28-5	3	1		11ESCa	11INIM1Wa (32)	10TXIM2Cm (28)
	Wed	2	12CS2Cm (27)	Yr13 Stats Mk	11IM3Wa (30)	12INIM1Re (23)
		3	13CM1Cm (17)	Yr13 Stats Cp	12IM1Wa (22)	Yr11 SS Breddy
		4	10TXIM4X (26)	Y13 Stats Lt	10TXIM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)

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		5					Y13 Stats Lt								
30-5	5	1					Yr13ArtDesign								
	Fri	2					Yr11WkFoMa (15)				12ESCa				
		3												Yr12Graphics Ab	
		4					Yr13 Stats Mk								
		5					Yr13 Stats Cp							Yr9Jap1 Pa	
3-6	6	1					Y13 Stats Lt								
Wk6	Tue	2	Yr9SocStud Ferreira				Yr13ArtDesign								
		3					12ES Cammel								
		4												Yr12Graphics Ab	
		5					Yr13 Stats Mk								
4-6	1	1					Yr13 Stats Cp							Yr11 SS Breddy	
	Wed	2	Year11WkFoBMa (15)				Y13 Stats Lt				Yr9 So St Breddy				
		3					Yr13ArtDesign								
		4					Y12 Ro								
		5					11ES Cammel							Yr12Graphics Ab	
5-6	2	1					Yr13 Stats Mk								
	Thur	2					Yr13 Stats Cp							13BU FIC	
		3					Y13 Stats Lt								
		4	Lion Nathan Business				Yr13ArtDesign								
		5					Lion Nathan Business								

6-6	3	1	Lion Nathan Business	Yr12 Ec Ke	11NM1Wa (32)	10TXM2Cm (28)
	Fri	2	12CS2Cm (27)	Yr13 Stats Mk	11IM3Wa (30)	12NM1Be (23)
		3	13CM1Cm (17)	Yr13 Stats Cp	12IM1Wa (22)	Lion Nathan Business
		4	10TXM4X (26)	Y13 Stats Lt	10TXM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign	11M2Wa (23)	12IM2Cm (32)
9-6	4	1	12CS1Th (35)	12ES Cammel	10TXM1Wa (22)	Yr10 Econ Ke
Wk7	Mon	2		Yr12 Ec Ke	11NM1Wa (32)	
		3	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30)	12NM1Be (23)
		4	13CM1Cm (17)		12IM1Wa (22)	Year11SocSt Breddy
		5		Yr11WkFoMa (15)		11IM1Cm (22)
10-6	5	1		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
	Tue	2	12CS1Th (35)	12ES Cammel		10TXM2Cm (28)
		3		11ES Cammel	11NM1Wa (32)	
		4	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30)	12NM1Be (23)
		5	13CM1Cm (17)		12IM1Wa (22)	Year11SocSt Breddy
11-6	6	1	10TXM4X (26)	Yr10 Econ Ke	10TXM3Wa (27)	11IM1Cm (22)
	Wed	2		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (35)	12ES Cammel	10TXM1Wa (22)	
		4		11ES Cammel	11NM1Wa (32)	Yr9 Jap5 Pa
		5	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30)	12NM1Be (23)
12-6	1	1	13CM1Cm (17)		12IM1Wa (22)	Year11SocSt Breddy
	Thur	2	Year11WkFoBMa (15)			11IM1Cm (22)
		3		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXM1Wa (22)	
		5		11ES Cammel	11NM1Wa (32)	

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13-6	2	1	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30)	12NIM1Re (23)
	Fri	2	13CM1Cm (17)		12IM1Wa (22)	13BU.FIC
		3	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)			10TXIM2Cm (28)
16-6	3	1			11INIM1Wa (32)	10TXIM2Cm (28)
Wk 8	Mon	2	Year 10 Exam QU	Yr13 Acc(3) Yr 12 Comp Cm	Year 10 Exam TS	12NIM1Re (23)
		3		13CM1Cm (17)		12IM1Wa (22)
		4	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
17-6	4	1	12CS1Th (35)	12ES Cammel	10TXIM1Wa (22)	
	Tue	2	Yr10 IM Exam		11INIM1Wa (32) Exams	13BU.FIC
		3	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30)	12NIM1Re (23)
		4	13CM1Cm (17)		Yr10 EXAMS TS	12IM1Wa (22)
		5		Yr11WkFoMa (15)		11IM1Cm (22)
18-6	5	1		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
	Wed	2	12CS1Th (35)	12ES Cammel		Yr 10 EXAM CM
		3		11ES Cammel	11INIM1Wa (32)	
		4	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30) Exams	12NIM1Re (23)
		5	13CM1Cm (17)		12IM1Wa (22)	

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19-6	6	1	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
	Thur	2		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (35)	12ES Cammel	10TXIM1Wa (22)	
		4		11ES Cammel	11NIM1Wa (32)	Yr 10 Catchup EXAM IM
		5	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30)	12INIM1Re (23)
20-6	1	1		13CM1Cm (17)	12IM1Wa (22)	
	Fri	2	Yr 13 Stats Ass Cp	Year11WkFoBMa (15)		11IM1Cm (22)
		3			11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXIM1Wa (22)	
		5		11ES Cammel	11NIM1Wa (32)	
23-6	2	1	12CS2Cm (27)	Yr13 Accounting(3)	11IM3Wa (30)	12INIM1Re (23)
Wk9	Mon	2	13CM1Cm (17)		12IM1Wa (22)	Yr11 Soc St Bd
		3	10TXIM4X (26)		10TXIM3Wa (22)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)			10TXIM2Cm (28)
24-6	3	1			11NIM1Wa (32)	10TXIM2Cm (28)
	Tue	2	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)
		3	13CM1Cm (17)	Yr9SocStudBl	12IM1Wa (22)	Yr11 Soc St Bd
		4	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)

25-6	4	1		12ES Cammel		
	Wed	2				13BU.FIC
		3				
		4	Yr 9 Japanese3 Pa (29)			Yr11 Soc St Bd
		5		Yr11WkFoMa (15)		
26-6	5	1	Yr12Music(15)	Yr13ArtDesign		
	Thur	2		12ES Cammel		
		3		11ES Cammel	11INIM1Wa (32)	
		4	12CS2Cm (27)	Yr11 Geo (Bl)	11IM3Wa (30)	12INIM1Re (23)
		5	Yr 9 Japanese1 Pa (28)	Yr9SocStudBl	12IM1Wa (22)	13CM1Cm (17)
27-6	6	1			10TXIM3Wa (27)	11IM1Cm (22)
	Fri	2		Yr13ArtDesign	11IM2Wa (23)	
		3				
		4		11ES Cammel		
		5			11IM3Wa (30)	12INIM1Re (23)
30-6	1	1				
Wk10	Mon	2	Year11WkFoBMa (15)			11IM1Cm (22)
		3	12ES Cammel	Yr13ArtDesign	11IM2Wa (23)	
		4				
		5		11ES Cammel		
1-7	2	1		Yr 11.2GeogBl		
	Tue	2				
		3		Yr10EcoKe		
		4	Yr 11.1GeogBl	Yr13ArtDesign		
		5				

2-7	3	1			11INIM1Wa (32)	10TXIM2Cm (28)
	Wed	2	12CS2Cm (27)	Yr 11.2GeogBl	11IM3Wa (30)	12NIM1Re (23)
		3	13CM1Cm (17)	Yr9 Soc Stud Bl	12IM1Wa (22)	Yr12 BusinessKe
		4	10TXIMMX (23)		10TXIM3Wa (27)	11IM1Cm (22)
		5	Yr 11.1GeogBl	Yr13ArtDesign	11M2Wa (23)	12IM2Cm (32)
3-7	4	1	12CS1Th (35)	12ES Cammel	10TXIM1Wa (22)	10 Econ Ke
	Thur	2			11INIM1Wa (32)	13BU.FIC
		3	12CS2Cm (27)	Yr 11.2GeogBl	11IM3Wa (30)	12INM1Re (23)
		4	13CM1Cm (17)	Yr9 Soc Stud Bl	12IM1Wa (22)	Yr12 BusinessKe
		5				11IM1Cm (22)
4-7	5	1	Yr 11.1GeogBl	Yr13ArtDesign	11IM2(Wa (23)	12IM2Cm (32)
	Fri	2	12CS1Th (35)	Yr11WkFoMa (15)		10TXIM2Cm (28)
		3		11ES Cammel	11INIM1Wa (32)	
		4	12CS2Cm (27)	Yr12 Jap Pa	11IM3Wa (30)	12INIM1Re (23)
		5	13CM1Cm (17)	Yr9 Soc Stud Bl	12IM1Wa (22)	Yr12 BusinessKe

Total Hours:
245

	Day		ROOM 66 (IMacs)				ROOM 65 (IMacs)				ROOM 67 (IBM Compatible)				ROOM 69 (IBM Compatible)			
	No.		Computer Studies classes mainly				Cross-curricular mainly				Cross-curricular AND IM classes				IM classes mainly			
			1-2 pods avail some periods				Imovie/photoshop=10				Some opt lines/some pods avail				1-2 pods avail some periods			
(+1 tchr machine)			26 + 1 tchr machine				28 + 1 tchr machine				24 + 1 tchr machine				24 + 1 tchr machine			
Date	Day	Period	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4
21-7	6	1	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)			
Wk1	Mon	2					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)			
		3	12CS1Th (35)								10TXIM1Wa (22)							
		4									11NIM1Wa (32)							
		5	12CS2Cm (27)				Yr12Ac(3)				11IM3Wa (30)				12NIM1Re (23)			
22-7	1	1	13CM1Cm (17)				Blucher				12IM1Wa (22)							
	Tue	2	Year11WkFoBMa (15)												11IM1Cm (22)			
		3	Howell				Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)			
		4	12CS2Th (27)								10TXIM1Wa (22)				Yr10 Economics Ke			
		5									11NIM1Wa (32)							
23-7	2	1	12CS2Cm (27)				Yr12Ac(3)				11IM3Wa (30)				12NIM1Re (23)			
	Wed	2	13CM1Cm (17)				Blucher				12IM1Wa (22)							
		3	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)			
		4					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)			
		5	12CS1Th (35)				Y11 Spanish OL								10TXIM2Cm (25)			
24-7	3	1									10NIM1Wa (32)							
	Thur	2	12CS2Cm (27)				Yr12Ac(3)				11IM3Wa (30)							
		3	13CM1Cm (17)				Yr10ScienceWo				12IM1Wa (22)				FIC Bu (12)			
		4	10TXIM4X (26)								10TXIM3Wa (27)							
		5	Yr12/13 Spanish CS				Yr13ArtDesign				11IM2Wa (23)							
25-7	4	1	12CS1Th (35)								10TXIM1Wa (22)							
	Fri	2									11NIM1Wa (32)							
		3	12CS2Cm (27)				Yr12Ac(3)				11IM3Wa (30)				12NIM1Re (23)			
		4					Yr10ScienceWo				12IM1Wa (22)							
		5													11IM1Cm (22)			

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28-7	5	1		Yr13ArtDesign	11M2Wa (23)	12IM2Cm (32)
Wk2	Mon	2	12CS1Th (35)	Yr11WkFoMa (15)		10TXIM2Cm (28)
		3			11NIM1Wa (32)	
		4	12CS2Cm (27)	Yr12Ac(3)	11IM3Wa (30)	12INIM1Re (23)
		5			12IM1Wa (22)	13CM1Cm (17)
29-7	6	1	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
	Tue	2		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (35)		10TXIM1Wa (22)	FIC Bu (12)
		4			11NIM1Wa (32)	
		5	12CS2Cm (27)	Yr12Ac(3)	11IM3Wa (30)	12INIM1Re (23)
30-7	1	1			12IM1Wa (22)	13CM1Cm (17)
	Wed	2	Year11WkFoBMa (15)			11IM1Cm (22)
		3		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXIM1Wa (22)	
		5			11NIM1Wa (32)	Yr10Social Studies Peri
31-7	2	1	12CS2Cm (27)	Yr12Ac(3)	11IM3Wa (30)	12INIM1Re (23)
	Thur	2		Yr11EngUlt Kl	12IM1Wa (22)	13CM1Cm (17)
		3	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)			10TXIM2Cm (28)
1-8	3	1			11NIM1Wa (32)	10TXIM2Cm (28)
	Fri	2	12CS2Cm (27)	Yr12Ac(3)	11IM3Wa (30)	13NIM1Re (23)
		3	13CM1Cm (17)	Yr11EngUlt Kl	12IM1Wa (22)	Yr11SocStBreddy
		4	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)

4-8	4	1									10TXIM1Wa (22)				12CS1Th (35)	
Wk3	Mon	2									11INIM1Wa (32)					
		3	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)	
		4	13CM1Cm (17)								12IM1Wa (22)				Yr11SocStBreddy	
		5													11IM1Cm (22)	
5-8	5	1					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)	
	Tue	2	12CS1Th (35)				Yr11WkFoMa (15)								Foundation Immersion Class Bu	
		3									11INIM1Wa (32)				F	
		4	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)	
		5	13CM1Cm (17)				Yr11EngUlt KI				12IM1Wa (22)				Yr11SocStBreddy	
6-8	6	1	10TXIM4X (26)				SENESOL MP				10TXIM3Wa (27)				11IM1Cm (22)	
	Wed	2					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)	
		3	12CS1Th (35)								10TXIM1Wa (22)					
		4									11INIM1Wa (32)					
		5	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)	
7-8	1	1	13CM1Cm (17)								12IM1Wa (22)				Yr11SocStBreddy	
	Thur	2	Year11WkFoBMa (15)				SENESOL MP				Yr11 SocSt Breddy				11IM1Cm (22)	
		3					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)	
		4									10TXIM1Wa (22)				12CS2Th (27)	
		5									11INIM1Wa (32)					
8-8	2	1	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)	
	Fri	2	13CM1Cm (17)				Yr12IELTS				12IM1Wa (22)				Yr11SocStBreddy	
		3	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)	
		4					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)	
		5	Yr13Geo Bl								12CS1Th (35)				10TXIM2Cm (26)	

