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**Digital Opportunities Pilot Project (2001-2003)  
Evaluation of  
Digitally Boosted Study Support Centres**

**Report to the Ministry of Education**

**Michael Winter**

Ultralab South

**RESEARCH DIVISION**



**Wāhanga Mahi Rangahau**

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**Digital Opportunities Pilot Project 2001-2003**

# **Digitally Boosted Study Support Centres**

## **Final Evaluation Report 2005**

**Michael Winter**

Ultralab South  
PO Box 13678  
Christchurch  
[michael.winter@ultralab.net](mailto:michael.winter@ultralab.net)

This research was carried out whilst the author was a member of the staff of Christchurch College of Education, PO Box 31065, Christchurch.

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## Abstract

The progress of the Digitally Boosted Study Support Centre Pilot, one of the four Digital Opportunities projects, is reported for the period January 2002 to December 2003. The project involved four study support centres located in three low decile schools and one marae in Christchurch and Invercargill. These centres piloted the use of a computer based boost to their after school activities. The boost included provision of a suite of computers and software, broadband internet connection and a dedicated web facility created by The Learning Centre Trust (LCT). The pilot proved to be a successful '*proof of concept*,' with around 270 primary and intermediate students involved during the two years. The centres also involved their local community in ICT based activities including computer training.

This report covers findings related to the research questions guiding the evaluation, and includes a soft systems analysis aimed at pointing to lessons which might inform roll out of the project to other centres.

The student clientele of the centres had mean ages of around 11.5 years in both years of operation. There were higher percentages of Maori and Pacific students in the centre than in the general population of comparable age in the respective regions. However, in two of the school centres, the percentages of Maori students were lower than in the whole school populations.

Students performed a wide range of activities, both ICT based and non-ICT, within the centres. Whilst most gave study related reasons for initially joining the centres, the most common reasons for rejoining centres for a second year were related to enjoyment. Teachers commented on improved attitudes of centre students.

Schools achieved most of their objectives for the centres, the notable exception being the involvement of businesses in the schools. Learning objectives of centres tended to shift with time, moving from being centred on homework to being more student centred models. For example, one centre started the project with a formal, membership only homework club way of operating. By the middle of 2003, it had changed to a flexible approach of allowing access in response to students' needs.

Centres varied in the extent and the way in which they used the *WickEd* web resources.

The professional development offered at the beginning of the project, provided by the LCT liaison teacher/coordinator and by attending *Navcon* conferences was greatly appreciated by teachers and coordinators, and an ongoing need for further development was identified.

In general, the infrastructure supplied to centres was robust and reliable. There were router problems at the start of the project, and, more recently, hard drive failures. There have also been issues of apparent software incompatibilities. The marae centre lacked e-mail facilities for its students throughout the project.

A soft systems analysis was carried out which highlighted issues related to the underlying partnership arrangement, and to the learning process within the centres.



## **Executive Summary**

One of the research questions was to identify *'lessons which have been learned from the pilot which could usefully inform any roll out of the scheme to other schools and to other school districts.'* This summary begins by listing the evaluator's perceptions regarding key lessons and suggestions. These are followed by a summary of findings and lessons categorized under headings corresponding to the main foci of the research.

### **KEY LESSONS AND SUGGESTIONS**

Participating institutions (schools and marae) did not regard the project as being a 'true' partnership between institutions, business and government. True partnerships would involve ongoing cooperation and communication between the partners for the duration of the project. It was believed that all stakeholders would benefit from a more genuine partnership.

Contractual arrangements between stakeholders should be flexible enough to enable institutions joining later in the life of the project to receive the full range of facilities enjoyed by those joining at the start.

Ongoing liaison and professional development support similar to that provided by the LCT coordinator/liaison teacher was seen as crucial to future sustainability and roll out.

The production of a 'start-up' manual is suggested to guide newly participating institutions recruited during roll out.

### **COLLECTED FINDINGS, AND LESSONS RELATED TO RESEARCH FOCI**

#### **Background Data on the Study Centre Students**

168 Students were involved in the pilot in 2002, and around 102 in 2003. In 2003, one centre worked more informally than in 2002, and numbers reported from this centre may be an underestimate of the total number of students involved. Moreover, in two other centres, numbers were restricted in 2003 as a consequence of selecting committed students in order to reduce behaviour problems.

Mean ages of the students were 11.8 years in 2002 and 11.3 years in 2003.

In 2002, females greatly outnumbered males in the Christchurch centres. In the Invercargill centres in 2002 and all centres in 2003, gender ratios were more equal.

The percentage of Maori and Pacific students in the centres was higher than in their respective regions as a whole. A higher percentage of European students, and a lower percentage of Maori was evident in 2003 compared with the 2002 figures.

56% of study centre students claimed to have computers at home in 2002. The number rose to 65% in 2003. Of these, around 75% claimed to have use of the home computer.

#### **Findings Relating to Students, Teachers and the Web Based Resources**

##### *Student learning*

##### **What sorts of activities did the students engage in?**

Students in all centres combined ICT based activities with more traditional learning activities.

The more traditional activities included completing homework, interactive microteaching, and quiz questions. Activities at the marae included te Reo and tikanga Maori.

Online activities included research for projects using search engines, presentation work using *Word* and other programs, e-mail, web page design and work with the *WickEd* website.

**What were the stated learning objectives, and observed learning outcomes, of those activities? (How) did these change over time? How relevant to each of the Centres' specific objectives were the ICT activities?**

Learning objectives included assisting students in completing homework, acquiring computer skills, improving student attitudes to learning and increasing students' essential skills. The marae's learning objectives included improving literacy, numeracy, te Reo and tikanga Maori.

In most centres learning objectives changed over time. Centres tended to move from a membership based programme dominated by homework to a more flexible programme based on students' actual needs.

Most centres achieved most of their goals and objectives. Links with communities and businesses were problematic for some.

ICT activities were crucial to the objectives of two school based centres. The other school was planning to change its *modus operandi* in such a way that would make ICT crucial to its future objectives.

**What was the balance of ICT based and non-ICT based Activities in the various Centres' programs?**

As the project progressed, the balance of activities in most centres shifted so that the majority of activities were ICT based.

**How much emphasis was placed on mathematics, science and technology in the ICT based Activities undertaken in the Centres?**

All centres emphasised numeracy and mathematical skills in their programmes. They tended not to emphasise science and technology.

### *Student motivation*

**Why did students opt to join the various Study Support Centre programmes? What was the role of the ICT component in motivating students either to join the centres, or to continue participating in them?**

The most common reasons for initially joining the schools' centres related to homework or school work.

The most common reason for students' returning in 2003 was that centres were 'good' or 'fun.'

Parental pressure played a minor role in most student decisions to join a centre.

Computers and ICT were not major factors for most students in school based centres, although marae students gave *rorohiko/computers/internet* as the most common reason for joining.

## *Web-based resources*

**In what ways did content resources or communications tools provided through the Learning Centre Trust contribute to the centre programmes? What were the most effective, and ineffective, online resources developed for the centre programmes?**

LCT provided the *WickEd* website which included a range of resources and communications technologies to support the project. These resources included themes, quizzes, educational games, a student gallery and areas such as *Maths Stuff*, *Technology Stuff*, *Science Stuff* and *Korero Mai*. There were also links to other educational sites. LCT also ran challenges and provided virtual characters as online mentors for student learning. There was also a *Teachers' Lounge* communication tool.

Centres varied in their use of the *WickEd* material. Use of this material tended to increase with time as teachers became more confident and as the quality and quantity of resources increased.

Teachers regarded themes, *Cool Stuff*, *Korero Mai*, *Information Station* and the challenges as being among the most effective *WickEd* resources. Science and technology resources and some maths interactives were regarded as less effective.

## *Teachers and teaching*

**How effective did the participating teachers find the professional development opportunities offered through participation in the project? How broadly spread were those opportunities among the staffs of the four pilot schools?**

Teachers found the professional development opportunities generally to be very effective. Especially appreciated were the opportunity to attend *Navcon* conferences and professional development support from the LCT liaison teacher.

The professional development opportunities were widely spread amongst staff of participating schools.

## Findings Related to Educational Opportunity within the Wider Community

**How much was the ICT used for the educational benefit of the wider school community (e.g. other teachers or classes in the normal school day, parent and community access etc)? What was the nature of that use? What were the perceived benefits of such use?**

All schools used the ICT facility extensively for regular classes.

Teachers used the computers for e.g. planning and research.

Schools involved their wider communities in ways which included basic computer courses and offering access for research and e-mail.

Schools benefited by the positive publicity and increased visits by community members. Community members acquired skills and self confidence.

## Findings Related to the ICT Infrastructure and Sustainability

### *The ICT infrastructure*

**How technically reliable and robust, over time, were the ICT systems put in place by the various business partners?**

Initial problems were experienced with multiple e-mail accounts and router problems. After these were resolved, most centres were happy with the reliability of the systems.

Hard drives began to fail from late 2002, probably due to wear and tear. Centres had varying experiences when attempting to get the problem resolved.

In the two centres which ran proprietary filtering software, there were problems relating to compatibility with *Smart Tools*.

The marae experienced significant ongoing infrastructural problems resulting from its late addition to the project. This resulted in students at this centre being at a disadvantage relative to students at other centres

Business partners regarded the systems as robust and reliable.

**For what purposes, were the infrastructural technologies provided by the business partners used by the schools for purposes other than the provision of study support centres?**

Schools made extensive use of the technology to support classroom teaching, teacher and community use.

*The sustainability of the project*

**To what extent, and under what conditions, did the stakeholders regard the project as sustainable in the pilot schools beyond the pilot phase?**

Centres and businesses regarded the project as being sustainable.

Issues of sustainability related to ongoing costs, staffing and system maintenance.

Some of the financial issues were addressed by extension of the Digital Opportunities contracts (in a scaled down form) in 2004.

Centres mentioned continuing provision of a project coordinator as important for ongoing sustainability

LCT regarded sustainability as reliant on continued funding of *WickEd* content and continuing links between *WickEd* content and school programmes.

**What lessons have been learned from the pilot that could usefully inform any roll out of the scheme out to other schools and other school districts?**

It would be preferable to establish full partnerships with participation of all stakeholders, including host institutions (schools and marae), from the inception of the project.

There needs to be clarity about roles, responsibilities, communication etc within such a partnership.

Partnerships and contracts need to be flexible to accommodate late entrants to the programme with full involvement and facilities.

Arrangements need to be put in place from the start of projects to ensure internet safety of members of centres and to avoid software clashes with filtering programs.

The experience of the marae based centre showed that it is more difficult to coordinate a centre from a distance than from on site

Principals and senior management of low decile institutions were concerned about being able effectively to sustain the programme without support to help with staffing, infrastructure etc.

Institutions need to decide on their pedagogical approach within their centres.

Centre teachers and coordinators need ongoing professional development, including ICT skills, accessing and using online learning resources, and basic troubleshooting skills.

Ongoing provision of an LCT coordinator/liaison teacher to the project would help achieve the above professional development.

It is suggested to avoid employing beginning teachers as such a coordinator unless issues concerning their eligibility for full teacher registration are resolved. Both of the coordinators funded by LCT were first year teachers and had problems getting recognition of their year working on the project towards their full registration as teachers.

If the ongoing aim is to involve high proportions of Maori and Pacific students, centres will need to be accessible to them and the centre environment and programmes will need to be attractive to them.

The focus on ‘mathematics, science and technology’ needs re-evaluating in the light of the ages of participating students and the evolution of most of the centres towards a less formal way of operating

New schools joining the WickEd community would appreciate ‘start up’ manuals.





## Introduction

The primary purpose of this evaluation was to work with the project's key stakeholders to provide formative and summative data on the implementation and outcomes of the ICT Boosted Study Support Centres, January 2002 -December 2003. This final report of the evaluation is expected to form part of a further document incorporating the evaluations of all four Digital Opportunities Projects.

### AIMS OF THE EVALUATION

The aims of the evaluation were to:

- identify the extent to which, and the ways in which, the provision of an ICT boost to Study Support Centres enhanced the learning of students, especially in mathematics and science.
- explore innovative ways of using ICT in the provision of educational activities for students, teachers and their communities.
- assess the technical robustness of the ICT infrastructure systems and support provided by the business partners.
- identify the resources, skills and conditions that are necessary to enable the continuation of the project.

### GENERAL GOALS OF THE ICT BOOSTED STUDY SUPPORT CENTRES DIGITAL OPPORTUNITIES PROJECT

Like the other three projects which comprise the Digital Opportunities initiative, the ICT Boosted Study Support Centres Digital Opportunities Project had the general aim of *'bridging the digital divide'*. That is, it had an *'overarching goal of raising student achievement and improving student participation, particularly in the areas of mathematics, science and technology'*, and especially in school catchments where access to adequate ICT infrastructure had hitherto been limited.

The particular focus of the ICT Boosted Study Support Centres Project was to *'bridge educational gaps'*, and lower infrastructural, socio-economic and geographical barriers to student achievement and participation in after school programmes in low decile or isolated areas. Four study support centres were chosen for the pilot. Three were in low decile primary or intermediate schools where such barriers were felt to exist; and the fourth on a marae in a similar area. The participants in the pilot project were:

**Table 1. The Locations of the Digitally Boosted Study Support Centres**

School	Year Levels	Decile
Wainoni School, Christchurch	0-8	1
Linwood Intermediate School, Christchurch	7-8	3
Tweedsnuir Junior High School, Invercargill	7-10	2
Murihiku Marae, Invercargill – a Ngai Tahu marae	-	-

The centres were initially expected to support the learning of a collective total of approximately 100 year 5-8 students.

The business partners in the project were:

- Telecom NZ (project leader)
- Renaissance/ITAS

- Compaq (this company subsequently merged with Hewlett Packard and was renamed HP Compaq)
- The Learning Centre Trust (LCT)

The business partners in the project were contracted to provide for the pilot project:

- broadband access - Telecom learning line with *Jetstream*. In the event, the marae joined the project after initial contracts had been set up for the project. Telecom did not provide services to the marae study centre, arguing that this centre was not included in the original contract
- hardware and software – for all centres:
  - Renaissance *Smart Tools* for 10 machines and service facilities
  - 10 leased desktop Compaq computers, 1 Compaq server
  - 1 Renaissance laserjet printer.
- staff professional development and release - up to 17.5 teacher release days for professional development including:
  - internet and IT capability training
  - places at *Navcon* conferences
- relevant content resources and activities shared through the *WickEd* website.

For their part, the participating institutions were contracted to:

- incorporate ICT based activities into their study support centre programmes, especially related to mathematics/science study and research skills
- provide ‘*a facility with community access*’
- work with the Learning Centre Trust (LCT) to develop content and resources suitable for use by students in study centres.

Much of the year 2001 was spent installing the ICT infrastructure from the business partners. At the time of scoping the evaluation three of the four study centres had been using the equipment during Term 4, and the fourth, the marae in Invercargill, had just been put on-line.

## Scope of the Evaluation

Information for the scoping of this evaluation plan was gathered through:

- Three meetings with Ministry of Education staff from the Research Division and the ICT Strategy for schools, and scoping researchers for the suite of Digital Opportunities Projects.
- Written material providing background on the Digital Opportunities Projects in general, and specifically related to the ICT Boosted Study Support Centres project.
- Interviews with key stakeholders from two of the schools, and the business partners involved. These included interviews with two staff with specific responsibility for the Project from among the business partners, two principals of participating schools, two teachers of the programme at Linwood Intermediate School, and some student members of the centre at Linwood Intermediate School.
- One site visit, to Linwood Intermediate School, to observe the programme in action.

The evaluation adopted a multi-method approach to data collection within the general methodology of a multiple case study. The focus of the evaluation was to assess the '*value added*' to the various study support centres by the ICT based activities, especially in terms of teaching and learning. The collection of data covered the years 2002 and 2003.

The evaluation was formative in the sense that the researcher provided the participants with periodic reports summarising key findings of the investigation, in order for the implementation of the pilot to be adapted if necessary. These reports were provided at approximately six monthly intervals.

A feature of the evaluation was the continuing assessment of the programmes in terms of meeting the most commonly expressed stakeholder goals and objectives. In the scoping interviews and in the analysis undertaken during the development of this plan, it was clear that there were a few overriding common goals held by centres, such as providing out of school hours support for children's learning, and providing opportunities for access to ICT and other educational activities that students and communities would not otherwise have had. Apart from that, however, centres had quite different sets of specific objectives, and varied in their views on how the ICT 'boost' might help to achieve those objectives. For this reason it was felt that each Centre should be evaluated largely in terms of the extent to which, and ways in which, the ICT contributed to its particular goals over time.



## **Methodology**

### **EVALUATION STRATEGY AND OBJECTIVES**

The evaluation has focused on reporting processes and outcomes related to:

- The contributions that ICT based activities made to student learning, especially in relation to mathematics, science and technology.
- The contributions that ICT based activities made to student motivation, interest and self-esteem.
- The contributions that ICTs made in terms of providing educational opportunities for wider school communities.
- The robustness and suitability of the ICT Infrastructures put in place by business partners.
- What teachers and business partners learned over time about good practice in developing and teaching with web-based educational resources.
- Programme sustainability.

The general strategy used for the evaluation was a mixed method, multi centre investigation covering the establishment, operation of the project, student and community usage of the resources and benefits to stakeholders of the project. The detailed research questions addressed by the evaluation are outlined below.

#### **Research Questions Related to Student Learning**

- What sorts of activities did the students engage in?
- What were the stated learning objectives, and observed learning outcomes, of those activities?
- (How) did these change over time?
- What was the balance of ICT based and non-ICT based activities in the various centres' programs?
- How relevant to each of the centres' specific objectives were the ICT activities?
- How much emphasis was placed on mathematics, science and technology in the ICT based activities undertaken in the centres?

#### **Research Questions Related to Student Motivation**

- Why did students opt to join the various study support centre programmes?
- What was the role of the ICT component in motivating students either to join the centres, or to continue participating in them?

## Research Questions about Teachers, Teaching and Web-based Resources

- In what ways did content resources or communications tools provided through the *WickEd* site contribute to the centre programmes?
- What were the most effective, and ineffective, online resources developed for the centre programmes?
- How effective did the participating teachers find the professional development opportunities offered through participation in the project?
- How broadly spread were those opportunities among the staff of the four pilot centres?

## Research Questions Related to Educational Opportunity within the Wider Community

- How much was the ICT used for the educational benefit of the wider school community (e.g. other teachers or classes in the normal school day, parent and community access etc)?
- What was the nature of that use?
- What were the perceived benefits of such use?

## Research Questions Related to the ICT Infrastructure

- How technically reliable and robust, over time, were the ICT systems put in place by the various business partners?
- For what purposes, were the infrastructural technologies provided by the business partners used by the schools for purposes other than the provision of Study Support Centres?

## Research Questions Related to the Sustainability of the Project

- To what extent, and under what conditions, did the stakeholders regard the project as sustainable in the pilot schools beyond the pilot phase?
- What lessons have been learned from the pilot that could usefully inform any roll out of the scheme out to other schools and other school districts?

## **SAMPLING & DATA COLLECTION**

Because the four centres differed so much in their general objectives and 'feel', the evaluation involved regular observation/interview visits to all four locations. This was in order to maximise opportunity for cross-case comparison when analysing and synthesising the data.

Some of the data required was quantitative, and was collected by the participants themselves, or obtained from routinely kept school records (e.g. attendance figures, tracking of student usage of the *WickEd* site etc).

Much of the data, however, was of a descriptive or discursive nature and required more ethnographic data collection methods, relying on interviews with participants and stakeholders, direct observations of teaching and learning episodes, and the like.

In the case of the Christchurch centres, several sessions were observed per term during 2002 and 2003, and students were formally or informally interviewed. Distance made the same level of observation impossible for the Invercargill centres. However, visits were made to Invercargill three times each year to carry out observations and interviews. Several stakeholders had spoken of hoped for flow over effects on students' attitudes and learning in normal classrooms. In order to follow up this aspect, some of the students' regular classroom teachers were interviewed. There does not appear to be any evaluation research of study centres *per se* in New Zealand (Matheson 2002).

