

Science and Mathematics Education Centre

Technology Education; Education for Enterprise (E4E)

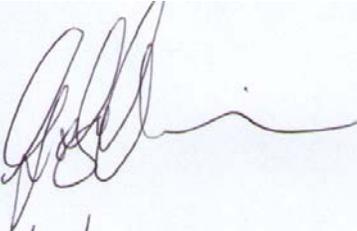
Gary Christopher O'sullivan

**This thesis is presented for the Degree of
Doctorate of Philosophy
of
Curtin University**

November 2012

DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made. This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature: 
Date: 22/11/12

ABSTRACT

A growing body of national and international research has informed the development of technology education within the New Zealand curriculum framework. Technology education in its current form is a relatively new curriculum area and the intentions, purposes and outcomes for the subject are still forming. It is therefore necessary to research models of implementation and the influence of professional development programmes designed to facilitate the subject's development. Education for Enterprise is often cited as a goal in educational policy documents; however, understandings of definition and intention at the practice level are often unclear.

The research reported in this thesis was underpinned by the interpretive-constructivist paradigm utilising a Fourth Generation Evaluation methodology. The purpose of the research was to examine conflicting rationales for the implementation of technology education and Education for Enterprise, and to evaluate a professional development project. The professional development project was established to facilitate teachers' incorporation of Education for Enterprise and community partnerships within technology education.

The professional development project endeavoured to provide the participating teachers with opportunities to investigate develop and reflect on their professional knowledge and practice of Education for Enterprise within technology education. The Fourth Generation Evaluation research approach allowed the collection of substantive information about teachers' thinking and practice. The responsive evaluation methodology was designed to inform and develop that practice through the provision of professional development workshops, comprising data collection, analysis and reflection.

The study involved teachers from 16 schools clustered in three regions of New Zealand. Both primary school and secondary school teachers participated in three rounds of four workshops spanning a three-year period. Data were generated about the teachers' knowledge, thinking and practice through questionnaires, semi-

structured interviews, classroom observations, and reflective journals. Observation transcripts were analysed, coded, discussed, and reflected on during reflection blocks at the beginning and end of each workshop.

The findings of the study revealed that the main point of difference between Education for Enterprise and other quality learning is that successful Education for Enterprise is based on needs that students perceive from the start. These perceived needs help to make the learning connected and often involve working with community partners. Activities that work well are those that are linked to practical undertakings, and include tangible outcomes such as those found in technology education. Instances where the students failed to be supported by a teacher facilitator invariably led to a failure of the experience and outcome.

The research indicates that a combination of technology education and Education for Enterprise was successful when students were given a controlling function within the project. This led to enhanced ownership of their individual learning. This controlling function is enhanced if time is given in the early stages of the unit to build students' knowledge. Many teachers and students struggled with these early stages, known in technology literature as the fuzzy front end.

By the end of the final workshop nearly all teachers had appreciably improved the quality of their classroom offerings. The research demonstrates the effectiveness of quality supported development programmes and responsive evaluation research as a model for reflective professional development and enhanced teaching and learning.

ACKNOWLEDGEMENTS

I would like to sincerely express my gratitude to my supervisor Associate Professor Peter Taylor for his thoughtful and thorough assistance from conception to completion of this thesis.

I would also like to thank my colleagues from Massey University Institute of Education and those from the wider community; all of whom entered into lively and rigorous debate with me on the key issues raised in this thesis.

To my wife and children, whose encouragement and support has been unconditional and inspirational, my heartfelt thanks.

Finally, I wish to acknowledge the educational staff, students, advisers and facilitators who voluntarily gave of themselves and their time to enable this study to take place.

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	viii
LIST OF TABLES	viii

CHAPTER ONE - INTRODUCTION TO THE STUDY

Introduction	1
The researcher's interests	2
Background to the study	3
Research objectives	4
Research questions	5
Research Method	6
Organisation of the Thesis	7

CHAPTER TWO - TECHNOLOGY EDUCATION: THE COLLECTOR BARREL

Introduction	9
What is technology education?	11
What is technological practice?	14
What is technological literacy?	15
What is an inclusive technology education?	17
Who are the stakeholders pushing technology education?	18
What is the New Zealand perspective?	22
How has technology education in New Zealand developed?	25

CHAPTER THREE - THE FEEDER COMPONENTS OF THE TECHNOLOGY CURRICULUM INJECTOR

Introduction	36
What is Education for Enterprise (E4E)?	37
What are the determinants of Economic Growth?	45
What is the employment argument?	46
What is community involvement and the third way?.....	53
What is the connected curriculum?	54
Where to next?	66

CHAPTER FOUR - METHODOLOGY

Introduction	70
Research questions	71
Research paradigm	74
Interpretivist ontology, epistemology and methodology	75
Evaluation in practice.....	82
Fourth generation evaluation.....	83

CHAPTER FIVE - PHASE ONE

Introduction	89
Participants	91
The research study.....	93
Schools background information	93
Baseline data collection and analysis	96
Participation in the phases and workshops	99
Workshop 1 report.....	101
Claims, issues and concerns raised from phase one	114

CHAPTER SIX - PHASE TWO

Introduction	116
Workshop 2 report	116
Claims, concerns and issues raised from workshop two	123
School facilitation and consultation visits	124
Claims, issues and concerns raised from phase two	158

CHAPTER SEVEN - PHASE THREE

Introduction	160
Workshop 3 report	162
School facilitation and consultation visits	169
Claims, issues and concerns raised from phase three	190

CHAPTER EIGHT - PHASE FOUR

Introduction	198
Workshop 4 report	199
Supplementary activity community partnerships	203
Summary of the school facilitation and consultation visits	208
Claims, issues and concerns raised from phase four and the project overall	211
Conclusion of the research phases	227

CHAPTER NINE - A WAY FORWARD

Introduction	229
Connection through integration	231
The fuzzy front end	231
Reflections and recommendations	232
Developing school-community partnerships	235

Utilising resources (planning and management)	239
Enhancement of technology provision	242
Education for Enterprise	244
Reflections on the research questions	248
Raising the profile of technology	251

CHAPTER TEN – CONCLUSION

Introduction	256
Conclusions	256
Professional development implications	263
Limitations of this study	266
Further research	268
Final remarks	269

REFERENCES	270
-------------------------	-----

APPENDICES

Appendix 1: Research Information sheet	295
Appendix 2: Permission to use student work	297
Appendix 3: Permission to publish photographs	298
Appendix 4: Baseline questionnaire	299
Appendix 5: Risk and mitigation analysis	303
Appendix 5b: Risk and mitigation analysis revisited	304
Appendix 6: Education for Enterprise project video record	305
Appendix 7: The E. 4. E. daily snoop	306
Appendix 8: Enterprise education project cluster workshop	310
Appendix 9: School background information	311
Appendix 10: Workshop four survey	318

LIST OF FIGURES

Figure 1:	The technology curriculum injector	2
Figure 2:	Kimbell hands and minds	13
Figure 3:	Pacey technological practice	14
Figure 4:	Human capital tree	59
Figure 5:	Model of evaluation practice	83
Figure 6:	Technology curriculum injector teaching and learning approach	251

LIST OF TABLES

Table 1:	Rural cluster schools	94
Table 2:	Coastal cluster schools	95
Table 3:	City cluster schools	95
Table 4:	Workshop dates timeline	100
Table 5:	Enhancement of enterprising attributes	123
Table 6:	Rural cluster school visits	209
Table 7:	Coastal cluster school visits	210
Table 8:	City cluster school visits	210
Table 9:	Frequency table of responses mapped to research questions 3, 4 and 5	211
Table 10:	Possible benefits of school-community partnerships	236
Table 11:	Possible benefits for students and teachers of school-community partnerships	237
Table 12:	Possible names for teaching and learning spaces	241
Table 13:	Characteristics of effective professional development adapted from Mitchell, L. & Cubey, P. (2003).	264

CHAPTER ONE

INTRODUCTION TO THE STUDY

What the best and wisest parent wants for his own child, that must the community want for all of its children. Any other ideal for our schools is narrow and unlovely. (Dewey 1915/1980, p. 5)

INTRODUCTION

This chapter introduces the thesis and includes a brief outline of the researcher's interests and involvement in the area, followed by an introductory background to the study. The research objectives are outlined, important terms are identified, and definitions discussed.

In order to understand this thesis, it is important that the reader is conversant with the competing influences which have led to the introduction and formulation of technology education as a new curriculum area in New Zealand. This chapter utilizes technology education as the 'collector barrel' of an educational model called the technology curriculum 'injector' (Figure 1). This metaphor refers to the hopper and barrel in a plastics injection moulder. Technology education has the opportunity to mix discrete components together and produce something tangible and useful. The injector and feeder components are manifested by external educational policies which are always brought to bear on curriculum endeavours. As an example, this thesis focuses on a New Zealand Ministry of Education organised research project. This project aimed to identify what actually takes place when policy directives bring together technology education, enterprise education, school-community partnerships and the notion of a connected curriculum.

To facilitate understanding I have incorporated a diagrammatic model for the focus of the research '*the technology curriculum injector*'. This model was not devised as part of the original study but has developed from the inductive analysis of the

interactions surrounding the research findings. It has been used as a continuing descriptive and visual aide to highlight my focus and intentions.

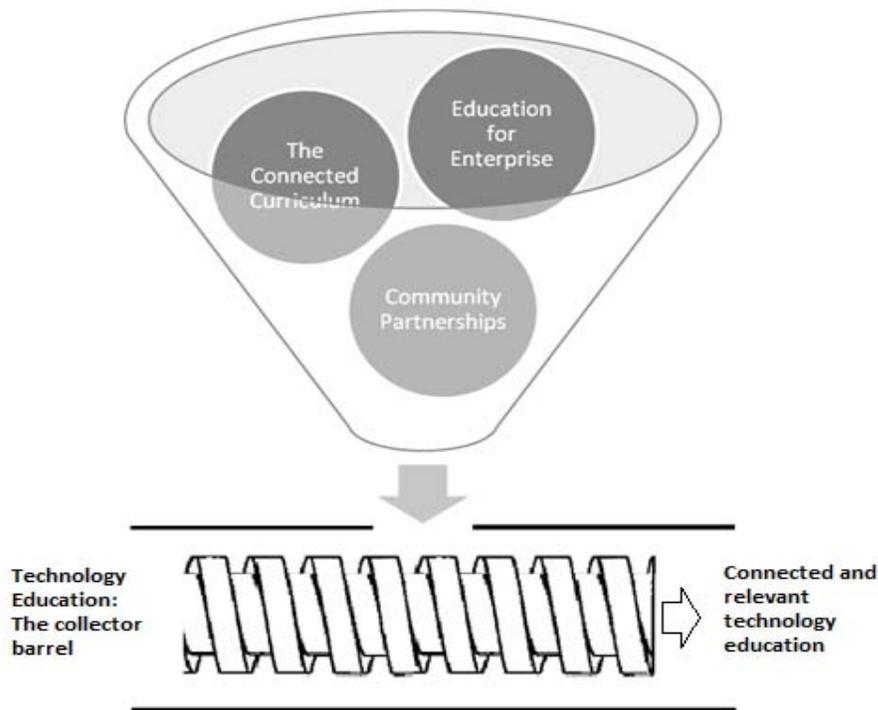


Figure 1. *The Technology Curriculum Injector*

It is important when studying a multifaceted curriculum endeavour such as this research project to appreciate that there ought to be shared common understandings of the terms used; therefore some extensive questioning is necessary. Certain themes emerge in response to these questions and these are identified and reflected upon throughout the thesis.

THE RESEARCHER'S INTERESTS

The idea for this thesis developed from my long-term personal interest in questioning some of the rationale for the involvement of external organisations, particularly business and industry in the development and delivery of Technology Education; Education for Enterprise. My 30+ year working career has spanned both the industrial/business and educational sectors. My teaching career began at the cusp of the introduction of technology education as a compulsory part of the national

curriculum in England; the first country to mandate design and technology education for all students. Initially, my involvement was as a classroom teacher charged with helping to facilitate the transition to technology education, and then, as a Head of Department, to coordinate its delivery across a school. This was followed by my becoming Director of Technology Education in the first Girls' Technology College in the U.K. Technology colleges were developed extensively on partnerships between schools, local businesses and industry, and were charged with focusing on technology, science and mathematics education. I currently direct two small to medium enterprises (SME). This, combined with my current academic position as a senior lecturer in technology education at Massey University, has given me the ideal opportunity to critically reflect on the purpose and role of Technology Education; Education for Enterprise from both practical experience and an informed research base.

BACKGROUND TO THE STUDY

This thesis aims to evaluate what actually took place when policy directives brought together technology education, enterprise education and wider community partnerships. In 1999 a national curriculum was established in New Zealand, part of which was the introduction of a new subject called Technology Education. Since its introduction there has been little critique of the intentions of the curriculum.

In New Zealand and other countries there has been a shift in education policy. This shift has moved away from a liberal-humanist education towards a more vocationally focused and community responsive curriculum. According to Price (1991) the change has come about partly as a response to economic targets and objectives set by national policy makers. An example of this shift can be seen in the growing emphasis on making education more responsive to the needs of the community, particularly the industrial and business sectors. These policies have led to the development of a variety of Technology Education; Education for Enterprise initiatives. Education for Enterprise is not a new concept; enterprise education has increasingly been considered within educational policies in recent decades. Education for Enterprise initiatives have found particular prominence in the recent addition of technology

education to the New Zealand curriculum. However, little research has been conducted to ascertain what actually goes on in such an initiative and/or the motives that might be behind their introduction within the technology education curriculum.

In 1996, the Education Review Office (ERO) published a report entitled “School - business links.” The executive summary of the report highlighted the need for more research:

Many New Zealand secondary schools have relationships of some kind with local businesses. There is little information available, however, about how extensive these relationships are, why they are established and whether they contribute positively to the learning outcomes of students.
(ERO, 1996, p. 14)

The report also noted that some specific programmes were being developed in areas of science and technology but few in other areas of the New Zealand Curriculum Framework. This could be as a direct response to the overt links made in the technology curriculum statement:

The link between schools and the community, including business and industry, tertiary institutions, and local authorities, is important to a well-developed, inclusive technology curriculum. (Ministry of Education, 1995, p. 17)

RESEARCH OBJECTIVES

According to Jones (1997) various stakeholder tensions, such as the economic imperative, have been used to propagate technology education’s position within a national curriculum framework. More recently these have manifested under the guise of enterprise education. In late 2005, a New Zealand Ministry of Education two-year Education for Enterprise project was funded to run a professional development programme with a group of sixteen schools, to examine ways in which teachers’ capability to include Education for Enterprise could be developed. The specific focus

was to be on technology education and the fostering of links within the wider community. This thesis describes the research which ran alongside the professional development programme and evaluates the impact it had on classroom practice, with consideration given to the ideologies driving the initiatives. I was engaged as the researcher for the project to work alongside two facilitators. This thesis (a) evaluates the professional development programme, (b) describes the learning intentions and outcomes of the professional development, and (c) reports on the ideologies and policies driving these initiatives.

An examination of the development of technology education in New Zealand is presented. A detailed critique of policies and ideologies behind Technology Education; Education for Enterprise provides a backdrop for the implementation of Education for Enterprise initiatives. The difference between policy and practice is noted when evaluating the learning intentions and outcomes of such initiatives. To facilitate this evaluation a 20-year analysis of educational policy guidelines is presented to establish a framework for the latest initiatives. Models of implementation are identified and exemplars of real practice in the classroom are highlighted. Attempts to align technology education and enterprise education are explored and an argument that connecting the two offers enhancement is put forward.

RESEARCH QUESTIONS

The purpose of the research reported in this thesis was to evaluate the professional development programme, to facilitate this five questions were developed.

Question 1:

What recognisable ideologies underpin technology education, enterprise education and school community links in New Zealand?

Question 2:

What is a creative connected curriculum and how does this relate to technology education?

Question 3:

What teacher practices support or undermine development of enterprising attributes within the Education for Enterprise project?

Question 4:

What school-wide practices support or undermine development of enterprising attributes within the Education for Enterprise project?

Question 5:

What is the influence and impact of school-community partnerships on teaching and learning within the Education for Enterprise project?

RESEARCH METHOD

In this thesis an interpretative constructivist paradigm as described by Denzin and Lincoln (2000) is employed. Under the interpretative constructivist paradigm, interactions between all stakeholders, including the researchers, are deemed equally important. These interactions, combined with an exploration of values held by all the stakeholders, help shape the information which becomes a major focus of the study. The interpretative constructivist paradigm can be characterised by its use of primarily qualitative data gathering techniques in a hermeneutical and dialectical manner. Interpretative constructivist researchers focus on the multiplicity of viewpoints held and illuminate how these interact to shape the study. It is the mutual interactions between those studied and those doing the studying that guides the research outcome. The interpretative constructivist paradigm supports the view that the observed reality exposed as part of a research study is a social construction process and that no single truth is discoverable.