11-8	**3**	**1**														
Wk4	**Mon**	**2**														
		3														
		4					SENESOL Mp									
		5	Yr10SocStudTs				Yr13ArtDesign									
12-8	**4**	**1**														
	Tue	**2**	Yr10.3EnKl				Peri								FIC Bu (12)	
		3					Yr9EnKl									
		4					Blucher								Yr11Alt Kl	
		5														
13-8	**5**	**1**					Yr13ArtDesign									
	Wed	**2**					Yr11WkFoMa (15)									
		3														
		4														
		5														
14-8	**6**	**1**														
	Thur	**2**					Yr13ArtDesign									
		3	Yr9Science Brown													
		4					Yr10SSBl									
		5														
15-8	**1**	**1**					9SSBl								Yr11Alt Kl	
	Fri	**2**	Year11WkFoBMa (15)				Yr9/12ScienceMu									
		3	Yr10.7EnKl				Yr13ArtDesign									
		4	Yr9Science Brown													
		5					Yr10SSBl								Yr10SocStudPl	

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18-8	2	1	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)
Wk5	Mon	2	13CM1Cm (17)	9SSBl	12IM1Wa (22)	Yr11Alt Kl
		3	10TXIM4X (26)		10TXIM3Wa (22)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	Yr9/5ScienceMu		12CS1Th (35)	10TXIM2Cm (28)
19-8	3	1			11NIM1Wa (32)	10TXIM2Cm (28)
	Tue	2	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)
		3	13CM1Cm (17)	9SSBl	12IM1Wa (22)	Yr12NSTMd
		4	10TXIM4X (26)	9SSBl	10TXIM3Wa (27)	11IM1Cm (22)
		5	Yr10.7EnKl	Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
20-8	4	1			10TXIM1Wa (22)	12CS1Th (35)
	Wed	2	Yr10.3EnKl	Yr10SSBl	11NIM1Wa (32)	FIC Bu (12)
		3	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)
		4	13CM1Cm (17)	9SSBl	12IM1Wa (22)	Yr12NSTMd
		5	9SSBl	Yr11EnKl		11IM1Cm (22)
21-8	5	1	Woollard	Yr13ArtDesign	11IM2(Wa (23)	12IM2Cm (32)
	Thur	2		Yr11WkFoMa (15)	12CS1Th (35)	10[illegible]M2Cm (28)
		3		Yr10SSBl	11NIM1Wa (32)	
		4	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)
		5	13CM1Cm (17)	Yr10Sci Br	12IM1Wa (22)	Yr12NSTMd
22-8	6	1	10TXIM4X (26)	Yr11EnKl	10TXIM3Wa (27)	11IM1Cm (22)
	Fri	2	9SSBl	Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		3		Yr9ScienceMu	10TXIM1Wa (22)	12CS1Th (35)
		4			11NIM1Wa (32)	
		5	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)

25-8	1	1	13CM1Cm (17)								12IM1Wa (22)				Yr11EngAlt Kl				
Wk6	Mon	2	Year11WkFoBMa (15)				Woollard								11IM1Cm (22)				
		3	Woollard				Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)				
		4									10TXIM1Wa (22)				12CS2Cm (27)				
		5									11NIM1Wa (32)				Yr10SocStudPi				
26-8	2	1	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)				
	Tue	2	13CM1Cm (17)								12IM1Wa (22)				Yr11EngAlt Kl				
		3	10TXIM4X (26)				Woollard				10TXIM3Wa (22)				11IM1Cm (22)				
		4					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)				
		5									12CS1Th (35)				10TXIM2Cm (28)				
27-8	3	1									11NIM1Wa (32)				10TXIM2Cm (28)				
	Wed	2	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)				
		3	13CM1Cm (17)								12IM1Wa (22)				Yr11EngAlt Kl				
		4	10TXIM4X (26)				Woollard				10TXIM3Wa (22)				11IM1Cm (22)				
		5					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)				
28-8	4	1									10TXIM1Wa (22)				12CS1Th (35)				
	Thur	2	Yr10SocStudPi								11NIM1Wa (32)				FIC Bu (12)				
		3	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)				
		4	13CM1Cm (17)								12IM1Wa (22)				Yr11EngAlt Kl				
		5													11IM1Cm (22)				
29-8	5	1	Woollard				Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)				
	Fri	2					Yr11WkFoMa (15)				12CS1Th (35)				10TXIM2Cm (28)				
		3									11NIM1Wa (32)								
		4	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)				
		5	13CM1Cm (17)								12IM1Wa (22)								

1-9	6	1	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)
Wk7	Mon	2					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)
		3									10TXIM1Wa (22)				12CS1Th (35)
		4									11NIM1Wa (32)				
		5	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)
2-9	1	1	13CM1Cm (17)								12IM1Wa (22)				
	Tue	2	Year11WkFoBMa (15)				Woollard								11IM1Cm (22)
		3	Woollard				Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)
		4									10TXIM1Wa (22)				12CS2Cm (27)
		5									11NIM1Wa (32)				
3-9	2	1	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)
	Wed	2	13CM1Cm (17)								12IM1Wa (22)				FIC Bu (12)
		3	10TXIM4X (26)				Woollard				10TXIM3Wa (22)				11IM1Cm (22)
		4					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)
		5									12CS1Th (35)				10TXIM2Cm (28)
4-9	3	1													10TXIM2Cm (28)
	Thur	2	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)
		3	13CM1Cm (17)								12IM1Wa (22)				
		4	10TXIM4X (26)				Woollard				10TXIM3Wa (27)				11IM1Cm (22)
		5					Yr13ArtDesign				11M2Wa (23)				12IM2Cm (32)
5-9	4	1									10TXIM1Wa (22)				12CS1Th (35)
	Fri	2									11NIM1Wa (32)				
		3	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)
		4	13CM1Cm (17)								12IM1Wa (22)				
		5													11IM1Cm (22)

8-9	5	1					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)			
Wk8	Mon	2					Yr11WkFoMa (15)				12CS1Th (35)				10TXIM2Cm (28)			
		3									11NIM1Wa (32)							
		4	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)			
		5	13CM1Cm (17)								12IM1Wa (22)							
9-9	6	1	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)			
	Tue	2					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)			
		3									10TXIM1Wa (22)				12CS1Th (35)			
		4									11NIM1Wa (32)							
		5	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)			
10-9	1	1	13CM1Cm (17)								12IM1Wa (22)							
	Wed	2	Year11WkFoBMa (15)												11IM1Cm (22)			
		3					Yr13ArtDesign				11IM2W				M2Cm (32)			
		4									10 M1Wa (22)				12CS2Cm (27)			
		5									11NIM1Wa (32)							
11-9	2	1	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)			
	Thur	2	13CM1Cm (17)								12IM1Wa (22)				FIC Bu (12)			
		3	10TXIM4X (26)								10TXIM3Wa (22)				11IM1Cm (22)			
		4					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)			
		5									12CS1Th (35)				10TXIM2Cm (28)			
12-9	3	1									11NIM1Wa (32)				10TXIM2Cm (28)			
	Fri	2	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)			
		3	13CM1Cm (17)								12IM1Wa (22)							
		4	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)			
		5					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)			

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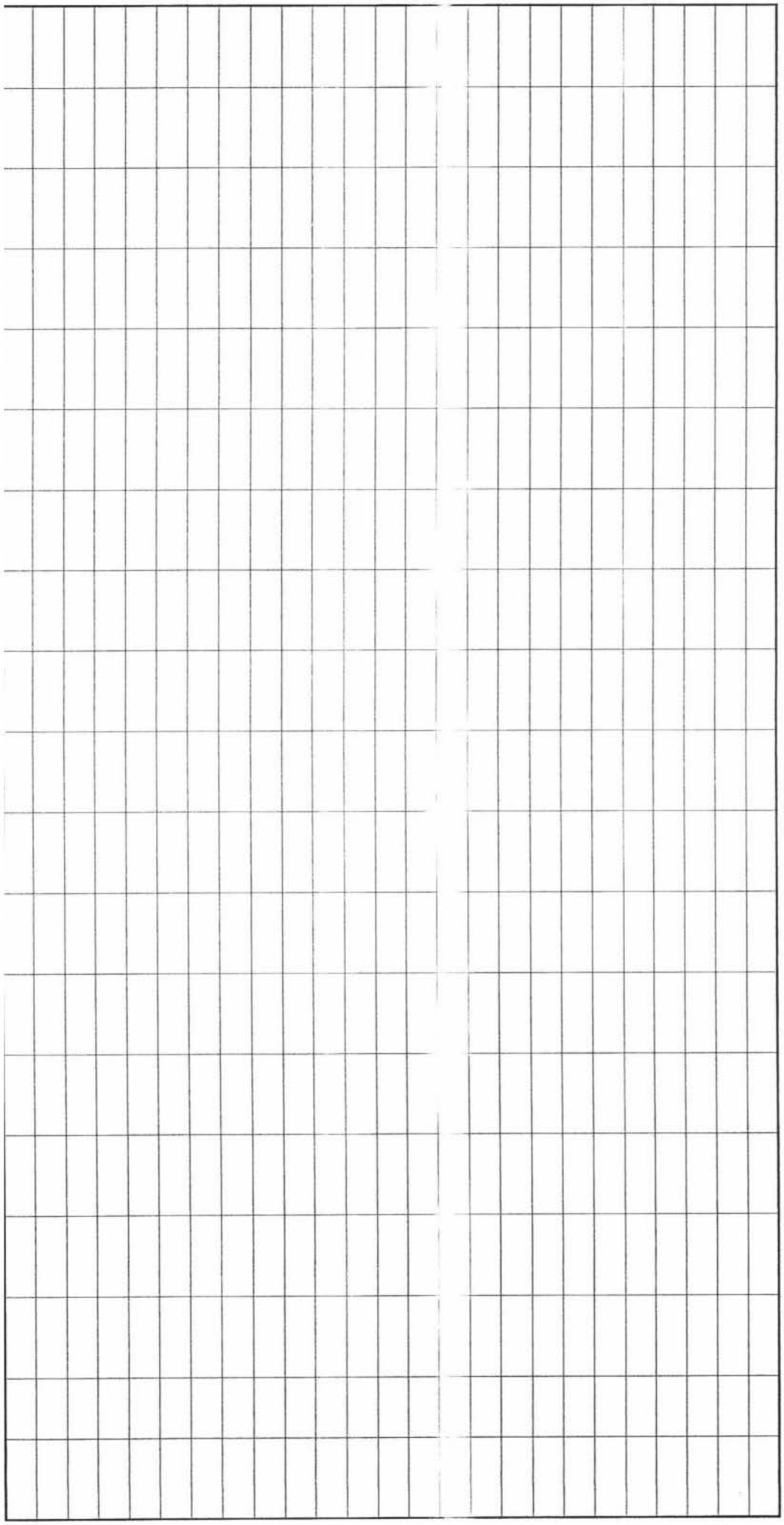
15-9	4	1									10TXIM1Wa (22)		12CS1Th (35)	
Wk9	Mon	2									11INIM1Wa (32)		FIC Bu (12)	
		3	12CS2Cm (27)								11IM3Wa (30)		12INIM1Re (23)	
		4	13CM1Cm (17)								12IM1Wa (22)			
		5											11IM1Cm (22)	
16-9	5	1					Yr13ArtDesign				11IM2Wa (23)		12IM2Cm (32)	
	Tue	2					Yr11WkFoMa (15)				12CS1Th (35)		10TXIM2Cm (28)	
		3									11INIM1Wa (32)			
		4	12CS2Cm (27)								11IM3Wa (30)		12INIM1Re (23)	
		5	13CM1Cm (17)								12IM1Wa (22)			
17-9	6	1	10TXIM4X (26)								10TXIM3Wa (27)		11IM1Cm (22)	
	Wed	2					Yr13ArtDesign				11IM2Wa (23)		12IM2Cm (32)	
		3									1 [illegible]		[illegible] (35)	
		4									11INIM1Wa (32)			
													Re (23)	
18-9	1	1	13CM1Cm (17)								12IM1Wa (22)			
	Thur	2	Year11WkFoBMa (15)										11IM1Cm (22)	
		3					Yr13ArtDesign				11IM2Wa (23)		12IM2Cm (32)	
		4									10TXIM1Wa (22)		12CS2Cm (27)	
		5									11INIM1Wa (32)			
19-9	2	1	12CS2Cm (27)								11IM3Wa (30)		12INIM1Re (23)	
	Fri	2	13CM1Cm (17)								12IM1Wa (22)			
		3	10TXIM4X (26)								10TXIM3Wa (27)		11IM1Cm (22)	
		4					Yr13ArtDesign				11IM2Wa (23)		12IM2Cm (32)	
		5									12CS1Th (35)		10TXIM2Cm (28)	

Total Hours:
225

270



	Day		ROOM 66 (iMacs)				ROOM 65 (iMacs)				ROOM 67 (IBM Compatible)				ROOM 69 (IBM Compatible)			
	No.		Computer Studies classes mainly				Cross-curricular mainly				Cross-curricular AND IM classes				IM classes mainly			
			1-2 pods avail some periods				Imovie/photoshop=10				Some opt lines/some pods avail				1-2 pods avail some periods			
(+1 tchr machine)			26 + 1 tchr machine				28 + 1 tchr machine				24 + 1 tchr machine				24 + 1 tchr machine			
Date	Day	Period	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4	POD 1	POD 2	POD 3	POD 4
6-10	3	1									11INIM1Wa (32)				10TXIM2Cm (28)			
Wk1	Mon	2	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)			
		3	13CM1Cm (17)								12IM1Wa (22)							
		4	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)			
		5					Yr13ArtDesign				11IM2Wa (28)				12IM2Cm (32)			
7-10	4	1	12CS1Th (35)								10TXIM1Wa (22)							
	Tue	2									11INIM1Wa (32)							
		3	12CS2Cm (27)								11IM3Wa (30)				12[illegible]Re (23)			
			[illegible]								12IM1Wa (22)							
		5																
8-10	5	1					Yr13ArtDesign								[illegible] (32)			
	Wed	2	12CS1Th (35)				Yr11WkFoMa (15)								10TXIM2Cm (28)			
		3									11INIM1Wa (32)							
		4	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)			
		5	13CM1Cm (17)								12IM1Wa (22)							
9-10	6	1	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)			
	Thur	2					Yr13ArtDesign				11IM2Wa (28)				12IM2Cm (32)			
		3	12CS1Th (35)								10TXIM1Wa (22)							
		4									11INIM1Wa (32)							
		5	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)			
10-10	1	1	13CM1Cm (17)								12IM1Wa (22)							
	Fri	2	Year11WkFoBMa (15)												11IM1Cm (22)			
		3					Yr13ArtDesign				11IM2Wa (28)				12IM2Cm (32)			
		4	12CS2Cm (27)								10TXIM1Wa (22)							
		5									11INIM1Wa (32)							