Visits were made to two non-pilot centres which started using the *WickEd* website during the course of the project.

## Data Sources

Stakeholders' contracts and other documents relevant to the pilot were used together with stakeholder interviews to gain an overview of the history, contractual arrangements and expectations of the project.

School records were used to obtain data on such matters as students' academic profile and study centre attendance rates. Interviews with students, teaching staff, and parents were used to gain qualitative data concerning student responses to and progress resulting from the project. Centre coordinators, principals and Ngai Tahu management provided data on aspects such as the management of centres. Community members were interviewed to ascertain their responses to the centres. Business stakeholders provided data on the technical infrastructure. Ministry officials shared a broader perspective covering the philosophy of the project and its overall management. Finally, LCT representatives gave valuable insights into the philosophy, design and ongoing development of the *WickEd* website. Most of this data was obtained by phone or face to face interview during site visits.

Written and online questionnaires were given to students, and others participating in the project to obtain background information such as demographic data on the students

Detailed observations were also made of teaching and learning episodes during site visits. These observations produced quantitative data on student usage of digital resources, both online and programs installed on the centre's system. They also provided more qualitative data on student computer skills, the social 'climate' of centres, and routines and pedagogies employed in the centres.

Automatically logged monthly data concerning usage of the *WickEd* website was analysed to gain an impression of the growth and usage of the site.

## HANDLING THE DATA

Quantitative data from surveys and observations, and data on student academic performance (where available) were entered into *Excel* databases, and analysed using the graphing and other facilities included in the program. Face to face interview notes were handwritten or transcribed from tapes. Hard copy of digital data such as relevant e-mails etc were filed, and digital data securely stored on the evaluator's hard drive and on his allocation of the College of Education network drive.

## USING SOFT SYSTEMS METHODOLOGY TO INDICATE LESSONS LEARNT FROM THE PILOT

The Digitally Boosted Study Support Centre Pilot was a complex project which was conceived as a partnership between government, business and schools. The project was intended to address issues related to the '*digital divide*'. The '*digital divide*' refers to inequities between different socioeconomic

groups in access, ability and attitude with respect to digital technologies. The project can be regarded as a *'proof of concept'* pilot and involved a diverse set of stakeholders and a range of objectives.

The purpose of the present study was to evaluate the effectiveness of the Digitally Boosted Study Support Centre Pilot project, and to indicate lessons which may have been learnt during this initiative. These lessons may help in the further evolution and roll out of the present programme, or in the design and establishment of future similar partnership programmes.

The evaluator chose to use Soft Systems Methodology to arrive at lessons and suggestions for future improvement of this and similar projects. Soft Systems Methodology is described in Appendix 1. The application of the methodology to the present project is given in Appendix 2.



## Research Findings

In the present document, findings are reported in relation to the research questions. Some background data on the study centre students are given before describing the findings in detail.

### BACKGROUND DATA ON THE STUDY CENTRE STUDENTS

#### Numbers of Students

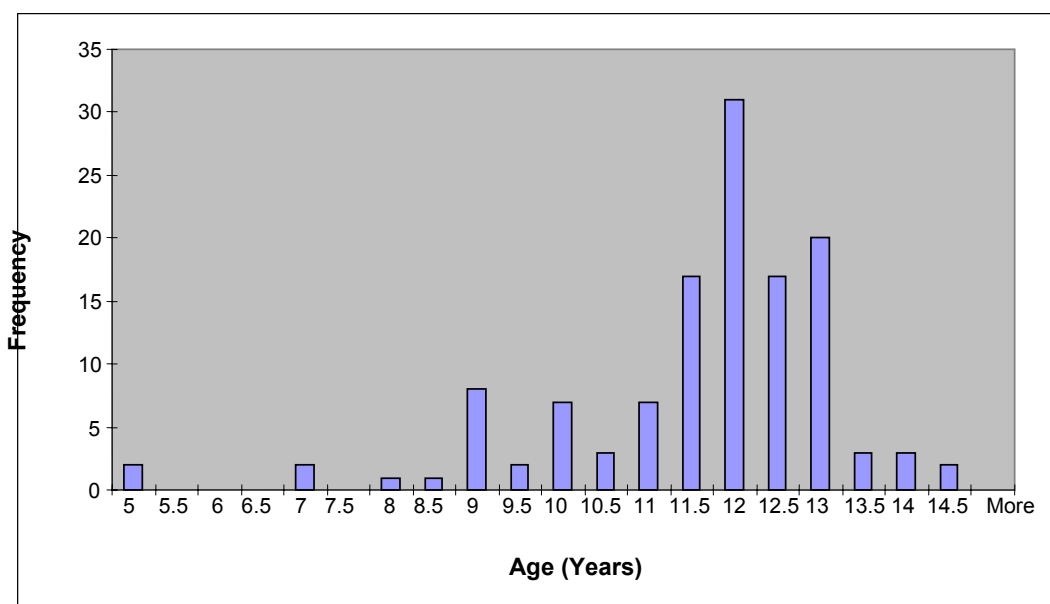
Total numbers of students responding to the entry survey in 2002 were 168, whilst 102 responded in 2003. These figures are likely to underestimate the numbers of students, especially in 2003, because of fluidity of numbers attending the centres. One centre in particular moved from a membership basis for attendance at the centre to a needs-based basis. This led to students attending when they needed help or support with specific aspects of their work.

#### Age Distribution of Students

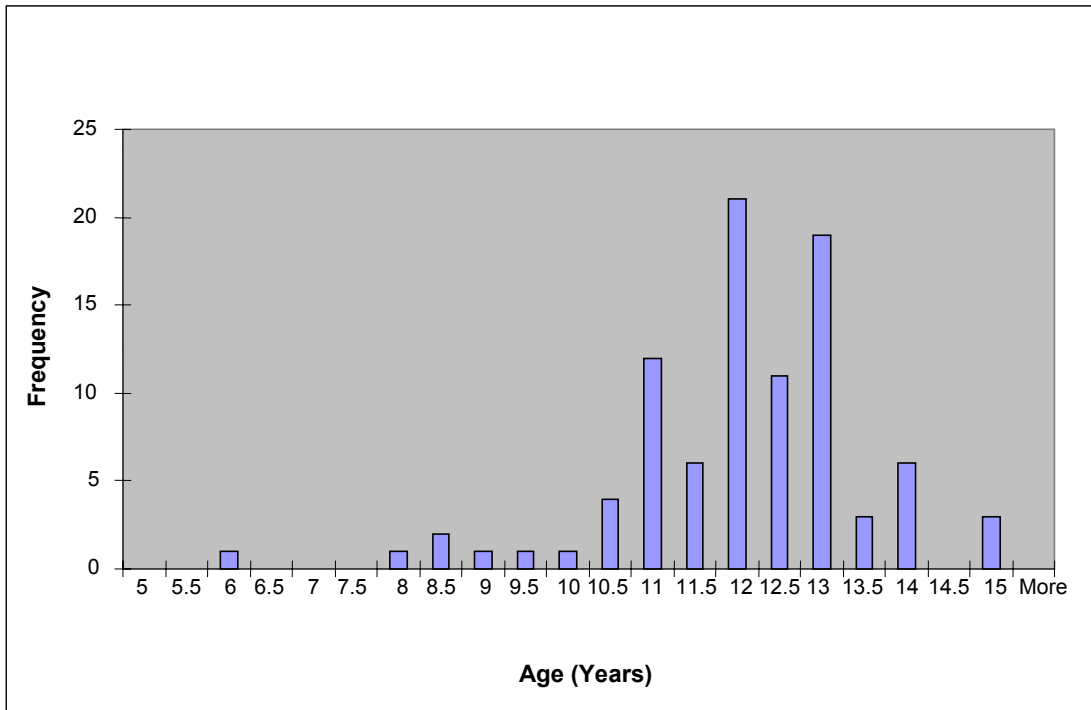
The histograms show overall age distributions of the study centre students for all centres for 2002 and 2003. Mean ages for 2002 and 2003 for all students were 11.8 and 11.3 years respectively (Figures 1 and 2).

The corresponding standard deviations of ages were 1.5 years in both years. It can be seen that there was a wide age variation in both 2002 and 2003. Analysis of data for each centre shows, as would be expected, a lower mean age for the primary school and marae centres than for the intermediate and junior high school. Several centres had one or two secondary students who attended occasionally and who supported their juniors in their work, and the marae had several students under 10 years of age.

**Figure 1. 2002 Age Distribution Histogram**



**Figure 2. 2003 Age Distribution Histogram**

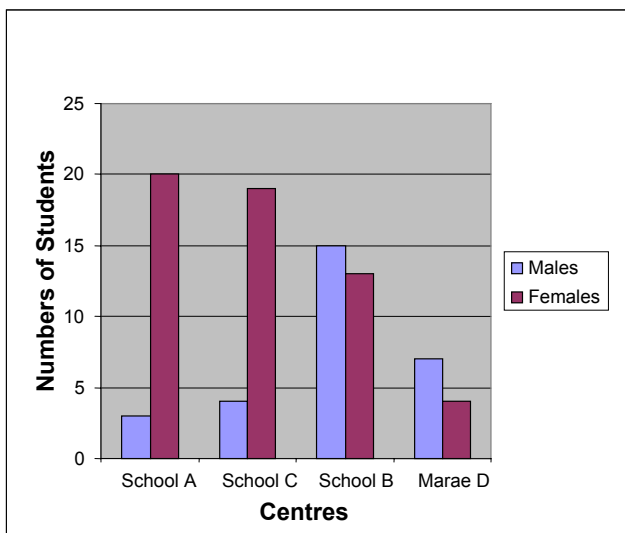


**Gender Ratios**

In 2002, over all centres, girls (62%) outnumbered boys (38%). In 2003, the ratio was almost exactly 50% of each gender.

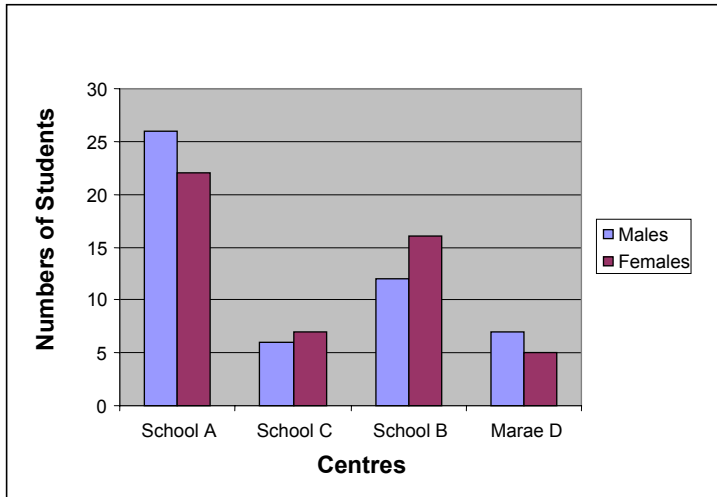
In 2002, the gender distribution in individual centres in Christchurch showed a large majority of girls, whereas boys slightly outnumbered girls in the Invercargill centres (Figure 3). In 2003, the ratios were more balanced in all centres. (Figure 4) The reason for the anomalously high numbers of girls in the Christchurch centres in 2002 is not known.

**Figure 3. Gender Ratios for Centres in 2002**



School A and C are in Christchurch, School B and Marae D are in Invercargill

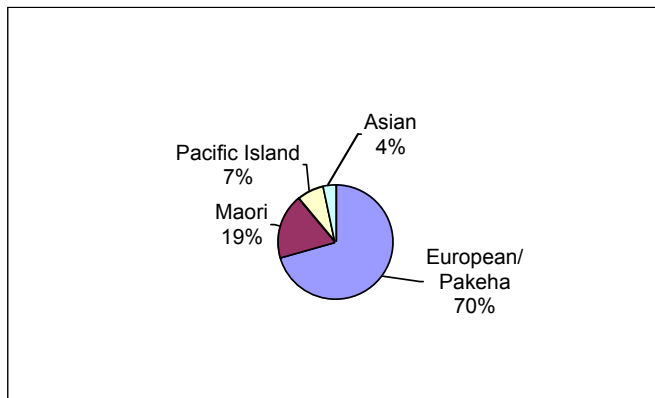
**Figure 4. Gender Ratios for Centres in 2003**



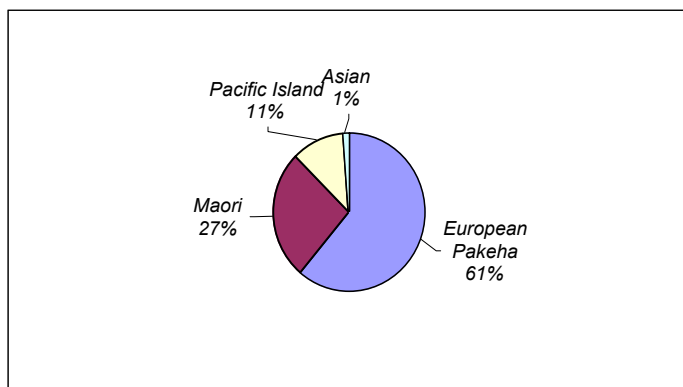
### Ethnic Distribution of Students

Analysis of the 2002 survey data indicated that study centre C had similar percentages of Maori and Pacific students to the percentages in the whole school (Centre 38% Maori, 17% Pacific; School 40% Maori, 19% Pacific). Study centres A and B had lower percentages of Maori students than the respective schools, whilst centre A appeared to have a lower percentage of Pacific students (Centre A 19% Maori, 7% Pacific; School A 27% Maori, 11% Pacific. Centre B 11% Maori, 4% Pacific; School B 22% Maori, 4% Pacific). However, absolute numbers of Maori and Pacific students in these centres were very low. Figures 5 and 6 show ethnicity distributions for centre A and the whole school population.

**Figure 5. 2002 Ethnicity Distribution Study Centre A**



**Figure 6. 2002 Ethnicity Distribution Whole School A**



The overall ethnic spread of the membership of the study centres (including marae D) was closer to that of the national low decile schools' ethnic distribution than the ethnic spread of the school populations of Canterbury and Southland, which have a very high proportion of students of European ethnicity (Ministry of Education 2000). Ministry data show that the representation of European ethnicity children in both provinces was over 80%, whilst the percentage of Maori was 15% and below. The representation of Maori in all study centres was 23%, compared with 42% in all decile 1-3 schools in the country

In 2003, the ethnic distribution of study centre students was similar. However, the proportion of European students was somewhat higher than in 2002, with a corresponding decrease in the percentage of Maori students. A notable difference in the ethnicity ratios for individual schools was the increase in the percentage of Pacific students in the study centre in school C from 19% to 50%.

### **Access to Computers**

In 2002, 56% of students claimed to have computers at home. This number had risen to 65% in 2003. Of these students, 78% percent claimed to be allowed to use the home computer in 2002, compared with 74% in 2003. There was considerable variation in the percentages of students with home computers from centre to centre and from year to year. In 2002 for example, 77% of students at the study centre at school B had computers at home, whilst for school C the corresponding figure was 30%. In 2003, the corresponding percentages were 81% and 8% (one student) respectively. Percentages of students with home computers from both the other centres rose in 2003.

### **Summary**

1. 168 Students were involved in the pilot in 2002, and 102 in 2003.
2. Mean ages of the students were 11.8 and 11.3 years respectively.
3. In 2002 females greatly outnumbered males in the Christchurch centres. In the Invercargill centres in 2002 and all centres in 2003, gender ratios were more equal.
4. The percentage of Maori and Pacific students in the centres tended to be lower than in the whole school populations. A higher percentage of European students, and a lower percentage of Maori were evident in 2003 than in 2002.
5. 56% of students claimed to have computers at home in 2003. The number rose to 65% in 2003. Of these, around 75% claimed to have use of the home computer.

## FINDINGS RELATING TO STUDENTS, TEACHERS AND THE WEB BASED RESOURCES

### Student Learning

#### **What sorts of activities did the students engage in?**

Activities carried out by the students varied from centre to centre. In most centres they also changed with time. This variation with time was a function of increased experience of centre staff, and also of staff turnover.

#### ***School A***

School A's centre teacher/coordinator was the TKI liaison teacher for the whole pilot, and work in the study centre in 2002 was greatly influenced by her involvement. The centre was open from 3.30 to 5.00 pm on Monday to Thursdays during term time, with a short break for afternoon tea. Sessions generally started with administrative matters, students then tended to start on their homework or other activities at the computers. There were often formal micro teaching sessions when the teacher expected students to move away from the computers and discuss the topic with her. These sessions were very interactive with the teacher acting as facilitator. Topics could involve computer skills, as well as other theme based material such as the discussion of film production techniques. The micro teaching sessions led into much more student centred work on the computers.

The teacher/coordinator attempted to keep in touch with what was taught in class – a difficult task since centre students were drawn from 7 or 8 different classes. She tried to support class work with the activities students carried out in the centre.

In the entry survey, 59% of students at this centre in 2002 stated that they wanted to use the computers for homework, school work or other study, and a further 16% wanted to use them for research. This was corroborated at interview, where most of the students cited homework as the main reason for joining the centre.

Observation of the students during 2002 revealed that the students at this centre performed a wide range of ICT activities and used a more diverse set of programs and sites than students at other centres, reflecting the highly student centred approach of the centre's coordinator to students' use of the computers. Students often made their own selection of sites to support their work, and were comfortable using sites and programs ranging from *Cartoon Network* and *Hotmail* to *Power Point* and *Word*. Many of the students were also excellent at peer tutoring their colleagues and sharing their skills.

Students at this centre tended to make good use of the resources of the *WickEd* web site. They used the *Themes* and frequently e-mailed the virtual characters. They also regularly submitted material to the student gallery.

Microsoft *Word* was used extensively to prepare project work. Students also enjoyed challenges from the *WickEd* and other sites. The evaluator observed students enthusiastically involved in an online maths assessment game at the end of one session.

The coordinator of this centre left the position at the end of 2002, and was replaced in 2003. The new coordinator found it difficult to coordinate the centre's activities with the students' class work, although they continued to complete home work in the centre. The coordinator tended to focus on using *WickEd* activities such as the *Themes* to support student learning. These themes were curriculum based and covered a different curriculum area each month. From time to time, current events

dominated the activities of the centre. Thus students were very involved in assignments related to the Rugby World Cup when this was taking place.

### ***School B***

During 2002, school B ran its study centre in a classroom in which half the room was set up like a conventional classroom, and the computers were located along one side of the room and at one end (Figure 7). In 2003, the number of computers in the room increased, filling the original room. The centre then used an adjacent classroom as well as this computer room. Both arrangements favoured a unique style of operation in which students generally began each session sitting at tables or desks completing their homework. After about half an hour, students had refreshments and those that wished or needed to moved onto the computers.

During 2002, the number of computers linked to the internet was limited to the ten machines supplied by the business partners. Accordingly, students needing to use internet resources had priority in using the machines. Despite this, and the relatively large numbers of students attending sessions (up to 30 students at any one session), this centre had the highest level of unoccupied computers (observed between 40 and 60% unoccupied during evaluator visits in 2002). The arrangement of the room with worktables away from the computers may have been a factor in the low occupancy rate of the computers. Students at this school spent a considerable amount of time working away from the computers and moved naturally between worktables and computers as the work demanded. The evaluator's impression is that students at school B made very good use of the computers, and integrated their use effectively with their work at the worktables. Students at other centres tended to spend most of the session seated at computers. This sometimes made it difficult for the evaluator to tell whether machines at these centres were actually in use or not.

In 2002, after refreshments, students had free time and could use the computers if they wished. Many students tended to continue doing homework or school work related tasks. They carried out research related to their work or to personal interests, word processed or published documents, sent e-mails or played educational games. Favourite web sites included *Google* and *Yahooligans*.