In the case of the specific research reported in this thesis, defining and making sense of the impact of a professional development programme needs to be co-constructed from the perspectives of all the participants. Interpretivist methodology is a participative and collaborative endeavour concerned with constructing new understandings. Fourth Generation Evaluation (Guba & Lincoln, 1989) was used as a

method to investigate the Education for Enterprise professional development programme for teachers. It was selected because this method focuses on negotiation (the hermeneutic/dialectic). The tensions and conflicts associated with this methodology are considered, including theory and practice issues, the role of active participants and ownership of evaluation studies.

With the new curriculum implementation underway and the Education for Enterprise professional development project concluding, it was timely and important for academic research in this area to be introduced. Connecting school activity with out of school experience is not a new concept; it relies heavily on the work of Dewey (1933) and reflective thinking.

ORGANISATION OF THE THESIS

The thesis is organised into chapters and each chapter has common elements and follows a theme.

Chapter One sets the scene for the study and outlines the research objectives and methods to be employed. In addition it explains the researcher interests and background.

Chapters Two and Three provide historical, political and philosophical insights into technology education and Education for Enterprise, and their relationships, thereby providing a powerful theoretical perspective for interpreting the data arising from the fieldwork in Chapters Five through Eight. Literature reviewing is a distributed activity occupying the whole study. There are a number of components which are considered important to review. Firstly, the definitions of key terms give the reader access to the language that is used throughout the thesis. Technology education is a new curriculum area and the possible directions it may take are dependent on its origins and the view of the stakeholders who have introduced it. These directions, origins and stakeholders' views are explored. One argument remains the strongest for the introduction of the technology curriculum and this argument is exposed.

Chapter Four explores the methodology of the research from an academic perspective. This includes a discussion about the research questions, exploration of the research paradigm and a justification for the methodological approach utilized in the study. The chapter highlights the researcher's role and Fourth Generation Evaluation in practice.

Chapters Five through Eight detail the findings of the research. Data collection methods are described and discussed through a focus on the claims, concern and issues which arose during the various phases of the research period.

Chapter Nine suggests possible ways forward for combining technology education and Education for Enterprise by utilising findings from this research.

Chapter Ten draws conclusions from the research, identifies the implications and limitations of the thesis, and suggests further research which might be considered.

CHAPTER TWO

TECHNOLOGY EDUCATION: THE COLLECTOR BARREL

The conception of the technology education in a given country is strongly dependent on the economic, social, political, and cultural environment of this country. (Ginestie, 2005, p. 11)

INTRODUCTION

Since the introduction of a national technology curriculum to New Zealand schools in 1999, there has been little critique of its intentions. The role and place of technology education in terms of overall education internationally is not well defined. The epistemological referents of and about technology education, their justification, pertinence and coherence all require further investigation and debate. There are those who question whether education from a socio-cultural background is too far removed from the vocational requirements of organisations who deal with scientific and technological knowledge. Increasingly the cultural, political and economic changes that occur in society give rise to additional responsibilities for education to include and represent these values (Ginestie, 2005).

According to Compton and Jones (2004) epistemologically, technological knowledge in keeping with most socio-cultural and constructivist theories, acknowledges knowledge as a social construct. The validation of this is usually located in a pragmatic notion of truth, where knowledge from any domain is validated by agreement within that domain. What happens if the domain is still forming and is subjected to the influence of a significant ideological agenda? Baird (2002) claims that the epistemic criteria for judgment of knowledge in the domain of technology should be materialist. That is, referenced to the 'people made' world rather than the 'natural' world as in the case of science, or the 'imagined' world as in the case of art and music.

During the period of this study a significant political metaphor was being used to acknowledge the importance of education as part of a 'knowledge economy'. A policy booklet entitled 'The Knowledge Economy: A submission to the New Zealand Government' by the Minister for Information Technology's Advisory Group (ITAG) revealed why this was important. According to the ITAG report, the 'lessons' for New Zealand are that the world's knowledge economy cohort all demonstrate similar attributes. These attributes are listed as:

- *an efficient and cheap universal telecommunications network;*
- *improved productivity through information-intensive, value-added businesses;*
- *improved industrial and commercial competitiveness;*
- *support for the information services sector;*
- *a focused investment in education and training (especially technical education) together with lifelong learning and up-skilling;*
- *a better-informed populace with higher level of participation in democracy;*
- *support for cultural values.*

(Frederick & McIlroy, 1999, p. 14)

The metaphor clearly includes technology education as an identified attribute for a knowledge economy development. What are the cultural and ideological values that underpin technology education in New Zealand? This thesis investigates technology education's position as the main collector of a technology curriculum injector model. It is necessary that an extensive interpretive and historical account of the development of technology education is given to ensure all the epistemological referents of technology education are exposed. This has been achieved via detailed, focused questioning. Chapter 3 focuses on the feeder components of the technology curriculum injector model: (a) Education for Enterprise (b) connected curriculum and (c) community partnerships. Each one is discussed in turn incorporating a critique of the current literature.

WHAT IS TECHNOLOGY EDUCATION?

The growth of technology education as an area of study within general education is one of the most significant curriculum developments of recent years. Throughout the world, numerous countries are developing ways of offering technology education within mainstream education. In 1999, technology education became, for the first time, a compulsory subject in New Zealand. The introduction of any new curriculum area is bound to cause some trepidation and confusion. In the case of technology education this confusion has been compounded by its name. Ask people, even those who are involved with education, what they think technology is and most will associate it with modern artefacts such as the computer (Burns, 1990; Jones & Carr, 1992). The association has become more common due to the growth in computing use over the same period; read or hear about computers and the word technology will appear nearby.

The viewpoint expressed above, that sees technology as ‘computer’ or ‘things’, though narrow, is not incorrect. However, there is more to technology education than just modern artefacts or products. Technology is as old as people themselves, according to Williams (1996), “*The first reference and definition of the word occurred in the 1615 edition of a New English Dictionary on Historical Principles in which it was defined as ‘a discourse or treatise on an art or arts: the scientific study of the practical or industrial arts.’*” (p. 1)

Sterry and Hendricks (1999) summarise four different ways in which technology is viewed by teachers.

The first is as *objects*. As stated earlier, this is probably the most popular viewpoint. These technological objects, products, systems or artefacts are generally modern in nature and typically include computers, and other ‘high tech’ machines. Acknowledging the New Zealand Ministry of Education’s definition, perhaps it is reasonable to suggest that the computer fits as a technological outcome. However, it is when we consider the development process of the computer that we get a closer match to the definition given.

This *process* is the second viewpoint described by Sterry and Hendricks (1999). The process viewpoint implies action towards meeting identified needs, wants or opportunities and that technology generally involves doing and action. This process is often referred to as problem solving or, more specifically in technology education, as ‘a’ design or technological process. The process itself is often made up of mini processes, or sub processes. They are worth identifying and they should be viewed in a non-linear fashion. Questioning processes, inquiring processes, investigating processes, observing processes, analysing processes, visualising processes, communicating processes, modelling processes, predicting processes, manipulating processes, quantifying processes, valuing processes, managing processes, and evaluating processes are all included in expressing what technologists do in their ‘technological practice’.

The third viewpoint described by Sterry and Hendricks (1999) is that of *knowledge*. One can see how this viewpoint would be popular with teachers of technology. The traditional school subjects all have a knowledge base to call their own and this is one of the things that make each subject distinct. For technology to be accepted as a discrete curriculum area it must have a knowledge base for itself. However, most dictionary definitions of technology describe it as the application of science and maths. This creates another contentious point. Technology as a curriculum area is relatively new and as such is trying to find a place within an already crowded school day. To dismiss the subject as having no knowledge base of its own might be an easy way to ignore it: however, technology education does have a knowledge base and one that is growing very quickly. According to Burns (1997) an aspect of technological knowledge can be referred to as ‘*tacit*’, which is developed through practice. This knowledge is derived from a different way of thinking and, according to Burns, hardly ever involves straightforward application of scientific laws.

The fourth viewpoint described by Sterry and Hendricks (1999) is ‘*volition*’ which they describe as the ‘desire to do something, (1999, p. 3). This is the creative side of the subject. This creativity is often linked to innovation and is put forward by policymakers when talking about the introduction of technology education and economic prosperity. However, to educationalists creativity should mean much more than that. It is the freedom for students to learn through trial-and-error. It may or

may not be a response to some identified problem according to Cave (1995), “Technology is a creative activity whose goal can be described in the most general terms as bringing things into being and making things work better.” (p. 2)

Technology teachers rather than policymakers often cite this creative aspect of technology education as one of its main merits. It offers the learner the opportunity to pursue a personal area of interest through his or her own volition. As a pedagogy, it can be seen at a very early stage when, for example, a young child builds a tower out of blocks. It is what Kimbell (1987) described as the interaction of mind and hand (Figure 2).

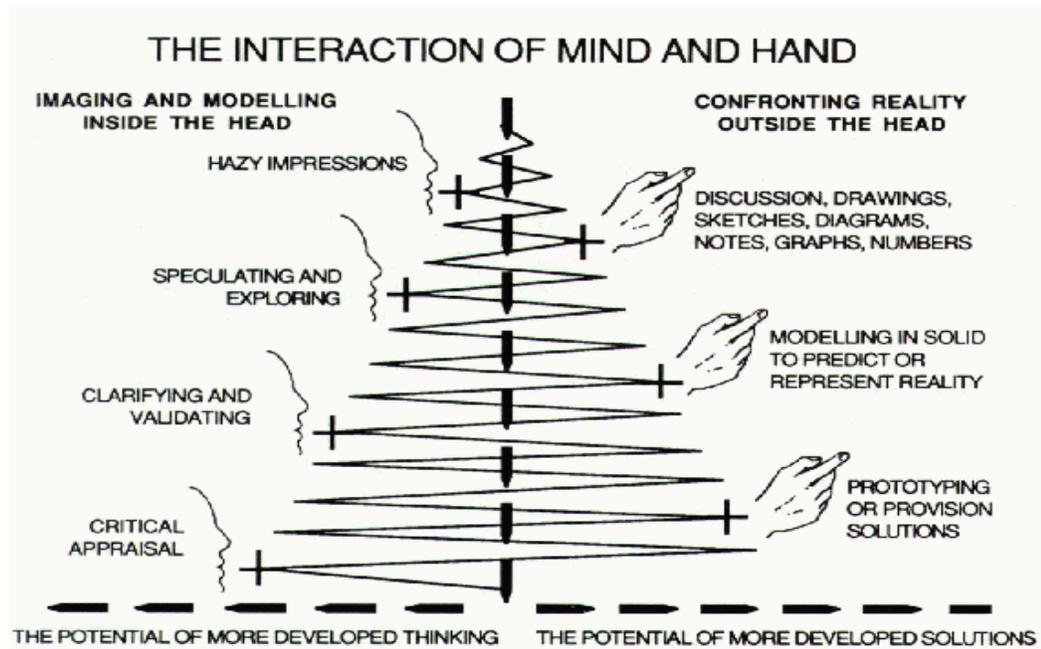


Figure 2. *The APU model of interaction between mind and hand.*

(Kimbell 1987, p. 62)

This model expresses how the process of technology has become just as important as the final product; perhaps even more so. It describes what occurs both inside and outside the head. Technological practice involves more than just conceptual knowledge and practical skill, yet its success is dependent on both. Recently, a third component has been expressed as missing from Kimbell’s model of minds on and

hands on: hearts on. ‘Hearts on’ refers to a critical component supported by the environmentalists as well as other interested stakeholders.

WHAT IS TECHNOLOGICAL PRACTICE?

There are a number of models of technological practice (what technologists do) in this thesis the preferred model is that of that of Arnold Pacey (1985) (Figure 3). Pacey described technology as involving three widely differing ‘disclosures’ that are embodied, either consciously or unconsciously, in technological activity.

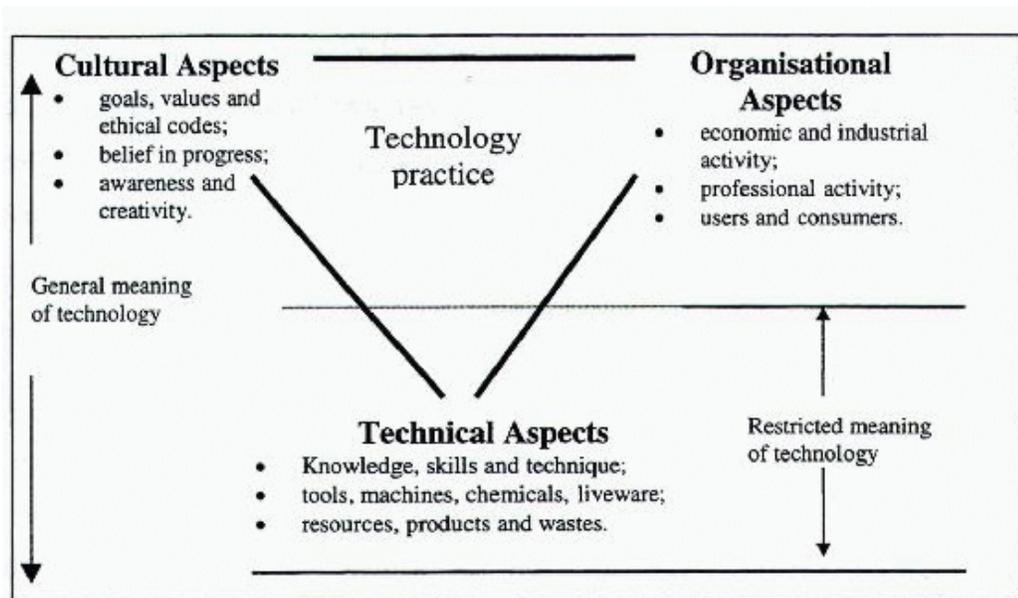


Figure 3. Definition of Technology Practice

(Pacey, 1985, p. 6)

Cultural aspects, according to Pacey, involve the goals of society, values and ethics and the awareness and creativity within that culture. This view is strongly supported by others who are interested in the cultural aspects of technological practice:

There is a sense in which technology; both its products and its processes represent the embodiment of culture. We create the things we value, the things we think beautiful or useful. We devise tools, machines and systems to accomplish the ends we value. . . Our beliefs, our values, our

philosophies, our experiences, in short our culture, is made manifest, in part of the artefacts and systems we create. (Prime, 1993, p. 30)

If one agrees with Prime, then the cultural context of technological practice should be explored when making observations on the development and impact of technology. This should be seen as a worthwhile aspect within the Nature of Technology strand of the New Zealand Curriculum.

Organisational Aspects involve economic and industrial activity, professional activity, users and consumers. Management systems, quality control, financial controls and production systems would all be included in this aspect. In addition, Pacey identifies the users and consumers of the technology; this would include all the marketing and promotion sectors as well as the service sectors. This is an important aspect of technology education where one of the outcomes for technological literacy might be a critically informed user and consumer base.

Technical Aspects are, in educational terms, the aspects which traditionally have been the focus of preceding curricula and might be seen as the precursor of the current technology curriculum. These aspects include the knowledge, skills and techniques used in the development of a technological solution or technological practice. Pacey refers to tools, machines, chemicals, and liveware and this is consistent with a technician or an instrumentalist approach to technology education.

Pacey's definition of technological practice is certainly broader and more comprehensive than most, and therefore it is the definition preferred in this thesis.

WHAT IS TECHNOLOGICAL LITERACY?

In New Zealand the official aim of technology education is for students to achieve a broad technological literacy (Ministry of Education, 2007). While there are many interpretations for literacy, it could be described as the ability to encode and decode a message Waetjen (1993). If one encodes and decodes very well, one is well educated, or at least one can read and write very well. So there is a minimum level of

attainment if one is to be literate, but at the same time, there is a range of literacy. According to Waetjen (1993) the same conditions must apply to technological literacy. That is, technological literacy requires the ability of an individual to decode and encode technological messages.

Hayden (1989) takes the position that technological literacy is having the knowledge and abilities to select and apply appropriate technologies in a given context. While not revealing the source of his thoughts, Steffens (1986) claims that technological literacy involves knowledge and comprehension of technology and its uses; skills, including tool skills as well as evaluation skills; and attitudes about new technologies and their application. Croft (1991) devised a table of the characteristics of a technologically literate student. The characteristics are: abilities to make decisions about technology, possession of basic literacy skills required to solve technology problems, abilities to make wise decisions about uses of technology, abilities to apply knowledge, tools and skills for the benefit of society, and finally, the ability to describe the basic technology systems of society.

Dyrenfurth, (1991), defined technological literacy as:

Technological literacy is a concept used to characterize the extent to which an individual understands, and is capable of using, technology. Technological literacy is a characteristic that can be manifested along a continuum ranging from non-discernible to exceptionally proficient. As such, it necessarily involves an array of competencies, each best thought of as a vector, that include: Basic functional skills and critical thinking, constructive work habits, a set of generalized procedures for working with technology, actual technological capability, key interpersonal and teamwork skills, and the ability to learn independently. (p. 179)

According to Compton and Jones (2004) the aim of technology education in New Zealand is to develop programmes that support the development of a critical technological literacy in students, which will serve them well as future informed and empowered citizens. This critical technological literacy is seen as more important and much broader than just functional literacy (Compton and Harwood, 2003;

Davies, 2000; Petrina, 2000). Todd (1991) presents a useful taxonomy to describe technological decision making that embraces five levels: awareness, literacy, ability, creativity, and criticism. These powerful levels of competence are concerned with the knowing and doing of technology but advance into the more difficult areas of criticism and judgement. This notion of criticism and judgement is important for this thesis.