2 T 2

13-10	**2**	**1**	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)
Wk2	**Mon**	**2**	13CM1Cm (17)								12IM1Wa (22)				
		3	10TXIM4X (26)								10TXIM3Wa (22)				11IM1Cm (22)
		4					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)
		5	12CS1Th (35)												10TXIM2Cm (28)
14-10	**3**	**1**									11INIM1Wa (32)				10TXIM2Cm (28)
	Tue	**2**	12CS2Cm (27)								11IM3Wa (30)				12NIM1Re (23)
		3	13CM1Cm (17)								12IM1Wa (22)				
		4	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)
		5					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)
15-10	4	**1**	12CS1Th (35)								10TXIM1Wa (22)				
	Wed	**2**									11INIM1Wa (32)				
		3	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)
		4	13CM1Cm (17)								12IM1Wa (22)				
		5													11IM1Cm (22)
16-10	**5**	**1**					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)
	Thur	**2**	12CS1Th (35)				Yr11WkFoMa (15)								10TXIM2Cm (28)
		3									11INIM1Wa (32)				
		4	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)
		5	13CM1Cm (17)								12IM1Wa (22)				
17-10	**6**	**1**	10TXIM4X (26)								10TXIM3Wa (27)				11IM1Cm (22)
	Fri	**2**					Yr13ArtDesign				11IM2Wa (23)				12IM2Cm (32)
		3	12CS1Th (35)								10TXIM1Wa (22)				
		4									11INIM1Wa (32)				
		5	12CS2Cm (27)								11IM3Wa (30)				12INIM1Re (23)

20-10	**1**	**1**	13CM1Cm (17)		12IM1Wa (22)	
Wk3	**Mon**	**2**	Year11WkFoBMa (15)			11IM1Cm (22)
		3		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXIM1Wa (22)	
		5			11INIM1Wa (32)	
21-10	**2**	**1**	12CS2Cm (27)		11IM3Wa (30)	12INM1Re (23)
	Tue	**2**	13CM1Cm (17)		12IM1Wa (22)	
		3	10TXIM4X (26)		10TXIM3Wa (22)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)			10TXIM2Cm (28)
22-10	3	**1**				10TXIM2Cm (28)
	Wed	**2**	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)
		3	CM (17)		12IM1Wa (22)	
		4				
		5		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
23-10	4	**1**	12CS1Th (35)		10TXIM1Wa (22)	
	Thur	**2**			Ma (32)	
		3			(30)	12INM1Re (23)
		4	13CM1Cm (17)		12IM1Wa (22)	
		5				11IM1Cm (22)
24-10	**5**	**1**		Yr13ArtDesign	11IM2(Wa (23)	12IM2Cm (32)
	Fri	**2**	12CS1Th (35)	Yr11WkFoMa (15)		10TXIM2Cm (28)
		3			11INIM1Wa (32)	
		4	12CS2Cm (27)		11IM3Wa (30)	12INI
		5	13CM1Cm (17)		12IM1Wa (22)	

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28-10	6	1	10TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
Wk4	Tue	2		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		3	12CS1Th (36)		10TXIM1Wa (22)	
		4			11INIM1Wa (32)	
		5	12CS2Cm (27)		11IM3Wa (30)	12INIM1Re (23)
29-10	1	1	13CM1Cm (17)		12IM1Wa (22)	
	Wed	2	Year11WkFoBMa (15)			11IM1Cm (22)
		3		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXIM1Wa (22)	
		5			11INIM1Wa (32)	
30-10	2	1	12CS2Cm (27)		IM3W	12IM1Re (23)
	Thur	2	13CM1Cm (17)		12IM1Wa (22)	
		3				11IM1Cm (22)
		4				12IM2Cm (32)
31-10	3	1				
	Fri	2	12CS2Cm (27)		11IM3W	12NIM1Re (23)
		3	13CM1Cm (17)			
		4	10TXIM4X (26)			12IM2Cm (32)
		5		Yr13ArtDesign	11IM2Wa (23)	

95 hrs end of Wk 4.

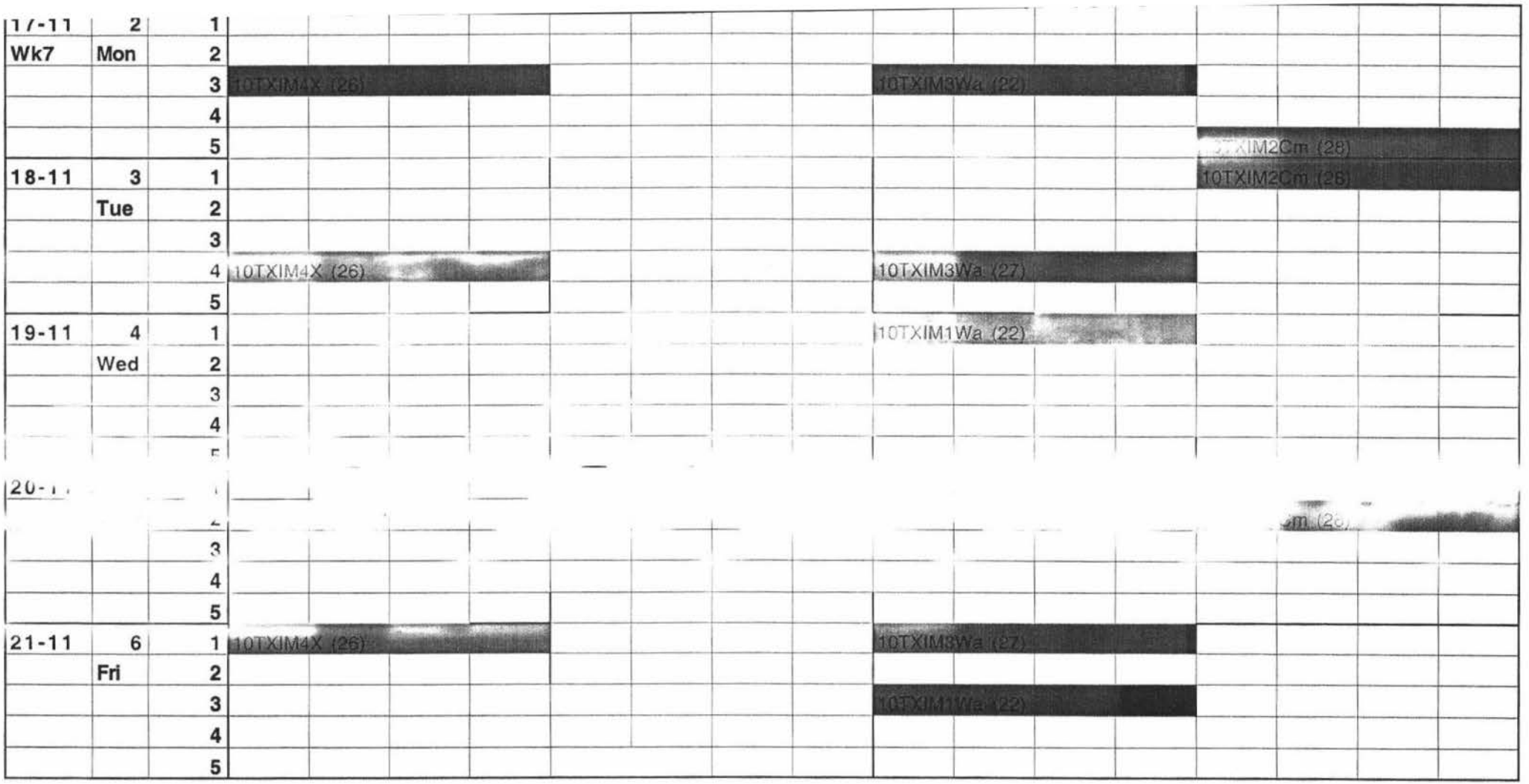
3-11	4	1	12CS1Th (35)		10TXIM1Wa (22)	
Wk5	Mon	2			11INIM1Wa (32)	
		3	12CS2Cm (27)		11IM3Wa (30)	12INM1Re (23)
		4	13CM1Cm (17)		12IM1Wa (22)	
		5				11IM1Cm (22)
4-11	5	1		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
	Tue	2	12CS1Th (35)	Yr11WkFoMa (15)		10TXIM2Cm (28)
		3			11INIM1Wa (32)	
		4	12CS2Cm (27)		11IM3Wa (30)	12INIM1Re (23)
		5	13CM1Cm (17)		[illegible] (22)	
5-11	6	1	10TXIM4X (26)		[illegible]IM3Wa [illegible]	11IM1Cm (22)
	Wed	2		Yr13ArtDesign	[illegible]Wa (23)	[illegible]2IM2Cm (32)
		3	12CS1Th (35)			
		4			[illegible]Wa (32)	
	Thur	2	Year11WkFoBMa (15)			
		3		Yr13ArtDesign	[illegible]Wa (23)	12IM2Cm (32)
		4	12CS2Cm (27)		10TXIM1Wa (22)	
		5			11INIM1Wa (32)	
7-11	2	1	12CS2Cm (27)		11IM3Wa (30)	12INIM1Re (23)
	Fri	2	13CM1Cm (17)		12IM1Wa (22)	
		3	10TXIM4X (26)		10TXIM3Wa (22)	11IM1Cm (22)
		4		Yr13ArtDesign	11IM2Wa (23)	12IM2Cm (32)
		5	12CS1Th (35)			10TXIM2Cm (28)

120hrs End of wk5

276

10-11	3	1			11INIM1Wa (32)	10TXIM2Cm (28)
Wk6	Mon	2	12CS2Cm (27)		11IM3Wa (30)	12NIM1Re (23)
		3	13CM1Cm (17)		12IM1Wa (22)	
		4	[illegible]TXIM4X (26)		10TXIM3Wa (27)	11IM1Cm (22)
		5		Yr13ArtDesign	1IM2Wa (23)	12IM2Cm (32)
11-11	4	1			10TXIM1Wa (22)	
	Tue	2				
		3				
		4				
		5				
12-11	5	1				
	Wed	2				[illegible]XIM[illegible]Cm (28)
		[illegible]				
		4				
		5				
		[illegible]				
	Thur	2				
		[illegible]			[illegible]Wa (22)	
		4				
		5				
14-11	1	1				
	Fri	2				
		3				
		4			10TXIM1Wa (22)	
		5				

Total Hrs
- senior leave.
125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Tue 2
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19-11 4 1
Wed 2
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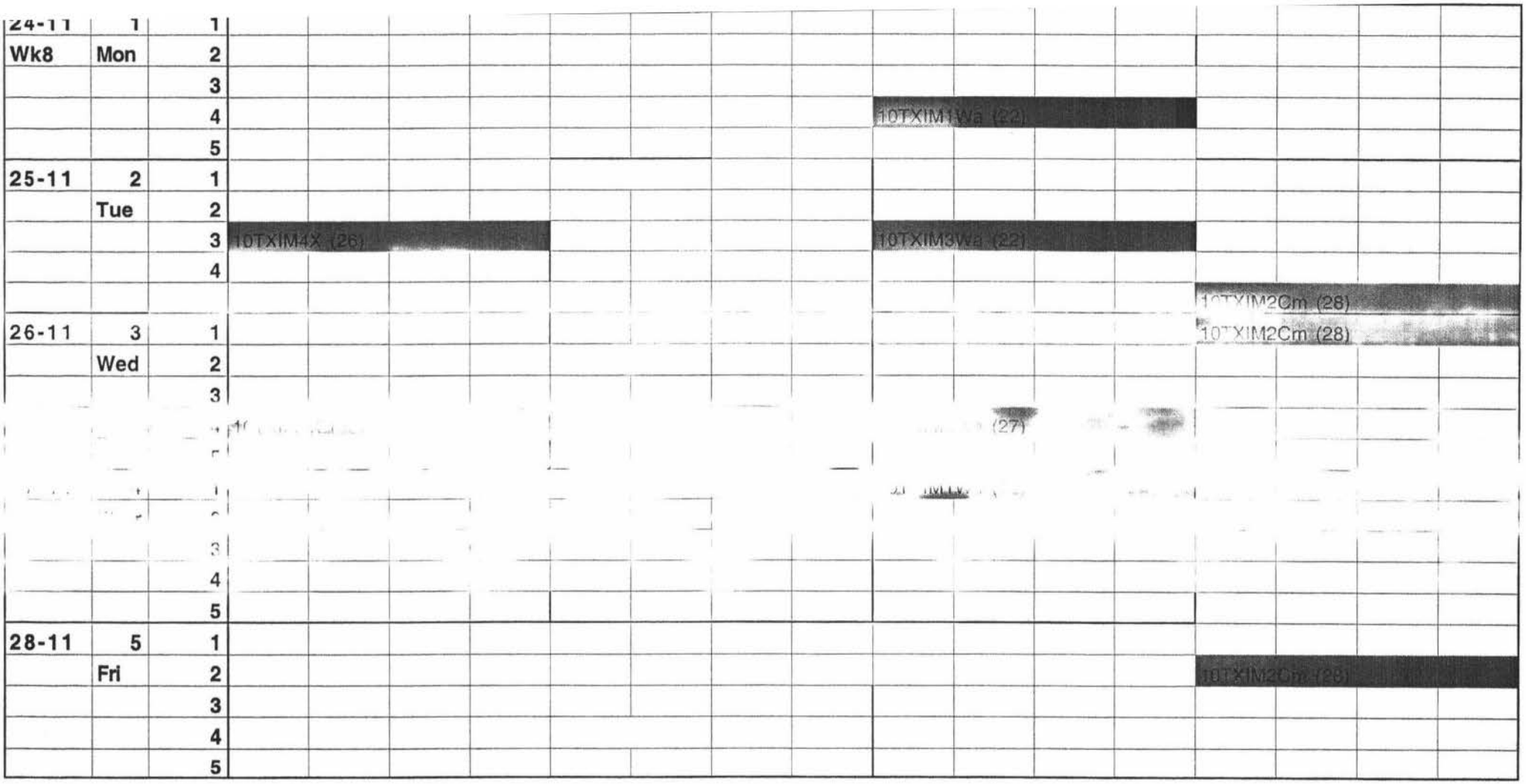
5
20-11
3
4
5
21-11 6 1
Fri 2
3
4
5
10TXIM4X (26)
10TXIM3Wa (22)
10TXIM2Cm (28)
10TXIM2Cm (28)
10TXIM4X (26)
10TXIM3Wa (27)
10TXIM1Wa (22)
10TXIM4X (26)
10TXIM3Wa (27)
10TXIM1Wa (22)