The use of the *WickEd* site was not emphasised at this centre, and hence usage was low. A comparatively low number of students played games, and the number decreased as the year progressed.

On one visit, one boy was observed researching the internet for a project on *Mysteries*. He was learning to use the browser and search engines to access information on Loch Ness, and was clearly developing keyboard and searching skills. Another boy was working on a project on commercial uses for different breeds of sheep. He had already carried out a sophisticated websearch to find the information required. Not only was this student very competent in using the technology, but he naturally and fluently integrated the use of ICT with his school and home work. He also appreciated the value of computers and internet access in the farm situation and to enhance life generally.

During another visit, two girls were observed working on items for their school journal. They were searching for jokes and using clipart. They typed slowly, using two fingers. At one point one of the girls tried to save her file, but lost it instead. They helped each other in proofreading their work and in using features of the programs. Finally, one of the girls printed out her work, cut out the jokes and clip art to be pasted on paper for her journal. The work which she had produced with the computer contained stories, jokes, poetry, and clip art. Her final product also contained hand drawn pictures. The girls had a moderate level of skill with the computer, but lacked good typing skills and the confidence to complete their layout work on the computer.

**Figure 7. School B Study Support Centre February 2002**



During 2003, the emphasis of the centre gradually moved from a membership model to one which was more flexible. The new emphasis allowed students to use the centre as they needed to support learning, to do research and to complete assignments such as ICT presentations using programs such as *Word* or *Power Point*. The centre became a favoured place for students to complete work set by their teachers. They were able to access information from the web, and received help from centre teachers when needed. Centre students tended to achieve high quality outputs.

### ***School C***

By contrast with the preceding schools, an intermediate and junior high school, School C was a decile 1 year 0-8 primary school in east Christchurch. Consequently the ages of the students attending the centre was generally lower. This school had a study centre for six years before the start of the present project. The centre was unusual in that students were paid for regular attendance, on the basis of *work + effort = reward*. The principal of this school in 2002 made it clear that '*my study centre was never just about ICT. It was about a bigger thing – the work ethic.*' The centre was open four afternoons per week.

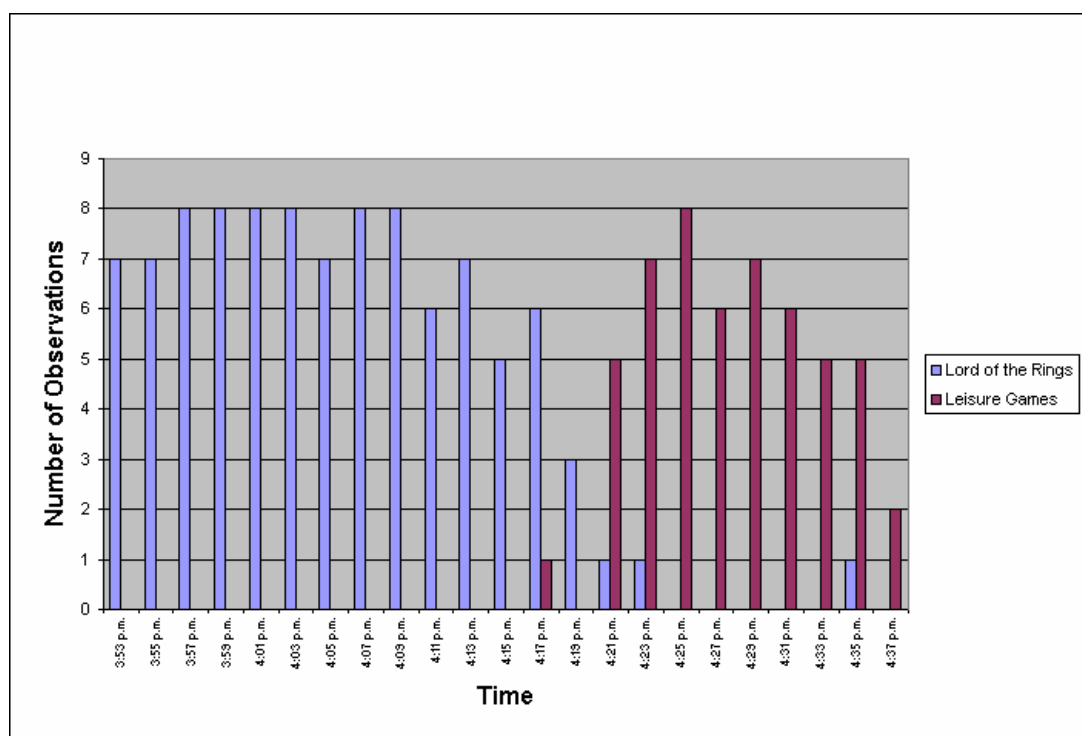
On interview, several students mentioned that they had acquired specific skills such as logging on, accessing the *WickEd* and other websites, using *Word* and building websites. They also mentioned mathematics and reading activities, and the availability of help from centre staff.

Sessions tended to begin with students completing homework. This was often followed by a mental arithmetic or general knowledge quiz and afternoon tea before students were allowed on the computers. Homework was generally completed in the library, which was adjacent to the computer suite. Observation of sessions at this school revealed a high level of unoccupied computers compared with the other Christchurch school. As in the case of school B, this may be a function of the layout of the centre involving computers separate from the area in which students did their homework.

Students at this school tended to use a more limited range of software resources than students at the other Christchurch school. This may result from the relative youth of the students, and perhaps of a more teacher directed approach. Students tended to make relatively little use of the *WickEd* website, and spent much time completing project work.

Towards the end of the sessions, students were given permission to access games or e-mails. Some observation sessions were analysed to investigate how student use of computers varied during the session. During one such session, students were allowed on to the computers at about 3.40pm, and were directed to the *WickEd Lord of the Rings* theme site. They were left to work at the computers until 4.20pm, and then were given permission to access games or e-mails. Figure 8 shows the number of computers accessing *Lord of the Rings* and games as a function of time. The compliance with the tutor's instructions is remarkably high.

**Figure 8. Computers Accessing Lord of the Rings and Games Sites during an Observation Period**



The evaluator observed a student at this centre using *Word* to prepare a report on rugby. This student worked on the report for about 30 minutes, pasting in clipart when necessary. He also used *Photoeditor* and *Grid Club*, a British educational site. He then switched to the *WickEd* site and accessed the *Radius of the Lost Arc* mathematics game. He helped his neighbour with some of the maths questions before returning to the *Grid Club* site for the remainder of the session. Another student answered a *WickEd* challenge question by e-mail, using *Outlook Express*. He then accessed the *WickEd Lord of the Rings* theme and finally used *Real Music* to access and play a Michael Jackson MP3 file with visuals.



Another observation involved a girl who used *Publisher* to design and print a birthday card for a friend. She then moved to *Coolmath* to play a game called *Snake Pit*, and then went to two other games including a word search. The teacher came over and told her the aim of the game. After a few minutes, she accessed *Power Point* and looked at a presentation about the opening of a nearby road bridge. She got help from her neighbour to see the whole picture. She then moved to a presentation of a kapa haka performance in Christchurch Cathedral, and on to others showing a school ski trip and a visit to a rocky shore. Then she helped her neighbour with a maze game before returning to the ski trip presentation. She then used *Publisher* to design another card 'for Juliette' and pasted a ski trip photo into it. After printing her cards, she logged on to *Outlook Express* and read and sent several e-mails

At the end of 2002, the principal of school C retired. One effect of his retirement was that the payment students received for attending the centre was immediately halved. This resulted in a reduction in numbers attending the centre and the students present appearing more focused on their work. During this year, students tended to attend for two of the four weekly afternoon sessions. The pattern of work in the afternoon sessions was similar to that in 2002, and the smaller groups allowed teachers to give more individual attention to students. There was more use of the *WickEd* site during 2003.

An innovation during 2003 was that the LCT coordinator visited the school from school A every Friday morning and ran a session with small groups of students, making extensive use of the *WickEd* resources. The evaluator observed one of these sessions which involved six students, all members of the study centre. The coordinator worked with the students on a science interactive *Acids, Bases and Neutrals*. The students carried out the exercise on screen of mixing various solutions together and observing pH changes and indicator colour changes. The activities introduced the idea of pH and of fair testing. Students seemed to master the technique rapidly, generally carrying out the tasks by trial and error, but soon got bored. When questioned by the evaluator, students had little understanding of the science behind the activity. The evaluator considers that such science simulations need to be supplemented by practical work, and by simple discussion of the relevant theoretical ideas.

Introduction of these weekly sessions appeared to bring a clear focus and sense of purpose to the centre activities. At the end of 2003, the centre's coordinator and a centre teacher were interviewed by the evaluator. They outlined plans for the centre's activities to change in 2004 to be much more clearly focused on *WickEd* activities and to move away from the original emphasis on homework.

### ***Marae D***

Sessions at Marae D normally started with a karakia and welcome to any visitors. Students usually spent around 30 minutes working on te Reo, and homework before being guided to online activities. Students tended to take tea breaks at times appropriate for them. They were also encouraged to take occasional 'OSH breaks' from the computers during which they carried out moving and stretching exercises.

The membership had a broader age range than other centres, with the mean age being 9.7 years in 2002. The focus of activities at this centre was on literacy, numeracy and te Reo. During one session, students were observed to work on social studies issues related to the teenage TV programme *Being Eve*. They used *Word* to answer questions and moved on to a competition on *A Plus Math*, and to work on *Cool Math*. Students made little use of the *WickEd* site, and also of utilities and search engines. This probably reflects the directive approach taken by the teacher who limited the range of sites students were allowed to use; and the age, limited English and lack of confidence of the students.

A later observation session involved students using the *Grammar Gorilla* activities from the *FunBrain* site. Some students explored other areas of the *FunBrain* site. Students then used *Word* and *Publisher* to work on poems for the rest of the session. Again there was little use of the *WickEd* site.

During another session observed in 2003, students spent some time learning about parts of speech in English. (One student mentioned at interview that she had joined the centre to get help 'with subjects like English which I don't learn at the kaupapa.') They then proceeded to work on their homework before moving on to the computers. Once on the computers, students worked on their stories about 'My Family', including pictures and borders in their work. One student also worked on a *WickEd* quiz.

Students had also been working on projects about life in foreign countries. Each student chose a different country to study. They used the internet to research the topic, and produced and presented posters summarising their work.

Students at this centre were unable to make full use of the *WickEd* site, since throughout the two years they had not had e-mail facilities. This appeared to be a consequence of one of the business partners not providing the centre with the same facilities as were provided to the other centres.

## Summary

1. Students in all centres combined ICT based activities with more traditional learning activities.
2. The more traditional activities included completing homework, interactive microteaching sessions, and quiz questions. Activities at the marae included te Reo and tikanga Maori.
3. Online activities included research for projects using search engines, presentation work using *Word* and other programs, e-mail, web page design and work with the *WickEd* website.

## **What were the stated learning objectives, and observed learning outcomes, of those activities? (How) did these change over time? How relevant to each of the centres' specific objectives were the ICT activities?**

Schools set objectives for their study support centres which are summarised in Tables 3 to 5. It proved difficult to separate the centres' learning objectives from their broader objectives, for example involving the wider community. It can be seen from Tables 3 to 5, that schools' stated goals and success indicators included broad learning and other objectives. The formatting of these tables varies because the originals were developed by individual schools. In discussion, centre staff were generally reluctant to state specific learning objectives, except in the case of the marae. As a consequence, both these research questions will be addressed centre by centre. Each centre's goals and success indicators, as notified at the beginning of the project are reproduced in tabular form, together with notes on the level of success achieved and the relevance of ICT to the centre's goals.

When interviewed, principals and staff involved in the centres did not regard science and technology as primary learning objectives of the project. At this level these areas of study are not separate subjects as they are in secondary schools.

It was not easy to draw conclusions about curricular learning outcomes of the students, due to a lack of meaningful data or difficulties with interpretation. School C was the only school that supplied data which enabled a comparison to be made between study centre students' literacy and numeracy and those of their classmates. School A provided data which was difficult to interpret comparatively, and school B did not provide any information.

### ***School A***

The school's goals and objectives are listed in Table 2. The evaluator has completed the *Observed Outcomes* and *Relevance of ICT* columns of the table based on data gathered during the evaluation.

Most of the school's goals and objectives were met during the pilot project, with the possible exception of '*business sees education as worthy of investment.*' The lack of perceived interest of business stakeholders in the progress of the pilot was also noted with other centres, and could reflect the nature of the partnership arrangement.

The coordinator for school A in 2003 initially aimed for students to develop computer skills. As the year progressed, her focus was to develop students' independent and cooperative learning and thinking skills. In addition, her focus moved towards helping students achieve basic knowledge in each learning area. Her aim was also to boost students' general knowledge, which she did using *WickEd* as well as other resources. The coordinator used many activities to foster cooperative learning, as well as units linked to specific curricular areas. For example, she related weaving to the technology curriculum and used a *WickEd* Pasifika theme for social studies.

**Table 2. School A Goals and Success Indicators**

Goals & Objectives (Provided by school)	Success Indicators (Provided by school)	Observed Outcomes (completed by evaluator)	Relevance of ICT (completed by evaluator)
<ul style="list-style-type: none"> <li>• Improved student attitude to learning – curriculum goals less important than attitudinal ones.</li> <li>• To see children and teachers working in learning environment unfettered by fixed curriculum – especially ‘hard to teach’ kids.</li> <li>• To break down egocentricity and ethnocentricity in children.</li> <li>• To increase students’ essential skills.</li> <li>• To provide IT access when not much at home.</li> <li>• Increase parental involvement.</li> <li>• To have ICT working dependably.</li> <li>• Business sees education as worthy of investment.</li> </ul>	<ul style="list-style-type: none"> <li>• Children have positive attitude, motivated to learn, and to use ICT. Children having fun.</li> <li>• ICT used as a tool &amp; for communication. ‘Sparky learning’ happening with ICT.</li> <li>• Children highly confident &amp; competent ICT users.</li> <li>• SSC pedagogy has effect on rest of school &amp; teaching in ‘normal’ classrooms.</li> <li>• Constructivist teaching is happening.</li> <li>• Increased community use of the facility.</li> <li>• Minimal technical problems.</li> <li>•</li> </ul>	<p>Children interviewed had positive attitude to the centre. Comments included ‘learned heaps’.</p> <p>Students constantly using wide range of ICT facilities and communicating regularly using e-mail. High level of creativity in using ICT to solve problems and find information.</p> <p>Children observed to be skilled in use of ICT and confident enough to help their peers and to be involved in tutoring adults</p> <p>Teachers commented on more positive attitude in classroom and improved ability to focus on tasks. More cooperation in the classroom.</p> <p>Teachers used the ICT resources for a variety of purposes, including searching for information, and preparing class activities. E-mail used as general communications tool in school.</p> <p>Centre coordinator attempted to use constructivist approaches in 2002. 2003 coordinator based her work on Bloom’s taxonomy.</p> <p>Students without ICT access at home used the centre.</p> <p>Community members were involved in community classes, primary school students used the centre for ICT activities.</p> <p>There were some early problems with multiple e-mail accounts. These were resolved, help centre could be hard to contact. In 2003, hardware problems emerged especially with hard drives. Up to half the Digital Opportunities machines not operating at a time, related to time constraints on staff.</p> <p>Little evidence of interest by business stakeholders (except LCT) in progress of pilot at the school.</p>	<p>ICT central to activities of the centre. Tools in daily use included <i>WickEd</i>, e-mail, search engines, <i>Word</i>, <i>Power Point</i>, <i>Paint</i>, etc. Students frequently took part in <i>WickEd</i> challenges</p> <p>ICT resources crucial for community activities.</p>

### ***School B***

School B's goals and success indicators are listed in Table 3. The present evaluation covers the period 2002 and 2003. The evaluator has completed the *Observed Outcomes* and *Relevance of ICT* columns of the table, including 2001 outcomes, based on data gathered during the evaluation.

Almost all of the outcomes listed were achieved. Involvement of parents and the community in the centre was somewhat slower than anticipated. However the weekly community sessions were popular, served a valuable function and formed a firm foundation for greater community involvement in the future.

The main learning objectives of the centre were to assist students in completing individual work set by classroom teachers. This was achieved by students using the facilities to access information and to improve the presentation of their work. Teachers commented on the high quality of students' output, and one student remarked: *'Great! It's amazing. It's the first project I've ever finished.'*

The coordinator remarked that the learning objectives and outcomes evolved as the students became more sophisticated in their use of the facilities, and as teachers improved their use of ICT in normal classroom work. As teachers moved away from setting worksheets for homework and began setting more challenging tasks, students began to rely more on the ICT resources and made better use of study centre time.

**Table 3. School B Goals and Success Indicators**

<b>Year</b>	<b>Objective (Provided by school)</b>	<b>Outcome (Provided by school)</b>	<b>Success Indicator (Provided by school)</b>	<b>Observed Outcomes (completed by evaluator)</b>	<b>Relevance of ICT (completed by evaluator)</b>
2001	1. ICT facility is used well by students	SSC staff/students can use facilities capably	Staff keen to have students on computers; computers fully utilised by SSC students	This had been attained before the evaluator's first visit in February 2002.	Cannot be achieved without ICT
	2. Teachers direct/help SSC students search	Students learn to search independently	Most students can identify key words and conduct searches	By February 2002 many students were beginning to search competently	Cannot be achieved without ICT
	3. Parent/community liaison commenced	Students invite parents to SSC to visit	All parents have visited SSC at least once	By mid 2002, community members involved in evening sessions. Some family members attended evening sessions	Community sessions used ICT
2002	1. SSC ICT facilities used by whole school	Timetabled use of SSC in school time	High level of bookings for SSC facilities	Teachers more and more using facilities for classes and individual work	This use involved ICT
	2. Increasing student use of SSC independently	Students will become familiar with some web sites	Many students have favourite web sites and good search skills	Many students did indeed have favourite web sites and used research skills to good effect in project and private work	Cannot be achieved without ICT
	3. Parent use of facility encouraged	Parents invited to use facility/have lessons etc	Significant number of requests from parents for use/lessons	Parent use of the centre was not large.	This would involve ICT
2003	1. SSC facility is seen as an integral part of the school	All staff/students know how to use facilities	SSC facilities used flexibly by all students/staff in learning/teaching	Students began to use SSC flexibly on an 'at need' basis	This use often involved ICT use e.g. for research
	2. ICT integral part of any/all schoolwork	ICT will be treated by staff/students as just another resource	Students use internet as a first port of call if appropriate	Students began to use SSC flexibly on an 'at need' basis. Teachers became more sophisticated in their use of ICT. ICT became more important in normal classroom work	This use involved ICT
	3. Booking SSC by community for use	Parents/groups will book SSC for individual/group use	SSC treated as just another school facility and booked as such	Community use one evening a week. 3 families visited regularly.	This use involved ICT

**Notes. (Provided by school)**

Objective 1 for each year relates to staff/student use of facilities as a progression from Study Support Centre use of facilities only to whole school and then wider community.

Objective 2 for each year relates to content and ICT and is a progression from teacher direction to more student independence to ICT being seen by both staff and students as just a normal part of any/all learning

Objective 3 for each year relates to parent/community use of facilities as a progression from visiting the SSC to flexible use as a school/community facility

### *School C*

School C provided the evaluator with a set of goals and success indicators which it had appended to the project's evaluation plan. This document is reproduced with observed outcomes in Table 4.

It is apparent from the table that most of the goals and objectives of the centre have been met. As with school A, however, businesses appeared to show little interest in the centre after the set up phase.