There are a number of researchers who have published on this topic McCormick, (1997), defines a technologically literate person as one who:

- knows and understands about technology (Conceptual Knowledge);
- knows ‘how to do’ technology, or has technological capability (Procedural Knowledge);
- makes critical judgements about their own and others’ technological activity (Strategic Knowledge).

Stevenson (1994) classifies these different knowledge types into three orders. The first order is linked to direct goals such as hammering in a nail, and can be described as automatic familiar goals. The second order relates to unfamiliar goals and can be called problem solving goals. The third order switches between the other two and has a controlling and decision-making function. Obviously all three orders are inter-related and should be taught together as part of a technology education programme.

WHAT IS AN INCLUSIVE TECHNOLOGY EDUCATION?

One might argue that Pacey’s definition of technological practice is inclusive. This term is used in the New Zealand technology curriculum statement and requires further explanation. Inclusive technology can be a statement used when an author wishes to promote the positive aspects of the technology curriculum. According to Compton (1997), “*good technological practice is therefore, by definition, inclusive and thus technology education should uphold the same philosophy.*” (p. 63).

In reality this inclusivity has never been defined. However, it is clearly related to the stakeholder's interpretation of technology. These stakeholder positions are in fact the driving forces behind the development of a technology curriculum; not only in New Zealand but internationally. When trying to define an inclusive technology curriculum these stakeholder positions and their differing philosophies need to be explored.

WHO ARE THE STAKEHOLDERS PUSHING TECHNOLOGY EDUCATION?

There have been many attempts to introduce notions of technology education into schools. Dewey was one of the first to consider its place early in the twentieth century. According to Phillips (1985) during the 1960s there were a number of projects introduced. However, it was not until recently that a curriculum subject called Technology has been introduced in New Zealand. Technology education is now not only part of a compulsory national curriculum in New Zealand but also has an international curriculum representation. There are a number of professional associations and academic journals promoting the virtues of this new curriculum area. What is the rationale for this much stronger recent support?

UNESCO has been an important publisher of technology education research with a series of publications called 'Innovations in Science and Technology Education.' In 1971 an International Commission for the Development of Education was appointed and in 1972 a report entitled *Learning to be* was published by UNESCO which argued technology education was important because:

Lack of understanding of technological methods makes one more and more dependent on others in daily life, narrows employment possibilities and increases the danger that the potentially harmful effects of the unrestrained application of technology . . . will become overwhelming.

(Faure, 1972, p. 66)

In 1994, Layton published a reading in a UNESCO volume on Science and Technology which has become widely cited when speaking of stakeholders in technology education. In this reading, the concept of “technological literacy” is discussed (which is also a concept central to the New Zealand curriculum document).

Education in technology at the conceptual level should enable everyone to understand the ways in which they can change their environment.

(Layton, 1994, p. 12)

Layton’s work looked at the stakeholders and tensions that arose from the different positions held. After a general introduction, where he describes the range of influences and the politics of technological literacy, he distinguished some of the more prominent characteristics of the groups involved under the following headings:

Economic Instrumentalist

This is a very strong lobby group and historically probably the most influential. Their viewpoint has an important bearing on this thesis. They argue that education has an important role to play in the national economic competitiveness of nations where the creation of wealth should be the overriding aim. This association is at its strongest when talking about technology and the economy. Another important point is the link between vocational education and technology education. The economic instrumentalists see the two as synonymous. I have highlighted the economic instrumentalist viewpoint throughout this thesis, as it is paramount, not only to the development of New Zealand technology education, but technology education internationally. The first country in the world to introduce technology as part of a national curriculum was England. Medway (1992), in his description of constructions of technology, notes that economic instrumentalism may in fact be the beginning of a move away from the classical subjects of mathematics and science towards the more instrumental technology education. Similar viewpoints have been expressed in the United States for the introduction of the ‘Technology for all Americans’ project by the International Technology Education Association (ITEA) (1996).

Professional Technologists

This group is allied to the economic instrumentalists in that both see the connection between technology education and the economy. In addition, the professional technologists see technology as a ‘third culture,’ different from the arts and sciences. Professional associations such as The Institute of Professional Engineers of New Zealand (IPENZ) support the development of technology education as a means to influence not only the content of what is taught in schools but also to expose students to their importance in the wider society. This image building and possible future attraction into the professions is discussed later in this thesis. These professional organisations have been a significantly powerful lobby group in driving the policy decisions and ultimately the content of curriculum documents around the world. The UK Engineering Council report by Smithers and Robinson (1992) was quite damning of the original technology curriculum in England and Wales, which resulted in a re-write that swung towards the Council’s agenda.

Sustainable Developers

This group has a different viewpoint as to why technology education should be taught in schools. Their main concern is the future of the biosphere. An emphasis is placed on the values and attitudes of technology education. Empowerment through education is seen as the method to ensure that the quality of life is not reduced purely for technological developments. This viewpoint is important for the understanding of technology education in the New Zealand curriculum. One of the three strands is aligned to this view, at least in the structure of the curriculum, but whether it is being taught is another matter open for debate. One can already see a tension between the views regarding the compatibility of economic growth and environmental protection.

However, there are a number of organisations that promote alternative technology education. This viewpoint, often associated with sustainable developers, focuses on the culture in which the technology is placed and developed. Issues such as appropriate and intermediate technologies would be a significant factor in a technology education curriculum promoted by this group.

Girls and Women

Women have always lived with and been heavy users of technology both in the workforce and home: however, they have never been a major force in terms of the creation of new technologies. Layton (1994) suggests the main point made by this lobby group is that it is time for technology education to help redress the issues of gender bias. My own experience of teaching in single sex girls' schools has led me to strongly support this viewpoint. Women and girls have attitudes and values important for the development of future technology education courses. Wajcman (1991, p. 64) notes that through the feminist movements of the 1980s the focus shifted towards the gendered character of technology. In his respected work *The Culture of Technology* Pacey (1985) outlines three sets of values which impact on views of technology: virtuosity, the economy and responsibility. It is in responsibility that he sees a significantly different viewpoint expressed by the genders. He argues that women are more inclined to work with nature and act accordingly, whereas men are more concerned with the conquest of nature.

Defenders of Participatory Democracy

This group of stakeholders has central to its viewpoint the notion of equality for all citizens. They fear the development of a technocratic elite who alone would have access to the specialised knowledge and language associated with technology education. The idea of a technologically illiterate underclass that is fearful of technology that they have no control over is a viewpoint shared by many Frezzo (1991). It is their view that only through technology education for all will there be a possibility to protect society from this elitism. Only through an educated citizenship can society possibly deal with the impacts and developments of technology. According to McCormick (1993), "*The value-laden nature of technological activity, and the need to reflect this in education, is now accepted in most proposals for technology education.*" (p.12)

McCormick highlights two overlapping strands: the first is the capability for the citizen to make judgements about technology and the second is preparing students to live in an increasingly technological society.

Liberal Educators

This group supports technology education for its intrinsic value to teaching and learning. They argue that the way technologists do their work involves a particular type of cognition. All students should be exposed to this form of cognition to enable them to reach their full potential. A strong liberal humanist education position may be directly opposed to the world of work, so that what is important is the individual's intellect and reaching their potential. Any criterion which is imposed or set outside that objective is seen as irrelevant Banks (1994).

Does technology have intrinsic value as a subject area? McCormick in Banks (1994) argues that technology does have intrinsic value and thus supports the Liberal educators' position. Initially McCormick identifies two aspects of importance for teaching and learning: the solving of real problems and the reflective thinking that such problem solving promotes. This educational justification relies heavily on the work of Dewey (1916). The "Great Debate" in England emphasised the need to educate people to be able to 'do' as well as 'know' in order to develop individuals who are technologically capable Callaghan (1976). So, in this viewpoint, technology education can be said to be the integration of the cognitive, psychomotor and affective domains, which is quite similar to Kimbell's model (Figure 1). It also emphasises the teaching of heuristics.

WHAT IS THE NEW ZEALAND PERSPECTIVE?

Jones (1997) who had a leading role in the development of the original technology curriculum identified a similar rationale to that of Layton (1994) for the teaching of technology in New Zealand. He describes six grounds for developing technology education.

Economic

In his description, Jones (1997) identifies that enterprise has expressed the need for people who are creative, innovative and resourceful and have the ability to adapt to an ever-changing world. He goes further to state that "*Our economic future depends*

on developing product and market niches. This argument points to the value of the interaction of school students with the commercial world.” (p. 49)

This viewpoint is similar to that expressed by the economic instrumentalists as described by Layton.

Pedagogic

Jones (1997) describes this through the contexts that technology education can bring to the curriculum; an integrated curriculum approach which brings together the knowledge and skills from the other curriculum areas and external experiences into an individual problem solving learning experience. It also combines, and more importantly equally values, the two domains of knowing and doing. This, together with an increased understanding of the relationship between technology and society, is a strong pedagogical argument. This would seem to concur with the arguments presented by the liberal educators described by Layton.

Motivational

Under this heading, Jones (1997) describes how students will readily engage with technology education because of its real-life relevance to them. If technology is about meeting people’s needs, wants and interests then topics such as sports technology, communication technology and health technology should allow easy access for students. From this starting point of motivational interest, technology education could then expose them to the wider aspects of technology education.

Cultural

Jones (1997) describes how different cultures throughout time have had different ways of tackling technological issues and that this is particularly important in a multicultural society. The opportunity to discuss values and beliefs within the technological context is seen as a valuable reason for technology education. This could be seen as a direct response to the first aspect identified by Pacey. It can also be associated with the ideas of the defenders of participatory democracy as identified by Layton.

Environmental

Students should explore the environmental impact of technology and know the possible environmental considerations for past and future technologies. By studying technology in this way, students are better informed and equipped to deal with further advancements in this area. This argument for technology education is similar to Layton's sustainable developers in many respects.

Personal

Lastly, Jones (1997) describes a personal reason for teaching technology; this argument is looking at education from the student's individual needs. "*In a technological world students should be aware of their responsibilities as members of a technological society to contribute to informed decision making about technology and to become empowered to be active in response to new technological challenges.*" (p. 51)

Jones elaborates by describing how students are not encouraged to take risks within the traditional curriculum areas, yet in technology it should be encouraged. Wise choices and good decisions are essential in any technological endeavour. Sometimes the decisions involve conflicting criteria which offer students an opportunity to become informed risk takers.

These six grounds for teaching technology, which are identified by Jones and follow closely Layton's stakeholders, are very similar to what appeared in the final version of the original technology curriculum:

Technology education is a planned process designed to develop students' competence and confidence in understanding and using existing technologies and in creating solutions to technological problems. It contributes to the intellectual and practical development of students, as individuals and as informed members of a technological society.
(Ministry of Education, 1995, p. 7)

HOW HAS TECHNOLOGY EDUCATION IN NEW ZEALAND DEVELOPED?

It is beyond the scope of this thesis to report fully the development of technology education in New Zealand; however, it is appropriate to highlight the key events which had a bearing on its rise and the policies behind it, leading to its inclusion as part of the current curriculum framework.

In 1877 a public primary schooling system was introduced and it was made available and free to both rural and urban children in New Zealand. The quality of education however, was bookish and resource poor, often with a staff to pupil ratio of 1:100 (McKenzie, 1992). In 1900 John McKenzie, the Minister of Lands, argued that rural schools should focus the curriculum more on technical and agricultural content. McKenzie argued that this would have a more direct bearing on their lives and the occupations that they might pursue in their area. However, it was noted that:

If in an agricultural district you trace the occupations followed afterward by students passing higher standards you will find that a larger proportion of them go into fancy occupations, such as clerking etc. than go into agriculture. In addition, the same applies in the mining districts. For some of the district high schools double the number go into the teaching profession than go into mining, and four times the number go into the Civil Service than go into mining. (McKenzie J. cited in McKenzie D., 1992, p. 31)

Attitudes, and to some degree policy, reflected the educational practices of England where, according to McKenzie, technical schools of that era were associated with second-class knowledge. Nevertheless, by 1910 technical high schools were established in all the major centres. Again, instead of offering a route into the manufacturing sectors the courses, which were typically only one year long, tended to prepare students for the commercial sector and mainly clerical positions. There were apprenticeships available for those who wished to enter the manufacturing industries.

The powerhouse of Western Europe during this time was Prussia and they had a technical curriculum, although many viewed it with suspicion. In 1919, Henry Holland, the leader of the labour party in New Zealand, described the German system as preparing students to be ‘wage slaves’ and part of the efficient machine (McKenzie, 1992). In 1926, W. J. Morrell the Rector of Otago Boys high stated that his school would continue to serve the professional sector and the local technical schools could cater for the artisans and lower commercial classes.

There was a shift in the policies and views expressed and through the Atmore Report of 1930 it was stated that post primary schools were small in size and should cater for both sectors. In 1935, the Labour Government proclaimed equal status for students entering post-primary education; however, the reality was quite different. Academic studies were for those who would go on to professional courses and short ‘realistic’ courses were available for those who would not stay at school, typically the Maori youth.

After the Thomas report in 1945, the Education Department imposed a compulsory core curriculum. The committee responsible for the report saw its role as preparing a curriculum to educate students for their forthcoming roles as ‘workers, neighbours, homemakers, and citizens’ (Lee, 1992). This led to a comprehensive type of education which was to be the demise of the technical school, though it took almost twenty years for it to happen (McKenzie, 1992). The author acknowledges that the path for the academic to further and higher education changed little in comparison during this same period.

It would seem that the stakeholders behind the curriculum in 1961 were liberal in their approach to technical education, the syllabus of the time, declaring:

“it is most important to keep in mind that the development of children as individual personalities is the purpose of handcraft. It is not our purpose to train cabinetmakers or to give a course preparatory to apprenticeship in a metal trade.” The introduction goes on to lay out the aims of the curriculum: *To provide opportunities for children to develop in character*

and personality by using their abilities creatively. (Department of Education, 1961, p. 12)

The next curriculum change occurred in the technical area after a national course on craft was held at Lopdell House in 1972. A curriculum unit paper entitled 'Craft Subjects Forms 1-5' was published, the main recommendations were that a revision committee should be formed to draw up new syllabi, and that these syllabi should be offered to both boys and girls and should include a school certificate course.

In 1986, the Department for Education published the 'Forms 1-4 Workshop Craft Syllabus for Schools' and in it the aims for workshop craft were expressed as follows:

To provide workshop experiences that enriches students' growth and development, and encourages them to be creative and imaginative. These experiences should foster in students' responsible attitudes, a sense of achievement, and personal satisfaction. (1986, p. 7)

Again, one might suggest that the liberal educator stakeholder was still prominent.

According to Benson (1991), a Senior Policy Analyst at the Ministry, there has been a keen interest in technology education initiatives since the late seventies. By 1988, proposals for the inclusion of technology as a core curriculum subject had been made but these were overtaken by the 1989 education reforms.

In 1990 the National Party released its election manifesto that included a new policy for education called the 'Achievement Initiative'. Part of this initiative was to develop learning objectives for students in English, Mathematics, Science and Technology. The National Government was elected in 1990 and the following year work began on the educational reforms. Papers were written and meetings held to discuss amongst other things the position of technology education. Dr. Smith, the then Minister of Education, decided that technology education should be a separate area of the curriculum. Later, a task force, set up jointly by the Minister of Research Science and Technology and the Minister of Education, supported the independent

nature of technology education, in their report published in February 1992 (Ferguson, 2009).

In 1993 as a result of these reforms seven Essential Learning Areas were established to be a part of the New Zealand Curriculum Framework (NZCF). One of the named areas was Technology Education. This was a significant policy move and meant a significant change for many of the primary classrooms in New Zealand. A draft technology education curriculum was developed and trialled in schools in 1994. By 1995, submissions on the draft had been received and the final statement Technology in the New Zealand Curriculum (TINZC) was published in 1995. Implementation concerns were central to a decision taken in May 1997 by the Ministerial Consultative Group on workloads; subsequently the revised date for implementation became February 1999. 1997 also saw the establishment of Technology Education New Zealand (TENZ) a professional association for technology teachers. Since 1997 TENZ has run a very popular and successful biennial conference.

In February 1999 the New Zealand Ministry of Education *gazetted* the statement that made it mandatory in state schools. This meant that Primary schools (Years 1-6), Intermediate schools (Years 7-8) and Secondary schools (Years 9-10) were required to deliver programmes designed to implement this curriculum. The Ministry of Education, through its publication *Technology in the New Zealand Curriculum* described technology as:

A creative, purposeful activity aimed at meeting needs and opportunities through the development of products, systems, or environments. Knowledge, skills, and resources are combined to help solve practical problems. Technological practice takes place within, and is influenced by, social contexts. (Ministry of Education, 1995, p. 6)

This creative, purposeful activity in technology education was to be delivered through three interweaving strands: (a) Technological Knowledge (b) Understanding, Technological Capability, and (c) Technology and Society.