278


24-11 1 1
Wk8 Mon 2
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4
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25-11 2 1
Tue 2
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26-11 3 1
Wed 2
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28-11 5 1
Fri 2
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10TXIM1Wa (22)
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10TXIM2Cm (28)
10TXIM2Cm (28)

1-12	6	1	10TXIM4X (26)		10TXIM3Wa (27)	
Wk9	Mon	2				
		3			10TXIM1Wa (22)	
		4				
		5				
2-12	1	1				
	Tue	2				
		3				
		4			10TXI.1Wa (22)	
		5				
3-12	2	1				
	Wed	2				
		[illegible]			(22)	
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		[illegible]				(28)
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5-12	4	1			10TXIM1Wa (22)	
	F	2				
		3				
		4				
		5				

088

220 hrs
/ juniors leave.

Massey University
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Department of
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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

STUDENT QUESTIONNAIRE FOR CURRENT STUDENTS

NOTE:

- **Participants have the right to decline to participate in this research and should hand this questionnaire back to the researcher whether they have filled it in or not.**
- **Orewa College is soon to become a Year 7-13 school. Please take this into account when filling in this questionnaire.**

Are you: **MALE / FEMALE** (please circle one)

Please state your ethnicity (eg - NZ Maori/European, etc): _____

YOUR NAME IS NOT REQUIRED

1. What year level are you currently in?

   Year 9 / 10 / 11 / 12 / 13 (please circle one)

2. What does Information and Communication Technologies (ICT) mean to you? (What do you think is included under the umbrella of ICT?)

   _____

   _____

   _____

   _____

3. How important do you think it is for you to learn ICT skills?

   Very Important / Important / Reasonably Important/ Not Very Important
   (circle one of the above)

4. Explain your answer to number 3.

   _____

   _____

   _____

5. Had you learnt any ICT skills before coming to Orewa College?

   Yes - a lot

   Yes – some

   Yes – not much

   No (circle one – **If Yes, go to question 6, if No, go to question 8)**

6. Did you learn these ICT skills mostly at home or at school?

   At home / At school / Some at home, some at school / Other place

   (please circle one)

   Please specify where, if you circled "other place": _____

7. Describe the ICT skills that you learnt before coming to Orewa College.
   (Eg – I knew Powerpoint pretty well and had done some word processing).

   _____

   _____

   _____

   _____

   _____

8. **If you answered "No" to No. 5,** what do you think is the main reason that you did not learn ICT skills before coming to Orewa College?

_____

_____

_____

9. Have you ever taken an ICT subject at school? (Either at Orewa College or before coming here).

Yes / No (please circle)

(If yes, please circle the subjects below that you have taken before and write the year level/s beside)

Information Management – Year/s _____

Computer Studies – Year/s _____

Desktop Publishing – Year/s _____

Introductory Information Management – Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

10. Do you intend to study any ICT subject/s in the future? (Either at Orewa College or elsewhere).

Yes / No / Don't know (please circle one)

(If yes, please circle the subjects below, and over the page, that you intend to take and write the year level/s beside. If you intend to study the subject after high school years, write TERTIARY in the Year/s space.)

Information Management – Year/s _____

Computer Studies – Year/s _____

Desktop Publishing – Year/s _____

Introductory Information Management – Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

11. ICT skills are currently taught at Orewa College both in separate ICT subjects AND in other subjects as part of their courses. Do you think there is a need for ICT to be taught in separate subjects?

    Yes / No / Don't know (circle one)

    Give reasons for your answer: _____

    _____

    _____

12. **If you answered "Yes" to Number 17**, what topics do you think should be included in separate ICT subject(s), at Orewa College, **or** taught as individual subject(s) in their own right? (Please tick)

- ☐ Computer Keyboarding
- ☐ Layout and Design of Documents
- ☐ Word Processing
- ☐ Spreadsheets
- ☐ Databases
- ☐ Computer Programming – Language/s: _____
- ☐ Creating computer graphics
- ☐ Presentations (eg Powerpoint)
- ☐ Standard operating procedures and file management
- ☐ Use of peripherals: Scanner, Digital camera, Digital video camera, Data projector
- ☐ Internet
- ☐ Email
- ☐ Draw/Paint applications
- ☐ Ergonomics (how to correctly and safely use ICT equipment)
- ☐ Operating Systems
- ☐ The Impact of ICT on Society
- ☐ Networks – how they work and how to use them
- ☐ General problem solving and decision making
- ☐ Macros
- ☐ Research on Computers in Society
- ☐ Research on Telecommunications in Society
- ☐ Web Page Design
- ☐ Computer animation
- ☐ Other/s: _____ (continue over page if necessary)

13. **If you answered "No" to number 11,** please explain why you think there is not a need for ICT to be taught in separate subjects:

14. Do you think there is a need for some ICT to be taught in all, or most, subjects?

    Yes / No / Don't know (please circle)

15. Explain your answer to number 14:

16. Do you believe that, in some form, ICT should be compulsory?

    Yes / No / Don't know (please circle)

17. If yes, give reasons and briefly detail:

18. Please tick, from the list below, the forms of learning you are in favour of. You may tick as many, or as few, as you like.

- ☐ Online learning
- ☐ Individual student laptops
- ☐ Pods of computers in departments
- ☐ Computer labs (of 25 or more computers)
- ☐ Modular courses
- ☐ Don't know
- ☐ Other (please detail): _____

_____

_____

_____

19. Please give reasons for, or comments on, your response to no. 18:

_____

_____

_____

_____

_____

_____

_____

20. What does the word "academic" mean to you?

_____

21. Do you consider ICT skills to be "academic"?

Yes / No / Don't know (please circle)

22. Please explain your answer to no. 21: _____

_____

_____

23. Briefly, how would you describe the culture of Orewa College? (By "culture" I mean the character of the school. It includes "how we do things around here").

_____

_____

_____

_____

24. Any additional/relevant comments to this questionnaire: _____

_____

_____

_____

_____

This project has been reviewed and approved by the Massey College of Education Ethics Committee.

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE.

APPENDIX B2

Massey University
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Te Kupenga o Te Mātauranga

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Albany Campus
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Auckland,
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Facsimile: 64 9 443 9713

In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

PARENT/GUARDIAN QUESTIONNAIRE

NOTE:

- **Participants have the right to decline to participate in this research and should hand this questionnaire back to the researcher whether they have filled it in or not.**
- **Orewa College is soon to become a Year 7-13 school. Please take this into account when filling in this questionnaire.**

Are you: **MALE / FEMALE** (please circle one)

Please state your ethnicity (eg - NZ Maori/European, etc): ____________________

YOUR NAME IS NOT REQUIRED

1. What does Information and Communication Technologies (ICT) mean to you? (What do you think is included under the umbrella of ICT?)

____

____

____

____

2. How important do you think it is for students to learn ICT skills?

   Very Important / Important / Reasonably Important/ Not Very Important

   (circle one of the above)

3. Explain your answer to number 2.

_____

_____

_____

_____

_____

_____

4. Have you ever studied an ICT subject yourself?

Yes / No (please circle)

(If yes, please circle the subjects on the next page that you have taken before and write the year level/s beside – if studied after high school years, simply write TERTIARY beside Year/s)

Information Management – Year/s _____

Computer Studies – Year/s _____

Desktop Publishing – Year/s _____

Introductory Information Management – Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

5. **If you answered "yes" to number 4**, what benefits, if any, do you feel you gained? _____

_____

_____

_____

6. Do you intend to study any ICT subject/s in the near future?

   Yes / No / Don't know (please circle one)

   (If yes, please fill in the details below)

   Subject: _____ Duration of course: _____

   Subject: _____ Duration of course: _____

   Subject: _____ Duration of course: _____

7. Please give reasons for your answer to number 6: _____

   _____

   _____

8. ICT skills are currently taught at Orewa College both in **separate ICT subjects** (eg - Computer Studies) AND in **other subjects** as part of their courses (eg - spreadsheets in Mathematics). Do you think there is a need for ICT to be taught in a **separate** subject (or subjects)?

   Yes / No / Don't know (circle one)

   Give reasons for your answer: _____

   _____

   _____

MORE QUESTIONS ARE CONTINUED ON THE NEXT PAGE ...

9. **If you answered "Yes" to Number 8**, what topics do you think should be included in separate ICT subjects? (Please tick).

- ☐ Computer Keyboarding
- ☐ Layout and Design of Documents
- ☐ Word Processing
- ☐ Spreadsheets
- ☐ Databases
- ☐ Computer Programming – Language/s: _____
- ☐ Creating computer graphics
- ☐ Presentations (eg Powerpoint)
- ☐ Standard operating procedures and file management
- ☐ Use of peripherals: Scanner, Digital camera, Digital video camera, Data projector
- ☐ Internet
- ☐ Email
- ☐ Draw/Paint applications
- ☐ Ergonomics (how to correctly and safely use ICT equipment)
- ☐ Operating Systems
- ☐ The Impact of ICT on Society
- ☐ Networks – how they work and how to use them
- ☐ General problem solving and decision making
- ☐ Macros
- ☐ Research on Computers in Society
- ☐ Research on Telecommunications in Society
- ☐ Web Page Design
- ☐ Computer animation
- ☐ Other/s: _____

_____

_____

10. **If you answered "No" to number 8,** please explain why you think there is not a need for ICT to be taught in separate subjects:

_____

_____

_____

_____

_____

11. Do you think there is a need for some ICT to be taught in all, or most, subjects?

    Yes / No / Don't know (please circle)

12. Explain your answer to number 11: _____

    _____

    _____

    _____

13. Do you believe that, in some form, ICT should be compulsory?

    Yes / No / Don't know (please circle)

14. If yes, give reasons and briefly detail: _____

    _____

    _____

    _____

    _____

15. Please tick, from the list below, the forms of learning you are in favour of. You may tick as many, or as few, as you like.

    - ☐ Online learning
    - ☐ Individual student laptops
    - ☐ Pods of computers in departments
    - ☐ Computer labs (of 25 or more computers)
    - ☐ Modular courses
    - ☐ Don't know
    - ☐ Other (please detail): _____

      _____

      _____

      _____

16. Please give reasons for, or comments on, your response to no. 15:

_____

_____

_____

_____

_____

_____

_____

17. What does the word "academic" mean to you?

_____

18. Do you consider ICT skills to be "academic"?

Yes / No / Don't know (please circle)

19. Explain your answer to number 18: _____

_____

_____

20. Briefly, how would you describe the culture of Orewa College? (By "culture" I mean the character of the school. It includes "how we do things around here").

_____

_____

_____

_____

_____

This project has been reviewed and approved by the Massey College of Education Ethics Committee.

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY.

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Facsimile: 64 9 443 9713

In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

STAFF QUESTIONNAIRE

NOTE:

- **Participants have the right to decline to participate in this research and should hand this questionnaire back to the researcher whether they have filled it in or not.**
- **Orewa College is soon to become a Year 7-13 school. Please take this into account when filling in this questionnaire.**

Are you: **MALE / FEMALE** (please circle one)

Please state your ethnicity (eg - NZ Maori/European, etc): _____

YOUR NAME IS NOT REQUIRED

1 ICT is included in the NZ Technology Curriculum.

The seven technological areas are: Biotechnology, Electronics and Control technology, Food Technology, Information and Communication technology (ICT), Materials technology, Production and Process technology, Structures and Mechanisms.

Contexts for the technological areas to be experienced in include: personal, home, school, recreational, community, environmental, energy, business and industrial.

During Years 7 and 8 students must experience six technological areas. During Years 9 and 10 students must experience six technological areas. "A range of technology courses may be available in the senior secondary school, and at this level students may specialise in technological areas, undertake general courses in technology, or do both" (Ministry of Education, 1995:13).

"Four possible options for delivering the Technology curriculum are outlined:

a A timetabled subject called technology (using teachers from a range of disciplines)
b A school approach involving integrated modules or total integration of the curriculum across the curriculum
c A combination of the above two options
d Suspending the timetable for a fixed period to focus on technology as a year group or whole school"(Ministry of Education, 1995:29)

Note that these are pointed out as *possible* options and that the options are limited only by your imagination.