**Table 4. School C Goals and Success Indicators from Evaluation Plan**

<b>Goals &amp; Objectives</b> <i>(Provided by school)</i>	<b>Success Indicators</b> <i>(Provided by school)</i>	<b>Observed Outcomes</b> <i>(completed by evaluator)</i>	<b>Relevance of ICT</b> <i>(completed by evaluator)</i>
<ul style="list-style-type: none"> <li>• Establish a work ethic among children</li> <li>• Improved student attitude and enthusiasm regarding study.</li> <li>• Provide safe &amp; positive opportunity for H/W &amp; other curriculum learning, including ICT skills.</li> <li>• Provide access to study &amp; resources (incl. ICT) where not much outside school.</li> <li>• Increase school-community links &amp; school business links.</li> <li>• Maths/Science/technology focus is secondary.</li> </ul>	<ul style="list-style-type: none"> <li>• Positive attitudes and work ethic among children.</li> <li>• Positive parent responses.</li> <li>• Business sponsors visit schools frequently.</li> </ul>	<p>Students more positive and confident e.g. 'I'm learning more in class because I can concentrate better' and 'I want to get high standards. (It'll be) better for high school.'</p> <p>Parents surveyed by the school responded positively. All parents commented that all students seemed more focused completing homework and other tasks. Parents also noted improvements in children's computer skills. Parents attended sessions to observe their children working. On interview, students mentioned positive attitudes of parents to their attending the centre.</p> <p>No visits to school by most business partners.</p> <p>Students positive about membership of the centre ICT courses for community members run from the beginning of the pilot.</p> <p>Students frequently used maths sites. Science and technology less frequently.</p>	<p>Many of the goals and objectives did not necessarily involve ICT, although students spent much of their time on the computers. Obviously learning ICT skills dependent on the technology. Most of the information research performed by the students relied on use of the internet. In 2004, the school planned to refocus the centre towards being more focused on cooperative learning and using the WickEd site extensively. This would increase the relevance of ICT in the centre's activities.</p>

School C was the only one for which longitudinal data on student academic progress has been available. Data for student achievement in mathematics and literacy skills in 2002 are given in Table 5. The data was recorded by classroom teachers in February and October, and shows mean changes in curriculum levels for study centre members and non-members in each class. Data were only used for students who were assessed at both times.

The data clearly shows that membership of the centre has no consistent effect on student academic achievement in these areas, and agrees with the conclusions of Dynarski et al. (2003). These authors studied academic achievement in American after school study centres. However, students in the present study were reported as having improved attitudes and ability to concentrate (See for example Tables 2 and 4). Findings regarding these criteria in the Dynarski et al study were not so clear cut.

**Table 5. Changes in Student Achievement between February and October 2002 in Mathematics, Reading, Spelling and Writing for Study Centre Members and Non Members in Three Classes**

<b>Class 1</b>	<b>Number</b>	<b>Mathematics</b>	<b>Reading</b>	<b>Spelling</b>	<b>Writing</b>
Study Centre Members	7	+0.4	+1.8	+0.15	+0.35
Non Members	13	+0.35	+1.2	+0.4	+0.2
<b>Class 2</b>	<b>Number</b>	<b>Mathematics</b>	<b>Reading</b>	<b>Spelling</b>	<b>Writing</b>
Study Centre Members	11	+0.05	*	+1.1	+0.1
Non Members	13	+0.4	*	+0.8	+0.35
<b>Class 3</b>	<b>Number</b>	<b>Mathematics</b>	<b>Reading</b>	<b>Spelling</b>	<b>Writing</b>
Study Centre Members	6	+0.25	+0.6	*	0.0
Non Members	16	+0.1	+0.4	*	+0.1

(\* Indicates data difficult to interpret due to changes in methods of measurement)

### ***Marae D***

The evaluator did not receive a statement of goals and objectives for the marae study centre. However, in several interviews with the Ngai Tahu project coordinators, it became clear to the evaluator that priorities for student learning were to improve their literacy, numeracy, te Reo and tikanga Maori. These priorities are made explicit in the Ngai Tahu mission statement *Ngai Tahu 2025* (Ngai Tahu 2003) which outlines *inter alia* the educational aspirations of the iwi. The centre also aimed to boost students' attitude to learning, achievement and confidence, and 'to feel good about who they are' while helping them complete homework.

The activities of the centre were focused on achieving the above priorities. Use of te Reo during sessions, formal teaching of grammatical points, student use of mathematical and literacy games, support for students completing homework and the enthusiasm of centre teachers for teaching and learning all helped to meet the goals. At interview and in exit surveys, students claimed that attendance at the centre had resulted in improvements in school work. English, maths, spelling, technology, computer skills and completing homework were all cited as areas of improvement. A centre teacher also commented that students' school teachers had mentioned that students were thinking more about their work.

Some of the activities of the centre could have been carried out without the computer boost. However, the teacher regarded the ICT boost as 'an excellent tool to have,' especially useful for research. She also valued the educational maths and literacy resources



## Summary

1. Learning objectives included assisting students in completing homework, acquiring computer skills, improving student attitudes to learning and increasing students' essential skills. The marae's learning objectives included improving literacy, numeracy, te Reo and tikanga Maori.
2. Centres did not regard science and technology as being major foci of the project.
3. In most centres learning objectives changed over time. Centres tended to move from a membership based programme dominated by homework to a more flexible programme based on students' actual needs.
4. Most centres achieved most of their goals and objectives. Links with communities and businesses were problematic for some.
5. ICT activities were crucial to the objectives of two school based centres. The other school was planning to change its *modus operandi* in such a way that would make ICT crucial to its future objectives.

### **What was the balance of ICT based and non-ICT based activities in the various centres' programmes?**

All centres combined ICT and non-ICT based activities. In three centres there was time put aside at the beginning of sessions for students to complete homework away from the computers, and computer work generally commenced when homework was completed. Exceptions tended to be when homework demanded the use of ICT resources, such as web search facilities or presentation software.

In two centres, ICT work was supplemented by short formal teaching phases. These phases could include instruction on specific ICT skills, introduction of *WickEd* themes, or, in the case of the marae te Reo and English grammar work. As time progressed, teachers became more confident and comfortable with the technology and students increased their use of ICT. The coordinator at school B commented that '*the longer the centre goes, the better we get at it,*' and that towards the end of 2003 '*well over 50%*' of the activities were ICT based. School A's coordinator put the balance in her centre to be 80%. Much of students' homework required computer based research. School C tended towards the latter figure, and intended in 2004 that their centre's work would become centred on the *WickEd* website.

The Ngai Tahu coordinator saw the marae's use of ICT as being a '*very important tool*' in a balanced programme which offered a new range of possibilities to the students.

## Summary

1. As the project progressed, the balance of activities in most centres had shifted so that the majority of activities were ICT based.

### **How much emphasis was placed on mathematics, science and technology in the ICT based activities undertaken in the centres?**

Most centres' clientele was drawn from students aged between 11 and 13 years of age – i.e. years 7-9. Generally, these students did not study science or technology as separate subjects, and so these areas were not emphasised in the activities undertaken by most of the centres. The exception was school A, whose coordinator in 2002 had a particular interest in science and technology and tended to promote these subjects. Her successor used *WickEd* science material in her work, and the evaluator observed a

session where she used a resource on acid and bases with students at school C, which paradoxically had regarded mathematics, science and technology as a 'secondary' goal.

All centres tended to emphasise numeracy skills. These were regarded as especially important by the marae, and were a significant feature of study centre programmes in the other centres. Centres used a range of online resources to support this work including maths interactives from LCT, *Cool Math* and *Maths online*.

## Summary

1. All centres emphasised numeracy and mathematical skills in their programmes. They tended not to emphasise science and technology.

## Student Motivation

### **Why did students opt to join the various study support centre programmes? What was the role of the ICT component in motivating students either to join the centres, or to continue participating in them?**

In the entry surveys in 2002 and 2003, students were asked 'Why did you join the centre?' and those who had previously been members were asked 'Why did you come back to use the centre again this year?' In 2002, the most common reasons for joining related to homework or school work. The percentages of centre members from different schools giving these responses varied from 22 to 67%. Students at the primary school also mentioned mathematics (22% of responses). 13% of students at School A responded 'Fun' or 'I like it'. Some students at school B mentioned family reasons such as parental pressure (14%), or for peace (e.g. from siblings) (7%). Few students mentioned computers as reasons for joining – none at schools B and C, and 11% at school A.

Students at the marae gave somewhat different answers. 35% mentioned *Rorohiko/Computers/Internet* as reasons, 24% *Learning/Improve skills* and only 14% mentioned homework.

The most common reasons given for returning to the centre in 2002 by students at school A were related to the centre being *Good* or *Fun* (44%). Homework was the second most common reason (22%). A similar pattern was seen at school C, whilst students at school B gave *Homework* (37.5%) as the most common reason, and *Computers* (12.5%), *The Web* (12.5%), *Fun* (12.5%) and *to get away from Siblings or Parents* (12.5%) as the next most common reasons. The marae centre opened at the beginning of 2002, so the students had not had the opportunity to return for a second year.

In general these findings were supported during student interviews, most students mentioning homework. Family and social factors were also cited such as 'it's easier to get work done on time without my little brothers and sisters running round.' Some students mentioned outcomes such as 'being with my friends longer.' A student of school C commented 'Money' and one at School B said 'Food.' Few students at the schools mentioned computers as a reason for joining.

Students at the marae all mentioned computers as a factor in joining the centre, despite the fact that all six interviewed claimed to have access to computers at home. They also mentioned getting help with school and homework, including English (see above).

Analysis of the answers to the survey questions about the reasons for joining and rejoining the centres in 2003, revealed similar patterns of responses. The reasons for joining and rejoining given by all the students are shown in Figure 9.

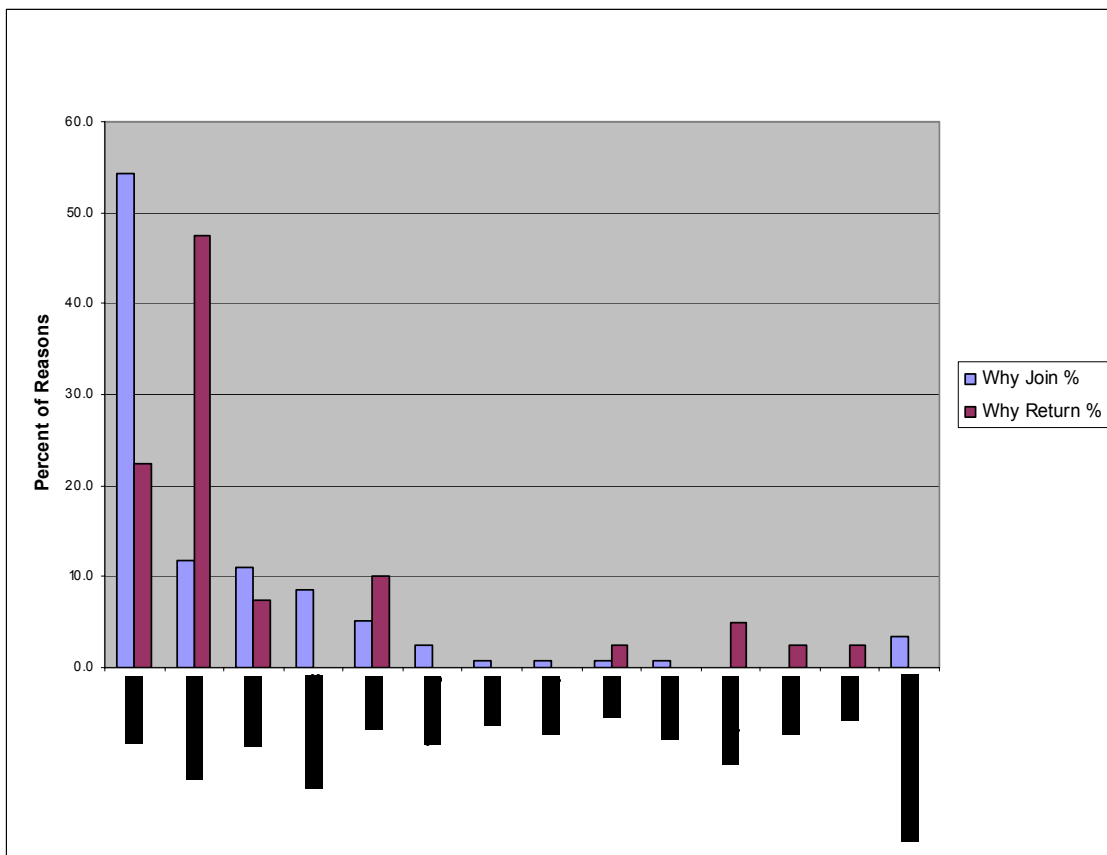
It is interesting to note from these data that the most common reason for students first joining the centres related to homework, whilst the most common reasons for rejoining were that the centres were 'Cool', 'Fun' or for social benefits. When pressed further, students indicated that computers and social interaction both contributed to the 'cool' and 'fun' aspects of the centres.

With regard to the influence of computers on students joining or rejoining the centres, it is clear from the above data that computers and ICT were not major factors for most students. This was supported on interview by most interviewees stating that they would continue to use the centres if there were no computer facilities.

### Summary

1. The most common reasons for joining the schools' centres related to homework or school work.
2. The most common reason for students' returning in 2003 was that centres were 'good' or 'fun.'
3. Parental pressure played a minor role in most cases in deciding to join a centre.
4. Computers and ICT were not major factors for most students in school based centres, although marae students gave *rorohiko/computers/internet* as the most common reason for joining.

**Figure 9. Students' Reasons for Joining or Rejoining Study Centres in 2003**



## Web-based Resources

**In what ways did content resources or communications tools provided through the learning centre trust contribute to the centre programmes? What were the most effective, and ineffective, online resources developed for the centre programmes?**

LCT personnel were interviewed to obtain information on resources provided to support the pilot. In addition, *Webtrends* data were accessed to find out about the usage of the *WickEd* resources. This information supplements data obtained by observation and interview of students and centre staff.

### *Material on the WickEd site*

Decisions about what to focus on with the *WickEd* web site were influenced by the general work which LCT carried out to support the maths, science and literacy communities within New Zealand. Knowledge of what was happening, such as the areas the Ministry was focusing on, other materials available within LCT and the professional development of teachers was very influential. These led to initiatives such as *Spellbinder* and the maths interactives. LCT staff emphasised that it was important to realise that what happened on *WickEd* did not happen in isolation.

Specifically, the discussion forum was used weekly to set maths challenges at three different levels. It was also used for communication between centres – e.g. students used it if they were looking for an e-pal. Students used *Manila*, a self publishing program, to place their own work on the gallery. One student put up photographs of mystery objects which she had found around her school. She asked other students to guess what the photos were of, and offered clues to help them guess. The *Teachers' Lounge* included an online calendar, the forum and minutes of meetings. It also carried photographs of events at the centres. There was also a fortnightly newsletter written by the project's coordinator on behalf of the centres.

In addition, there were virtual characters on the site. These virtual characters, Ed and Wiki, posed weekly challenges. Students could complete monthly themes and e-mail work to these virtual characters. This work was displayed on the site. There were also maths, literacy and science interactive developments.

LCT's Project Manager had noticed a vast improvement in students' ICT skills. The CWA partner involved with the LCT Digital Opportunities team said that the ability of students to post their work on the web site made '*WickEd ...potentially a rich source of student material...we were looking at...PowerPoint presentations which... the students have done (and) exhibit... skill and pure poetry.*'

### *Webtrends data*

It proved impossible to gain information on the frequency of visits to the *WickEd* site by all centres. The statistics on numbers of visits gave data only on the 20 most frequent visitors and were dominated by organisations such as *Google*, presumably obtaining information for listing the site on search engines.

The most frequent regular visitor was listed as *secondcwa*, and presumably related to updating and maintenance of the site by LCT personnel. This accounted for between 2 and 15% of visits during 2002 and 2003. Visits from *secondcwa* were as high as 63% of the total in the early development phase of the site in 2001.

School A generally was the most frequent visitor throughout 2002 and most of 2003, with up to 17% of total visits. Usage of the site in 2003 by school A tended to be lower – generally below 5% of total visits, and from July 2003, school A had dropped off the list of the top twenty visitors. School B generally was the second most frequent visitor of the centres, reaching a peak of around 2% of visits in

June 2003, and supplanting school A as the most frequent visiting centre from July 2003. School C featured intermittently in the top twenty list. In November 2001, it had been the most frequent visitor, with 4% of the total number. At no time did the marae enter the list.

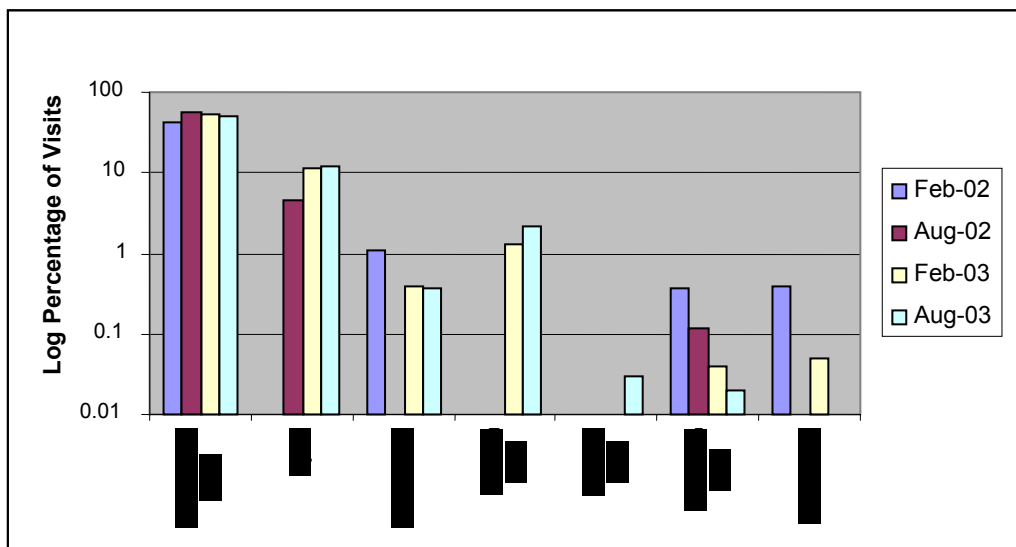
During the course of this project, approximately 20 other schools began to use the *WickEd* web site. Two of these schools occasionally featured in the most frequent visitor list. These were a decile 10 school in Wellington, and a decile 7 school in Auckland.

With regard to use of *WickEd* resources, *Webtrends* data for top pages visited are given in figure 10. This data was selected to highlight key areas of the site. Note that this graph is plotted on a logarithmic scale. The *Bubble Text* page was the main entry page of the site, and the large number of visits probably resulted from visits by search engine webbots.

Of the contents pages, the *Quizit* page which had links to quizzes in mathematics, science, Maori and language was the most visited with up to 12% of visits. Language and Maths Stuff were 5-10 times less popular with up to 2 and 1% of visits respectively. Use of the Science Stuff resources was much less frequent, with a maximum of 0.03% of total visits. Use of Science Stuff and Literacy Stuff in 2002 was so low that they did not appear in the list of top pages; and Technology Stuff did not appear in the statistics at all during the course of the pilot.

Other popular areas of the site were the themes. During the course of the pilot, the themes of *Lord of the Rings*, *Funky Dragon*, *Pasifika: the Arts* and *Weather* featured in the statistics.

**Figure 10. *WickEd* Webtrends 2002 and 2003 Selected Top Pages**



### *Centres' use of WickEd resources and communications tools*

#### *School A*

The coordinator at school A was funded by LCT, and part of her role was to act as a resource person for the other centres in the pilot. In 2002, the coordinator was deeply involved in creating resources for the *WickEd* site, having produced, for example, approximately one third of the resources listed on the *Quizit* area of the site. She helped LCT identify the type of resources needed in the centres. During her employment as coordinator, the students made extensive use of the material on the *WickEd* site. She found the theme activities to be the most effective resources on the site. The weekly challenge activities were also popular. Despite having a special interest in science, and trying to make this a

main focus for 2002, she did not use the maths and science material much. She found them less effective, saying that perhaps she did not direct children to them effectively.