Technological Knowledge and Understanding encompasses:

1. understanding the use and operation of technologies
2. understanding technological principles and systems
3. understanding the nature of technological practice
4. understanding strategies for the communication, promotion, and evaluation of technological ideas and outcomes.

Technological Capability encompasses:

5. identifying needs and opportunities
6. with reference to identified needs and opportunities:
 - a. generating, selecting, developing, and adapting appropriate solutions
 - b. managing time, and human and physical resources, to produce technological outcomes and products, systems and environments
 - c. presenting and promoting ideas, strategies, and outcomes
 - d. evaluating designs, strategies, and outcomes.

Technology and Society encompasses:

7. the ways the beliefs, values, and ethics of individuals and groups:
 - a. promote or constrain technological development
 - b. influence attitudes towards technological development
8. understanding the impacts of technology on society and the environment:
 - a. in the past, present, and possible future
 - b. in local, national, and international settings.

In addition, achievement objectives were identified which were expressed at each of the eight progressive levels in line with The New Zealand Curriculum Framework. These level statements were designed to show progression of the technology curriculum from junior primary (J1=Year 1) to senior secondary (F7=Year 13) although the curriculum statement was only compulsory to Year 10. Years 11-13 were to follow assessment guidelines associated with the National Certificate of Educational Achievement (NCEA). NCEA is the new senior secondary school national qualification which was implemented in New Zealand Schools in 2002.

Seven technological areas were identified to help students achieve the objectives of the curriculum. These areas were considered to be key areas of study particular to New Zealand. In some ways this was a double-edged sword. It was positive in that it helped teachers - particularly primary teachers - identify areas of study. In reality, however, many teachers saw these as separate subjects and upon reflection this was definitely seen as a miscommunication of the curriculum. The areas identified were:

- Biotechnology
- Electronics and Control Technology
- Food Technology
- Information and Communication Technology
- Materials Technology
- Production and Process Technology
- Structures and Mechanisms

There were nine contexts established in the statement. It was suggested that technological activities be carried out in a variety of broad overlapping contexts. Again these contexts helped to scaffold teachers' broader understanding but they also resulted in some misinterpretation of delivery requirements. Schools struggled to meet the requirements for coverage of these areas, due to perceptions of separation. The contexts identified were:

- Personal
- Home
- School
- Recreational
- Community
- Environmental
- Energy
- Business
- Industrial

Technological areas, contexts, strands, and achievement objectives combined together provided the framework for technology education. Technology education

became a compulsory curriculum for all students from (Years 1- 10). Although there had been some shift from the early days of technical education this was a giant and brave leap forward. The central thrust of the change had been the movement towards developing in students the notion of technological literacy. This literacy was much broader than the technical expertise which the previous historical offerings had encouraged and expected. Education in New Zealand was going through major reform during this period not just in the curriculum but assessment also. A new secondary qualification was also introduced. The National Certificate of Educational Achievement was launched in late 1998 under the umbrella of a project called Achievement 2001.

Around the same time in 2001 a curriculum stocktake was initiated by the Ministry of Education. This was to review all aspects of the compulsory curriculum including technology education. The stocktake had a relatively wide remit in that reviews were sought from international experts as well as evaluations of teachers' experiences of curriculum delivery. As a result of the stocktake a decision was taken to redefine the existing NZCF and the formation of a new framework called the New Zealand Curriculum and Marautanga Project (NZC & MP) was proposed.

As part of the stocktake review of technology education, a National School Sampling Study (NSSS) was carried out and this was to provide teachers with the chance to share their experiences of curriculum implementation. The sample was about 10% of the 2,900 schools in New Zealand. The data from this sample indicated that there was a reasonable amount of satisfaction with the structure and organisation of the new curriculum with only a third highlighting changes they would like to make. The upper secondary school teachers of Years 11-13 were the most disgruntled of the sample collected. The secondary teachers were concerned with the amount of paperwork. This could be associated with the new assessment procedures for the National Certificate of Educational Achievement (NCEA). Primary teachers asked for more guidance on planning and assessment since this is what they were concerned with.

The findings from approximately 70% of respondents indicated that most primary school teachers were aiming for curriculum coverage and had moderate levels of

confidence. Around 60% of primary teachers expressed concern over obtaining resources and appropriate equipment. The Years 7 and 8 teachers, who teach mainly in specialised intermediate schools, were concerned about assessment. (Jones, Harlow & Cowie, 2004).

Considering the relatively short timeframe that the compulsory technology curriculum had been in place, these findings might well be viewed as satisfactory. However, there was some evidence from both New Zealand and international research studies that students and teachers lacked a coherent conceptual understanding of the nature of technology. This, combined with a perceived lack of technological knowledge, was to be the thrust behind a revision of the curriculum statement for technology as part of the New Zealand Curriculum and Marautanga Project.

To address these concerns, it was suggested, in 2004, that there needed to be a greater focus on the philosophical understanding of technology and further development of technological knowledge (Compton & Jones, 2004). As a result, technology education was to be restructured around three new strands (a) Technological Knowledge (b) Technological Practice, and (c) Nature of Technology.

Just like the 1995 statement, these strands were still seen as intertwining to realise the aim of developing and increasing student technological literacy. However, the new curriculum was re-conceptualised and had more of an emphasis on critical literacy. Less emphasis was placed on the separate technological areas and contexts.

The New Zealand Curriculum Draft for Consultation was distributed in June 2006 and the Ministry of Education asked for feedback. The section devoted to technology education was incomplete and a supplement had to be released in October 2006 (Ministry of Education, 2006a). This had a negative impact on technology education and led to some debate as to the validity of feedback received. That said, there was significant and widespread consultation sought during this period ranging from schools through to universities, business and industry. In June 2006, Technology was added to the 'approved subjects' list required for university entrance, in recognition

of the academic strength of the new subject at senior levels in schools and the fact that technology is a growing focus of university study.

The current New Zealand Curriculum (NZC) was published late in 2007. The process of technology in the New Zealand curriculum (2007) is described as:

Intervention by design: the use of practical and intellectual resources to develop products and systems (technological outcomes) that expand human possibilities by addressing needs and realising opportunities. Adaptation and innovation are at the heart of technological practice. Quality outcomes result from thinking and practices that are informed, critical and creative. (p. 32)

Students will develop their technological literacy, it is suggested, by developing their learning through work in the three identified strands (a) Technological Knowledge (b) Technological Practice, and (c) Nature of Technology. Teaching programmes can still integrate all three strands, although individual units of work may focus on one or two strands at a time. This is a significant shift in guidance from the previous 1995 curriculum. The change has been made to increase flexibility and manageability for teachers. Additionally, it is hoped it will facilitate students' learning experiences by allowing them to develop greater progression in their context specific knowledge, skills and practice.

The **Technological Practice** strand which has been expressed as a combination of the earlier three strands identified in the 1995 curriculum should provide opportunities for students to examine the practice of others as well as undertake and critique their own. Further explanation to match the more critical literacy sought is provided through the supplemental material which includes additional justification. It is now identified that the students' practice should include identifying, investigating issues and existing outcomes. It also includes consideration of ethics, legal requirements, protocols, codes of practice, and the needs of, and potential impacts, on stakeholders and the environment. Through technological practice, students may design, develop and communicate a range of outcomes, including concepts, plans, briefs, technological models and fully implemented technological outcomes. In the

2007 curriculum there are three components identified within the practice strand: These are (a) *Planning for Practice*, (b) *Brief Development*, and (c) *Outcome Development and Evaluation*.

The **Technological Knowledge** strand provides opportunity for students to develop understandings of ‘*how things work*’ and develop technological knowledge specific to technological endeavours. So the rationale here is that students should have access through technology education to ‘key’ concepts and knowledge which is generic to any technological context. The components of this strand are: (a) *Technological Modelling*, (b) *Technological Products*, and (c) *Technological Systems*. Compton and France (2007) put forward an interesting separation and description of technological modelling which includes both functional and prototype modelling. They suggest that functional modelling is the exploration of the feasibility of design ideas and concepts; prototype modelling is the exploration of fitness of purpose of the outcome.

Within the **Nature of Technology** strand there are two components: (a) *Characteristics of Technology*; and (b) *Characteristics of Technological Outcomes*. This strand provides opportunity for students to develop a philosophical understanding of technology, including how it is different from other domains of human activity. For this to occur, students must develop a shared understanding of the purpose of technology and also develop an appreciation that the outcomes of technological practice are often a ‘best fit’ response. This strand supports the development of an understanding of technology that is critical in nature, and allows for informed debate of historical and contemporary issues and future case scenarios. Clearly this places technological activity in a ‘critical moment’ both from a timeframe and a societal perspective. Appreciation of this ‘critical moment’ concept should enable students to critically analyse what came before and what might occur in the future.

From 2010 teachers in New Zealand schools were required to incorporate all three strands into their technology education programmes. Assessing and reporting on student achievement are to occur using all eight achievement objectives identified in the 2007 curriculum. Although there have been relatively few historical accounts of

curriculum development written in New Zealand, those that exist invariably mention the importance of technical education in shaping curriculum reform. Codd (1981) spoke of the conflicts between the ‘Traditionalists and Progressives’ and the involvement and influence of the stakeholders, describing them as ‘legitimated sources of power and authority’. For Codd, these influences have been especially strong in New Zealand, *“For it was the social demand of industrial and technological expansion in the nineteenth century, with its resultant needs for specialised skills and a well-trained workforce, which gave impetus to the whole political movement towards universal compulsory education.”* (pp. 55-56)

This thesis argues the same can be said for the development of the current technology education curriculum and particularly the notion of school enterprise initiatives. The voice of the economic instrumentalists would seem to be the loudest and most influential of all the interested stakeholder parties. In this chapter I have reviewed the collector barrel of the technology curriculum injector model namely technology education. In the next chapter I introduce the separate components of the technology curriculum injector model. The chapter begins with my explanation of the analogy used, and then, I undertake a literature review of each of the components: (a) Education for Enterprise, (b) the connected curriculum, and (c) community partnerships.

CHAPTER THREE

THE FEEDER COMPONENTS OF THE TECHNOLOGY CURRICULUM INJECTOR

Technology teaching cannot be separated from the world outside school, as it is all about that world. (Banks, 2002, p. 290)

INTRODUCTION

In this chapter the feeder components of the technology curriculum injector are discussed. To utilize the analogy of a plastic injection moulding machine, it is important that the reader understands how an injection moulder works. Injection moulding is a method of manufacturing objects made from plastic. Raw plastic ingredients are placed into a large hopper, which utilizes gravity to feed them into a heated barrel, which contains a reciprocating screw or a ram injector. The heat in the barrel melts the plastic and then the screw is used to compress and inject the hot molten plastic into a mould. The plastic is injected through a nozzle and then into the empty mould where the plastic cools and hardens into the appropriate shape. The mould is usually kept cool in order to harden the heated plastic into the correct shape as it cools down. The mould itself is often made of aluminium and usually has two parts, a male and a female. These mould parts or plates are compressed closed by mechanical or hydraulic means to restrict the molten plastic escaping.

The injection moulding process has several advantages over other moulding processes. Typically, injection moulding is used to form objects of great precision and detail. Injection moulding allows for high-production output rates, meaning the same machine can be used again and again to produce different artefacts by changing the moulds used. The hopper feeder system allows for a variety of ingredients to be added, which allows the manufacturer to change the properties of the artefacts produced. There is typically very little post-production finishing work required

because the artefacts usually have a quality look upon ejection. Any excess plastic can be scraped away and reused.

The technology curriculum injector model proposed in this thesis (Figure 1) uses this manufacturing process as an analogy for how the outcomes of technology education can be changed by what is placed into the feeder hopper. In this chapter each of the hopper ingredients is described and motives for the different outcomes are explored. In the technology curriculum injector model there is no mould identified because unlike the manufacturing process I believe that each learner is unique and therefore the outcomes will be different. It is identified, however, that the outcomes, in this case the learners, may be shaped or influenced by going through the process. To continue the analogy further, stakeholders such as the Ministry of Education might be considered to be the designers of the system and teachers the operators. In Figure 1 there are three ingredients fed into the hopper these are (a) Education For Enterprise, (b) the connected curriculum, and (c) community partnerships.

WHAT IS EDUCATION FOR ENTERPRISE (E4E)?

Trying to find clear definitions in a field such as enterprise can often prove problematic for researchers: however, Bridges (1992) suggested that in the absence of authoritative definitions there is more opportunity to be prescriptive. For example, Kenyon and White (1996) emphasized that enterprise education could be described broadly or narrowly, qualifying with the claim that enterprise education usually involves participants facing degrees of difficulty or uncertainty and that the associated risks may be economic, physical, intellectual or emotional.

Technology education should, amongst other objectives, be about developing enterprising attributes in our students. Despite many education initiatives using enterprise as a theme there is still considerable conceptual confusion as to what Education for Enterprise actually involves (Gibb & Cotton, 1998). This confusion is compounded by the integrated nature of enterprise activities in education. This is an important consideration for this thesis and is explored in further detail in later

chapters. Enterprise education has been described in many ways, depending on the focus or lens of the viewer. Some management literature has sought to define enterprise education as a distinct activity by identifying the boundaries between entrepreneurship studies and traditional management studies (Gibb, 1999; Solomon, Duffy & Tarabishy, 2002).

From an education perspective enterprise education is often associated with a variety of concepts, including work related learning (Dwerryhouse, 2001), action-learning (Revans, 1991; Jones-Evans, Williams, & Deacon, (2000)), experiential learning (Kolb, 1984) and entrepreneurial learning (Gibb, 1999; Rae, 2000).

An article by Clark (2004) highlights the differing views about the word ‘enterprise’ when used in association with education. The article also highlights the issues surrounding interpretation, particularly those associated with the economic imperative.

Education for Enterprise in New Zealand has been defined by the Ministry of Education in broad terms as:

A teaching and learning process directed towards developing in young people those skills, competencies, understandings, and attributes which equip them to be innovative, and to identify, create, initiate, and successfully manage personal, community, business, and work opportunities, including working for themselves . . . It is about how we teach across the curriculum and how we get our students to take ownership of their learning. Education for Enterprise is not a discrete subject but provides learning experiences that encourage young people to be active participants in their learning. (2009, para. 1)

The outcomes of enterprise education can be very complex and unpredictable. Kearney (1996) suggested that the adoption of a broader approach to enterprise education (for example, an alignment with the broad definition of enterprise education) may achieve the narrow outcomes perhaps more effectively than the narrow approach itself. This was a view supported by Gibb (1993), although from a

United Kingdom perspective, who identified that what occurs under the label of ‘enterprise education’ (rather than ‘entrepreneurship education’) focuses on developing what constitutes the broader definition of enterprise education; that is, the development of personal attributes.

A simplistic approach to defining enterprise education is the teaching of business entrepreneurialism and the skills needed to start a business or enterprise (OECD, 1989). This has been described by some researchers as too narrow. Kearney (1996) argued that narrow definitions of enterprise education would reinforce the economic imperative stance and make enterprise education unappealing to teachers, parents, community groups and students themselves. Schools who adopted this model of enterprise education were more likely to encounter resistance from staff and students. Caird (1989) felt that the rationale and history of the education ‘for’ enterprise movement was quite distinct from the movements to educate ‘through’ or ‘about’ enterprise. The former grew out of concern to develop small business and entrepreneurship following the economic imperative, whilst the latter was more related to criticisms of the education system and concerns with school leaver capability, which may have little to do with entrepreneurship. Filion (1994) argued that enterprise education is not about training students to become self-employed, but instead, *“it means training everyone to be able to take charge of themselves in today’s world. It means training everyone to be autonomous and resourceful enough to get by on their own, in other words, to be enterprising people”* (p. 71)

Jack and Anderson (1999) went as far as suggesting that the promotion of enterprise education can be politically expedient as it helps convey the ‘friendly face of capitalism’. Despite these concerns, there has been an international shift in education policy away from liberal-humanist education towards a more vocationally focused curriculum. The change has come about partly as a response to economic targets and objectives set by national policy makers (Price, 1991). An example of this shift can be seen in the growing emphasis on making education more responsive to the needs of the community. Included in a recent white paper published by the English Department for Education (2010) the foreword written by the Secretary of State identified that successful systems of education, *“have put in place comprehensive*

plans for school improvement which involve improving teacher quality, granting greater autonomy to the front line, modernising curricula, making schools more accountable to their communities.” (p. 7)

The New Zealand Education Review Office (1996) produced a publication called *School -Business Links* which stated that, “*Many New Zealand schools have relationships of some kind with local businesses. There is little information available, however, about how extensive these relationships are, why they are established and whether they contribute positively to the learning outcomes of students.*”(p. 11)

When the first technology curriculum was published in New Zealand it was seen by some as the way to bring these relationships more formally into the curriculum. Various stakeholder tensions, such as the economic imperative, have been used to propagate technology education’s position within a national curriculum framework. More recently these have manifested themselves under the guise of enterprise education. In 2006 the New Zealand Ministry of Education released a draft curriculum for consultation. This draft curriculum had an introductory page about technology which included the following statement, “*Technology education connects students with a range of employment opportunities, particularly those that are enterprising and innovative in nature.*” (p. 23)

The current New Zealand Curriculum (Ministry of Education 2007) is a statement of official policy relating to teaching and learning. It describes a clear vision of Education for Enterprise by setting the direction of pupil learning. Included in this vision is a desire to develop young people who will be (a) “*creative, energetic, and enterprising; and (b) confident, connected, actively involved, and lifelong learners.*” They should be confident and this is reflected by them being, “*enterprising and entrepreneurial.*” (p. 8).