Which option do you prefer for the junior school (Years 7-10)?

a / b / c / d / other (please circle)

Please detail or comment further on your choice: _____

_____

_____

_____

_____

_____

Which option do you prefer for the senior school (Years 11-13)?

a / b / c / d / other (please circle)

Please detail or comment further on your choice: _____

_____

_____

_____

_____

_____

2 Are you aware of the following publications by the Ministry of Education? (Please tick those which you are aware of).

- ☐ Digital Horizons – Learning through ICT (2002)
- ☐ Interactive Education – An Information and Communication Technologies
- ☐ Strategy for Schools (1998)
- ☐ Technology in the New Zealand Curriculum (1995)
- ☐ Computing Across the Curriculum in Secondary Schools (1991)

3 Briefly outline what you see as the intention of each, or all, of these documents:

_____

_____

_____

_____

_____

_____

_____

4 How useful and/or important do you feel that the documents listed in no. 3 have been to your school?

Very useful / Useful / Of little use / Of no use (please circle)

Reasons: _____

_____

_____

_____

_____

_____

5 What documents, that you are aware of, does Orewa College have in place regarding ICT?

_____

_____

_____

_____

6 What values do you feel the documents mentioned in number 5 espouse?

_____

_____

_____

7 What department are you currently in? _____

8 What does Information and Communication Technologies (ICT) mean to you? (What do you think is included under the umbrella of ICT?)

_____

_____

_____

_____

9 How important do you think it is for students to learn ICT skills? (See list at question no. 19 for examples of ICT skills).

Very Important / Important / Reasonably Important / Not Very Important
(circle one of the above)

10 Explain your answer to no. 9.

_____

_____

_____

_____

_____

11 What ICT skills are currently taught within your department? (Please list them – you may refer to the list given in number 19 as a guide).

12 Please rate your own confidence teaching the ICT skills you listed in no. 11.

Very Confident / Confident / Not Very Confident / Not Confident

13 Are there ICT skills that **are not** currently taught in your department that you would like to be, or see the need for? Please list and explain reasons.

14 Are there ICT skills that **are** currently taught in your department that you think should not be? Please list and explain reasons.

15 Do you believe that ICT skills need to be *taught*? _____ Yes / No

Or, do you believe that these skills can simply be picked up via osmosis? _____ Yes / No

Please give reasons for the two answers you have given to this question:

_____

_____

_____

_____

_____

_____

16 If you answered "Yes" to the first question in no. 15, do you feel that ICT skills should be taught by specialist ICT teachers?
Always / Usually / Sometimes / Seldom / Never
Please explain: _____

_____

_____

_____

_____

17 To allow for more efficient use of computers in the school, would you be prepared to teach a class for an hour after school in exchange for an hour off before school or during the day? _____ Yes / No
Comments: _____

_____

_____

_____

_____

18 ICT skills are currently taught at Orewa College both in separate ICT subjects AND in other subjects as part of their courses. Do you think there is a need for ICT to be taught in separate subject(s) at Orewa College?

Yes / No (circle one)

Give reasons for your answer: _____

_____

_____

_____

_____

_____

_____

_____

19 **If you answered "Yes" to Number 17**, what topics do you think should be included in separate ICT subject(s), at Orewa College, **or** taught as individual subject(s) in their own right? (Please tick)

- ☐ computer keyboarding
- ☐ desktop publishing
- ☐ word processing
- ☐ spreadsheets
- ☐ databases
- ☐ computer programming – language/s: _____
- ☐ creating computer graphics
- ☐ presentations (eg Powerpoint)
- ☐ standard operating procedures, file management and troubleshooting
- ☐ use of peripherals: scanner, digital camera, video camera, data projector
- ☐ internet
- ☐ email
- ☐ draw/paint applications
- ☐ ergonomics (how to correctly and safely use ICT equipment)
- ☐ operating systems (eg Windows, MacOS, Linux)
- ☐ the impact of ICT on society
- ☐ networks – how they work and how to use them
- ☐ general problem solving and decision making
- ☐ macros
- ☐ research on computers in society
- ☐ research on telecommunications in society
- ☐ web page design
- ☐ computer animation

(list other topics over page)

Other/s: _____

_____

_____

_____

_____

20 **If you answered "No" to no. 18,** please explain why you think there is not a need for ICT to be taught in separate subjects:

_____

_____

_____

_____

_____

_____

_____

_____

21 Do you think there is a need for some ICT to be taught in all, or most, subjects?

Yes / No (please circle)

22 Explain your answer to no. 21: _____

_____

_____

_____

23 Do you believe that, in some form, ICT should be compulsory? Yes / No

24 If yes, give reasons and briefly detail: _____

_____

_____

_____

25 Please tick, from the list below, the forms of learning you are in favour of. You may tick as many, or as few, as you like.

- ☐ Online learning
- ☐ Individual student laptops
- ☐ Pods of computers in departments
- ☐ Computer labs (of 25 or more computers)
- ☐ Modular courses
- ☐ Other (please detail): _____

26 Please give reasons for, or comments on, your response to no. 25:

27 What does the word "academic" mean to you?

28 Do you consider ICT skills to be "academic"?

Yes / No / Don't know

29 Explain your answer to number 28: _____

_____

_____

30 Have you ever studied an ICT subject yourself?

Yes / No (please circle)

(If yes, please tick the subjects below that you have taken before and write the year level/s beside – if studied after high school years, simply write TERTIARY beside Year/s)

- ☐ Information Management – Year/s _____
- ☐ Computer Studies – Year/s _____
- ☐ Desktop Publishing – Year/s _____
- ☐ Introductory Information Management – Year/s _____
- ☐ Other: _____ Year/s _____
- ☐ Other: _____ Year/s _____
- ☐ Other: _____ Year/s _____

31 **If you answered "yes" to no. 30**, what benefits, if any, do you feel you gained? _____

_____

_____

_____

_____

_____

32 Do you intend to study any ICT subject/s in the near future?

Yes / No (please circle one)

(If yes, please fill in the details below)

Subject: _____ Duration of course: _____

Subject: _____ Duration of course: _____

Subject: _____ Duration of course: _____

33 Please give reasons for your answer to number 32: _____

_____

_____

_____

34 Briefly, how would you describe the culture of Orewa College? (The word "culture" here refers to the character of the school. It includes "how we do things around here").

_____

_____

_____

_____

_____

35 Any other additional/relevant comments to this questionnaire:

_____

_____

_____

_____

_____

_____

This project has been reviewed and approved by the Massey College of Education Ethics Committee.

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY.

Massey University
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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

HIBISCUS COAST PRINCIPALS QUESTIONNAIRE

NOTE:

- **Participants have the right to decline to participate in this research and should hand this questionnaire back to the researcher whether they have filled it in or not.**
- **Orewa College is soon to become a Year 7-13 school. Please take this into account when filling in this questionnaire.**

Are you: **MALE / FEMALE** (please circle one)

Please state your ethnicity (eg - NZ Maori/European, etc): _____

YOUR NAME IS NOT REQUIRED

1. What decile rating does your school currently have?

   1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 (please circle one)

2. What year groups does your school cater for?

   Years 1-8 Years 1-10 Years 7-8

   Years 1-6 Years 7-10 Other: .....

   (please circle)

3. What does Information and Communication Technologies (ICT) mean to you? (What do you think is included under the umbrella of ICT?)

4. How important do you think it is for students to learn ICT skills?

   Very Important / Important / Reasonably Important/ Not Very Important

   (circle one of the above)

5. Explain your answer to number 4.

6. What ICT skills are currently taught within your school? Please list them – you may refer to the list given in number 15 as a guide. Please also indicate the year level that each skill is taught. (You may wish to complete your response to this question on the back of this sheet).

7. Please rate the *majority* of your staff's confidence in teaching the ICT skills you listed in number 6.

   Very Confident / Confident / Not Very Confident / Not Confident (please circle one)

8. Are there ICT skills that **are not** currently taught in your school that you would like to be, or see the need for? Please list and explain reasons.

   _____

   _____

   _____

   _____

   _____

9. Are there ICT skills that **are** currently taught in your school that you think should not be? Please list and explain reasons.

   _____

   _____

   _____

   _____

10. Have you ever studied an ICT subject yourself?

    Yes / No (please circle)

    (If yes, please circle the subjects on the next page that you have taken before and write the year level/s beside – if studied after high school years, simply write TERTIARY beside Year/s)

    Information Management – Year/s _____

    Computer Studies – Year/s _____

    Desktop Publishing – Year/s _____

    Introductory Information Management – Year/s _____

    Other: _____ Year/s _____

    Other: _____ Year/s _____

    Other: _____ Year/s _____

11. **If you answered "yes" to number 10**, what benefits, if any, do you feel you gained? _____

_____

_____

_____

12. Do you intend to study any ICT subject/s in the near future?
Yes / No / Don't know (please circle one)
(If yes, please fill in the details below)
Subject: _____ Duration of course: _____
Subject: _____ Duration of course: _____
Subject: _____ Duration of course: _____

13. Please give reasons for your answer to number 12: _____

_____

_____

14. Do you believe that ICT skills need to be *taught*? _____ Yes / No

Or, do you believe that these skills can simply be picked up via osmosis? _____ Yes / No

Please give reasons for the two answers you have given to this question:

_____

_____

_____

_____

_____

_____

15. If you answered "Yes" to the first question in no. 14, do you feel that ICT skills should be taught by specialist ICT teachers?

Always / Usually / Sometimes / Seldom / Never

Please explain: _____

_____

_____

_____

_____

16. ICT skills are currently taught at Orewa College both in separate ICT subjects AND in other subjects as part of their courses. Do you think there is a need for ICT to be taught in separate subjects in a year 7-13 school?

Yes / No / Don't know (circle one)

Give reasons for your answer: _____

_____

_____

_____

MORE QUESTIONS CONTINUED ON NEXT PAGE ...

17. **If you answered "Yes" to Number 16**, what topics do you think should be included in separate ICT subjects? (Please tick).

- ☐ Computer Keyboarding
- ☐ Layout and Design of Documents
- ☐ Word Processing
- ☐ Spreadsheets
- ☐ Databases
- ☐ Computer Programming – Language/s: _____
- ☐ Creating computer graphics
- ☐ Presentations (eg Powerpoint)
- ☐ Standard operating procedures and file management
- ☐ Use of peripherals: Scanner, Digital camera, Digital video camera, Data projector
- ☐ Internet
- ☐ Email
- ☐ Draw/Paint applications
- ☐ Ergonomics (how to correctly and safely use ICT equipment)
- ☐ Operating Systems
- ☐ The Impact of ICT on Society
- ☐ Networks – how they work and how to use them
- ☐ General problem solving and decision making
- ☐ Macros
- ☐ Research on Computers in Society
- ☐ Research on Telecommunications in Society
- ☐ Web Page Design
- ☐ Computer animation
- ☐ Other/s: _____

_____

_____

18. **If you answered "No" to number 16,** please explain why you think there is not a need for ICT to be taught in separate subjects:

_____

_____

_____

_____

_____

19. Do you think there is a need for some ICT to be taught in all, or most, subjects?

    Yes / No / Don't know (please circle)

20. Explain your answer to number 17: _____

    _____

    _____

    _____

21. Do you believe that, in some form, ICT should be compulsory?

    Yes / No / Don't know (please circle)

22. If yes, give reasons and briefly detail: _____

    _____

    _____

    _____

    _____

23. Please tick, from the list below, the forms of learning you are in favour of. You may tick as many, or as few, as you like.

    - ☐ Online learning
    - ☐ Individual student laptops
    - ☐ Pods of computers in departments
    - ☐ Computer labs (of 25 or more computers)
    - ☐ Modular courses
    - ☐ Don't know
    - ☐ Other (please detail): _____

MORE QUESTIONS CONTINUE OVER PAGE ...

24. Please give reasons for, or comments on, your response to no. 23:

_____

_____

_____

_____

_____

_____

_____

_____

25. What does the word "academic" mean to you?

_____

26. Do you consider ICT skills to be "academic"?

Yes / No / Don't know (please circle)

27. Explain your answer to number 26: _____

_____

_____

28. Are you aware of the following publications by the Ministry of Education? (Please tick those which you are aware of).

☐ Digital Horizons – Learning through ICT (2002)
☐ Interactive Education – An Information and Communication Technologies Strategy
☐ for Schools (1998)
☐ Technology in the New Zealand Curriculum (1995)
☐ Computing Across the Curriculum in Secondary Schools (1991)

29. Briefly outline what you see as the intention of each, or all, of these documents:

_____

_____ (CONTINUE OVER PAGE)

_____

_____

_____

_____

_____

30. How useful and/or important do you feel that the documents listed in number 28 have been to your school?

    Very useful / Useful / Of little use / Of no use

    Reasons: _____

    _____

    _____

    _____

    _____

    _____

31. What important documents or policies has your school created in relation to ICT education?

    _____

    _____

    _____

    _____

32. What underlying values do you feel created the need for and/or show through in the documents/policies mentioned in number 31?

    _____

    _____

    _____

    _____ (CONTINUE OVER PAGE)

33. Please briefly outline how the Technology curriculum requirements (outlined in the Technology in the New Zealand Curriculum document) are being fulfilled at your school.

34. Briefly, how would you describe the culture of your school? (By "culture" I mean the character of the school. It includes "how we do things around here").

35. Any additional/relevant comments to this questionnaire: _____

(CONTINUE OVER PAGE)

This project has been reviewed and approved by the Massey College of Education Ethics Committee.

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY.

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

STUDENT QUESTIONNAIRE FOR PAST STUDENTS

NOTE:

- **Participants have the right to decline to participate in this research and should hand this questionnaire back to the researcher whether they have filled it in or not.**
- **Orewa College is soon to become a Year 7-13 school. Please take this into account when filling in this questionnaire.**

Are you: **MALE / FEMALE** (please circle one)

Please state your ethnicity (eg - NZ Maori/European, etc): _____

YOUR NAME IS NOT REQUIRED

1. What year did you leave Orewa College? _____

2. What year level were you in when you left?

   Year 9 / 10 / 11 / 12 / 13 (please circle one)

3. What does Information and Communication Technologies (ICT) mean to you? (What do you think is included under the umbrella of ICT?)