In 2002, children regarded the *WickEd* site favourably: '*Cool the way they've produced it with Maori and English challenges. The science bit's awesome.*' and '*fun – doing work and getting educated...I like the Science Stuff and science movies.*' Students used the *WickEd* site several times each week and frequently contributed to the student gallery, communicated with the virtual characters and took part in the challenge activities.

During 2003, the new centre coordinator made the *WickEd* site the basis for much of the learning in the centre and she regarded it as '*indispensable.*' She used the site not only at her own school, but also during her visits to run classes at school C. The most effective resources were the themes, *Cool Stuff*, *Korero Mai* and the weekly challenges. She also made good use of maths and science resources. Areas which she did not use included the technology resources and the *Teachers' Lounge*.

Most students used the *WickEd* site at least twice a week, and cited it as one of their favourite sites. They mentioned activities such as the challenges and maths games. Comments on the site included '*cool*', '*well set out*,' and '*easy to use.*' One student said that the site was '*good for kids, but a bit boring.*'

### ***School B***

During the early phase of the pilot, the school had been involved in development of resources with LCT. In 2002, the coordinator used *WickEd* for interactive resources, but not for themes. She was very enthusiastic about the earth science resource *Bumps and Grinds*: '*It's brilliant – a model for computer interactives*'. However she found the *Blast Off* maths interactives to be difficult for both students and teachers to work out how to start. She saw the centre as not being a place for formal teaching, and was happy about the way she used the LCT material to supplement other activities in the centre. It appeared from observation and interview that students at this centre made little use of the *WickEd* material in 2002.

In 2003, the coordinator said that the *WickEd* resources were getting '*better all the time*,' as the range and number of resources increased. She used the resources more and more, but that students in the centre did not use the '*clubby stuff*.' She saw this material as being more effective for younger students.

### ***School C***

During 2001, the coordinator and some of the centre's children were involved in the development of resources with LCT. In 2002, children at the centre made increasing use of the site, especially when searching for information. During observations, students used various parts of the *WickEd* site as directed by the centre teacher. Some students thought the site was good, whilst other opinions included '*pretty boring*'. Students at this centre found the maths games to be too difficult. One student was concerned about the need for LCT to take measures to prevent cyberbullying which involved children posting inappropriate comments about their peers.

In 2003, one of the centre teachers mentioned that students used the *WickEd* site mainly for educational games. She found the *Information Station* useful for homework and research, and mentioned the use of the site by the LCT liaison teacher in her weekly sessions with centre students. Interviewed students generally used the site frequently, one saying '*it's awesome! You learn other stuff you don't know about and it helps with school work.*' They mentioned several resources including *Korero Mai*, *Maths Stuff* and the *Harry Potter* theme.

## ***Marae D***

Staff or students at the marae were not involved in the production of resources for the *WickEd* site, the centre having been included in the pilot later than the other centres. Students at this centre were unable to participate fully in interactive activities on the site, because for the whole of the life of the pilot they did not have e-mail access. This was caused by contractual problems resulting from this centre's late inclusion in the programme.

In 2002, the centre lead teacher used the *WickEd* resources about twice per week, and regarded *Korero Mai* and the maths interactives as the most effective. She did not use the science resources. All students interviewed were very positive about the *WickEd* site, and a couple commented on how much could be learnt from the site. Students remained positive about the *WickEd* site in 2003, and specifically mentioned maths games, and crosswords. Centre teachers were not interviewed about their use of LCT resources in 2003.

## **Summary**

1. LCT provided a range of resources and communications technologies to support the project. These resources included themes, quizzes, educational games, a student gallery and areas such as *Maths Stuff*, *Technology Stuff*, *Science Stuff* and *Korero Mai*. There were also links to other educational sites. LCT also ran challenges and provided virtual characters as online mentors for student learning. There was also a *Teachers' Lounge* communication tool.
2. Centres varied in their use of the *WickEd* material. Use of this material tended to increase with time as teachers became more confident and as the quality and quantity of resources increased.
3. Teachers regarded themes, *Cool Stuff*, *Korero Mai*, *Information Station* and the challenges as being among the most effective *WickEd* resources. Science and technology resources and some maths interactives were regarded as less effective.

## **Teachers and Teaching**

### **How effective did the participating teachers find the professional development opportunities offered through participation in the project? How broadly spread were those opportunities among the staffs of the four pilot schools?**

Professional development opportunities offered with the project included staff being flown to Wellington to be involved in development of resources with LCT, training in the use of *Smart Tools*, attendance at the *Navcon* conference in Melbourne and Christchurch and on site training carried out by the LCT liaison teacher. These professional development opportunities were widely used by teachers in the participating schools. For example, in school C, eight teachers had been involved in professional development by the end of 2002, which the principal regarded as '*very significant for a seven classroom school.*' The principal of school A saw the professional development as '*holistic*' as opposed to being focused on one theme at a time, such as *Word* or *Excel*. The school had received two formal sessions, but would have appreciated more. The liaison teacher had run professional development sessions throughout 2002 which had been attended by virtually all teachers. The professional development and the technology brought the school's ICT vision forward by two to three years. Teachers in this school regarded the coordinator's friendly assistance as often more valuable than formal sessions. One staff member commented on the professional development she had received from the students, saying '*the kids teach me more.*' Teachers at school B regarded the *Navcon* conference in Christchurch as '*superb, (it) stimulated interest in digital classrooms,*' and another commented that '*now I'll go to the TKI site first for research.*'

The marae, having joined the pilot later than the school centres, did not take part in the early professional development programme. They had some tuition in *Smart Tools*, and valued professional development received from the LCT liaison teacher who made several visits to Invercargill in 2002. They also had a visit from the LCT *WickEd* site manager. All the other centres also had high praise for the development received from her.

All the above professional development was widely spread amongst the staff of the participating schools, and had contributed to a changing culture regarding the use of ICT in the schools. Both teachers at the marae centre and the Ngai Tahu coordinator had also taken part in professional development through the project.

Staff of several centres commented that they were promised follow up sessions of development regarding *Smart Tools*, but that this never happened.

Funding for professional development was not available for the project in 2003. However, staff at school C obtained independent funding to attend *Navcon 2K3* in Melbourne. In addition, the new LCT liaison teacher carried out some highly valued sessions at school C.

In 2002, the liaison teacher received a great deal of professional development whilst carrying out her LCT functions and was self motivated to take advantage of opportunities as they presented themselves. She found the *Navcon* conferences very effective for getting ideas and building self motivation. The new liaison teacher claimed that professional development had '*not happened*' for her, and that she was essentially self trained. She would have appreciated training in administering the network so that she could have helped sort out problems with the infrastructure. She regretted that she had had '*no chance*' to visit Invercargill to offer professional development to centre staff at school B and the marae.

## Summary

1. Teachers found the professional development opportunities generally to be very effective. Especially appreciated were the opportunity to attend *Navcon* conferences and professional development support from the LCT liaison teacher.
2. The professional development opportunities were widely spread amongst staff of participating schools.

## FINDINGS RELATED TO EDUCATIONAL OPPORTUNITY WITHIN THE WIDER COMMUNITY

**How much was the ICT used for the educational benefit of the wider school community (e.g. other teachers or classes in the normal school day, parent and community access etc)? What was the nature of that use? What were the perceived benefits of such use?**

All of the schools involved in the pilot made extensive use of the ICT facilities for the benefit of students in regular classes from the beginning of the project. The computers in school B were in the coordinator's daytime classroom during 2002, and were regularly used by students in her classes. Other students were welcome to use the machines, and tended to go individually to the computer suite to carry out research or other activities. In schools A and C the Digital Opportunities computers were in or adjacent to the school library. These facilities were regularly booked by classes during the school week, and were in use for most of the school day.



Teachers made personal use of the computers to a variable extent for planning and research. The coordinator at school B found that having the computers in her class room greatly affected her classroom practice. She commented that she could easily access a wide range of resources, print out materials in the same room, and that having *Smart Tools* made management very easy. Another teacher at this school who did not have her own computer used the machines for research, planning and to develop resources. She found that knowledgeable students gave her a lot of help to use the computers.

In school A during 2002, the coordinator reported that with development of the centre and having a dedicated computer room, there were significant effects on classroom practice. Teachers became more confident with, and found many novel uses for, the technology. Like school B, this school made extensive use of *Smart Tools*.

In 2003, as reported above, there was a new coordinator at school A. It appeared that the initial momentum associated with the centre in 2002 had reduced somewhat. The new coordinator reported that only two or three staff members used the computers regularly with classes. The computers were in use four mornings per week, and sometimes in the afternoons. They were probably in use for 50-60% of the school week.

The principal of school C commented that the computers in the centre were in use '*all day and every day*' for classes during 2002, and the school's coordinator for 2003 indicated extensive timetabled use for over 80% of each week.

The marae made use of the resources during the school day to support the learning of alternative education students. These students attended the marae for literacy and numeracy classes and used the machines to access appropriate resources and to learn computer skills.

All schools involved the wider community in their centres to a greater or lesser extent. The principal of school A mentioned a community computer teaching and learning programme which involved students and adults working together on web, e-mail and word processing skills. The school also worked with primary students from local schools, helping them develop basic information skills. The centre was also used by ex-students presently attending secondary school. Other information technology projects, which made use of the study centre included interviewing local senior citizens about their past to develop an e-book archive of living/oral history.

The coordinators of school A's centre, being the LCT liaison teachers, carried out valuable roles to support the wider study centre community. They both were involved in the development of resources for the *WickEd* site, and supported the professional development of teachers at the other centres. During 2003, the liaison teacher ran weekly classes for students at school C.

School C also ran computer classes for community members in 2002 and 2003, and some community members used the computers to use e-mail and other facilities. The LCT liaison teacher ran these classes during the second half of 2003.

School B ran weekly evening classes for students and community members, attracting up to 14 participants at the sessions. These classes attracted some of the school's students who found it difficult to attend the afternoon sessions, as well as year 6 to 12 students from other schools without study centres. Members of study centre students' families and others wanting to learn or brush up their computer skills also regularly used the evening sessions. The evaluator attended one of these sessions, where adults used *Living Library*, *Google*, *Word* and e-mail and publishing programs (Figure 11). Another attendee was a young man '*who hated school and this was a way I could work and get*

*exemption* (from school)'. He had developed from not being able to turn computers on to regularly using *Maths online* to develop his numeracy skills. His aim was to develop graphing and accounting skills.

All centres regarded community use as being beneficial for the school and the community. The coordinator of school A commented that it was '*great to have other people visiting the school*' and that it was '*great publicity*.' The principal of school B mentioned that the centre could become a focus for increased involvement of parents in the school, and helped community members understand information technology. Advantages of community involvement were seen by the coordinator of school C to include encouraging parents to take more interest in the school, and helping participants to increase self confidence, for example by allowing them to produce more professional *curricula vitae*.

**Figure 11. A Community Member Receiving Assistance during a Community Session**



**Summary:**

1. All schools used the ICT facility extensively for regular classes.
2. Teachers used the computers for e.g. planning and research.
3. Schools involved their wider communities in ways which included basic computer courses and offering access for research and e-mail.
4. Schools benefited by the positive publicity and increased visits by community members. Community members acquired skills and self confidence.

## FINDINGS RELATED TO THE ICT INFRASTRUCTURE AND SUSTAINABILITY

### The ICT Infrastructure

**How technically reliable and robust, over time, were the ICT systems put in place by the various business partners?**

#### *School based centres*

During 2002, the coordinators of schools A and B reported great satisfaction with the systems. There had been problems with multiple e-mail accounts in one school and with a router in the other. One of the coordinators found the follow up and fault fixing service to be occasionally hard to contact. However, when reached they were generally pleasant and helpful. The problems were solved effectively.

In 2003, school A's coordinator reported problems with the server filling up rapidly with e-mails. This affected the reliability of the system. In addition, there were frequent computer breakdowns, in the main caused by hard drive failures. On one evaluation visit, six of the Digital Opportunities machines were out of action. Children in the centre seemed to regard the Digital Opportunities machines as being '*free*' and therefore second rate. The coordinator regarded these problems as being due to lack of technical support within the school. During the second year, the 2002 coordinator took on the role of an in school technical support person. However her duties as a classroom teacher did not give her time to fulfil the technical role effectively as well as being a classroom teacher.

The coordinator of school B commented that '*we're totally happy*' with the reliability of the machines. The centre had five hard drive failures, but had not had any failures for some months. The fault fixing service was good with a good turn round.

The primary school reported considerable initial problems which were largely dealt with during the early part of 2002. The solution involved rebuilding their server. Because children and staff had '*occasionally and unintentionally (in the main) accessed inappropriate sites,*' the school began routing internet access through the *Watchdog* proxy filtering service. The school also reported problems with *Smart Tools* at times. It is possible that these problems arose from incompatibilities with the filtering software. These problems were overcome with phone support. However the coordinator was disappointed with support for staff wishing to undertake a network administrator role.

In 2003, the coordinator reported that the centre had several hard drive failures which were frustrating. He was not satisfied with the fault fixing service, and regarded the cost of new components as '*expensive.*' He would prefer in future to deal with local computer firms.

The computers in the centres are very heavily used, and it was regarded by a business partner as likely that the hard drive failures represented normal wear and tear.

#### *Marae centre*

The marae centre had ongoing problems with e-mail and with the broadband facility throughout the life of the project. These problems were linked to the centre joining the project later than the schools, and one business partner not extending facilities to this centre, which had not been included in the original contract. There were also problems with access to inappropriate sites. *Web Marshall* software was installed on the system, but this proved incompatible with the *Smart Tools* software used in the project. These were also ongoing issues which prevented use of e-mail facilities by the marae students, and hence students at this centre were unable to derive full benefit from the programme.

Considerable effort was expended by the Ngai Tahu coordinator in attempting to obtain resolution of these problems. Several attempts to obtain full facilities for the centre were unsuccessful. The coordinator had involved Ngai Tahu IT services in attempting to sort out the problems of incompatibility of *Web Marshall* and *Smart Tools*, but these attempts were not completely successful. The coordinator reported frustration with the service provided by the business partners. She had requested that *Smart Tools* be removed from the centre's system, but had no reply from the provider.

The coordinator recommended that future projects involve all participants fully from the start; and that partners' responsibilities be clear from the beginning of the project. Plans and contracts for projects should be flexible enough to ensure that late joining centres obtain full services. She also believed that service arrangements should involve businesses in centres' communities.

### ***Business partners' views***

Business partners generally saw the systems as being robust and reliable. In 2002, the partner supplying the computers expressed the view that the computers should be suitably robust and reliable to last the three years of the project. The company's spokesperson expected that hard drives would be the first components needing to be replaced. *Smart Tools* was regarded by a spokesperson as 'very robust.' He was less confident about the robustness and reliability of some of the hardware and mentioned some router failures. The spokesperson for LCT mentioned problems marrying together the computer resources centres needed to run the project with their pre-existing resources. He believed that some of the ongoing nagging issues could have been resolved quickly if there had been proactive systems in place within the project for reporting and fixing problems. The telecommunications company which had supplied the routers to three of the centres had tried to respond quickly to router problems. The company's spokesperson said that it was difficult for the company to respond quickly to individual centres' router problems, and the company would probably want to hand over responsibility for maintenance of routers to schools. She said that the decision not to include the marae in the centres serviced by the company was purely a contractual and cost containment decision.

### **Summary**

1. Initial problems were experienced with multiple e-mail accounts and router problems. After these were resolved, most centres were happy with the reliability of the systems.
2. Hard drives began to fail from late 2002, probably due to wear and tear. Centres had varying experiences when attempting to get the problem resolved.
3. In the two centres which ran proprietary filtering software, there were problems relating to compatibility with *Smart Tools*.
4. The marae experienced significant ongoing infrastructural problems resulting from its late addition to the project. This resulted in students at this centre being at a disadvantage relative to students at other centres.
5. Business partners regarded the systems as robust and reliable.

### **For what purposes, were the infrastructural technologies provided by the business partners used by the schools for purposes other than the provision of study support centres?**

As detailed above, all three schools made extensive use of the infrastructure to support classroom teaching, teacher preparation and research and community activities. The marae used the infrastructure with alternative education students.

## Summary

1. Schools made extensive use of the technology to support classroom teaching, teacher and community use.

### The Sustainability of the Project:

#### **To what extent, and under what conditions, did the stakeholders regard the project as sustainable in the pilot schools beyond the pilot phase?**

In general, centres regarded the project as being sustainable. However, all centres had concerns regarding issues of cost, staffing, and maintaining their computer systems.

The principal of school A believed that the quality of the programme could not be maintained if staff had to be rostered on a part time basis. He thought that if this were to happen, daily attendance would depend on which teacher was on duty. For quality to be maintained the school would need *'someone for whom the centre is their baby.'* He felt that the centre had made a real difference during its life, and that the centre's success should be acknowledged by continuing support. The centre had benefited the whole school and the wider community, and this should be acknowledged by funding the school to support a 0.5 centre teacher. He did not think that part time staff would be likely to be attracted to working two hours after school for four days a week. For him, the issue of ongoing funding to support the programme into the future was crucial, and he believed this would be a factor for other low decile schools.

Sustainability of the project came down to finance for school B. The school could not have funded its involvement in the project by itself. The principal regarded the key to the future being keeping the hardware up to date, and providing ongoing professional development for teachers. The coordinator would not consider opting out of the programme.

In 2002, the principal of school C commented that the project has *'got to be sustainable. You can't switch something like this off after two years.'* However, the school *'couldn't ever have been able to afford'* the project, and the question of maintaining ICT input depended *'on a whole lot of things including resources.'* At the end of 2003, the coordinator believed that it was sustainable in the school if the centre were to be used in a way based on the *WickEd* themes. A change to this mode of operation was planned for 2004. Presumably operation in this way might reduce staffing requirements. Sustainability would also depend on what the school could afford to pay tutors for after school work.

Schools were generally positive about the extension, albeit in a modified form, of the Digital Opportunities contract into 2004. The Ministry of Education agreed to pay centres' leasing costs during the year. However, centres would be responsible for their internet costs.

For the marae centre, sustainability depended on the nature of the study support centre contract. In 2003, the coordinator stated that she intended to discuss with local IT companies what was possible with the computers in order for the centre to get what it needs. Her view was that if the iwi were to pay for ICT, they need to get what they paid for, and to establish a system which would truly meet the needs of the students and the community. This had not been the case during the project. Besides lack of availability of e-mail facilities, computers had broken down. The expectation seemed to be that tutors could repair them themselves with phone guidance. The coordinator did not regard this as part of their role, and they were not trained for the task. The marae centre was coordinated for the first few months of the project from Christchurch, and the coordinator for this period found it a challenge to run

the centre from such a distance. Coordination was moved to Dunedin and a new centre coordinator was appointed. This reduced, but did not eliminate the difficulties.

In 2002, all centre coordinators regarded continued provision of a project coordinator as important to sustainability. During 2003, the project coordinator did not visit the Southland centres. These centres did not mention the need for provision of a project coordinator as crucial to sustainability, in contrast to the Christchurch centres who continued to emphasise the importance of a coordinator.

LCT's project manager commented that the *WickEd* Study Support Centre project required facilitators and a production team to be sustainable. The website could be sustained using current content but this would be detrimental to student learning, and the growth of the project. The CWA partner mentioned that the project was beginning to be promoted generally with the Ministry's publicity in the *Education Gazette*. A number of children had independently discovered the *WickEd* web site. There was an increase in the usage of the interactive components of the site. This was managed by bringing in secondary students to assist the LCT team. Similar strategies would be used as the site grows in the future. There was no advertising campaign for the site, so the growth in usage was manageable. Sustainability would continue to be dependent on there being explicit linkages between what *WickEd* does and what schools do. This would require human intervention to maintain communication between the centres, LCT and the schools themselves. The role of the liaison teacher/project coordinator was seen to be crucial. Children were also involved in the development and growth of the site from the beginning. The CWA partner commented *'it's very exciting to see (children) communicating with other kids and creating their own content...and...entering a co-construction model of development which ...has far greater sustainability possibilities than one where we are leading, no matter how well intentioned we (are).'*

The other business partners essentially saw the project as sustainable. The spokesperson of one business wanted to see the project rolled out further because it appeared to be adding a lot of benefit to schools and communities. She saw ongoing funding as the main issue affecting sustainability. Another partner's spokesperson regarded the infrastructure as being very sustainable at a realistic cost to schools, but realised that the employment of LCT staff to continue supporting the project was a considerable expense. He saw the project could still be of value to schools even if LCT *'walked away'* from it.