Education for Enterprise provides an opportunity for students to do the following within the context of curriculum learning:

- *apply their wider school learning in real-life situations;*

- *make decisions about their learning rather than having decisions made for them;*
- *have opportunities to exercise individual and group initiative, inside and outside the traditional boundaries of schooling;*
- *exercise personal and shared responsibility, rather than being dependent on the teacher to solve problems and resolve issues;*
- *develop and apply knowledge and skills that will underpin successful transitions to participation in economic and social life.*

(Ministry of Education, 2009)

Some might argue that this neo-liberal position about education embodied by the technology curriculum makes clear that the function of the New Zealand Curriculum Framework (NZCF) is to ensure that New Zealand is able to compete in a global economy in a culture of enterprise. The politics of the New Right have become successfully embedded in the NZCF. These notions of enterprise culture have permeated the education system through the reconstruction of knowledge as skill-based and measurable, through the marketization of schools as enterprises, and through repositioning the notion of knowledge as something that can be bought and sold (Lee, Hill & Lee, 2004).

If technology education in New Zealand is seen by policymakers as a key medium for delivering Education for Enterprise involving the community and an essential component for developing a connected integrated curriculum, then technology teachers will need to develop a robust personal construct of what the subject entails to ensure a successful enactment (O’Sullivan, 2008). The diagram (Figure 1) places technology at the core component of this integrative model to maintain a clear focus on technology education as being the central theme of this endeavour. There are other initiatives which include both technology education and enterprise education.

Increasingly governments internationally are looking towards incorporating STEM educational initiatives to help shape curriculum offerings to meet their objectives. The recent notion of STEM originated in the United States through collaboration

between the Department of Labour and various National Academies. According to Kimbell (2011) the government in the UK wants to increase STEM skills to:

- *provide employers with the skills they need in their workforce;*
- *help to maintain the UK's global competitiveness;*
- *make the UK a world-leader in science based research and development.*

(Kimbell, 2011, p. 7)

According to the STEM directory website in the United Kingdom, “*Enterprise activities promote a clearly structured and accessible approach to problem solving with Design and Technology.*”

([Http://www.stemdirectories.org.uk/view_scheme.cfm?cit_id=383080](http://www.stemdirectories.org.uk/view_scheme.cfm?cit_id=383080))

In Western Australia the state government has taken this link between technology and enterprise education even further by calling their subject Technology and Enterprise. They suggest that neither are new concepts. They have been a way of life since civilisation began and were developed from the core needs of humans for food, shelter and clothing. The Technology and Enterprise (T & E) learning area relates directly to the processes of applying knowledge, skills and resources to satisfy needs and wants, extending capabilities and realising opportunities.

The Department of Education acknowledges that Technology and Enterprise play an important role in the school curriculum by providing opportunities for students to become engaged in a range of learning experiences, set in relevant contexts with the ability to have meaning in their lives. These include:

- *meeting the demands of a changing world by addressing the needs of individuals, families and societies;*
- *developing skills and experiencing systems and processes by bringing ideas from conception to fruition;*
- *being enterprising while actively pursuing opportunities;*
- *considering the social and environmental impact of solutions to achieve.*

(<http://www.det.wa.edu.au/curriculumsupport/technologyandenterprise/de tcms/navigation/about-t-and-e/?oid=MultiPartArticle-id-10971217>)

This enterprising theme is developed further in the New Zealand curriculum when discussing key competencies, which are described as capabilities for living and lifelong learning. Under the *Managing Self* competency it is suggested that students who manage themselves are enterprising. When describing the learning area of technology we are informed that technology will make enterprising use of knowledge and skills. Under the technological knowledge strand of the technology learning area, students are encouraged to develop knowledge particular to technological enterprises.

The process of technology education in the New Zealand curriculum (2007) is described as, *“Technology is intervention by design: the use of practical and intellectual resources to develop products and systems (technological outcomes) that expand human possibilities by addressing needs and realising opportunities.”* (p. 32)

It is clear that some policy makers see technology education as a key medium for delivering Education for Enterprise whilst involving the community. An understanding of the technology curriculum injector model proposed in this chapter could facilitate developing a connected curriculum which is more than just another attempt to meet the economic imperative. Education for Enterprise as promoted here via the technology curriculum injector identifies that technology education should be an integral part of any education offering aimed at developing connectedness.

There is also a growing international consensus as to essential enterprising characteristics that should be developed as part of a programme designed to increase the enterprise performance of students Gibb (1993). If a teacher is trying to develop a technology education offering which includes being enterprising then an awareness and promotion of these attributes is paramount. The ability to work independently as well as with others in teams is an important starting premise as this is how most technological activity occurs outside of the classroom. Skills such as negotiating and influencing take time to develop and are as important as the practical skills which

might be required. A particular pedagogical approach is envisioned and promoted if teachers are going to encourage and develop enterprising pupil endeavours. Students must be taught to manage risk taking as well as how to generate and use creative ideas to ensure truly connected learning opportunities are tackled. This requires teachers and students to be flexible and look for ways to incorporate both the collector barrel and the injector to ensure successful outcomes.

When using an Education for Enterprise approach students should be provided with and taught about flexible frameworks to facilitate project management. Schön (1991) identified that practitioners who receive real-time coaching and encouragement to think carefully (about what they do while they do it) learn in a more profound way. Therefore the teacher adopting this approach should encourage and value reflection from the students and acknowledge this by incorporating it into progression and assessment strategies. Both the teacher and the pupil should reflect on their practice from the beginning to ensure an enterprising approach is taken and facilitated.

Making the connections between technology education and the students' world outside of school may not be achieved by just one department; there must be support from the whole school. The technology curriculum injector model could be used to increase understanding throughout the school as to the nature of technology education and its place in the curriculum. To facilitate this, support for participation and monitoring should come from the senior management team of the school. Teaching Education for Enterprise can be very demanding on the teachers, particularly in the early phases. To prevent individual teacher burn out staff should be encouraged to work in teams, thus ensuring the focus remains consistent even in the event of staff changes.

The understandings of Education for Enterprise should be shared amongst all staff not just those involved in particular projects. Education for Enterprise should not be seen as another extra but it should be interwoven with key learning intentions from numeracy, literacy and the technology curriculum area. Timetable allocations must be flexible enough to allow for appropriate research to be undertaken and ensure enough time to see the projects through. All of this requires significant buy in across the school.

Do the policy makers see technology education as a key medium for delivering Education for Enterprise whilst involving the community? If so, is this the way technology education can make a difference? Is technology the key for developing a connected curriculum or just another attempt to meet the economic imperative?

WHAT ARE THE DETERMINANTS OF ECONOMIC GROWTH?

One of the main influences on the introduction of the technology curriculum has been the economic imperative, a central theme for this thesis. Therefore it is important to consider what the actual determinants of economic growth are. According to Alcorn (2000), there are a mix of factors which affect the ability of an economy to grow. The author categorises them under five general headings (a) population, (b) state of the arts, (c) growth of knowledge, (d) available resources, and (e) rate of capitalisation.

The population factor includes overall population numbers as well as demographics. New Zealand is a small country with a small population and therefore this factor affects its ability to grow economically. *The state of the arts* factor is described as types of technology, their availability and application. Again, for New Zealand there will always be a difficulty because of size, although in certain areas of technology such as biotechnology, New Zealand has made some international advances. *The growth of knowledge:* factor concerns the specificity of knowledge, the overall growth in knowledge and how it is assimilated and communicated through education. Unfortunately, it is not a strong factor in New Zealand due to the low expenditure on research and development in technology related fields. *The available resources* factor includes the type and quantity of resources available, their use and lifespan. New Zealand is relatively resource rich but small in size, and many resources are owned by offshore investors, such as forestry. *The rate of capitalisation* factor refers to investment in productivity and is, according to the author, as much about attitude towards the investment as it is about the actual amount invested. There seems to be an exodus of capital investment from New Zealand to foreign shores, notably Australia.

Alcorn (2000) states that three of the five factors are directly related to technology: state of the arts, the rate of capitalisation and growth of knowledge. State of the arts is the development of technology in that society. The rate of capitalisation relates to spending on technology; the author specifically talks of technology in terms of artefacts. The third factor, growth of knowledge, is identified as the most important for long term economic growth. Unlike questions of resourcing which are difficult to change, the quality and quantity of technology education can be increased. Perhaps this is why technology education has become increasingly popular as a new curriculum area included in national curricula around the world.

WHAT IS THE EMPLOYMENT ARGUMENT?

One of the major impacts of economic growth is the effect on employment. The significance of technology education on the employability of future school leavers is one of the important assertions of the economic instrumentalists Layton (1993). The association of technology education with vocational education has already been identified in this review of the literature.

A clarification of terms, which began earlier, continues throughout this thesis but firstly I will explain a phrase used predominantly in this text, namely ‘school-industry links’. For ease of reading, this phrase is applied to any relationship or partnership between a school and an outside industry, agency or enterprise. When talking of links the term ‘industry’ should not be applied narrowly to the manufacturing sector but, according to Price (1991), “*includes the entertainment industry, the tourism and hospitality industries, the agricultural industry and the communications industry, to name but a few and takes in employers, managers, unionists and other workers.*” (p. 2)

The 1990 election in New Zealand, which brought to power a National (conservative) government, saw a cultural change which had at its core the stimulation of economic growth and global competitiveness. National argued that to achieve this, New Zealand needed to develop an ‘Enterprise Culture’. In their publication ‘Working together building partnerships between schools and

enterprises' the New Zealand Ministry of Education outlines why these 'links' are required:

The nature of work, and the workplace that students can expect to enter, are rapidly changing in response to technological developments and changes in trade relations and the economy. To respond to these changes, schools need to develop in students the knowledge and skills that enable them to be self-reliant and adaptable participants in working life, whether paid or unpaid. (Howard Fancy Secretary for Education, 1999, p. 2)

Later, in the same foreword, the Secretary states that one of the ways the New Zealand government plans to improve education responsiveness to this issue is by:

incorporating into the curriculum framework the new essential learning area of technology, which encourages participation with enterprise through its emphasis on technological practice and links with the community.

Technology education has become synonymous with vocational education. This relationship is being explored by teachers throughout New Zealand as they endeavour to teach the subject, which was introduced in January 1999. As stated earlier, the original curriculum document for technology education regards the links between schools and the community as important to the development of inclusive technology education.

Consideration needs to be given to the political climate in which technology education has been introduced and to the questioning of whether there are other reasons for creating links with parties outside schools. Late in 1999 the New Zealand National Government published a booklet entitled '*Bright Future, 5 steps ahead, making ideas work for New Zealand*' (New Zealand Ministry of Commerce, 1999). Max Bradford, who was then the Minister for Enterprise and Commerce and Minister for Tertiary Education, led the team that produced the booklet. The purpose of the booklet was to highlight how the government planned to transform New Zealand into a knowledge based economy. The challenge was how to reverse the trend which had

seen New Zealand slip from being a country with one of the highest standards of living in the developed world thirty years ago to one of a much lower standing currently. According to Bradford (1999), *“New Zealand stands at a crossroads. Knowledge will be one of the essential drivers of the New Zealand economy. We are part of a global marketplace. We must create value from ideas. The five steps hold the key to a brighter future.”* (p. 6)

The above quote demonstrates great rhetoric as one might expect from an experienced politician, but how is this slip going to be halted? The proposed solution comprises the five key steps of the Bright Future package which were announced in February 1999: (a) *lifting our skills and our intellectual knowledge base*, (b) *better focusing the Government’s efforts in research and development*, (c) *improving access to capital*, (d) *getting rid of the red tape stifling innovation*, and (e) *promoting success, and supporting creative and innovative New Zealanders*. (NZ Ministry of Commerce, 1999, p. 7)

The first of the five steps focused on education. The responses to this ‘step’ included the introduction of scholarships for the ‘brightest and best’. These scholarships were designed to encourage able students to keep learning, particularly in the areas of science and technology. The important elements of this scholarship scheme were as follows:

- *500 enterprise scholarships were jointly funded with industry for the 2000 academic year, rising to 1500 by 2002. When fully implemented, these scholarships will be worth more than \$30 million a year;*
- *Up to 80 doctoral scholarships awarded during the academic year, each worth around \$40,000;*
- *Increased bursary awards for top maths, science and technology secondary school students, worth \$1 million a year;*
- *\$10.2 million over three years for teacher study awards and fellowships in maths, science technology and enterprise;*
- *Taskforce to ensure enterprise education meets the needs of business;*
- *\$1 million over three years to foster enterprise education in schools.*

(NZ Ministry of Commerce, 1999, p. 22)

The *Bright Futures* initiative was the culmination of the National Government's (1990-1999) attempts to develop an enterprise culture. The association between the knowledge and wealth of a country is a viewpoint held not only by the New Zealand Government but also by others:

Knowledge has become perhaps the most important factor determining the standard of living in today's most technologically advanced economies are truly knowledge based. (World Bank cited in Bright Future, 1999, p. 12)

The link between wealth generation and technology education has been raised by many when introducing technology into national curricula (Banks, 1994). It is of significance that around the same time as the publication of the five key steps the compulsory introduction of technology education into the national curriculum occurred. This recent addition to the New Zealand education framework included statements to support links between schools and industry:

Exploring technology in the community, whether in the environment, in products, or in systems, such as those relating to public safety, gives students an appreciation of the relationship between technology and society, how decisions are made, and future opportunities for technological development. (Ministry of Education, 1995, p. 17)

In 'Working Together Building Partnerships Between Schools and Enterprises' (Lynch, 1999) the New Zealand Ministry of Education outlined why these links are required. The workplace of the future will be significantly different from what we know today and constantly changing in response to new technologies and changes in the economy. Schools will need to change to enable students to be successful participants in this new environment. One of the ways the New Zealand Government planned to improve education responsiveness to this issue was by incorporating into the national curriculum framework the essential learning area of technology that encourages links with enterprise and industry.

The link between technology education and the wealth of a nation is not a new concept; it is a well-trodden path. The reason that school enterprise links are a topical issue seems to relate directly to the economic woes of the country. When a country is doing well economically, school industry links are not top of the agenda (Molnar, 1996). However, if there is an economic downturn it seems that state education systems come under much closer scrutiny and criticism for not delivering the 'skilled' workforce required. This is a view supported by Price (1991), who claimed that schools in general are allowed to concentrate on the needs of the individual rather than the economy when it is booming. However, in times of depression schools must conform to the economic needs of society. There are researchers in New Zealand who have already called into question the timings of such criticism:

Thus, unemployment does bring us back to fundamentals which are not new at all but are frequently overlooked during times of full employment when schools seem to be doing their job and hence are not challenged. The assumptions underlying schooling need to be challenged but in times of economic growth only political activists and academic theorists get around to such challenges and few listen to them for schools are carrying out (or appear to be carrying out) their main function of preparation for the labour market. (Snook, 1988, p. 220)

Little research on this topic has been carried out in New Zealand. However, in 1997 Hawk (1997) published a final report on the technology development schools which were established by the New Zealand Ministry of Education in 1993. In the report, the author notes that there might be a mismatch between political ideology and actuality in schools. All four schools in the scheme endeavoured to forge links with industry and they were successful in the areas of job shadowing and work experience. However, the time and effort involved did not bring great rewards in other key areas, such as the learning outcomes of the students.

Hawk's (1997) report focused on a small sample highlighting technology programs which occurred in all four schools. None of the schools particularly promoted careers in technology but there were early indications that the studies were broadening the

students' options and making them more attractive to employers. A similar scheme on a much larger scale was operated in the UK via the Technology College Trust:

Perhaps the best indications of a successful education-industry partnership will be when teachers and industrialists genuinely understand each other's point of view and there is an acceptance that the purpose of education is to prepare young people for later life, a major part of which involves working to provide a better quality of life for future generations through scientific and technological progress. (Lynch, 1993, p. 31)

In the USA, one of the driving forces behind the economic imperative over the last few decades has been the publication of a report called '*A Nation at Risk*'. According to Molnar (1996), who has condemned the involvement of industries in schools, there were reports of outrage in boardrooms across America over the apparent debased and trivial school curriculum, which was failing their students. This sounds all too familiar! '*Tomorrow's Schools*', in New Zealand offered much the same rationale for educational reform.

It is noted that some New Zealand schools used their Secondary Tertiary Alignment Resource (STAR) funding for the promotion of school-industry links. However, Molnar (1996) argued that if the education system were to provide more highly skilled workers all that would happen would be that the level of discourse in the unemployment offices would be raised.