   _____

   _____

   _____

   _____

4. How important do you think it was for you to learn ICT skills?

   Very Important / Important / Reasonably Important/ Not Very Important

   (circle one of the above)

5. Explain your answer to number 4.

   _____

   _____

   _____

6. Had you learnt any ICT skills before coming to Orewa College?

   Yes - a lot

   Yes – some

   Yes – very few

   No (circle one – **If Yes, go to question 7, if No, go to question 9)**

7. Did you learn these ICT skills mostly at home or at school?

   At home / At school / Some at home, some at school / Other place

   (please circle one)

   If you circled "other place" please specify where: _____

8. Describe the ICT skills that you learnt before coming to Orewa College.
   (Eg – I knew Powerpoint pretty well and had done some word processing).

   _____

   _____

   _____

   _____

   _____

9. **If you answered "No" to no. 6**, what do you think is the main reason that you did not learn ICT skills before coming to Orewa College?

_____

_____

10. Have you ever taken an ICT subject before? (Either at Orewa College or before or after your time there).

Yes / No (please circle)

(If yes, please circle the subjects on the next page that you have taken before and write the year level/s beside – write TERTIARY beside the subject if you have taken it after leaving high school)

Information Management – Year/s _____

Computer Studies – Year/s _____

Desktop Publishing – Year/s _____

Introductory Information Management – Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

Other: _____ Year/s _____

11. How has/have the ICT subject/s you have taken in the past assisted or benefitted you? Give as much detail as possible. You may continue on the reverse of this page if necessary. _____

_____

_____

_____

_____

_____

12. Do you intend to study any ICT subject/s in the future? (Either at Orewa College or elsewhere).

    Yes / No / Don't know (please circle one)
    (If yes, please circle the subjects that you intend to take and write the year level/s beside. If you intend to study the subject after high school years, write TERTIARY in the Year/s space.)

    Information Management – Year/s _____

    Computer Studies – Year/s _____

    Desktop Publishing – Year/s _____

    Introductory Information Management – Year/s _____

    Other: _____ Year/s _____

    Other: _____ Year/s _____

    Other: _____ Year/s _____

    Why will you study these subjects? _____

    _____

13. ICT skills are currently taught at Orewa College both in separate ICT subjects AND in other subjects as part of their courses. Do you think there is a need for ICT to be taught in separate subjects at Orewa College?

    Yes / No / Don't know (circle one)

    Give reasons for your answer: _____

    _____

    _____

MORE QUESTIONS ARE CONTINUED OVER THE PAGE ...

14. **If you answered "Yes" to Number 13**, what topics do you think should be included in separate ICT subject(s), at Orewa College, **or** taught as individual subject(s) in their own right? (Please tick)

- ☐ Computer Keyboarding
- ☐ Layout and Design of Documents
- ☐ Word Processing
- ☐ Spreadsheets
- ☐ Databases
- ☐ Computer Programming – Language/s: _____
- ☐ Creating computer graphics
- ☐ Presentations (eg Powerpoint)
- ☐ Standard operating procedures and file management
- ☐ Use of peripherals: Scanner, Digital camera, Digital video camera, Data projector
- ☐ Internet
- ☐ Email
- ☐ Draw/Paint applications
- ☐ Ergonomics (how to correctly and safely use ICT equipment)
- ☐ Operating Systems
- ☐ The Impact of ICT on Society
- ☐ Networks – how they work and how to use them
- ☐ General problem solving and decision making
- ☐ Macros
- ☐ Research on Computers in Society
- ☐ Research on Telecommunications in Society
- ☐ Web Page Design
- ☐ Computer animation
- ☐ Other/s: _____

_____

_____

15. **If you answered "No" to number 13,** please explain why you think there is not a need for ICT to be taught in separate subjects:

_____

_____

_____

_____

_____

16. Do you think there is a need for some ICT to be taught in all, or most, subjects?

    Yes / No / Don't know (please circle)

17. Explain your answer to number 16: _____

    _____

    _____

    _____

18. Do you believe that, in some form, ICT should be compulsory?

    Yes / No / Don't know (please circle)

19. If yes, give reasons and briefly detail: _____

    _____

    _____

    _____

    _____

20. What does the word "academic" mean to you?

    _____

21. Do you consider ICT skills to be "academic"?

    Yes / No / Don't know (please circle)

22. Explain your answer to number 21: _____

    _____

    _____

23. Any additional/relevant comments to this questionnaire: _____

    _____

    _____

    _____

This project has been reviewed and approved by the Massey College of Education Ethics Committee.

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY.

INTERVIEW QUESTIONS FOR FACE-TO-FACE PARTIALLY STRUCTURED INTERVIEWS WITH OREWA COLLEGE STAFF

Opening Statement by Interviewer:

Please ignore the fact that my position within the school is Head of Business and the fact that current ICT specialist options come under the umbrella of that department. I am after an honesty in your responses to combine with other interview responses to form a holistic Orewa College view of the future learning of ICT at Orewa College.

The interviewer outlines the dominant views on ICT education at the beginning of the interview as follows:

The dominant perspectives on ICT education can be summed up as follows:

1. **Specialist ICT Options** - Those that are in favour of this perspective believe that specialist ICT teachers should teach ICT skills and knowledge in specific ICT subjects, separate from other curriculum areas, either in addition to or instead of teaching ICT in other areas.

2. **Integration** and/or **Osmosis** - Those that hold this view believe that ICT skills should be taught in all curriculum areas, as the skills are needed to assist or further student learning in each curriculum area. Some that hold this view believe that a curriculum context is essential for learning ICT skills and knowledge. Some take the integration view further and see ICT as a tool. They believe no formal instruction in ICT skills or knowledge is necessary. They take the view that students will simply absorb the ICT skills and knowledge that they need in an osmosis-like process by using ICT equipment. Students will be self-taught in a discovery-like manner.

The following questions are then asked.

1. Which of these dominant views, or aspects of these views, do you most agree with?

   (If prompting is needed, then the following questions are used for follow up: Why? Can you outline your view?)

2. How do you see the future of ICT Learning Taking Place at Orewa College?

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subject/s?

INTERVIEW QUESTIONS FOR TERTIARY INSTITUTIONS

NOTE: Participants have the right to decline to participate in this research.

1. What ICT knowledge and skills do you believe **most** incoming tertiary students have at present?
2. What ICT knowledge and skills would you ideally like **all** incoming tertiary students to have in the near future?
3. Do you feel that there is a need for ICT to be taught as separate subject/s at secondary school level?
4. Can you elaborate on your answer to the last question?
5. If yes to number 3 – which ICT subjects do you feel should be taught and what topics should be included in these subjects?
6. What ICT subjects are offered at your institution? Please list all relevant qualifications and papers.
7. What prerequisites do you have for the qualifications and papers you mentioned in your response to question 6?

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

EMAIL QUESTIONNAIRE FOR EMPLOYERS/COMMUNITY

NOTE: Participants have the right to decline to participate in this research.

The Ministry of Education defines Information and Communications Technology (ICT) as:

"Information Technology (IT) - the term used to describe the items of equipment (hardware) and computer programs (software) that allow us to access, retrieve, store, organise, manipulate and present information by electronic means. Personal computers, scanners and digital cameras fit into the hardware category; database programs and multimedia programs fit into the software category.

Communication technology (CT) is the term used to describe telecommunications equipment through which information can be sought, sent and accessed, for example, phones, faxes, modems, and computers." (Ministry of Education, 2002)

ICT subjects at Orewa College have historically included subjects such as Computer Studies, Information Management, Desktop Publishing, Computer Keyboarding, Film and Media Studies.

1. What ICT knowledge and skills would you expect the majority of your employees to have eventually (through on the job training if they don't already have these skills and knowledge before coming to you)?

2. What ICT knowledge and skills would you ideally like the majority of your prospective employees to have before coming to you?

3. Do you feel that there is a need for ICT to be taught as separate subject/s at secondary school level?

4. Can you give reasons for your answer to the last question?

5. If yes to number 3 – which ICT subjects do you feel should be taught and what topics should be included in these subjects?

6. What ICT training do you currently offer your employees, if any?

7. Do you currently specify any minimum ICT experience or qualifications that prospective employees must have?

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

INTERVIEW QUESTIONS FOR OTHER SECONDARY SCHOOLS

NOTE: Participants have the right to decline to participate in this research.

1 What is your current position in your school?

2 Are you male or female?

3 Please state your ethnicity (eg NZ Maori/NZ European).

4 What decile rating has your school been given by the Ministry of Education?

5 What range of ethnicities does your school have? (eg 68% NZ European, 25% NZ Maori, 6% South East Asian, 1% Other)

6 What year groups does your school cater for/teach? (eg Year 7-13)

7 What does Information and Communication Technologies (ICT) mean to you? (What do you think is included under the umbrella of ICT?)

8 Are you aware of the following publications by the Ministry of Education? (Please state which you are aware of).

Digital Horizons – Learning through ICT (2002)
Interactive Education – An Information and Communication Technologies Strategy for Schools (1998)
Technology in the New Zealand Curriculum (1995)
Computing Across the Curriculum in Secondary Schools (1991)

10 How useful and/or important do you feel that the documents listed in question 8 have been to your school?

Very useful / Useful / Of little use / Of no use (please circle)

Please state reasons.

11 What Information and Communications Technology (ICT) subjects does your school currently offer to each year group? (Please give **Year**, **Subject name**, **Duration** of course, and state whether each course is **compulsory or optional**. A sentence or two summarising each course's **content** would also be appreciated).

Year	Subject name	Duration	Compulsory or Optional	Brief content outline

12 What ICT skills are currently being taught in other curriculum areas in your school?

13 The Ministry of Education document *Technology in the New Zealand Curriculum* outlines four possible options for delivering the Technology curriculum:

a A timetabled subject called technology (using teachers from a range of disciplines)
b A school approach involving integrated modules or total integration of the curriculum across the curriculum
c A combination of the above two options
d Suspending the timetable for a fixed period to focus on technology as a year group or whole school"(Ministry of Education, 1995:29)

How is the Technology curriculum currently being delivered at your school for **Year 7-10** students?

a / b / c / d / Other (please specify and briefly detail)

14 How is the Technology curriculum currently being delivered at your school for **Year 11-13** students?

a / b / c / d / Other (please specify and briefly detail)

15 Do you believe that ICT skills need to be *taught*? Yes / No

Or, do you believe that these skills can simply be picked up via osmosis? Yes / No

Please give reasons for the two answers you have given to this question.

16 If you answered "Yes" to the first question in no. 15, do you feel that ICT skills should be taught by specialist ICT teachers?

Always / Usually / Sometimes / Seldom / Never

Please explain.

17 Are you planning for changes to the delivery of ICT skills and knowledge in your school in the near future?

18 Are you planning for changes to the delivery of the Technology curriculum in your school in the near future?

19 What forms of learning ICT are currently being used in your school? (eg - online learning, individual student laptops, pods of computers in departments, computer labs, modular courses, other ...) Please list and briefly detail in a couple of sentences.

20 Can you list the pros and cons of each form of learning that you stated you were using in Question 19?

21 Are any ICT classes taught outside of normal school hours at your school?

22 What system(s) do you use for the booking/sharing of ICT equipment at your school?

23 Do you have any other additional/relevant comments that you would like to make?

Participant Coding

Questionnaires

Tertiary Institutions' Respondents - T1, T2a, T2b
Employers - E1-E25
North Shore Schools' Respondents - S1-S10
Hibiscus Coast Principals - P1, P2
Orewa College Students - ST1-ST48
Orewa College Parents - PA1-PA40
Orewa College Staff/Teachers - TE1-TE55

Interviews with Key Personnel

I1a-I1b, I2, I3, I4a-I4e, I5, I6a-I6c, I7a-I7k, I8

Document Analyses

Staff Groups - Staff Grp A to Staff Grp J

At the beginning of relevant sections in this Findings chapter, codes are given to indicate the questionnaires and question numbers from which responses are being summarised. For example, *(TE Q2; S Q8; P Q28)* refers to the Teacher Questionnaire, Question No. 2; North Shore Schools Questionnaire, Question No. 8; Parent Questionnaire, Question No. 28.

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

CONFIDENTIALITY AGREEEMENT

I have been employed by Lisa Ballantyne to type transcriptions from tape recorded interviews and enter data from questionnaires into a spreadsheet for the purpose of the above-named thesis. I agree to keep all names and information associated with this thesis confidential. I agree not to disclose any information to any other persons.

Signature: ..... Date: .....

Full Name (printed): .....

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

CONSENT FORM
for current students

CONSENT FORMS WILL BE RETAINED BY THE RESEARCHER FOR A PERIOD OF FIVE YEARS AND THEN DESTROYED

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... Date: .....

Full Name (printed): .....

PARENT/GUARDIAN Signature (if under 16 years): .....

Full Name (printed): .....

NOTE: ***Students*** - please return this consent form to the box labelled "Research Consent Forms" [redacted]

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

CONSENT FORM
for parents

CONSENT FORMS WILL BE RETAINED BY THE RESEARCHER FOR A PERIOD OF FIVE YEARS AND THEN DESTROYED

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... Date: .....

Full Name (printed): .....

NOTE: ***Parents*** - please ask your child to return this consent form to the box labelled "Research Consent Forms" [redacted]

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

CONSENT FORM
for HBC Principals

CONSENT FORMS WILL BE RETAINED BY THE RESEARCHER FOR A PERIOD OF FIVE YEARS AND THEN DESTROYED

I have read the Participant Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... Date: .....

Full Name (printed): .....

NOTE: Please post this form, together with the HBC Principals Questionnaire to [redacted]

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

CONSENT FORM
FOR OTHER SECONDARY SCHOOLS

CONSENT FORMS WILL BE RETAINED BY THE RESEARCHER FOR A PERIOD OF FIVE YEARS AND THEN DESTROYED

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

I agree to the researcher conducting a telephone interview with myself at a time specified by me.

Signature: ..... Date: .....

Full Name (printed): .....