## Summary

1. Centres and businesses regarded the project as being potentially sustainable with continued support.
2. Issues of sustainability related to ongoing costs, staffing and system maintenance.
3. Some of the financial issues were addressed by extension of the Digital Opportunities contracts (in a scaled down form) in 2004.
4. Centres mentioned continuing provision of a project coordinator as important for ongoing sustainability.
5. LCT regarded sustainability as reliant on continued funding of *WickEd* content and continuing links between *WickEd* content and school programmes.

### **What lessons have been learned from the pilot that could usefully inform any roll out of the scheme out to other schools and other school districts?**

Some of the lessons which could be drawn from the pilot arose out of discussions with centre staff and participating stakeholders. In the main these lessons related to financial and professional development issues. Most of these lessons were further highlighted by the soft systems analysis.

Soft Systems Methodology was used to analyse the project and to draw further lessons and suggestions which may be of use in future roll out of this project and the initiation of future projects. The culture of the project, issues of partnership and the nature of the ICT based learning activity system were considered. Soft Systems Methodology is explained in Appendix 1. The Soft Systems analysis is detailed in Appendix 2, and conclusions summarised at the end of this section.

The methodology uses modelling of idealised systems designed to overcome problems in the real world situation to produce 'desirable' suggestions for change. These are meant to be bases for subsequent dialogue aimed at leading to agreed actions for improvement.

During 2003, a number of other schools (estimated by LCT as more than 20) began to use the *WickEd* facilities in study support centres. The evaluator wondered whether there were any further lessons which could be learned from these new centres. Accordingly, he visited two of these centres, located in a decile 1 and a decile 2 school in east Christchurch in order to compare these centres with the original group. The visits to these centres are summarised in Appendix 3. One outcome of these visits was that staff at these new centres would have appreciated initial help from 'start up' manuals.

### **Summary of Lessons including those highlighted by Soft Systems Analysis and Visits to New Centres (Appendix 2 and Appendix 3)**

1. It would be preferable to establish full partnerships with participation of all stakeholders, including host institutions (schools and marae), from the start.
2. There would need to be clarity about roles, responsibilities, communication etc within such a partnership.
3. Partnerships and contracts would need to be flexible to accommodate late entrants to the programme with full involvement and facilities.
4. The experience of the marae based centre showed that it is more difficult to coordinate a centre from a distance than from on site.
5. Arrangements would need to be put in place from the start of projects to ensure internet safety of members of centres and to avoid software clashes.
6. There was an issue of low decile institutions being able to effectively sustain the programme without support to help with staffing, infrastructure etc.
7. Institutions would need to be conscious of the nature and implications of their pedagogical approach within their individual centres.
8. Centre teachers and coordinators would need ongoing professional development, including ICT skills, resource availability and use and basic troubleshooting skills.
9. Ongoing provision of an LCT coordinator/liason teacher to the project would help achieve the above professional development.

10. It is suggested to avoid employing beginning teachers as such a coordinator unless issues concerning their eligibility for full teacher registration were to be resolved.
11. If it is to be the ongoing aim to involve high proportions of Maori and Pacific students, the centre environment and programmes would need to be attractive to them.
12. The focus on ‘mathematics, science and technology’ would need re-evaluating in the light of the ages of participating students and the movement of centres towards a more student centred way of operating.
13. New schools joining the *WickEd* community would appreciate ‘start up’ manuals.



## Appendix 1 Soft Systems Methodology

Soft Systems Methodology (SSM) was originally conceived as a seven stage process of researching complex real life situations. It was originally proposed by Checkland (1984) and has been further developed by Checkland and others over the ensuing thirty years. (e.g. Davies and Ledington, 1991). SSM has been applied to a wide range of situations by researchers in many western countries, including New Zealand. These situations have involved industry, health providers, civil service, overseas development organisations and educational institutions (See e.g. Checkland and Scholes 1999).

Soft Systems Methodology *'is a means of guiding the tackling of real world situations which are perceived as problematical for some of the time by at least one member of that situation.'* (Davies and Ledington, *op. cit.* p11). It was thus considered to be of potential value in the present study.

Soft Systems Methodology is structured to allow for data collection and analysis of the real world situation, creation of idealised models of the situation, and suggestion of possible solutions to improve the situation. The seven stages are shown in Table 6 (adapted from notes posted on the web by Travis and Venable (1999)) and in Figure 12. Stages 1,2,5,6 and 7 take place in the 'real world' whilst steps 3 and 4 are part of 'systems thinking'. Note that in this approach, the term 'system' refers to the conceptual world of 'systems thinking'. It is not applied to the 'real world' situation. In the present evaluation, the logical analysis is followed through to step 5. Steps 6 and 7 are intended to be discussed with participants in the situation in order to bring about improvements. The cycle can then be repeated in order to continue an ongoing process of improvements. Steps 6 and 7 of the methodology were not carried out in the present project, because of the way in which the evaluation process was set up. The evaluator considers that the project could have benefited by following the full SSM process after a year of operation.

The seven stage process is not a rigid formula to be slavishly followed when working with real world situations. It is often more appropriate to loop back and revisit earlier stages as the process unfolds. Dick (2002) has described the methodology from a dialectical perspective.

Situations in the real world are *'soft'* – i.e. they involve people and organizations and hence are embedded in a cultural context. An important aspect of the *'developed form'* of SSM is a cultural analysis which explores the roles, norms, values and power structures within the situation. This *'cultural analysis'* is an essential complement to the *'logical analysis'* of the seven step model.

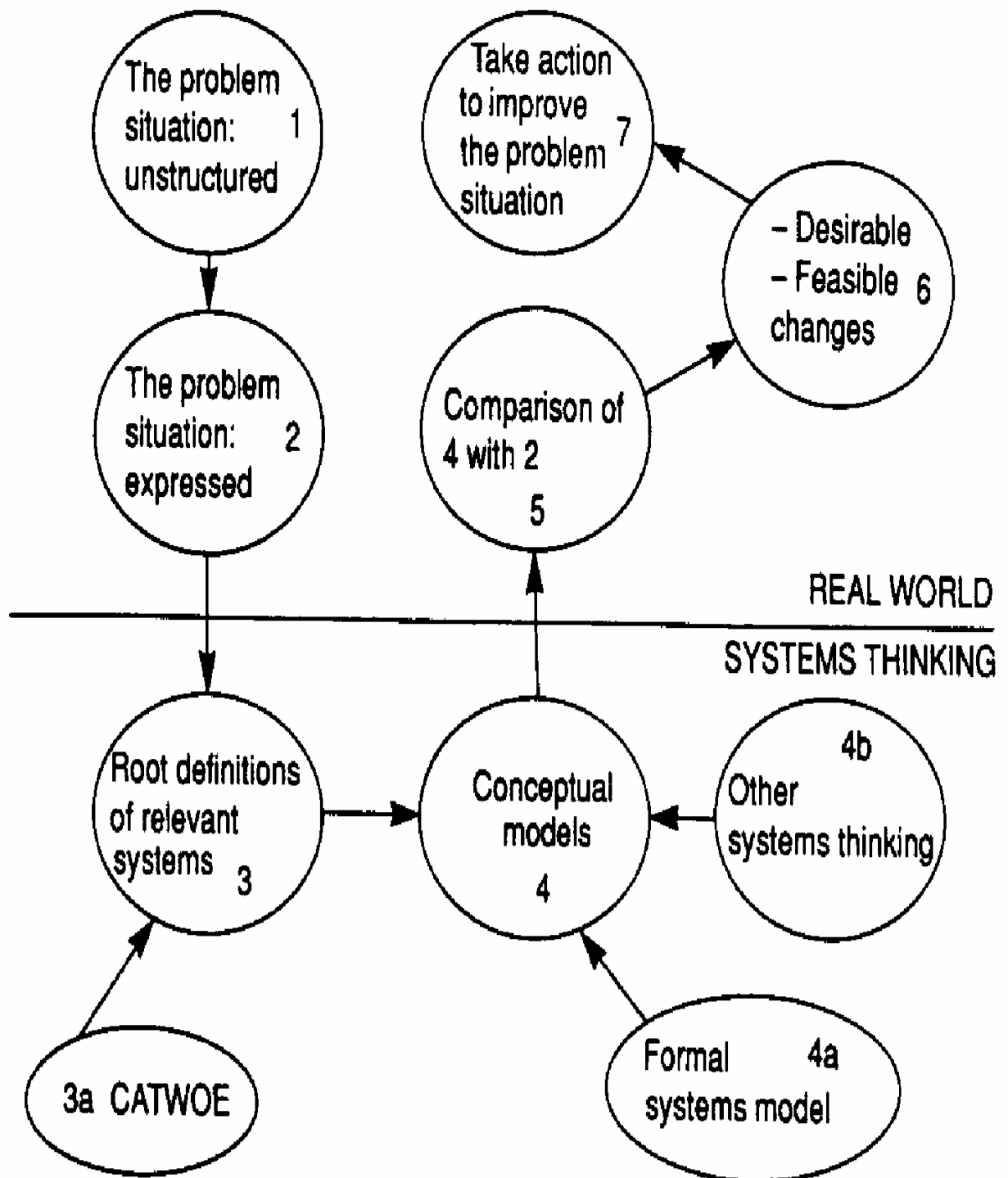
### *Logical analysis*

The first stage in the logical stream of analysis is the gathering of data. In this study, such data included *'hard'* data (such as numbers of students, ethnicities, gender distributions etc) and *'soft'* data which gave valuable insights into the cultural milieu of the project. Such soft data included data gathered by interview and from qualitative answers to survey questions. It also included subjective impressions gathered from on site visits and phone discussions with stakeholders. The aim was to assemble as rich a range of relevant data as possible.

**Table 6. The Seven Stages of Soft Systems Methodology (After Checkland 1984)**

Stage	Main activity
1. The unstructured problem situation	Gathering quantities of background information
2. The problem situation expressed	The situation is expressed in the form of a ' <i>rich picture</i> ' to illustrate structures and issues needed for subsequent analysis, reflection and developing systems for change.
3. Creation of ' <i>root definitions</i> ' of relevant systems	Statements, from various significant viewpoints, defining the systems, the people involved in, or who could affect the system, the transformation carried out by the system, the system's environment and the system's purpose.
4. Creation of ' <i>conceptual models</i> ' of relevant ideal systems	Models, based on the root definitions which represent desired human activities. The modelling process involves the minimum necessary activities to carry out the transformation process required. It involves consideration of the time sequence in which the activities must be carried out.
5. Comparing the conceptual models with the problem situation	The aim here is to understand the problem better, and to identify differences between the model and the actual situation, so as to suggest potential improvements
6. Identify desirable and feasible changes	The changes suggested in step 5 are discussed to determine which of them are able to be accepted and integrated into the cultural setting of the situation. Economic considerations may also be relevant.
7. Taking action to improve the situation	During this stage, discussion takes place and plans are drawn up covering the action to be taken, the people involved and the timing of appropriate actions. Actions should be aimed at improvement of the situation, rather than for the sake of change.

Figure 12. Diagrammatic Representation of the Seven Stage Soft Systems Model (from Travis and Venable, 1999)



In the second stage, this data was assembled into the form of a 'Rich Picture'. The aim of the rich picture is to capture the richness of the situation by illustrating the issues, tasks and climate of the situation. Both 'hard' and 'soft' data were used to generate the rich picture.

The rich picture was used to help identify areas to focus on during the analysis. Such areas included key tasks and problematic features of the project. These were areas which it was believed could be 'improved' in future roll out and development of the project, and were candidates for modelling using systems concepts. The systems which could be derived from these areas were classified into *Task Based* and *Issue Based* systems. A key aspect of systems thinking is that of *hierarchy*. Systems relating to large tasks or issues are made up of interacting lower level systems. Thus an educational task system would include teaching/learning systems, resource gathering systems, assessment systems etc.

The next stage in the logical stream involves moving from the real world to systems thinking, and developing models of systems representing improvements on aspects of the real world situation. This was done by creating root definitions and conceptual models of relevant task based and issue based systems.

A root definition of a relevant system is a concise description of what the system *is* – i.e. *a system to do X by means of Y in order to achieve Z*. The formulation of a root definition is based on a set of criteria which is known by the acronym CATWOE. The components of CATWOE are:

**Table 7. CATWOE**

<b>Customers</b>	Who are the beneficiaries or victims of the proposed action?
<b>Actors</b>	Who will carry out the activities
<b>Transformation</b>	What is the proposed action? What transformation (of material or abstract entities) is to be carried out? This can be expressed as: Input → <b>Transformation</b> → Output
<b>World view or Weltanschauung</b>	What is the world view which makes the root definition meaningful?
<b>Owner</b>	Who could stop this activity; or could make or break the system?
<b>Environment</b>	What is the environment of the system, and how do they affect each other?

The root definitions of the relevant task based and issue based systems were next used to create conceptual models of the systems. The conceptual model involves considering the minimum necessary number of activities needed to carry out the system's transformation process. It involves considering the time sequence in which the activities must be carried out to achieve the transformation process. In order to develop conceptual models, the activities implied by the root definitions were listed in their chronological order by creating lists of *logical dependencies*. The conceptual model shows the activities necessary for the transformation, arranged in time sequence, and connected by arrows to show the movement of relevant items (people, information, energy, materials etc).

In order for systems to survive over time and to respond to changes in the environment, there needs to be effective monitoring and control subsystems which monitor all the processes within the system, compare performance with appropriate criteria, and regulate systemic activity to maintain or improve performance.

Having completed root definitions and conceptual models, the analysis moves back into the real world with the comparison of the conceptual models with the real situation. This was done for each selected

system by listing the activities in the conceptual model, determining whether each activity existed in the real world situation and considering how each activity was done in the real world, and how it was judged. This process gave rise to ideas for improvement based on the disparities between the models and the real world. These ideas in turn led to suggestions for *desirable* changes which could be made to improve the situation and to guide future progress.

The parallel cultural analysis was broken into three sub analyses. Following Checkland and Scholes (1999), Analysis One considered the roles of client who commissioned the evaluation, problem owner and problem solver in the situation. Analysis Two was concerned with the roles, behavioural norms of key players in the situation; and the values against which performance of the roles were judged. The third analysis was concerned with the power dynamics of the project.

Considering the desirable changes in conjunction with the cultural analysis gave rise to a list of suggestions for potential improvements to the situation. These are considered in this report as *'lessons that have been learned from the pilot which could usefully inform any roll out of the project to other schools and other school areas.'* Ideally these lessons would be debated amongst the stakeholders in order to arrive at an agenda for change, improvement and future roll out of the project. In the present project such debate did not occur, and the suggestions are presented as potential starting points for discussion in developing new projects or considering roll out of the current pilot.



## **Appendix 2 Soft Systems Analysis Leading to Lessons for Future Roll-out**

### **THE RICH PICTURE**

The Soft Systems Methodology is outlined in Appendix 1. This discussion focuses firstly on the rich picture of the project situation and the choice of candidate areas to model. The evaluator's cultural analysis of the situation is then described. This is followed by consideration of each modelled system through to suggestions for changes which the evaluator considers to be potentially desirable

The situation is complex and 'messy.' There are many stakeholders, each with its own worldview and agenda. The situation involves technical, planning, communication and relationship issues. There were also factors involving power and control. The rich picture in Figure 13 is an edited version of a working document used during the evaluation. In the rich picture, the arrowed lines indicate relationships or the flow of information. Conventionally, such interactions involving strain or conflict are represented by crossed swords.

Text comments encapsulate factual or affective information expressed by or relating to the various stakeholders.

A cultural analysis of the Digitally Boosted Study Support Centre situation is now presented, followed by a logical analysis of suggested areas for improvement.

### **DIGITALLY BOOSTED STUDY SUPPORT CENTRES CULTURAL ANALYSIS**

The project represented a meeting of at least four different kinds of culture – government, business, schools and iwi – and also generated its own subculture. Analysis of the cultural aspects of the project was important to indicate which suggestions from the logical analysis were likely to be feasible. The cultural analysis follows Checkland and Scholes (1999).

#### **Analysis One – Role Analysis**

The role analysis (Table 8) considers the perspectives of the client for the evaluation, the 'would be problem solver' – i.e. the entity or entities wishing to improve the situation, and the problem owner – the entity or entities which has the power to terminate the problem situation.

In this case, the client for the evaluation was the Ministry of Education, which commissioned the evaluation research. The Ministry was one of the 'would be problem solvers'. Research questions agreed with the Ministry involved enquiry into the sustainability of the project, in rolling out the scheme to other schools and in improving the outcomes of the pilot, and hence it was assumed that the Ministry had an interest in suggestions relating to these questions. The Ngai Tahu coordinator wished to resolve the ongoing issues related to the lack of e-mail facilities for students at the marae centre. Other would be problem solvers are listed in the table with their perceived interests. Problem owners are those who are affected by problematic aspects of the situation. In this project there was a long list of problem owners, reflecting the complexity of the situation.

## Analysis Two - Social Analysis

This analysis (Table 9) considers the roles, norms and values of key players in the situation. These are defined as:

- Roles: social positions recognised as significant by people in the situation
- Norms: expected behaviours associated with roles
- Values: criteria for judging performance of role holders based on what is perceived as 'good' or 'bad' performance by role holders.

Each of these three aspects defines and is defined by the others.





**Table 8. Analysis One–Role Analysis**

<b>Role</b>	<b>Entity</b>	<b>Notes</b>
Client	Ministry of Education	Required evaluation research and feedback to include lessons learnt from project.
Would be problem solvers (improvers of the situation)	Ministry of Education and Manager	MoE wished to use evaluation research to 'improve' this and other projects.
	Evaluation Researcher	Devoted time and energy to the project. Concerned to draw valid reliable conclusions which in discussion with stakeholders would lead to useful and actionable suggestions for improvement. Funded by MOE.
	Ngai Tahu Centre Coordinator	Wished to resolve ongoing problems related to e-mail access etc.
	LCT	Wished to improve <i>WickEd</i> facilities to cope with roll out.
	Schools	Wished to sustain SSCs in the future.
Problem owners	Ministry of Education	MoE set up project and wished to learn from it.
	MoE Manager	Keen to have this and other Digital Opportunities projects succeed. Concerned with overall management of project. Negotiate with stakeholders. Concern with ongoing sustainability. Concern whether partnership with business would be the best way to go in the future or whether normal contractual arrangements would be better.
	Ngai Tahu Coordinator	Concerned with problems of IT access (e-mail) and safety, and managing the marae centre from a distance.
	ITAS/Renaissance	Concerned with problems associated with <i>WebMarshal</i> software.
	LCT	Concerned with production and interactive delivery of supportive resources and teaching materials. Project roll out and sustainability.
	LCT Liaison Teacher	Concerned with professional development of centre staff and preparation of <i>WickEd</i> resources.
	Evaluator	Concerned to produce valid, relevant and useful information which can guide improvements and future projects. Used evaluation to develop soft systems methodology skills.
	School coordinators	Concerned with overall functioning of centre. Often concerned with policy on student membership. Maintained contact with BPs and/or school technician where appropriate to service/repair infrastructure. Maintained contact with LCT liaison teacher. Often involved in wider community outreach.
	Centre Teachers	Concerned with day to day running of the centre. Concerned that computers and software run. Concerned for discipline, session structure, teaching and learning.
	Principals	Concerned with housing and staffing centre. Effect of centre on school profile. Decisions about ongoing sustainability and funding, including affordability for low decile schools.
	Business partners	Concerned with getting project up and running. Concerned to be seen as socially responsible. Often expressed interest in ongoing partnership with schools Often lacked time to make this a reality. Concern to ensure that original contract was adhered to.