Price noted that any improvement in the education sector which leads to further education for a higher number of students may create a shortage of those ready to go into the manufacturing industries. Additional questions about social justice and values and ethics, although too broad for this thesis, might lead us to the conclusion that these links are politically too hot to handle. Yet there are a significant number of schools, both here and overseas, who have partaken in some kind of link.

An addition to the Times Educational Supplement (TES) (1999) in the UK, entitled *Business Links*, included an article by Stephen Hoare who described how initial

interactions with companies were based around donated information posters. These posters contained information about certain industries, often relating to power and oil companies. There was a much greater involvement when, in the early 1980s, the Technical and Vocational Education Initiative was introduced. This greater involvement continued with local management of schools and the technology college movement where schools were actively encouraged to seek industrial sponsorship.

Hoare (1999) also noted that cash donations to schools had been in decline, as businesses preferred to offer help in kind. The rationale for any support is made later in the article when the author states:

The reason why education comes top of the business agenda is not hard to guess. Skills shortages are biting across the board and young people's lack of basic skills makes them unemployable in a modern world. Under-performing schools eventually equal under-performing companies. It is not a case of philanthropy, it is more a case of self-interest. (Hoare, 1999, T.E.S.)

A more worrying concern is the final reason offered in the article for the business involvement in schools. This is where selling and marketing to schools directly is seen as a future growth area. Perhaps we will see students as a potential cash crop or, at the very least, a "pester" power to force parents into buying. This is a viewpoint shared by Molnar (1996), and this move seems to be an ever increasing reality in the USA. Perhaps the bright future that the government was talking about was a bright future for companies able to sell direct to a new untapped marketplace: the school. This may sound abhorrent and not something that could ever happen in New Zealand. According to Molnar, it has been rife and increasing in America for years. In reaction to the growth of practices such as those in the UK, a voluntary guideline has been put in place to try to prevent it taking hold. However, the marketing people already have a name for it, cause related marketing. The trend is beginning in New Zealand where there are a number of schemes in operation in schools such as "book it" pizza, "apple stickers" for sports equipment, and "bread tags" for computers. Is it a bright future or just a repackaged past?

During the 1990s the National government focused much of its attention towards education as a medium for pushing their enterprise culture agenda by encouraging and nurturing a climate where students would be more aware of the values behind the economic imperative. Some argued that *Technology in the New Zealand Curriculum* (1995) was the most overt curriculum embodiment of this agenda (O'Neil & Jolley, 2004).

WHAT IS COMMUNITY INVOLVEMENT AND THE THIRD WAY?

What the new government had promised was a reversal away from the competitive market approach to education of the 1990s and a move towards a more inclusive, equitable education system. This promise meant an education system with more responsibility, shared ownership and community involvement. The third way was supposed to offer an alternative to neoliberalism and move New Zealand towards a society with more social responsibility and inclusiveness. This shift followed on from a similar shift which occurred in England under New Labour and Tony Blair.

It was obvious that the change that happened was not in keeping with this early promise. Kelsey (2002) criticised “*the third way*” rhetoric, suggesting that the New Zealand Labour-led government had in fact consolidated neoliberalism through political management and what was in place was globalisation and competition with a social face. Under this third way education was still seen as central to the alignment of economic goals and success in a global marketplace. In fact Kelsey argued that this allowed the labour Government to: “*claim simultaneously that it is abandoning neoliberalism and to stabilise the conditions for its continuation. The result is a more deeply entrenched form of neoliberalism that perpetuates the tensions which the government was elected to relieve.*” (p. 50)

Stuart (2005) argued that third way governments such as those in New Zealand talk about social and community inclusion initiatives but push those that bring about closer partnerships with business. Together, businesses and government can produce stronger citizens. In fact he argues what happened was: “*Egalitarianism through*

economic nationalism was replaced under neoliberalism with enterprise culture through enterprise education.” (p. 221)

Stuart describes three key roles that schooling has to perform when trying to facilitate the development of enterprising citizens. Each has a major function to fulfil in the generation and promotion of an enterprising community culture. First schools must equip students with the appropriate knowledge and skills for effective transition to a post Fordist workplace. Second schools must help students to become more efficient, entrepreneurial and responsive to the needs of their community. Third schools must develop students’ entrepreneurial dispositions which foster business values. This, Stuart argues, is the purpose of Education for Enterprise. This focus on Education for Enterprise has at its core an economic imperative and acknowledges the importance of human capital theories when trying to develop a knowledge economy.

WHAT IS THE CONNECTED CURRICULUM?

John Dewey (1910-1952) was an early pioneer in suggesting that education should try and *connect* the interests of students with the intentions of the curriculum. Through his notions of productive pragmatism and his views on education and democracy, Dewey believed that there were multiple ways of looking at educational activity. Addressing these multiple viewpoints was the best way to overcome the problematic dualism of pupil and curriculum. Dewey wanted school learning to have the same emotional force as non-school learning and felt that connecting students' outside interests with the curriculum would increase motivation. Dewey's concern with experience, interaction and reflection is at the heart of most technology curriculum developments. It would be easy to assume Dewey was a promoter of child-centred learning. However, this is too simplistic. He was clearly disposed towards a connected curriculum. Dewey believed that knowing is relative, as it involves connection to others. This position develops and extends an individual’s knowledge by considering the viewpoints of others as they form communities of inquiry via problem solving activity.

Dewey (1915) argued that humans are constantly developing through interactions with their environment, society and technology. He saw successful technological development and change as a democratic process which was resolved through practice but led to no final absolute answer. Dewey (1964) describes in his seminal reading *Reconstruction in Philosophy* an epistemological conflict between tradition and practice, emotion and reason, doing and thinking, all of which underlie the assertions made in this thesis:

When the school introduces and trains each child of society into membership within such a little community, saturating him with the spirit of service, and providing him with the instruments of effective self-direction, we shall have the deepest and best guaranty of a larger society which is worthy, lovely, and harmonious. (p. 311)

The purpose of the technology curriculum injector model is to enhance the position of technology education as an important component of general education and to ensure a stronger relationship between technology and the community. The injector manifests itself through national educational policies such as curricula, the personal beliefs of technology teachers and the classroom practicalities and realities that the learners face. These sometimes conflicting requirements are brought to bear on various technology curriculum offerings. The practicalities and realities of a connected curriculum are the starting point of the injector model. In the model, the enactment of education policy is built on community partnerships and involvement designed to encourage Education for Enterprise through technology education.

Technology education is often portrayed as the connector between curriculum on the one hand and employment on the other. This connection can be seen through industry involvement at a number of levels such as curriculum and assessment, development at a policy level, as well as a significant number of community based teaching resources for the classroom. However this thesis proposes that the connection to employment is only one facet of technology education's connectedness. According to Postman (1992): "*Perhaps the most important contribution schools can make to the education of our youth is to give them a sense*

of coherence in their studies, a sense of purpose, meaning, and interconnectedness in what they learn.” (pp. 185-186)

This portrayal can be based on quite narrow educational theoretical assumptions. These assumptions strongly rely on a causal connection between schooling and the world outside. Teachers of technology may unwittingly become facilitators and purveyors of these assumptions. For the purposes of this thesis an understanding of the work of Dewey, Watts, Saunders and others is a requirement. This thesis has already introduced the notion of human capital and its relevance to the third way ideology and this section clarifies these positions. O’Sullivan (2009 a) argues that the following four significant underlying or tacit theoretical assumptions should be used to debate how the wider community links to education while maintaining a sound technology education. With any debate a clear understanding of the differing positions is essential to facilitate deeper understanding. It is important to position the technology and the community debate within a theoretical framework, and for the purpose of this debate the four theoretical perspectives are:

1. Structural functionalist perspective
2. Structural Marxist perspective
3. Liberal educators’ perspective
4. Progressive / emancipator perspective.

The first two are described as structural frameworks. Structural functionalism is a broad perspective which is incorporated as an underlying theory both in sociology and in anthropology. Structural functionalism spawns terms such as the ‘nuclear family’ and ‘strong communities’. These communities are deemed to be held together by shared values, beliefs and intentions. Structural Marxism is a philosophical approach primarily associated with the work of the French philosophers in the 1960s and based on Marxism. A structuralist Marxist perspective would argue that the institutions of the state (including schools) function in the long-term interests of society and capitalism. Both Functionalist and Marxist positions are based on modernist theories that look at operations from a macro or a big picture perspective, invoking notions of the whole society. They imply strong causal

frameworks and, according to Saunders (2000), tend to be reductive, looking for explanations from meta-theories.

A liberal perspective is likely to approach learning from an empowerment standpoint focusing on the needs of individuals. It prepares them to deal with complexity, diversity, and change. It provides students with a broader knowledge of the wider world (community and industry) as well as in-depth study in a specific curriculum area such as technology. A liberal education perspective would encourage students to develop a sense of social responsibility; this would be supported by transferable intellectual and practical skills such as communication and problem-solving. These skills would be demonstrated by the ability to apply knowledge and skills in real-world settings. From a progressive/emancipatory perspective, students need to learn how to critically reflect on their place in society in order to become active citizens. To become truly democratic an education system must facilitate the individual's understanding of the wider community and society, otherwise, they are unable to shape the future of the community with which they are interacting.

Understandings of these four perspectives are rarely considered from a single curricular perspective. However, they form the backbone of many assumptions made about technology education and its connections with the wider community. Each perspective is considered individually to facilitate understanding of their educational intentions. They all have some relationship with Dewey's assertion that learning is connected to society at every level.

1. Structural functionalist perspective

The structural functionalist perspective views society as a whole, using the analogy of a living organism. Each aspect of society has responsibilities for the next and all are mutually interdependent. For schools, this has created increasing pressure to respond to the needs of society. This perspective is supported by lobby groups who believe in education's responsibility to meet the economic imperative. Typically, lobby groups might come from professional technology practitioners associated with engineering and business professions. Countries such as England, USA and New Zealand have seen the development of their technology curricula influenced by the

Engineering Council, the National Academy of Engineering (NAE) and the Institution of Professional Engineers New Zealand (IPENZ) respectively.

Put crudely, if labour market requirements are not being met, we should be looking for a policy which brings them into line. Critically, this view presupposes that requirements can be 'known', that they are of a 'technical' nature and the 'norm is that they can be met through the choice of appropriate policies. (Saunders, 2000, p. 686).

Saunders elaborates to say that in this perspective it is seen as logical that education should 'coordinate with the requirements of work because that is how societies function'. Watts (1983) identifies this notion as *human capital*. These bonds or *functions* are the ways in which education can service wider community needs. As part of a 'capital good' rationale, education can be used to develop the human resources necessary for economic and social transformation. The focus on education as a capital good supports the notion of human capital, which emphasizes that the development of skills is an important factor in production activities. Where else in the school curriculum would these 'skills' be developed but within technology education? Developing these skills may be seen as a functional role of technology education but it is too narrow a perspective upon which to focus a curriculum with so much potential to help develop creativity and innovation.

Human Capital Tree: a narrow view of how education can service society's needs.

To understand how technology education may be helping to promote the structural functionalist perspective it is important to locate schooling within the human capital tree. In this analogy, the tree's trunk is schooling which helps support the crown of the tree where the fruits and the major growth is supposed to occur. The roots of the Human Capital Tree (Figure 4) are fed by the various process programmes, and initiatives that schools adopt to meet the functional requirements of the tree.

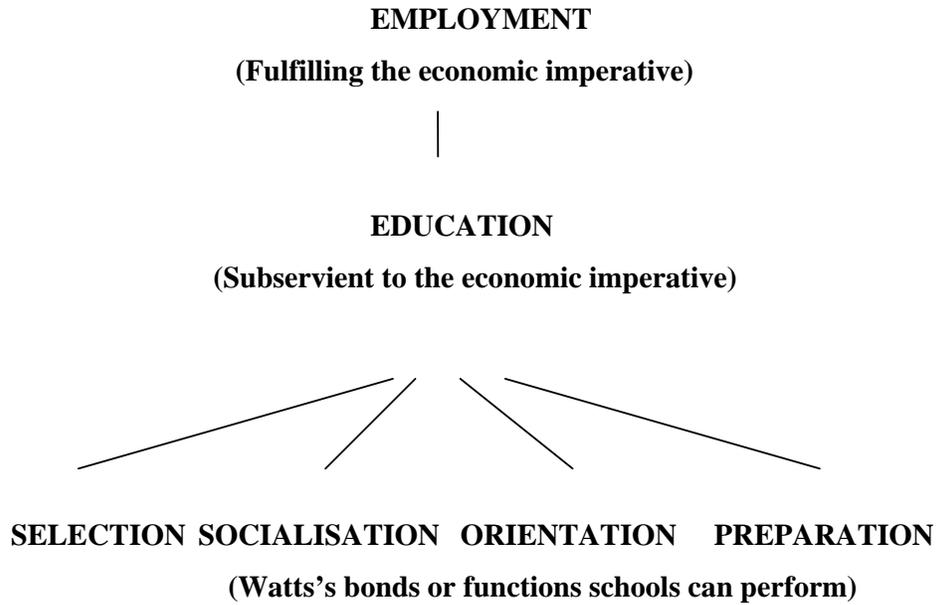


Figure 4. *Human Capital Tree*

(Adapted from O’Sullivan, 2009)

Building on the work of Schultz (1971), Sakamota and Powers (1995) and Psacharopoulos and Woodhall (1997), human capital theory is based on the assumption that formal education is connected and even responsible for the production output and ultimately the prosperity of a nation. According to Babalola (2003) the rationality behind investment in human capital is based on three education related positions. First generations must be given the appropriate parts of the knowledge which have already been accumulated by the previous generations. Second generations should be taught how existing knowledge is used to develop new products, to introduce new processes and production methods and social services. Third new generations must be encouraged to develop entirely new ideas, products, processes and methods through creative approaches.

These positions relate strongly to many of the rationales developed for technology education curricula around the world. The process of selection matches closely the employment strategies of the industrial era, thus fulfilling the first function. It relies heavily on industrial practices of the division of labour. Educationally it includes systems that regularly test students and separate them by the results. This separation normally includes splitting into academic and vocational type courses, with those

who fail academically being filtered off into lower level employment. This leads to misunderstandings from every party: pupil, employer and society in general. Internationally, historical accounts of technology education clearly reflect this use of a selection policy (O'Sullivan, 2001). Recently the Minister for Education in New Zealand announced the government's commitment to establish trades academies:

Trades Academies are about relevance – they will provide those students who prefer to opt for practical hands-on education experiences with exactly that, and provide them with more opportunities to gain the practical skills they need to enter the 21st Century workforce. (Tolley, 2009, <http://www.beehive.govt.nz/release/trades-academies-one-step-closer>)

During this period five trades academies were announced, one of which is an area school which provides education for students from Years 1 to 13. The second function identified in Figure 4 is the socialization process. This is embedded in the students' experience of schools. These experiences can involve explicit or implicit procedures whereby the students begin to associate themselves with particular types of endeavours. This is often carried out in schools by reinforcing stereotypes (for example, gender, class and racial associations with particular types of courses). Historical forms of technology education are often associated with this function (craft for boys and food for the girls). In terms of school-community links, care should be taken to ensure that biased socialization does not occur.

The third function, orientation, moves from the slightly more subtle socialization process to deliberate curricular intervention or channelling. Most notably this can be seen through career guidance, work experience or placement programmes. Additionally, one could readily associate school community links with this function if they are carried out without a critical or questioning premise. Typically, the words 'enterprise' or 'entrepreneurial' are used in such orientation practices. The worry here is that a narrow representation of enterprise is promoted and models of technological practice explored may not reflect social good as well as economic gain.

The fourth of Watts (1983) functions is that of preparation. This refers to the role of schools in preparing students with specific skills and knowledge required in the workforce. At the general level according to Watts, this may mean numeracy and literacy. However, Saunders (2000) argues that it is this preparation aspect which underpins *new vocationalism* and the introduction of education as training. It is also evident in many of the rationales for technology education throughout the world. Whereas many subjects offered at senior school levels are seen as a pre-cursor to further educational study, technology education is often over represented as a precursor to work.

This functionalist perspective views people as ‘human capital’ and society is therefore making an investment in people; a term used in many educational policy directives in recent times. Lee and Hill (1996) state that this was exactly the rationale for the introduction of the New Zealand curriculum. According to Williams (2011):

Spurred on by the global financial crisis, it is hoped that coordination and integration of STEM (Science, Technology, Engineering and Mathematics) activities will better equip a workforce for dealing with the contemporary nature of business and industry, and encourage more school leavers to seek further training and employment in areas of engineering and science (pp. 26-35).

Proponents of this perspective argue that investment in technology education will no doubt bring returns in the technological fields of both higher education and employment. According to Saunders (2000), this human capital theory has proved to be incorrect, noting the English example of higher numbers of students going on to university but studying in esoteric courses rather than science and technology. The paradox accompanying this perspective is that despite the huge investment in education, there is little researched evidence that this connection has any real underlying impact on the prosperity of a society. Fagerlind and Saha (1997) assert that while nations may implement educational plans consistent with specific economic goals and strategies, there can be no guarantee of the outcomes. In fact,

they argue that the more political the goals of education, the more problematic the outcomes become.