NOTE: Please post this form [redacted]

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

CONSENT FORM
FOR STAFF, SENIOR MANAGEMENT, EMPLOYERS, TERTIARY INSTITUTIONS

CONSENT FORMS WILL BE RETAINED BY THE RESEARCHER FOR A PERIOD OF FIVE YEARS AND THEN DESTROYED

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

I **agree/do not agree** to an interview of myself being audio taped. **(Delete as appropriate)**

Signature: ..... Date: .....

Full Name (printed): .....

[redacted]

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

CONSENT FORM
for past students

CONSENT FORMS WILL BE RETAINED BY THE RESEARCHER FOR A PERIOD OF FIVE YEARS AND THEN DESTROYED

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... Date: .....

Full Name (printed): .....

Age: .....

[redacted]

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In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

PARTICIPANTS INFORMATION SHEET

Researcher: Mrs Lisa Ballantyne
Employment Status: HOD Business, Orewa College *(On study leave)*
Email: [redacted]
Supervisors: Dr Mollie Neville-Tisdall
Department of Social and Policy Studies
Phone: [redacted]
Email: M.Neville@massey.ac.nz
Mr Bill Anderson
Department of Learning and Teaching
Phone; [redacted]
Email: W.G.Anderson@massey.ac.nz

The researcher or supervisors may be contacted regarding any questions in relation to this research.

Type and Purpose of the Project:

This research is being carried out for two purposes. Firstly, its purpose is to provide a fresh look at the ways in which ICT could be delivered at Orewa College in the future. Secondly, it will fulfil the researcher's thesis requirements to complete her MEd(Admin).

Participant Recruitment:

Participants have been randomly chosen, ensuring however that an equal gender balance and proportional representation (where appropriate) has been obtained. Names of participants are not required for this research.

Project Procedures
Personal information, such as names will not be asked for. Confidentiality is assured. Data will be transcribed by the researcher only and will be stored securely. All data collected will be destroyed at the end of the research period.

Research Period – February 2003 to November 2003

Participant Involvement

Participants will be asked to fill in a questionnaire, which should take a maximum of 30 minutes to complete.

Anonymity

Although participants will not be individually identified by name, permission of the Board of Trustees has been granted to use the school's name and therefore total anonymity is impossible.

Participants Rights

You have the right to:

- Decline to participate
- Decline to answer any particular question
- Withdraw from the study at any time during the research period (specified above)
- Ask any questions about the study at any time during participation
- Provide information on the understanding that your name will not be used unless you give permission to the researcher
- Completion and return of questionnaire implies consent.

Interviews

Employers, tertiary institutions and senior management of Orewa College will be asked to participate in an interview either by email, or face-to-face. In a face-to-face interview, participants may be asked if an audio-tape may be used. Participants have the right to deny the use of an audio-tape.

During an interview, participants have the right to ask for the audio tape to be turned off at any time during the interview.

Access to the Project Findings

A copy of the final report on completion of this research will be provided to the Orewa College Board of Trustees and Senior Management Team. A copy will also be available in the Massey University Library in Albany.

Committee Approval Statement

This project has been reviewed and approved by the Massey University College of Education Ethics Committee.

Rodney DISTRICT

Appendix Ia

5 Feb 03

To Lisa Ballantyne
[redacted]

- [ ] Returned with thanks
- [ ] For your information
- [x] As requested/promised
- [ ] For your comments please
- [ ] For your approval
- [ ] For your signature
- [ ] Please complete
- [ ] Please return

Attached are 3 sets of census data for your info: The first 2 tables show industry types & occupation types in the eastern ward. The last table show occupation types of the entire population in the district. Please contact me if you require further info.

Signature Jocelyn Cheung extn 3223

Designation Policy Planner

~~09 427 3223~~ 339

Industry Types in Eastern Ward and Rodney District (2001 Census)

Industry Description	No. to survey	Total Count in Eastern Ward		Total Count in Rodney District	
Agriculture, Forestry and Fishing	2	108	1·4%	2928	13·8%
Mining	—	0	0	81	0·04%
Manufacturing	19	933	12·1%	2643	12·5%
Electricity, Gas and Water Supply	3	12	0·2%	15	0·001%
Construction	20	987	12·8%	2346	11·1%
Wholesale Trade	8	393	5·1%	903	4·3%
Retail Trade	30	1476	19·2%	2925	13·8%
Accommodation, Cafes and Restaurants	7	363	4·7%	975	4·6%
Transport and Storage	3	144	1·9%	495	2·3%
Communication Services	1	66	0·9%	126	0·6%
Finance and Insurance	3	171	2·2%	402	1·9%
Property and Business Services	19	951	12·4%	2217	10·5%
Government Administration and Defence	4	213	2·8%	309	1·5%
Education	12	573	7·5%	1482	7%
Health and Community Services	12	606	7·9%	1395	6·6%
Cultural and Recreational Services	5	270	3·5%	609	2·9%
Personal and other Services	6	276	3·6%	723	3·4%
Not Elsewhere Included	3	~~144~~	1·9%	567	2·7%
Total		**7686**		**21141**	

2%.

→ I need to survey.

157 businesses.
−12
145 businesses.

Already surveying - HBC principals
- Other secondary schools
- Tertiary Institutions.

Status in Employment for the Employed Census Usually Resident Population Count Aged 15 Years and Over, 2001

APPENDIX Ib

Employment	Paid Employee	Employer	Self-Employed and without Employees	Unpaid Family Worker	Not Stated	Total
Rodney District						
Wellsford	543	66	84	24	33	747
Leigh	96	27	45	6	6	180
Warkworth	843	129	222	15	27	1239
Kumeu	1824	342	597	135	72	2967
Waipareira West	267	39	96	27	9	438
Red Beach	1776	210	378	33	54	2454
Waiwera	63	15	12	6	3	102
Hatfields Beach	387	24	69	6	12	498
Orewa	1356	114	276	39	60	1845
Stanmore Bay	3018	300	657	57	63	4095
Manly	1626	228	444	36	42	2376
Army Bay	732	105	198	15	24	1071
Gulf Harbour	228	69	105	6	18	426
Silverdale South	507	84	198	21	6	819
Silverdale North	411	60	156	36	6	669
Dairy Flat-Redvale	504	153	183	33	15	888
Paremoremo West	129	39	54	6	6	231
Tauhoa-Puhoi	849	174	414	135	39	1614
Tahekeroa	879	222	327	93	18	1542
Cape Rodney	1332	360	759	180	63	2694
Matheson Bay	24	0	9	9	0	48
Kawau	12	6	9	0	3	30
Snells Beach	837	111	210	27	30	1221
Algies Bay-Mahurangi	147	42	84	15	6	294
Parakai	354	42	84	21	21	522
South Head	333	54	126	39	15	570
Kaukapakapa	741	108	285	81	15	1230
Muriwai Beach	660	81	267	39	21	1071
Rewiti	534	117	174	57	12	900
Riverhead	696	186	285	45	9	1224
Helensville	720	69	120	24	30	963
Taupaki	243	51	117	12	6	435
TOTALS	**22671**	**3627**	**7044**	**1278**	**744**	**35403**

ATTENTION: North Shore Principals

During 2003, I am researching the future direction of ICT education at Orewa College. As well as providing possibilities and recommendations for the future of ICT education at Orewa College, this research will also fulfil the requirements for my thesis for my Masters in Educational Administration through Massey University.

I intend to ask students (present and past), parents, staff, senior management, tertiary institutions, employers and other schools for their input into this research. Participation is voluntary, but would be greatly appreciated.

I have attached a Participant Information Sheet and Email Interview Questions for your perusal. I would very much appreciate it if you could find time in your busy schedule to read the Participant Information Sheet (this is yours to keep). **Your responses to the interview questions can be typed in bold underneath each question** and then emailed to me at lisa_ballantyne@hotmail.com. Any queries you may have may also be emailed to this address. Your response will imply consent. I realise that your schedule will be hectic and greatly appreciate any input you can give me.

Lisa M Ballantyne (Mrs)
MEdAdmin Student, Massey University
HOD Business, Orewa College
(on study leave until end of Term 3)

Massey University
COLLEGE OF EDUCATION
Te Kuperga o Te Matauranga

Department of
Learning & Teaching
Albany Campus
Private Bag 102 904
North Shore MSC
Auckland,
New Zealand
Telephone: 64 9 443 9688
Facsimile: 64 9 443 9717

15 April 2003

ATTENTION: Hibiscus Coast Principals

During 2003, I am researching the future direction of ICT education at Orewa College. As well as providing possibilities and recommendations for the future of ICT education at Orewa College, this research will also fulfil the requirements for my thesis for my Masters in Educational Administration through Massey University.

I intend to ask students (present and past), parents, staff, senior management, tertiary institutions, employers and other schools for their input into this research. I have enclosed a Participant Information Sheet, a Consent Form and a HBC Principals Questionnaire for your perusal. I would very much appreciate it if you could find time in your busy schedule to read the Participant Information Sheet (this is yours to keep). If you could then please sign the enclosed Consent Form and return it with your completed Questionnaire to me at:

Mrs Lisa Ballantyne
HOD Business
C/- Orewa College
PO Box 345
OREWA

Any queries can be emailed to me at [redacted] Obviously, your response will ensure input into the future education of your current students. I realise that your schedule will be hectic and greatly appreciate any input you can give me.

Yours faithfully

Lisa M Ballantyne (Mrs)
MEdAdmin Student, Massey University
HOD Business, Orewa College
(on study leave)

Email to Employers Subject heading:
A BRIEF QUESTIONNAIRE FROM LISA BALLANTYNE, OREWA COLLEGE

As part of my Masters in Educational Administration, I am undertaking research for my thesis, entitled "**How Could ICT Be Delivered at Orewa College? *Osmosis, Integration and/or Specialist Subjects?***". I am looking to the future of our high school and how ICT skills and knowledge might best be conveyed to our students. As part of this research, I am surveying Orewa College staff, students and parents. I am also surveying employers and the community, other secondary schools and tertiary institutions. I am requesting permission for an appropriate staff member within your business (or yourself) to complete an email interview/questionnaire as a part of this research. This will take 10-30 minutes to complete, depending on the length of responses.

I have attached a copy of the participant information sheet and a copy of the brief, one-page questionnaire. Both attachments are Microsoft Word documents. A consent form is not required as your response will imply that you have consented to completing the questionnaire. All responses will be confidential. Feel free to email me with any queries.

I would appreciate it if you could assist me by either opening the attached questionnaire, typing your answers below each question and sending the document to me by return email to:

[redacted]

OR

print the questionnaire, handwrite your answers on the back of the document (please number your answers) and send by return post to:

Lisa Ballantyne
[redacted]

It would be appreciated if you could respond no later than **30 April**. Thank you so much for taking the time to assist both myself and Orewa College on our path to improving the ICT education for our students.

Lisa M Ballantyne
MEdAdmin Student, Massey University
Head of Business, Orewa College
(currently on study leave)

Plan for Staff Meeting

at

Orewa College, Library Seminar Room
Tuesday 4 March, 2003

In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

3.30 pm LOLLIES!!!!
Introduction and Background to Research

- For my thesis, but also for OC and future of ICT
- Forget what we've had, let's look at what we need
- There is one culture question at end of questionnaire. I've already done a cultural study of the college and will be adding to it from observations, staff comments and informal interviews. It is important that we provide for what is best for OUR SCHOOL.
- The delivery of ICT will need to be reviewed every few years (content at least) due to the speed of new technology being introduced these days and the fact that students will have learnt old skills younger and need to acquire new ones that didn't used to exist
- Explain triangulation of research (lit review, questionnaires, interviews)
- Participants will get to see the draft report and comment before final report is written
- Copies of the final report (thesis) will be in OC library and Massey library for all to view. A copy will also be given to the BOT.
- ICT is covered by the Technology curriculum document. Therefore, before deciding how we could deliver ICT, we need to look at how we could deliver Technology as a whole. (**GIVE OUT TECHNOLOGY HANDOUT** SHOWING WHAT WE TEACH NOW) Also ...
- The government has provided an ICT strategy - Digital Horizons - which we must take into account when planning for ICT in Orewa College's future. So ...
- We will now look at these two documents to try and uncover the intention of the Ministry of Education in regards to Technology and ICT, before you have your chance of telling me how you would like to see it delivered.

3.40 Document Analysis

- The three main views as to the transferal of ICT knowledge and skills are OSMOSIS, INTEGRATION AND/OR SPECIALIST SUBJECTS - Lisa explain and then ...
- Divide staff into 10 groups
- **Give out The Matrix handout** and **Ministry documents**
- Go over The Matrix handout
- Staff to work on own in groups

4.00 Groups report back orally - Lisa to make notes on board under the three headings - OSMOSIS, INTEGRATION AND/OR SPECIALIST SUBJECTS
Collect in group's sheets

4.20 **Give out participant information sheet** and **consent form** and go over briefly.
Collect in signed consent forms. They keep info. sheets.
(OPTIONAL TO PARTICIPATE, BUT WOULD APPRECIATE IT)
Hand out questionnaire.

4.30 AFTERNOON TEA and FILL IN QUESTIONNAIRE

Please do take the time to fill in the questionnaire. Write your OWN answers not other people's. If you don't know, then write "don't know". Use the back of pages to write on if you run out of room.
Collect in questionnaires OR they can put them in my pigeonhole when complete.