**Table 9. Analysis Two–Social Analysis**

<b>Role Holder</b>	<b>Norms (Expected Behaviours)</b>	<b>Values (against which performance is judged)</b>
Ministry of Education	Carrying out government policy. Establishing project partnerships. Overseeing project. Commissioning evaluation research. Being involved in any future roll outs. Ensuring appropriate professional development.	Maintaining appropriate confidentiality. Selecting appropriate locations for centres. Appointing suitable manager and evaluator. Learning lessons from pilot. Ensuring appropriate funding. Set up appropriate contacts with stakeholders.
MoE Manager	Continuously managing project. Coordinating partnership between stakeholders. Trouble shooting. Encouraging, Acting quickly, Having wider perspective of Digital Opportunities projects	Accessibility. Responsiveness to project/stakeholder needs. Being a good 'broker' Acting quickly, effectively and proactively to solve/avoid problems. Being well informed.
Business Partners	Setting up and maintaining hardware and software. Maintaining ongoing interest and commitment to project.	Setting up and testing hardware, software and connections in good time. Providing complete package to all centres. Responding quickly and effectively to faults or infrastructural problems. Showing ongoing interest and involvement in project.
LCT	Setting up, developing and maintaining WickEd website. Interacting with schools and students to ascertain and provide what is needed. Developing services to cater for roll out	Developing and providing appropriate resources to meet students' and centres' needs. Adapting site appropriately to increased demands.
LCT Lead Teacher/coordinator	Liaising with coordinators, teachers in schools in order to enable guidance and professional development to facilitate project. Working with students. Assisting in developing <i>WickEd</i> resources.	Contacting coordinators and teachers regularly. Visiting all centres regularly for professional development, student support etc. Developing appropriate resources.
Principals	Supporting establishment of Digital Boost in Study Centres and giving positive publicity. Staffing and resourcing centres. Being committed to project's success.	Positively supporting establishment and ongoing functioning of centre. Publicising centre effectively. Solving resource and staffing problems involved in sustaining centre.
Coordinators	Administering the centre including managing maintenance of infrastructure. Liaising with technical support. Reporting on progress.	Running centre smoothly with minimum of infrastructural or administrative problems. Reporting progress regularly and appropriately.

<b>Role Holder</b>	<b>Norms (Expected Behaviours)</b>	<b>Values (against which performance is judged)</b>
Centre Teachers	Developing programme; teaching and day to day running of centre.	Running effective programme which students gain from and are positive about. Minimal behaviour problems occurring in centre. Reporting technical problems to coordinator quickly.
Students	Attending centre. Improving skills, content knowledge, attitude by attendance.	Students attending centre, participating and learning well. Minimal behaviour problems.
Ngai Tahu Coordinator	Administering the centre including managing maintenance of infrastructure. Liaising with technical support. Liaising with runanga and centre teachers. Helping solve IT problems associated with marae centre.	Centre running smoothly. Sorting infrastructural problems out quickly. Maintaining harmonious relations with runanga.
Ngai Tahu IT Department		Solving problems quickly.
Runanga Evaluator	Providing of space for marae centre. Carrying out evaluation research. Collecting relevant data. Visiting centres. Maintaining relationships with stakeholders. Reporting findings.	Appropriate space provided. Appropriate data collected and analysed. Findings reported. Harmonious relationships maintained.

The Ministry of Education was constrained by the political process to maintain confidentiality about the project until the Digital Opportunities projects were announced publicly on February 7 2001. The time course to implementation and selection of centres was thus telescoped and it was not possible to involve schools in the planning process. The initial project involved three schools, but was extended to include the marae.

One focus of the Digital Opportunities projects was to trial partnerships between schools, business and government. Contracts with business partners were to ensure a better business contribution than could be obtained by the normal tendering and contracting process. The Digital Opportunities Manager acted as an effective broker between the centres and businesses. He responded quickly and effectively to e-mail communication. He made effective decisions throughout the project, including adding the marae to the project and extending the infrastructural support into 2004.

The business partners set up and maintained the infrastructure. Apart from some initial set up problems there were few problems, although both school C and the marae had problems with apparent incompatibilities between *Smart Tools* and filtering software. Because the marae entered the pilot later than the rest of the centres and was not included in the original contract, a key partner would not supply infrastructural support. This led to ongoing problems for the centre which were unable to be resolved during the pilot. The outcome was that students at this centre were severely disadvantaged, being unable to communicate by e-mail and thus unable to make full use of the WickEd website.

LCT created and maintained the WickEd site. The initial work on the site involved students and staff from schools, and ongoing development involved feedback from centres and the liaison teacher whose salary was largely paid by LCT. Growth and roll out of the site and its sustainability was a concern of LCT.

The LCT lead teachers/coordinators carried out their roles well. In 2002, the coordinator was more involved with professional development and with resource creation than in 2003. One issue affecting the coordinators was that they were both first year teachers who needed two years classroom experience to gain a full practicing certificate. Working in the Study Centres did not count as classroom experience. This meant that compared with their peers who taught in a conventional classroom, they were at a disadvantage in applying for registration and were eager to move to a classroom role. This led to both relinquishing the role after one year. Thus the experience and skill gained by the coordinator was lost from the project. It would be desirable for the guidelines for registration to be addressed so that time spent in the liaison/coordinator role can count towards registration. It was felt that professional development and support of teachers in future roll out of the project would be supported by ongoing provision of a coordinator.

Principals, coordinators and centre teachers generally ensured that centres were publicised and ran smoothly. They commented that the project was not a 'real' partnership between schools, businesses and government, and regretted the lack of apparent involvement and interest by business partners. In some cases there was uncertainty about who to contact to resolve problems, and there was a call for responsibilities of partners to be clearly spelled out. Each centre ran the project differently, reflecting the differences in school climate and in approaches of the coordinator and teachers.

In most cases students enjoyed being members of the centres and gained valuable learning, social and attitudinal benefits.

The Ngai Tahu coordinator had to manage the centre from a distance. The coordinator worked from Dunedin (the original coordinator worked from Christchurch), and the centre was in Invercargill. She was frustrated by the infrastructural problems at the centre arising from one business partner not

providing facilities, and believed that *'our centre was an afterthought...we got second best...one lesson we learnt was not to join a project later.'* She involved an Invercargill company and Ngai Tahu IT department in trying to resolve the problems. No real resolution was achieved.

The runanga were keen to host the centre at the marae. Whanau and elders were impressed by the work of the students.

The evaluator attempted to communicate appropriately and regularly and to collect appropriate data. In the main this was not difficult. It was not possible to obtain meaningful data on centre students' academic outcomes in most cases because of unavailability of data or difficulties with the way they were recorded. The exception was school C. At the end of the project, school B did not supply online exit surveys from their students. The evaluator did not visit the Invercargill centres in term 4, 2003 for budgetary and time reasons. In retrospect, it may have been better to have done so.

### **Analysis Three – Political Analysis**

The principal power relationships within the project are shown in Table 10.

Most of the power relationships in the projects were relatively straightforward. The major problematic area related to the issue of supply of full services to the marae. The consequences of one partner using its power to withhold support from this centre were severely to disadvantage the students relative to those at the other centres. This highlights the need to consider the nature of partnership and of contracts in this and future projects.

**Table 10. Analysis Three–Political Analysis**

<b>Power Held by:</b>	<b>Nature of Power</b>	<b>How Power is Wielded or Used</b>
Ministry of Education, vested in the Digital Opportunities Manager	Budgetary and Financial Political Planning Brokering	Allocating financial resources Deciding which schools to include Deciding to include marae Extending contracts for equipment Facilitating sorting out problems with businesses Encouraging schools to stick to commitments
Business Partners	Supplying and maintaining infrastructure	Investing in project Deciding how to interpret partnership contract – e.g. not supporting late entrants to project
School boards and Principals	Executive and Planning Resource Allocation Information	Decision to join project Decision to continue with project Staffing Funding support within school Communicating information on project
Coordinators/Teachers	Management Teaching Information	Ensuring day to day functioning and support of project within school Communicating information on and enthusing about the project
Students	'Grass roots' Power	Students could wield power by deciding not to involve themselves in programme and/or disrupting.
TKI	Provision of WickEd resources and coordinator/liaison teacher	Setting tone and content of web resources. Funding coordinator/liaison teacher
Ngai Tahu Development Corporation	Executive and planning, resource allocation	Deciding whether to support the project

## **LOGICAL ANALYSIS**

### **Problematic Areas and Candidate Systems for Modelling**

After reviewing the rich picture and the source data, the evaluator extracted a number of issues and tasks which appeared to be important in the establishment, sustainability or future roll out of the project to other schools and school areas. These are summarised in Table 11. Systems chosen for modelling are shown in bold type.

**Table 11. Some Key Issues from the Project**

<b>Task/Issue/Problem Area</b>	<b>Relevant System</b>	<b>Comment</b>
What to include and how to run study centre sessions (Task)	<ul style="list-style-type: none"> <li>A study centre programme design system*</li> </ul>	Includes the choice of content and pedagogy and the balance between ICT and non-ICT activities. Also the cultural content of the activities. Relevant to principals, coordinators, and teachers
Students using the centre (Task)	<ul style="list-style-type: none"> <li><b>An ICT based learning activity system*</b></li> </ul>	To increase learning and skills using appropriate ICT activities
Student selection (Issue)	<ul style="list-style-type: none"> <li>A system to select and target low SE and particular ethnicity students for the project</li> </ul>	Because of the location of the pilot study centres, clientele had higher representation of Maori and Pacific students than regional populations of similar ages. Relevant to encourage more low decile schools to be involved in roll out. Could involve publicity to Maori and Pacific communities and making centres and their activities especially appealing to these cultures. TKI has developed some appropriate resources for the WickED site
Creating resources (Task)	<ul style="list-style-type: none"> <li>A system to create and deliver appropriate interactive ICT learning experiences to the students</li> </ul>	This has been handled well by TKI. Provided that support continues for this to happen, it should continue in foreseeable future
Learning focus (Issue)	<ul style="list-style-type: none"> <li>A system to decide the primary academic focus of the digitally Boosted Study Centre Project</li> <li></li> </ul>	The focus was stated to be on ' <i>maths, science and technology</i> .' How relevant is this to younger students? How relevant is it to have a curriculum in an after school study centre?
The nature of partnership (Issue)	<ul style="list-style-type: none"> <li><b>A system to establish and maintain meaningful partnerships between Government, businesses and schools</b></li> </ul>	Schools and iwi have not seen the pilot as a true partnership. Difficulties have arisen about the inclusion of late comers into the pilot and lack of clarity about roles and communication within the partnership from the point of view of the centres



Task/Issue/Problem Area	Relevant System	Comment
Public image (Issue)	<ul style="list-style-type: none"> <li>A system to improve the public reputation of the host school or marae and/or of business partners</li> </ul>	Is the project being used to best effect to inform the community of the benefits and facilities offered by centres or to publicise the social good of business involvement?
Passing on lessons to new centres (Task)	<ul style="list-style-type: none"> <li>A system to pass on lessons to new centres</li> </ul>	Both new and original centres have expressed need for documentation and support when starting out to avoid <i>'reinventing the wheel'</i>
Professional development (Issue)	<ul style="list-style-type: none"> <li>A system to provide appropriate professional development to centre staff</li> </ul>	Professional development needed for centre teachers to be aware of WickEd facilities, to make appropriate use of these facilities and to design suitable centre programmes. Also basic infrastructure maintenance. Staff turnover and expansion of the project makes this an ongoing need
Fair treatment for liaison teachers (Issue)	<ul style="list-style-type: none"> <li>A system to ensure TKI coordinator/liaison teachers are not disadvantaged for teacher registration</li> </ul>	This is an issue when first or second year teachers are employed in this role.
Equipment and software failures (Issue)	<ul style="list-style-type: none"> <li>A fault finding and rectification system</li> </ul>	Mostly this has been satisfactory. However problems with proprietary filtering software and hard drive failures have been troublesome. Not all centre staff are skilled enough to diagnose or fix problems.
Internet safety (Issue)	<ul style="list-style-type: none"> <li>A system to ensure internet safety for people using the centres</li> </ul>	Two centres were troubled by access to inappropriate material and installed filtering software which led to computer problems. Also issue of server overload with junk e-mails. Roll out should include compatible filtering software

\* Related systems could be envisaged for teaching and learning in marae based centres which could include te Reo and tikanga Maori. Modelling such systems is not a task for a European evaluator!

The chosen systems, indicated in bold type, were then modelled following the seven step procedure of Checkland and Scholes (1999), as described in Appendix 1 of this report. Such models are not intended to be implemented, but to stimulate dialogue regarding lessons and possible improvements.

### Fruitful Partnership System

Discussion with the Ministry of Education ICT Manager who was responsible for overseeing the initial phases of the project revealed that the Digital Opportunities projects were originally set up as responses to certain businesses' concerns over the skills base of the New Zealand population, and their wanting to act positively to improve the situation. The projects, including the Digitally Boosted Study Support Centres pilot, were conceived as partnerships between business and government to address the problem. The extension of the partnership concept to include schools as well as business and government was a later development.

Because of the nature of the political process surrounding the establishment of the project, and the timing of the initiative, it was not possible to involve schools in the initial planning process.

Many teachers, coordinators and principals commented to the evaluator that they did not see the pilot as a true partnership between schools or iwi, the ministry and businesses. To a greater or lesser extent they felt that they had no part in the design of the project and had to take the project or leave it. They did not perceive some of the business partners as having an ongoing interest in the project. From the point of view of the business partners, some would have appreciated periodic updates on the progress of the project from the centres.

Centre staff were sometimes bemused about whom to contact to receive assistance, and what the responsibilities of the partners were. They would have appreciated clearer information on responsibilities and accountabilities. The Ngai Tahu coordinator was frustrated with the consequences of the marae centre joining the pilot later than the other centres. She suggested a more flexible partnership which would allow for late comers and would extend the full facilities to them. Otherwise, she said that a lesson for the iwi was not to join similar schemes after they had started.

Steps one and two of the logical analysis consisted of data gathering and ordering using the rich picture described above. In SSM, the system to be developed represents a theoretical, idealised model of an intervention designed to improve on the real life situation. It is developed without further reference to the real situation. Later in the methodology, this idealised system is compared with the real situation to indicate desirable changes which may bring about improvements. In the methodology, step three is to write root definitions of a relevant system which could improve the real situation; and step four involves constructing a conceptual model. The root definition describes what the idealised system **is**, whilst the conceptual model describes what it **does**. Keeping all these factors in mind, a fruitful partnership system was designed. The root definition is given in Table 12.

The partnership system was designed to create and maintain a fruitful partnership between all the project stakeholders in order to support the establishment and ongoing functioning of the programme, as stated in the root definition. The transformation process converts stakeholders working independently and in isolation into a team working together effectively to fulfil the needs of the project. The beneficiaries (customers), actors (those carrying out the transformation) and owners (those who have the power to terminate the system) are all the stakeholders, and the world view which makes the system relevant, and the environmental constraints are self evident.

The activities in the root definition were arranged in logical chronological order. (Table 13) This arrangement was used in step four to construct the conceptual model shown in Figure 14. The upper part of this diagram represents an activity system which describes the activities thought necessary to

establish fruitful partnerships. Outside the boundary of this system are entities and environmental factors which influence the working of the system. The lower activities within this boundary detail the activities necessary to establish and maintain fruitful partnerships, in logical order. Thus it is necessary to identify the partners before establishing relationships etc. The other activities to research likely partners and to solicit their involvement are prerequisites to the identification of partners to be involved.

For a system to continue to function in a satisfactory manner, it is necessary to establish a way of monitoring its performance, comparing the performance with desired criteria and taking appropriate corrective action when necessary. The lower part of the diagram represents such a monitor and control subsystem which responds to internal and external criteria.

In the present pilot as with the other Digital Opportunities projects, the business partners were the initiators of the cooperation. In future projects, this may not be the case, and it may be necessary to identify appropriate business partners. Ideally, schools and iwi would be brought into the planning of future initiatives in the early stages so that issues of timing of the start up and of compatibility of introduced infrastructure with pre-existing facilities in schools could be addressed. This could be part of the establishing relationships activity in the model. Consideration of the flexibility of the partnership, for example in accommodating late joining centres could be a part of the definition of the scope, of the partnership and of roles and responsibilities.

Table 14 compares the conceptual model with the activities in the real world situation (step five). The evaluator suggests the following as lessons that can be learnt about the nature of partnership in future roll out or similar projects in the future. If future projects are to be set up on a similar partnership model, it may be necessary to canvass appropriate business partners. The success of the pilot Digital Opportunities projects could be used to support such approaches. The outgoing Digital Opportunities manager has commented to the evaluator that the partnership model may not be the best option in the future, and that a regular tendering process may be better.

In future partnerships, it would be most appropriate if institutions hosting centres (schools and marae in the present pilot) were fully involved in the planning and setup phases of the project. In the present pilot, this was not possible because of the political process involved in setting up the Digital Opportunities projects. Involvement of host institutions would lead to their not feeling 'dumped on,' and would mean that some of the problems of set up and integrating the project computers into the school could be dealt with in good time. In the present pilot, one of the businesses commented on wiring for the computer system not being in place when the technicians arrived at a centre to install software. The former Ministry ICT manager, who was instrumental in setting up the Digital Opportunities projects, was of the opinion that institutions involved should be enthusiastic volunteers in this type of project.

The scope of the partnership, and roles and accountabilities need to be more closely defined. The marae coordinator commented that it was not clear whom to contact to sort out problems. Eventually, in desperation, she approached a local firm in Invercargill – and still the problems were not resolved. Partnerships need more flexibility in their contractual arrangements to accommodate late comers to the project. Such late comers need to be full participants in the partnership, with all facilities, or their students will be disadvantaged.

Regular communication between the stakeholders would help the partnership to bear ongoing fruit. Institutions expressed disappointment that they had not had contact with business partners since the early days of the project, and businesses expressed a desire to be kept in touch with developments.

Since both sectors are generally very busy, this process could perhaps be facilitated by the project manager or liaison teacher. An example of the benefits of this kind of communication could be to avoid the problems associated with filtering software experienced by two centres. If the first centre to encounter these problems communicated them to the rest of the centres promptly, much waste of time and energy could have been avoided. Such lessons could also be collected into a manual for future roll out institutions.

Monitoring and control of the partnership's functioning could lead to issues being addressed by the partners as a whole, and resolved quickly. In setting up the partnership, clear open guidelines for the partnership, involving all stakeholders, would facilitate effective monitoring and control.