2. Structural Marxist perspective

Structural Marxism is a perspective of economics which has developed from the writings of Karl Marx (1867). Marxist perspectives encourage the study of relationships that exist between people as they go about their endeavours and how that fits with their family life. Marx believed that human thought or consciousness is rooted in human activity; not the other way round. This viewpoint went against what many of the other philosophers of the period believed. Marx had at the cornerstone of his thinking the concept of class struggles. The relationship between the classes was, in his view, extremely antagonistic. The ideologies a society adheres to and the educational policies they develop were all, according to Marx, determined to some extent by the economic structure of society. Structuralists view society and the state as a capitalist mode of production. Under capitalism, according to Marx, the productive powers of labour are shown as the creative economic power of human capital. He regarded labour power as the most important of the productive forces of human beings. This power is generated because the state reproduces the logic of a capitalist structure in its economic, legal, political and educational institutions.

Saunders (2000) argues that at present we are in a capitalist mode in which classes of people buy and sell labour but that this is not an equal relationship. There are many cases of labour exploitation, and Saunders argues that Marxist perspectives are reflected in the existing education system. According to Saunders, education, from a Marxist perspective, maintains the status quo, thus enabling the capitalist mode of production to continue. This is achieved in education following much the same bonds as described earlier in the functionalist perspective. Functionalists identify socialization as a means of creating order whereas Marxists identify it as a means of maintaining social control. Functionalists identify selection as distributing recruits into a division of labour; Marxists view it as a means of sustaining inequalities in the education system and later life. These viewpoints are often found in work habits and attitudes, and Saunders describes this as the “hidden curriculum”. Young (1998) refers to a divided system, which has a divided curriculum and divided qualifications

and ultimately has a selective function. Technology education has a history of being at the centre of this selection process. This stems back to the selection of students into technical/vocational schools, programmes, courses and assessments. However, opponents of human capital would argue that rather than creating a plethora of good jobs which are unfilled because of a lack of necessary skills, the reality is precisely the opposite. In fact what we have is a workforce mismatched for the requirements of a modern knowledge economy.

3. Liberal educators' perspective

The liberal perspective, through the delivery of liberal education, has come to signify the opposite view of education from the structural frameworks discussed above. The liberal perspective sees education as important in its own right, rather than existing simply to fulfil some extrinsic factor such as employment or centralized economic objectives. Saunders (2000) contends that this view of education was historically associated with the aristocratic classes, but in the modern era is free from the divisive aspects of class.

The liberal perspective advocates that explicit vocational preparation is best undertaken either at work or just prior to beginning it. Instead of vocational education, advocates of this perspective believe the best preparation for life is a general education, which is broad, deep and informed by the whole culture; not just one aspect of it. This may include interactions with the world of work, not as direct preparation for a particular occupation, but as a pedagogical process. Effectiveness within this perspective should not be narrowly analysed by relating it to one particular employment or the national economy:

What is important for this perspective is the democratic imperative that no child should be denied access to these forms of knowledge and experience in the mistaken belief that they are not 'relevant' either to them or an extrinsic need like that of employers. (Saunders, 2000, p. 692)

The liberal perspective advocates that general education preparation is suitable for all aspects of future life, including work. Saunders (2000) describes the main problem

for this perspective as finding ways for all students to get the opportunity and access to such an education. Generally, in education the knowledge is imparted and learned in disembodied chunks and then tested through examinations at a later stage where only those who have the cultural means to accommodate this method succeed. According to Bereiter (2002), liberal education gives learners access to a culture that transcends the particularities of their social and ethnic backgrounds. The liberal perspective can support technology education but it would be technology education as general rather than vocational.

4. Progressive emancipatory perspective

This perspective is associated with individual growth and the learning styles which accommodate this growth. According to Saunders, this will lead to social goals of civic participation and democratic emancipation. Saunders identifies two sub-themes in this perspective. The first surrounds learner centeredness and personal growth, whereas the second is social reconstruction through empowerment. This perspective positions education centrally in social and personal reconstruction and is optimistic in nature. This perspective brings these two sub-themes together in the style of learning.

Unlike functionalist and Marxist perspectives, the progressive perspective underplays the social and political context. It also under-emphasises the nature of knowledge and skill that the liberal perspectives see as the starting point. It emphasises the power of the educational process to allow the learner to transform both the context and the nature of knowledge and skill to re-orientate him or herself. According to the OECD (2001) there is robust evidence that knowledge and skills (“human capital”) are an important determinant of economic growth and social development. Education and training systems play a crucial role in fostering the development of the human capital needed.

Developing civic participation and democratic emancipation by connecting school activity with out-of-school experience is not a new concept. It relies heavily on the work of Dewey and reflective thinking as explained by Marshall(1997):

This was not to make the schools an adjunct of industry and commerce and to acquiesce in the ‘untransformed, unrationalised and unsocialised phases of our defective industrial regime’, but of utilising the intellectual problem-solving potential inherent in modern technology; ‘to make school life more active, more full of meaning, more connected with out of school experience.’ (p. 309)

With the new curriculum implementation underway and also the Education for Enterprise professional development project having concluded, it is timely and important for academic research in this area to be introduced. Young (1998), when talking about flexible specialisation and its relevance to education, introduced a notion of ‘connective specialisation’. This contrasts with the insularity of the traditional subject specialists and ultimately with the divided curriculum which dominates the secondary sector. Divisive specialists see the curriculum from the point of view of their subjects, whereas connective specialists see their subjects from the point of view of the overall curriculum. The technology curriculum injector model suggested here may allow for both teachers and students to be more connective in constructive ways. Young argues for a shift from teacher centeredness, which can be divisive, to learner centeredness, which should be connective.

According to TKI, the Ministry of Education website:

Education for Enterprise provides opportunities for students to link their learning to ‘real-life’ situations. It combines classroom learning and participation in the broader community, including the world of business, and reinforces the relevance and value of what is learned in the curriculum. ([http://education-for-enterprise.tki.org.nz/About-Education for Enterprise/Why-focus-on-Education for Enterprise/Benefits-of-Education for Enterprise-approach](http://education-for-enterprise.tki.org.nz/About-Education-for-Enterprise/Why-focus-on-Education-for-Enterprise/Benefits-of-Education-for-Enterprise-approach))

A connective curriculum acknowledges that education takes place in a community of practice and that learning is purposive and a social process (Lave & Wenger, 1994 cited in Young, 1998). It exposes the need to relate educational activities to

developments in the wider society including but not exclusively linked to industry. So connectivity is more than just a curriculum model. It is the purpose of school itself!

Recent research has shown that aspects of self-understanding through construct developments play an important role in what students undertaking initial teacher education programmes learn (Massengill, Mahlios, Barry, 2005; Poulou, 2005) and the way in which teachers ultimately teach (Boote, 2006; Day, Kington, Stobart, & Sammons 2006). The technology curriculum injector model construct proposed in this thesis is that technology education as a connected curriculum should help promote Education for Enterprise rather than technology education acting as human capital preparation.

WHERE TO NEXT?

In 2006 the New Zealand Ministry of Education released a new draft curriculum for consultation. This draft curriculum had an introductory page about technology which included the following statement: “*Technology education connects students with a range of employment opportunities, particularly those that are enterprising and innovative in nature.*” (p. 23)

Education was still subordinated to the creation of an enterprise culture though now it was to be achieved by a knowledge economy. This enterprising theme is developed further in the revised New Zealand Curriculum (2006) when discussing key competencies which are described as capabilities for living and lifelong learning. Under the *Managing Self* competency it is suggested that students who manage themselves are enterprising. When describing the curriculum area of technology itself we are informed that technology will make enterprising use of knowledge and skills. This enterprise relationship is explicit in the policy directives and was also the focus of this research. The process of technology education in the New Zealand Curriculum 2007 is described as, “*intervention by design: the use of practical and intellectual resources to develop products and systems (technological outcomes) that*

expands human possibilities by addressing needs and realising opportunities.” (p. 32)

Some would argue that this neo-liberal position about education embodied by the technology curriculum makes it clear that the function of the New Zealand Curriculum Framework (NZCF) is to ensure that New Zealand is able to compete in a global economy in a culture of enterprise. The politics of the New Right have become successfully embedded in the NZCF. These notions of enterprise culture have permeated the education system through the reconstruction of knowledge as skill-based and measurable, through the marketization of schools as enterprises, and through repositioning the notion of knowledge as something that can be bought and sold (Lee, Hill and Lee, 2004).

If technology education in New Zealand is seen by policymakers as a key medium for delivering Education for Enterprise then involving the community is an essential component for developing a connected integrated curriculum. Technology teachers will need to develop a robust personal construct of what the subject entails to ensure a successful enactment (O’Sullivan, 2008). The technology curriculum injector model (Figure 1) denotes technology as the collector component of this integrative model to maintain a clear focus on technology education as being the central theme of this endeavour.

Developing the professional development programme

The underlying philosophy of this professional development project was informed by communities of practice literature which has been documented extensively in sociological and anthropological research (Lave & Wenger, 1991; Brown & Duguid, 1991; Orr, 1996; Wenger, 1998; Schlager et al., 2002)

There have been many studies of school-based professional development, programs organised and delivered by external providers, at both the local (McLaughlin & Mitra, 2001; Smylie et al., 2001) and national levels (Corcoran et al., 1998; Garet et al., 2001) which have found that professional development programs can be disconnected from practice and fail to meet the needs of those involved. Often this

has led to reluctance from teachers to be involved in professional development which includes the critique of their own or their peers practice.

This professional development project aimed to provide the participating schools with opportunities to develop professional learning communities. These would be comprised of school staff, the external facilitators who supported the school staff, and a project researcher. Together this community would develop and reflect on their professional knowledge and practice of Education for Enterprise within technology education. This professional development project was organised to meet a community of practice (Wenger, 1998) perceived need. This need would be met by utilising an extended program of facilitation action and reflection. According to Holly and McLoughlin (1989) professional development, can be viewed as a major factor in successful efforts to improve schools. The improvements here were to be identified by shifts in understanding and practice.

It was agreed by the facilitators and the researcher during the planning stages that this professional development program should include an opportunity for demonstrating evidence of success from both the previous and current contract. According to Guskey (reported in Kreider and Bouffard, 2006) it is important for participants to develop a positive reaction to the professional development experience if shifts are expected as a result from it. The professional development programme was designed to create a reciprocal iterative process designed to identify and develop shift interventions.

According to Stoll et al. (2006) there are five characteristics of professional learning communities each was important to this project. *Shared values and beliefs* these beliefs would impact on both decision making and action. *Collective responsibility* this helps to sustain commitment to the project for the lifetime of the community. *Reflective professional enquiry* this requires observation and analysis joint planning and development. *A collaboration* which requires identification of shared purpose, activity and achievement. Finally a realisation that *group as well as individual learning is to be promoted*. Wood (2007) also recognises the importance of collaboration through the active participation of teachers in the development and sharing of knowledge in professional learning communities. Wood describes a

Deweyan approach utilising collective inquiry through systematic observation and analysis of classroom activity as the basis of professional learning.

The research questions discussed in the next chapter were developed to try and identify and then facilitate shifts in understanding and practices in the participating schools with regard to Education for Enterprise as part of technology education and meet the five characteristics identified by Stoll. To facilitate this there was some recognition of Waters et al., (2003), assertions that any shift requires action at both individual and school level and would involve second order change i.e., shifts in practice that require an examination of personal beliefs and a new way of working.

CHAPTER FOUR

RESEARCH METHODOLOGY

Those who expect to follow the progress of science in brilliant light will be ill at ease following the qualitative researcher stumbling from lamplight to lamplight in the fog. (Adapted from Kemmis, 1980, p. 100)

INTRODUCTION

The selection of a research design involves a number of interconnected stages (Crotty, 1998; Denzin & Lincoln, 2008). These stages can be summarised as, first, locating the study within a research paradigm, second, the selection of an appropriate methodology, and third using the selected research paradigm and methodology to identify the methods used to generate, collect and analyse the data. In this chapter I describe the research methodology selected for this study. I highlight the methods used to investigate the research questions and generate the data.

Over the last fifty years there has been a significant shift occurring both in the nature of research and also in what defines discrete disciplinary boundaries. This shift has resulted in a blurring of the methodologies used for interpretive research and what defines a subject discipline. Denzin and Lincoln (2008) describe this shift as a revolution. This research study discusses both aspects of this revolution. Others, specifically in the area of technology education, have called for an expansion in the types of research methods used. Of the 220 reports identified in Zuga's (1994) review of technology education-related research, only 16 are identified as having used qualitative methods. Zuga notes also that many of those studies were conducted outside the United States. Johnson (1995) suggests that technology educators should "engage in research that probes for deeper understanding rather than examining surface features."

My interpretive study aims to identify what actually takes place when policy directives bring together technology education, enterprise education, and school - community partnerships. I have been involved in the introduction and delivery of national technology education curricula in two countries. This involvement has led me to be a passionate advocate for what the subject has to offer. However, since the introduction of a national technology curriculum to New Zealand schools in 1999, there was little critique of the intentions of the curriculum. Until in 2005 the Ministry of Education organised a two-year Education for Enterprise project. The primary objective was to run a professional development programme with a group of 16 schools, both primary and secondary, to examine ways in which teachers' capability to include Education for Enterprise could be developed. Specific focus was to be on technology education and the fostering of links with the wider community. This project allowed me to research and examine the Education for Enterprise professional development programme, in particular its impact on classroom practice with attention to the ideologies driving the initiatives.

This chapter begins with the identification of the research questions and the development of a constructivist qualitative research paradigm. This paradigm is discussed in terms of its ontological, epistemological and methodological positions. Various conceptions of this type of research are outlined from which key definitions and principles are identified to help shape and form the study. Fourth Generation Evaluation is discussed as an effective method to examine critically the Education for Enterprise professional development programme for teachers. The tensions and conflicts associated with this methodology are considered including theory and practice issues, the role of active participants and ownership of evaluation studies.

RESEARCH QUESTIONS

Responsive evaluation, as described by Guba and Lincoln (1989), is organised through claims, concerns and issues. This study utilises four basic methods for generating data and making decisions with regard to these organisers. These four methods have been widely used and tested by applied social scientists. They are (a) facilitated group meetings and exercises, (b) participant observation, (c) individual

interviewing, and (d) focus group interviews. Techniques include the ‘hermeneutic dialectic’, in which stakeholder constructions are investigated, challenged and contrasted to help develop new meanings. This occurs as part of facilitated meetings.

In New Zealand, as in other Western English speaking countries, there has been a shift in education policy away from liberal-humanist education towards a more vocationally focused curriculum. The change has come about partly as a response to economic targets and objectives set by national policy makers (Price, 1991). Although I am a business owner with experience of working in industry, as a teacher I believe education policy should reflect a learner-centered view and not shift from one ideology to another. An example of this current shift can be seen in the growing emphasis on making education more responsive to the needs of industry and business. Question one identifies and queries the ideologies which have driven this shift.

Question 1:

What recognisable ideologies underpin technology education, enterprise education and school community links in New Zealand?

Young (1998), when talking about flexible specialisation and its relevance to education, introduced a notion of connective specialisation. This contrasts with the insularity of traditional subject specialists and ultimately with the divided curriculum. Divisive specialists see the curriculum from the point of view of their subjects, whereas connective specialists see their subjects from the point of view of the overall curriculum. Young argues for a shift from teacher centeredness to learner centeredness. I believe technology education should be a broadly connected curriculum with a strong emphasis on developing practical creativity, enterprise and innovation. Question two is designed to explore this belief, specifically through interactions between myself as researcher, the facilitators and the participant teachers in the project.

Question 2:

What is a creative connected curriculum and how does this relate to technology education?

Clark (2004) identifies four conceptual interpretations of enterprise education:

1. Education to be enterprising
2. Enterprising organisations
3. Education about business enterprise
4. Indoctrination in Enterprise

Questions three and four seek to understand what constitutes Education for Enterprise and how teachers and schools might develop enterprising characteristics in their students using Clark's interpretations. Throughout this research project my role has been more than just researcher; there have been times where I have been a teacher, facilitator and learner. This has been an epistemological exercise in which all stakeholders, including both evaluators and participants, have had multiple roles. This I believe has led to an established, sophisticated trust where claims, concerns and issues can be expressed and critiqued openly.

Question 3:

What teacher practices support or undermine development of enterprising attributes within the Education for Enterprise project?

My teaching experience as well as other research projects I have been involved with has led me to the realisation that constructive undertakings which rely only on the endeavours of particular individuals fail to have any longevity and therefore any real significant educational impact.

Question 4:

What school-wide practices support or undermine development of enterprising attributes within the Education for Enterprise project?

Throughout my educational career I have been involved in community partnerships this has helped shape my belief in the importance of education connectedness. The New Zealand Ministry of Education, through its policy directives, outlines why these school-community partnerships are required. Question five addresses the impact of

these partnerships or links on the Education for Enterprise professional development programme.

Question 5:

What are the influences and impacts of school-community partnerships on teaching and learning within the Education for Enterprise project?