5.00 FINISH AND **HELP JILL CLEAN UP**

TECHNOLOGY AT OREWA COLLEGE 2003

Year 9	*Compulsory one term each of:* Food technology Materials technology (hard or soft - depends on staffing in each option line) Electronics Biotechnology
Year 10	*Optional subject choices:* Food technology Design technology: Materials - hard Design technology: Materials - soft *Information Management* - ICT Graphics (has own curriculum document)
Year 11	*Optional subject choices:* ACHIEVEMENT STANDARD COURSES: Food technology *Design technology*: Materials technology - hard *Information Management:* ICT Graphics (has own curriculum document) UNIT STANDARD COURSES: *Engineering* *Automotive engineering* *Motorbody* *Carpentry* COMBINED ACH STD AND UNIT STD COURSES: *Introductory Information Management:* ICT *Fabric technology:* Materials technology - soft (fabric)
Year 12	*Optional subject choices:* ACHIEVEMENT STANDARD COURSES: *Design technology:* Materials – hard *Business Studies:* Generic technology Graphics (has own curriculum document) UNIT STANDARD COURSES: *Information Management:* ICT *Computer Studies:* ICT *Engineering* *Automotive engineering* *Motorbody* *Carpentry* *Creative Pattern Making & Fashion Design (AUT course)* Electronics COMBINED ACH STD AND UNIT STD COURSES: *Introductory Information Management:* ICT *Fabric technology:* Materials - soft (fabric) Food technology
Year 13	UNIT STANDARD COURSES: *Computer Studies:* ICT *Desktop Publishing:* ICT (not running in 2003) *Catering:* Food Technology *Cuisine (mainly for overseas students)* *Fashion Studies* ACHIEVEMENT STANDARD COURSES: Graphics (has own curriculum document

"Technology: ICT" (an achievement standards course) was offered as an option in Years 11 and 12 for 2003, but students did not choose the subject as they were put off by the large amount of theory content in the course.

Have you seen the movie "The Matrix"?

It was great stuff! But we can't yet put a chip in every student's brain and upload/input information and skills, so ...

In what ways could ICT be delivered at Orewa College?

Osmosis, Integration and/or Specialist Subjects?

The **Ministry of Education** have provided us with some guidance in this area with:

Technology in the New Zealand Curriculum (1995)
Digital Horizons - Learning through ICT (2002)

ICT stands for Information and Communications Technology and comes under the Technology curriculum document mentioned above. This research will help us to come up with some recommendations as to how ICT could best be delivered, or learnt, at Orewa College.

We are going to divide into groups and analyse a few pages of these documents each, to deduce what the Ministry of Education's intention is in regards to the question raised in the heading at the top of this page.

Your group has been allocated:

Pages: ..... of the .....document.

Use the following page to make your notes on. Jot down any particular words, phrases or sentences that you feel belong in either the "osmosis", "integration", or "specialist subjects" group. There is also a "other relevant comments" section for you to note any other points of interest in relation to this topic, especially any particular mention of ICT.

Nominate a leader of your group who will report back to the whole staff at the end of this section of the meeting. This reporting back will help all staff to gain a better understanding of the Ministry's intention of these two documents.

THE MINISTRY OF EDUCATION'S INTENTION		
How could ICT be delivered at Orewa College?		
OSMOSIS	INTEGRATION	SPECIALIST SUBJECTS
Page no. and word/phrase/ sentence	Page no. and word/phrase/ sentence	Page no. and word/phrase/ sentence

Other relevant comments or points of interest: ....

....

....

Orewa College ICT Strategic Plan

1999-2001

DOCUMENT ANALYSIS

PURPOSE

To plan for development and **implementation of ICT** in the areas of **curriculum**, **administration** and **communications**.

VALUES

Consultation - varied ICT committee
Staff and students:

- Need to develop "**research and ICT skills**"
- Need "**access to the wider world** through a range of technological **tools**"
- Need to "**work smarter**"
- Need to develop "**global awareness**"

Access is an immediate priority.
Integration of ICT across the whole school curriculum is the main focus.
There is a need to identify "appropriate hardware and software" through **membership of "appropriate organisations" and liaison with local providers and other schools, including contributing schools.**

Professional Development - Staff capability has been analysed. Staff to include ICT goals in **appraisal**. **Training** and **certification** of staff to take place.

An **audit** needed of current infrastructure.

Access to the internet and **training** is needed. Year 10 to be trained, then whole school.

A need to "**continually refine the vision**" for ICT is stated.

Technical support is needed for the infrastructure in place.

Draft OC ICT Strategy 2003-2007

DOCUMENT ANALYSIS

PURPOSE

The three main purposes are to:

- **Integrate** ICT into curriculum areas and develop **digital literacy**
- Develop a school-wide **information network**
- **Integrate administration systems**

VALUES

Internet training - was done by Science department for Year 9 students in 2002. A different department to do this training each year as "a way of **getting departments to use the machines**".

Continuous professional development for staff is intended, based on **surveys of staff needs**.

The Ministry of Education's Digital Horizons (2002) vision headlines the strategy: "All learners will **use** ICT confidently and **creatively** to help develop the **skills and knowledge** they need to achieve **personal goals** and to be **full participants in the global community".**

Orewa College has used this vision to develop its own goal which is to:

"**Enhance teaching and learning processes** with a **wide variety of technologies** available to all **students, teachers and members of the school community**. Fostering **technological and digital literacy** so that all **staff and students and members of the school community** develop **skills for life-long learning."**

ICT Planning Meeting

Minutes - 18-6-02

DOCUMENT ANALYSIS

PURPOSE

"To **reconstitute an ICT committee** at Orewa College. To **brainstorm** for a new **strategic plan**".

VALUES

Wide variety of personnel present, including two staff from two of the **contributing schools**, computer technician, librarian, **two ICT business representatives**, the school's executive officer, a Board of Trustees representative, two members of the senior administration team, the Head of the Business and Computing departments, the Head of English and **a Ministry of Education (MOE) representative**.

ICT was reported to be mainly used as a **tool** to **enhance learning** at primary level.

Access issues at Orewa College were raised - the MOE representative stated that these issues were common amongst many schools. The issues were **pods vs labs** (access) and **the place for the learning of keyboarding and word processing skills** these days.

An **assumption** was made that **future Orewa College students will have ICT skills** and be ready to use them on arrival at Orewa College.

A need for staff to become comfortable with a **new teaching pedagogy** arose.

There arose an agreed need to **create a climate of using ICT** within the school staff.

Access issues again arose - **laptops** and **lab useage.**

A belief that "the **Technology curriculum/approach** needs to be looked at **across the curriculum**" was espoused.

It was decided that **staff professional development** is needed in:

- "The mechanics" (**basics**)
- "Units of work **using** ICT"

- "Teaching **Pedagogy** - the **constructivism** approach"

Possible professional development for staff included:
- a **compulsory** tertiary paper on ICT **pedagogy**
- **skills based** professional development
- ICT curriculum units
- guest speakers
- focused work **in departments**

Intranet development was considered important for **administration** to **lessen administration demands on staff** (eg meetings and filling in forms).

MOE to pay most of staff laptop costs. Board of Trustees and/or teachers to pay the difference. Pros and cons were discussed.

The **dual platform issue** (Macs and IBM compatible machines) was an agenda item, but was not discussed.

OC ICT Position Paper

Document Analysis

PURPOSE

To summarise the history of schoolwide ICT **use** and **infrastructure** in the school and to outline **issues** for the future of ICT **use** at the school.

VALUES

It seems that the value of ICT to **enhance learning** has already been embraced and the focus of this position paper is primarily on **infrastructure** and **access** to ICT.

"More focus on the **learning process**" is needed with students "**applying** information".

Access - questions were raised concerning:

- The physical layout of the school
- The **role of subjects such as Word Processing**
- Keyboarding skills - can these skills be taught in other curriculum areas or outside normal school hours? Currently 149 students only using IBM labs - **high cost per student**. Suggestion for glide time, split booking of labs, after school or block courses to give **access for students from other curriculum areas** during the school day.
- Pods vs Labs - a survey revealed that at this stage staff need labs so they can **teach students "en masse**".
- Memory - **space** needed for large files - eg Photoshop files

Staff training needed in:

- The **mechanics** (basic file management, etc)
- **Learning processes**
- **Metacognition, epistemology, pedagogy** - need to be examined and explored by the staff to a greater depth

Website needs to be **user-friendly**.

Intranet a priority for **administration** and **sharing of information** and caching websites.

Costs - try to keep the same each year for ICT, but **divide spending differently**.

Infrastructure becoming stable. **Focus now needs to shift to curriculum useage** and using ICT to **enhance thinking and learning skills**.

Massey University Human Ethics Committee (MUHEC)
Old Main Building, Turitea
Fax: 64 6 350 5622
http://www.massey.ac.nz/~muhec

Professor Sylvia V Rumball, Chair
Telephone: 64 6 350 5249
Email: S.V.Rumball@massey.ac.nz

Miss Karen A Kahukoti, Secretary
Telephone: 64 6 350 5573
Email: K.A.Kahukoti@massey.ac.nz

Appendix 1

Massey University

Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099

4 December 2002

Ms Lisa M Ballantyne
[redacted]

Dear Lisa

Re: In what ways could ICT be delivered at Orewa College?

Thank you for the MUHEC Checklist and Section A of the MUHEC Application Form that was received on 29 November 2002 and noted by the Chair, Massey University Human Ethics Committee.

As specified in the Code of Ethical Conduct for Research, Teaching and Evaluations involving Human Participants, persons who submit the MUHEC Checklist with every question answered with a 'no', together with Section A of the MUHEC Application Form (including a signed Declaration), do not require any further approval and may commence their research.

Yours sincerely

Sylvia Rumball

Professor Sylvia V Rumball, Chair
Massey University Human Ethics Committee

cc Dr Mollie Neville-Tisdall
Learning & Teaching
ALBANY

College of Education Ethics Committee

RESEARCH PROPOSAL REVIEW

Name of Applicant(s) Lisa Ballantyne

Title of Research In what ways could ICT be delivered at Orewa College?

Reference Number COE 02/055

THE PROPOSAL IS:

☐ No change

x Minor amendments (as listed at Amendments below)

☐ Not approved until completion of amendments (as listed at Amendments below)

☐ Submit to MUHEC

SUBJECT TO APPROVAL OF PRINCIPAL AND BOARD OF TRUSTEES

AMENDMENTS

- Delete section on interviews from parent/student consent form as this is not applicable.
- Use Massey letterhead, not Orewa College letterhead. You should insert your return address details if these are needed. Can you use the College as a return address? It is preferable not to use your residential address.

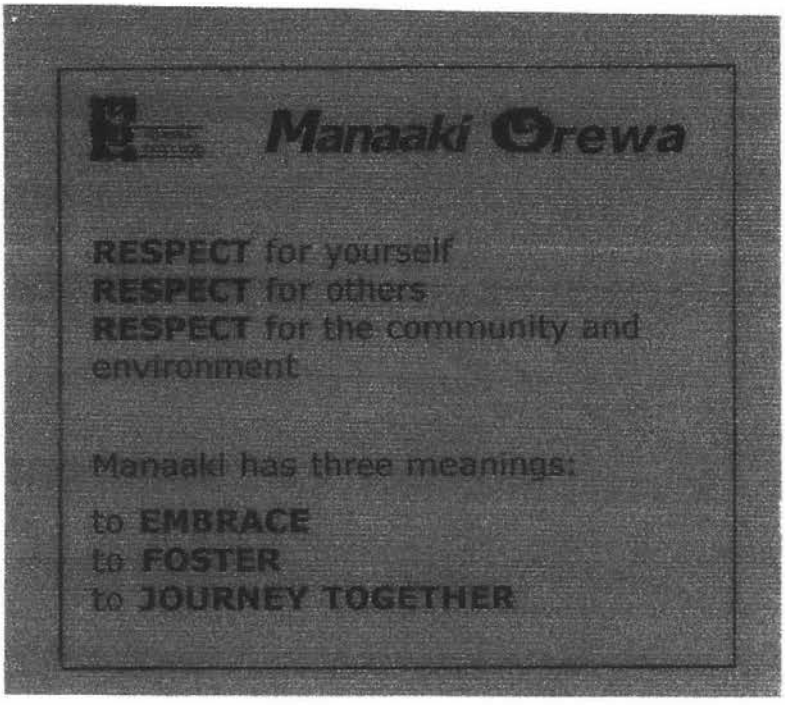
NOTES

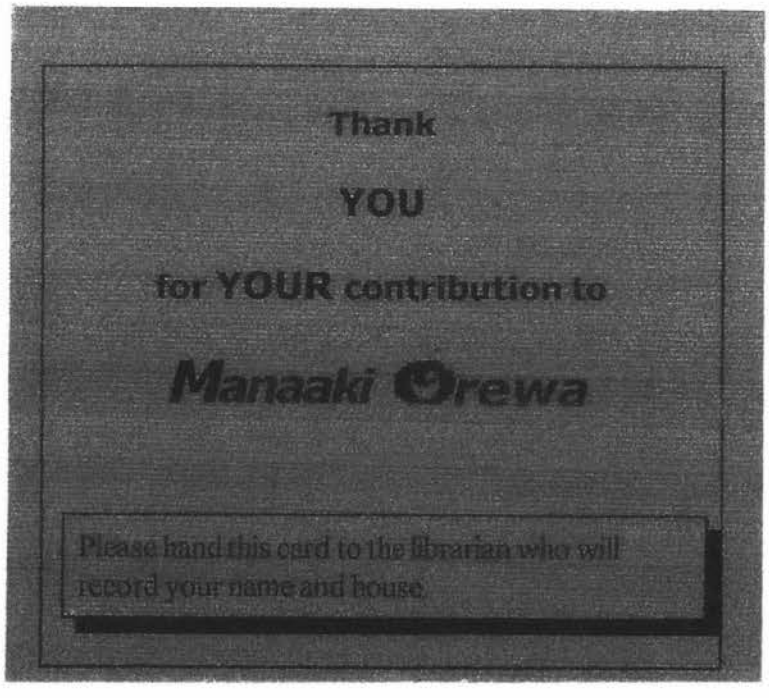
Note that participants are asked to fill in a 'questionnaire', not a survey; 'survey' refers to the overall method. Check your usage on letters and information sheet.

REVIEWER

Name Joy Cullen **Contact telephone number** [redacted]

Signature _____ **Date** 5.03.03


Manaaki Orewa
RESPECT for yourself
RESPECT for others
RESPECT for the community and environment
Manaaki has three meanings:
to EMBRACE
to FOSTER
to JOURNEY TOGETHER


Thank
YOU
for YOUR contribution to
Manaaki Orewa
Please hand this card to the librarian who will record your name and house.