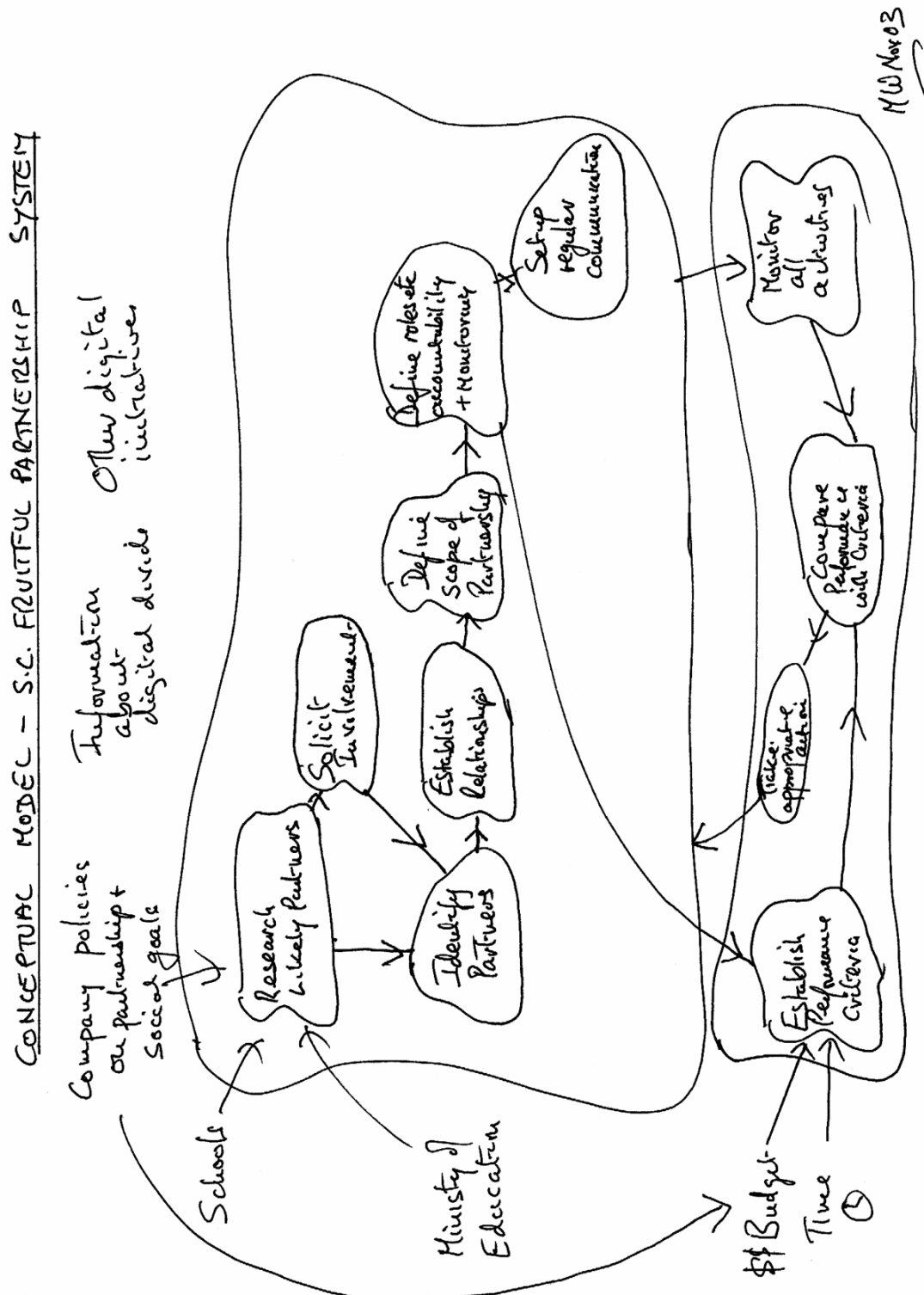
**Table 12. Root Definition–Partnership System Study Centre Evaluation**

A system to establish and maintain fruitful and meaningful partnerships between schools, marae, ministry, TKI and business partners by identifying potential partners, establishing working relationships with them, establishing regular communication and defining the scope and nature of the partnership in order to facilitate the establishment and running of the Study Centre project and to make all partners appreciate each others concerns regarding the project	
Customers	Centres, schools, BPs, TKI, iwi
Actors	Centres, schools, BPs, TKI, iwi
Transformation	Organisations and individuals ignorant of each others' worlds working in isolation from each other and pulling in different directions → A cooperative team of entities aware of each others worlds and issues, working together to create greater ongoing success
<i>Weltanschauung</i> (World View)	It is beneficial to the project and more efficient for these entities to work in real partnership than in isolation. New Zealand is too small a country for people not to work together
Owners	Centres, schools, BPs, TKI, iwi
Environmental Constraints	Need for digital projects to succeed if NZ to be competitive in digitized world. Financial constraints due to small size/budget in NZ.

**Table 13. Partnership System Study Centre Evaluation: Root Definition Activities and Logical Contingencies**

<b>Activities</b> Establish partnerships Maintain partnerships Identify Partners Establish Relationships Establish regular communications Define scope and nature Facilitate establishment and running	
<b>Logical Dependencies</b>	
<b>Action</b>	<b>Depends on</b>
Identify potential partners	Research likely partners
Establish relationships	Identify potential partners Solicit their involvement
Define nature and scope of partnership	Establish relationships
Define functions of each partner	Define nature and scope of partnership
Set up regular communication	Establish relationships

Figure 14. Partnership System-Conceptual Model



**Table 14. Comparison of Conceptual Model of Partnership System with Real Situation**

Activity from conceptual model	Does it exist in real situation?	How was it done?	How is it judged?	Comments
Identify partners	?	Business partners identified themselves by concern over raising digital competence in the population. Schools offered participation on take it or leave it basis.	Are appropriate partners identified? Do they subsequently become involved?	An alternative in future projects could be to invite expression of interest from schools and likely businesses?
Establish partnership	Yes	At least one meeting in which MoE and business partners were present.	Is a meaningful relationship established? Do all stakeholders feel involved in the partnership?	Centres have stated that 'it would be nice to see the business partners.' Businesses may have no time to pursue links. Maybe the role of manager or liaison teacher could include facilitating contact.
Define scope of partnership	Yes	By contractual agreements between MoE, schools, iwi and business partners.	Do the agreements work? Are centres appropriately catered for?	Need to anticipate changes in scope of project to embrace late starters. Need to plan implementation time line so longer and better planned.
Define roles, responsibilities, monitoring and control processes	Partially	Individual partners took implied responsibility for aspects of the project. Responsibilities about accountabilities and monitoring and control did not appear to have been clearly communicated to centres leading to misunderstanding about who to contact for help. Apparently little monitoring and control.	Centres need to know who to contact when in trouble and to get quick, effective action to resolve problems. Clarity needed about service to be expected and provided in all phases of the project.	Clarity needed in defining roles, responsibilities accountabilities and monitoring and control processes. Communication to avoid software glitches e.g. filtering software problems.
Set up regular communications between partners	Partially	Centres sometimes communicated with each other by e-mail and by sharing liaison teacher/coordinator. LCT continually communicated with centres. Little ongoing communication between other business partners and between them and centres.	Schools feel part of ongoing partnership with businesses and that businesses are genuinely interested in schools. Business partners receive information and communication from centres about how the project is going.	Regular newsletters from centres to business partners would be helpful as well as visits (1-2 times a year) from business partners to schools. Phone conferences. Development of manual to guide future roll out. Project manager or liaison teacher could facilitate.
Monitoring and control subsystem	?	?	The partnership is a healthy one with active ongoing cooperation and communication between partners. Issues such as responsibilities and accountability are clear and any issues are rapidly resolved.	A key part of this function could be undertaken by the MoE project manager or coordinator/liaison teacher.

## An ICT Based Learning Activity System

Study centres involved in the project tended to move more towards a student centred model of operation. Thus school B moved from a membership based operation to being more responsive to student needs, and school C intended to change the emphasis of its centre from homework to work based on the WickEd website. One of the non pilot schools using the WickEd site used a constructivist approach to the activities of the centre. In some centres, student behaviour was a problem, and students sometimes tended to spend considerable amounts of time playing computer games.

This system is a model of what students could be doing in a study centre in order to use ICT to succeed in academic work. The root definition of the system follows in table 15, and is based on students' world view, based on their comments.

In keeping with a student centred approach, the system's customers (beneficiaries) and actors are the students. The world view which makes this system relevant is taken from student comments to the evaluator. The owners are the centre coordinator and teachers, since these people have the power to terminate operation of the system. Environmental factors list some of the factors outside the system which could affect its operation.

After considering the root definition and the activities needed to occur in this system, a conceptual model was drawn to summarise the activities which would occur in such a centre and the order in which they would be carried out (Figure 15). In order for the system to be effective and self sustaining, it is necessary to include monitoring and control activities. Students would need to be taught to monitor the quality of their work, and the activities carried out by the students would need to be monitored by the teaching staff. This is the function of the monitor and control subsystem. Actual performance of activities in the primary task system would be monitored against criteria which in part would be defined by external expectations. Appropriate action would then be taken to correct inappropriate performance.

The conceptual model assumes that students can log into the computer. If this is not the case, they would have to be taught this skill. They would also need to be taught the skills of accessing and using the appropriate resources, such as the WickEd site and search engines. Depending on the students' needs, and guidance from the centre teacher, students would decide on appropriate activities and carry them out, interacting with other students in the centre, or online in other centres, and with virtual characters on the WickEd site. They would also monitor their work to ensure that it is of appropriate quality.

Step five in the seven step model involves comparing the activities in the system with the activities occurring in the real world. This is done in Table 16. The reason for this comparison is to point to possible ways in which the real life situation may be improved.

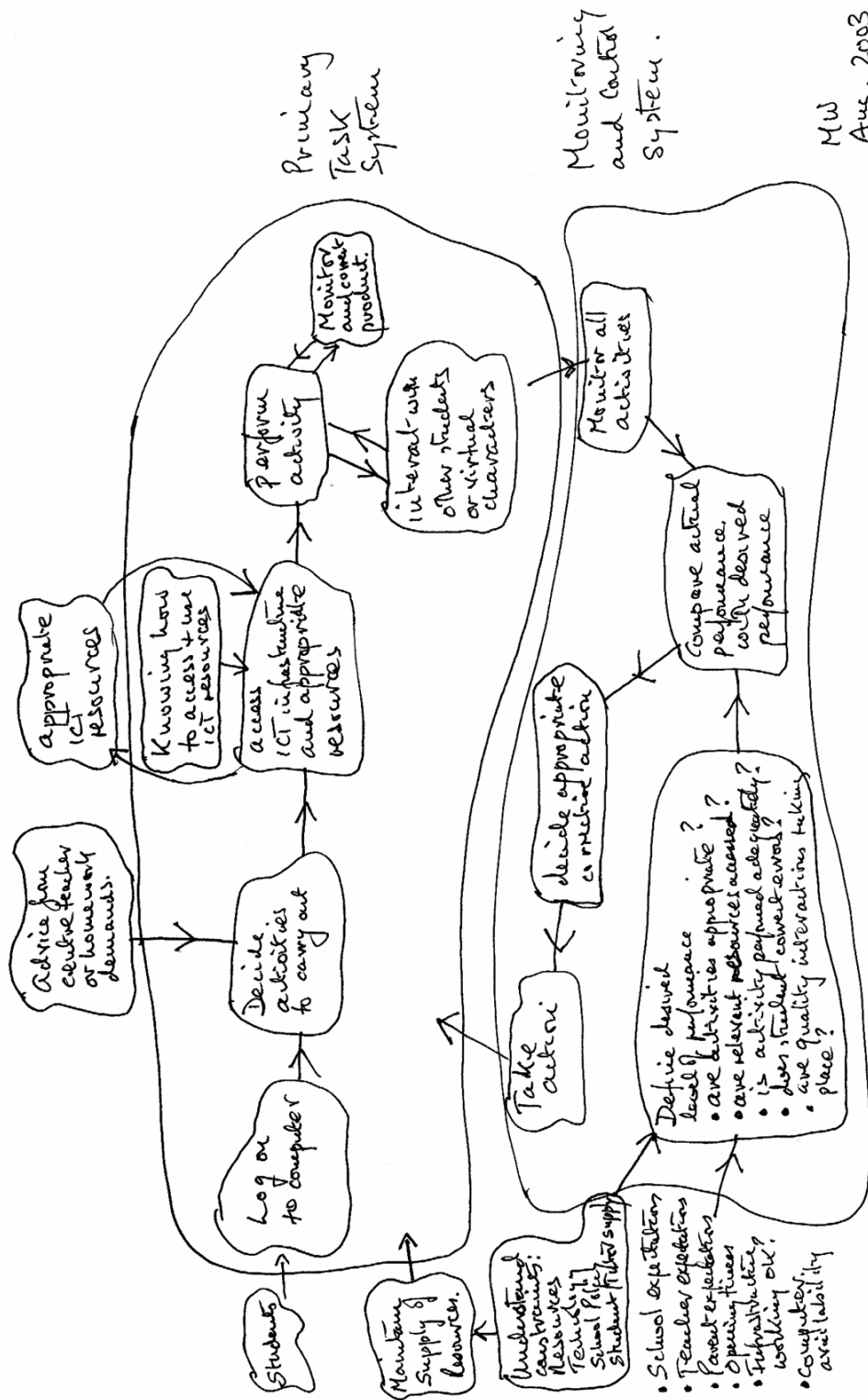


**Table 15. Root Definition of the ICT Based Learning Activity System in the Digitally Boosted Study Centre Schools**

A system for students to increase knowledge and skills using appropriate ICT based resources to carry out relevant learning activities in order to help them succeed and achieve in academic work. The activities may include interactive activities involving students within the centre or other centres or involving virtual ICT characters.	
Customers	Students
Actors	Students
Transformation	Students lacking knowledge and skills → Students with relevant knowledge and skills
<i>Weltanschauung</i> or World view	
Owners	Centre coordinator and teachers
Environmental Factors	<ul style="list-style-type: none"> <li>• Centre coordinator and teacher supporting learning</li> <li>• Other students in own or other centres</li> <li>• Homework/schoolwork requirements</li> <li>• Functionality and availability of ICT facilities</li> <li>• ICT resources such as WickEd site, Search engines, productivity software (word processor etc)</li> <li>• Opening times of centre</li> </ul>

Figure 15. ICT Based Learning System – Conceptual Model

ICT Based Learning System – Conceptual Model.



**Table 16. Comparison of Conceptual Model of an ICT Based Learning System with Real Situation**

Activity	Does it exist in real situation?	How was it done?	How is it judged?	Comments
Log on to computer	Yes		Students know how to log on	Students may need to be taught how to log on
Decide activities to carry out	Yes	In some centres, students were directed to particular activities. In others, students decided what they needed to do to achieve their objectives	Are activities directed to meeting students' needs and furthering their interests?	Students may need advice on which activities to carry out or which resources to use
Being able and knowing how to access and use ICT resources	Partially	In most cases, students were taught how to access and use appropriate resources.	Students use resources appropriate to the task	Centre staff may need professional development to improve their ICT skills and to be introduced to useful resources on e.g. the WickEd site Implies efficient diagnosis and fixing of IT faults
Access ICT infrastructure and appropriate resources	Partly	Students used the technology depending on their ICT skills	Do the students access the most appropriate resources? Can they use the tools (word processing etc) effectively?	Students may need training to improve their ICT skills
Perform activity	Yes	Students carried out activity depending on its nature and the resources needed	Do the students produce a quality product and do they learn from doing the activity?	
Monitor and control product	Sometimes	Students reviewed work	Do the students think about, critique and correct their own work?	Teachers may need to teach students how to critique their own work effectively and to reinforce theoretical learning.
Interact with others	Yes	Students peer tutored others in some centres, and communicated with students in other centres and with virtual characters.	Do the interactions enhance learning?	Students at the marae unable to communicate by e-mail.
Monitor and control subsystem	Yes – with varying effectiveness	Student activities were monitored and students told if activities inappropriate. Students helped when having problems	Are students carrying out activities which foster their learning? Are they achieving their goals?	Criteria for monitoring and control could be more closely tied to clear performance criteria linked to desired outcomes

The above analysis allows one to focus on the factors which the evaluator perceives as important in students' learning and to judge which of these are in place in centres. The comparison is intended to stimulate discussion of how to improve the learning process in centres.

This analysis points to a need for effective professional development for centre teachers. Another system could be modelled of an idealised professional development scenario for centre teachers. Such a system could include activities to help them improve their ICT skills, knowledge of what resources are available and effective on the *WickEd* site and elsewhere, and how to use these resources. Training in basic fault diagnosis and rectification would limit the adverse effects of hardware and software breakdowns. Teachers may also need support in developing monitoring and control procedures.

These needs could be met on an ongoing basis if the decision were made to allocate funding for that end. The evaluator believes that meeting professional development needs of centre teachers would need appointment and training of a permanent *WickEd* coordinator/liaison teacher for the programme. This person could be trained to pass on basic maintenance skills as well as the duties performed by the liaison teacher in the pilot. In view of the problems associated with teacher registration, this person should not be a beginning teacher unless this issue can be resolved.

### **Summary of issues highlighted and suggestions arising from the Soft Systems treatment.**

It would be preferable to establish full partnerships with participation of all stakeholders, including host institutions (schools and marae), from the start.

There would need to be clarity about roles, responsibilities, communication etc within such a partnership.

Partnerships and contracts would need to be flexible to accommodate late entrants to the programme with full involvement and facilities.

Arrangements would need to be put in place from the start of projects to ensure internet safety of members of centres and avoid software clashes.

The experience of the marae based centre showed that it is more difficult to coordinate a centre from a distance than from on site

There is a potential issue of low decile institutions being able to sustain the programme without support to help with staffing, infrastructure etc.

Institutions would need to decide on their pedagogical approach within their centres.

Centre teachers and coordinators would need ongoing professional development, including ICT skills, resource availability and use and basic troubleshooting skills.

Ongoing provision of a coordinator liaison teacher would help achieve the above professional development.

It is suggested to avoid employing beginning teachers as such a coordinator unless issues concerning their eligibility for full teacher registration were to be resolved.

If it is the ongoing aim is to involve high proportions of Maori and Pacific students, centres would need to be accessible to them and the centre environment and programmes would need to be attractive to them.

The focus on 'mathematics, science and technology' would need re-evaluating in the light of the ages of participating students and the movement of centres towards a more student centred way of operating.

### **Appendix 3. Evaluator's Visits to Two Centres Joining the *WickEd* Community During the Course of the Project**

The clientele at one of the centres was very multicultural, including Saudi, Ethiopian, Afghan, Chinese, Korean, Samoan, Maori and European students. There were around 15 year 5 to 8 students. The students worked at a wide range of levels. After completing homework, students were divided into two groups, one working on the computers and the other involved in learning and small group games.

The centre had a pod of six PCs, running Windows 98 and sharing a single power supply. The computers were a gift to the school. When the evaluator visited the centre, the students had been unable to access the *WickEd* site for some time. The school was still having teething problems with the system. These problems affected the students' ability to use the computers. One issue related to problems with filtering software and internet safety. The school had attempted to overcome these problems by entering an agreement to access the web *via* the city library server. This arrangement prevented downloading from the net and was not wholly satisfactory.

In view of the school's experiences with the facility, the coordinator would have appreciated guidance from successful *WickEd* schools. This guidance should indicate what had worked in the past so that newly joining centres would not have to '*reinvent the wheel*.' It would have been good to have clear indications of what the centre would need. The pod of six computers was not ideal – for example it was not attached to a printer. The school needed ongoing technical and professional development support to make the most of the resources, and to help teachers integrate ICT into their programmes.

The other school had up to 80 members aged 9 to 13 years old and mainly European and Maori. Up to 20 students attended at any one session. The centre did not exist for students to do homework, but to improve their knowledge of thinking and learning. The activities were project based. During the day, the centre housed the school's '*enrichment class*'. This class was for talented students, and used a consistent approach to their learning which was also project based. Students in this class and in the study support centre used the full Microsoft suite of programs including *Publisher* and *Front Page*. Children had designed the school's web site.

The centre had a '*huge effect*' on students' willingness to take risks. They had become aware of the opportunities available through technology and were prepared to take advantage of them. The school had eight-year old children designing web pages.

The centre teacher regarded the *WickEd* site as being safe. Students enjoyed a wide range of activities provided, including themes, *Information Station* and the challenges. They especially liked the opening fishbowl with the names of students logged in to the site.

There were 10 computers configured with ITAS software. The principal found the infrastructure reliable and the technical support from ITAS to be '*great*.'

The principal commented that it was difficult to attract qualified staff for two hours per day to run the study centre after school. For schools to deliver a quality study centre programme they needed more funding than was provided by the normal study centre grant. In addition the school, being historically a Mac school needed staff training to help them work with PCs. ITAS had promised training but this had not materialised. A guide book to help new centres by sharing other centres' experience would have made the centre teacher's task easier.

#### **Suggestion**

New schools joining the *WickEd* community would appreciate 'start up' manuals



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