RESEARCH PARADIGM

The notion of a research paradigm and its use as a conceptual framework for guiding the thinking of a community of scholars was advocated by Kuhn (1970). A paradigm consists of ontological, epistemological and methodological beliefs which help to decipher the complexity of qualitative research. Researchers are guided by particular paradigms, and the associated ontological and epistemological beliefs influence their research questions, their choice of research methodology, and their methods of data collection, generation and analysis (Guba & Lincoln, 1994; Kember, 2000; Lincoln & Guba, 2000). My study uses an interpretivist paradigm (Denzin & Lincoln, 2000) which is supportive of constructivist philosophical approaches. As such I share the notion that reality is a social construction, created between the observer and the observed, and that lived experiences need to be understood from the perspective of the observed. Willis (2000) groups interpretivism into two main research categories: (a) The Iowa School advocates an explanatory/empirical approach and provides causal explanation and may convert experiential testimony into numeric form, (b) The Chicago School is expressive and seeks to provide a vivid portrayal of experience. Angen (2000) offers six criteria for evaluating research from an interpretivist perspective:

- careful consideration and articulation of the research question;
- carrying out inquiry in a respectful manner;
- awareness and articulation of the choices and interpretations the researcher makes during the inquiry process and evidence of taking responsibility for those choices;
- a written account that develops persuasive arguments;

- evaluation of how widely results are disseminated;
- validity becomes a moral question and must be located in the ‘discourse of the research community’.

While Schwandt (1998) revealed the debate about which of these slightly different world views should be the umbrella term, the interpretivist term defined by Neuman and Kreuger (2003) forms the backdrop to my study: “*The interpretive approach is the systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds*” (p.71).

INTERPRETIVIST ONTOLOGY, EPISTEMOLOGY AND METHODOLOGY

As a theory of being, ontology refers to how we see ourselves in relation to others. Many interpretivist researchers adopt a relativist ontology, claiming that there can be no single correct way of seeing the world. Relativist ontology assumes that social reality is constructed inter-subjectively. With these multiple realities, notions of prediction, objectivity and control are replaced with thinking about understanding, subjectivity and choice. Meanings and understandings are developed socially and experientially. This subjective view of the physical world means that people’s views of reality can change as new meanings are constructed. Interpretivist researchers are therefore interested in finding out how people, in the case of this study – teachers and students - understand their professional development experience and its impact on teaching and learning (Schwandt, 1998).

As a theory of knowledge, epistemology refers to the relationship between the knower and what is known. Interpretivist researchers argue that there is a strong connection between the two; this is a view I share. The knower and the known interact and shape one another (Denzin & Lincoln, 2000). This epistemology indicates convergence with a sociocultural view that knowledge is co-constructed in dialogue and in other forms of joint interactions. The implication of this epistemology for my study is that new understandings are co-constructed between

the teachers, professional development facilitators, myself as researcher and also between teachers and students through their collaborative participation.

A methodology outlines and frames the theoretical perspectives that inform the conduct of any research. Given my interpretivist researcher's relativist ontology and socially negotiated view of knowledge, a methodology is required that enables one to define, and to make sense of, the issues that relate to the field. In the case of the research, reported in this thesis, defining and making sense of the impact of a professional development programme needs to be co-constructed from the perspectives of the participants. Interpretivist methodology is thus a participative and collaborative endeavour concerned with constructing new understandings "*that get inside the ways others see the world*" (Neuman & Kreuger, 2003, p. 75). This allows me to seek understanding and to try and make sense of the participants' viewpoints in a way which furthers our joint social constructions.

Constructivism views learning as a process in which the learner actively constructs or builds new ideas or concepts based upon current and past knowledge. One could say that learning involves constructing one's own knowledge from one's own experiences. Constructivist learning becomes a personalised endeavour, whereby concepts, rules, and general principles internalised may consequently be applied in a practical real-world context. A teacher acts as a facilitator who encourages students to discover principles for themselves and to construct knowledge by working to solve realistic problems. This research clarifies and organizes the learning that takes place so that it can be voiced to others. The study provides opportunities to elaborate on what is being learned and how it was facilitated by both the teachers and the expert facilitators.

Crotty (1998) describes constructivism from a social perspective as, "*the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context.*" (p. 42)

The constructivist view as described by Hipps (1993), that reality is changing whether the observer wishes it to or not, is an indication of multiple constructions of reality. Therefore it is impossible to have a single, privileged notion of truth. Constructivism values the individual multiple realities that stakeholders have in their minds. Therefore, to acquire reliable multiple and diverse realities, multiple methods of searching for or generating data are in order. Of course the researcher must also consider what effect the observer has, whether he/she is a participant or not. This is particularly true in the case of classroom research where every adult can be seen as teacher or teacher aide and therefore as having an effect on students's behaviour. I was conscious that as a researcher I was not seen as a fly on the wall. To mitigate this I actually led some of the workshop sessions:

In a natural setting it is difficult for the researcher who wishes to be covert not to act as a participant. If the researcher does not participate there is little to explain his presence, as he is very obvious to the actual participants. (Cohen and Manion, 1990, p. 127)

If this calls for the use of triangulation in the constructivism paradigm, then the use of investigator, method and data triangulations to record the construction of reality is appropriate (Johnson, 1995). An open-ended perspective in constructivism adheres to the notion of data triangulation by allowing participants in a study to assist the researcher in creating questions as well as assisting with the data collection. Engaging multiple methods, such as observation, interviews and recordings, I believe will lead to a more diverse construction of realities. In constructivist research it is important that the study is thorough, coherent and comprehensive. It should be trustworthy and useful; the interpretation should be provocative and generative of further inquiry. To improve the analysis and understanding of the constructions of others, triangulation involves several investigators or peer researchers' interpretations of the data occurring at different times or locations. In a related way, a qualitative researcher can use investigator triangulation and consider the ideas and explanations generated by additional researchers studying the research participants (Johnson, 1995).

Triangulation may include multiple methods of data collection and data analysis, but it does not suggest a fixed method for all research. The methods chosen in triangulation to make judgements about a study depend on the criteria of the research. I believe a useful interpretive study is one that considers the context of those who are the focus of inquiry and offers a promising explanation of why events occur and how these are meaningful for those involved. According to Flick (2002), triangulation is not a tool for validation but an alternative response which adds rigour, richness and depth to an inquiry.

Around the middle of last century, as a result of developments in constructivist theory, the previously held positivist viewpoint began to give way to postmodernism, in which a distinction is drawn between the world and our interpretive experience of it. Postmodernism has led to the emergence of a number of alternative research paradigms in the social sciences (Guba & Lincoln, 1994; Lincoln & Guba, 2000; Reason & Bradbury, 2001).

The interpretive or constructivist paradigm developed mainly out of sociological inquiry. This paradigm is based on a belief in a socially constructed, subjectively-based reality. Researchers use qualitative methodological approaches including ethnography, phenomenography, and hermeneutics, in order to interpret or develop understanding of participants' viewpoints (Kember, 2000; Lincoln & Guba, 2000; Reason & Bradbury, 2001).

For the purposes of my study an interpretative-constructivist paradigm is employed. Under the interpretative-constructivist paradigm interactions between all stakeholders including the researchers are deemed equally important . (Denzin & Lincoln, 2000). These interactions, combined with an exploration of values held by all the stakeholders, helped shape the data which became a major focus of this study. The interpretative-constructivist paradigm can be characterised by its use of primarily qualitative data generating techniques in a hermeneutical and dialectical manner (Denzin & Lincoln).

Interpretative constructivist researchers focus on the multiplicity of viewpoints held and illuminate how these interact to shape the study. It is the interpretative-

constructivist researcher's belief that the mutual interactions between those studied and those doing the studying guide the research outcome. This shared viewpoint allowed this study to follow multiple pathways as the need arose. The interpretative-constructivist paradigm selected supports the view that the observed reality exposed as part of a research study is a social construction process with no single truth discoverable (Tashakkori and Teddlie, 2003).

Interpretative-constructivist ontological, epistemological and methodological positions are subsumed within a broad qualitative research approach. Qualitative research aims to understand the world of the participant by situating researchers, with all their value assumptions, in that world (Denzin & Lincoln, 2000). Authentic social interactions in the field using a range of methods is the key to qualitative researchers making sense of or interpreting the meanings participants bring to an emergent study (Denzin & Lincoln, 2000). In contrast, quantitative researchers focus on predictability, control and hypothesis testing, often using statistical methods in a study that has a pre-determined structure (Merriam, 1998). Unlike quantitative researchers who seek absolute truth, causal determination, prediction, and generalisation of findings, qualitative researchers such as myself seek instead illumination, understanding, and extrapolation to similar situations (Hoepfl, 1997).

Qualitative research in education was developed significantly in the late 1960s and early 1970s (Atkinson, Delamont & Hammersley, 1993), and addresses questions concerned with matters of meaning. The nature of qualitative research emphasises the process, meaning and understanding of the phenomena studied (Merriam, 1998). Eisner (1991) described the hallmarks of qualitative research as flexibility, adjustment and iterativity. This iterativity is a familiar concept to technology education experts, as it is a key component of a design process. Therefore it fits this researcher's approach to both learning and researching.

These iterative stages are important as the inquiry described in this thesis sits in a paradigm that aims to highlight parts of an evolving complex world, rather than aiming to control variables in a laboratory-type setting. This enables the researcher to penetrate deep below the surface of an observable phenomenon. Although qualitative research has many variations, it is generally identified both by the way in which data

is generated and in the way it is analysed. Strauss and Corbin (1990) defined qualitative research as “any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification” (p. 17). There can be some quantification of data collected through qualitative work. However, while some of the data may be quantified, the analysis undertaken is generally qualitative.

The constructivist interpretive researcher places an emphasis on values. Social research invariably involves working with people, and includes the study of human behaviour. To gain insight the interpretivist will incorporate meanings, including his or her own, into the study. Acknowledgement of one’s own meanings and beliefs is an important aspect in an interpretive study and, as such, this is exposed regularly throughout this thesis. These collective meanings are paramount to the interpretivist research paradigm and are seen as a social reality based on a common-sense exposure. The interpretation of actions, along with recognition of values, forms the basis of the findings. The constructivist-interpretive researcher believes ‘bias’ effects all research and that claims of elimination, whichever paradigm is used, should be treated with scepticism. Instead, the constructivist-interpretive researcher discusses bias in relation to the situatedness of all interviewer/interviewee situations. Progressive subjectivity describes the process by which the researcher scrutinizes and contemplates his or her prior and emerging assumptions and interpretations. Care must be taken to ensure that the researcher’s own assumptions and values are not imposed over the constructions of others. A constant critical reflexivity of the researcher role is paramount.

An essential aspect of qualitative work described by Geertz (1973) is the concept of thick descriptions to explain the importance of moving away from describing the observed to understanding the deeper issues. The use of thick descriptions encapsulates the notion of meaning, and while the initial use of thick descriptions was used to focus on the nature of the method and aims of ethnography (Geertz, 1973), it is a term used by many qualitative researchers to describe the way in which attempts are made to produce full descriptions of the context, setting, content and interactions of the participants and their environment. These thick descriptions should be heard from the voices of the participants as well as my own. Eisner (1991) described thick description as an “effort aimed at interpretation, at getting below the

surface to that most enigmatic aspect of the human condition: the construction of meaning” (p. 15).

Patton (2001) discusses the role of the researcher’s involvement and immersion in the research by explaining that the real-world is subject to change and, therefore, a constructivist interpretive researcher should be present during the changes to record an event after and before the change occurs. These records are part of the thick descriptions generated. Several authors have identified what they consider to be the main characteristics of qualitative, or naturalistic, research (Bogdan & Biklen, 1998; Eisner, 1991; Lincoln & Guba, 1985; Patton, 1990). The list, which is discussed in some detail in a later chapter, is an amalgamation of these authors’ descriptions of qualitative research:

1. Qualitative research uses the actual real-world setting as the source of data. The researcher attempts to observe, describe and interpret these settings as they are encountered, maintaining what Patton (1990) calls an “empathic neutrality” (p. 55).
2. The researcher acts as a human instrument of data collection.
3. Qualitative researchers predominantly use inductive data analysis.
4. Qualitative research reports are descriptive, incorporating expressive language and the “presence of voice in the text” (Eisner, 1991, p. 36). These voices should come from all stakeholders including the researcher.
5. As identified earlier, qualitative research has an interpretive character, aimed at discovering the meaning events have for the individuals who experience them and the interpretations of those meanings by the researcher.
6. Qualitative researchers pay attention to the personal aspects as well as the pervasive, seeking the uniqueness of each situation.
7. Qualitative research has an emergent (as opposed to predetermined) design, and researchers focus on this emerging process as well as the outcomes or the product of the research.
8. Qualitative research is judged using special criteria for trustworthiness.

The decision to use either a quantitative or qualitative approach, or to use them together, does not rest on one being better the other. Rather it is a matter of one being

more appropriate to the researcher's ideology and questions, and to meet their need to supplement or illuminate the constructed data. The ability of qualitative data to more fully describe a real-world context is an important consideration not only from the researcher's perspective, but also from the reader's perspective. As Lincoln & Guba, (1985) note, "*If you want people to understand better than they otherwise might, provide them information in the form in which they usually experience it.*" (p. 120)

Part of my role as researcher is to draw the information out from those being studied. This, however, raises another concern of legitimation: how do we know that those being interviewed are not trying to deceive me? This highlights the need for a variety of methods of data generation, to check one against the other. The term used to describe this procedure is triangulation. This is an important issue, not just for this individual study, but also on the wider philosophical front:

Validity and reliability become problematic, however, if one rejects the positivist assumption of a reality that can be known objectively. How does a researcher arrive at reliable knowledge if each individual being studied constructs their own reality (the constructivist assumption), if the researcher becomes a central focus of the inquiry process (the reflexive turn in social sciences, and if no inquiry process or type of knowledge has any authority over any other (the postmodern assumption)? (Gall M., Borg & Gall J. 1996, p. 572)

EVALUATION IN PRACTICE

An essential aspect of any implemented conceptual framework or design is to develop a plan of action, and in interpretative qualitative research this plan needs to be flexible. As already stated, it is an iterative process. Therefore, to try to strictly follow a plan would be counter-productive, as the researcher needs to go where the information takes him. That said, there are some guidelines which can help shape a study such as this. DePoy and Gilson (2008) identified a model which shows some overall direction (Figure 5).

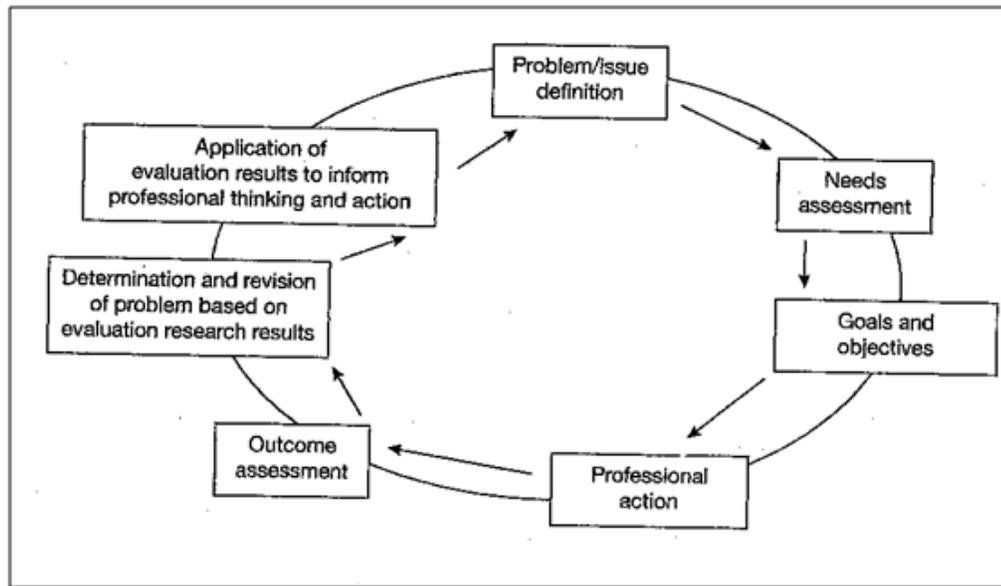


Figure 5. Model of Evaluation Practice, DePoy and Gilson (2008)

Although helpful, the arrows are somewhat misleading; drawn as part of a loop they could be described as linear. For this study reported in this thesis the arrows are multidirectional, that is, pointing in any direction required to signify that the evaluation process should be emergent rather than prescribed. Others (Patton, 2001; Rossi, Lipsey, & Freeman, 2004) have described evaluation as an on-going process for the purpose of using feedback to improve practice. It is this improving practice which has led to the selection of Fourth Generation Evaluation for this study.

FOURTH GENERATION EVALUATION

According to Taylor and Wallace (2007), Fourth Generation Evaluation has set the pace in this regard. A metaphor for this type of causal and interrelated process is that of a spider's web; the web is a multiuse and interconnected system which can be used for everything from warning of danger through to capturing and storing food. DePoy and Gilson (2008) cluster their model stages into three areas: (a) clarification of the problem or issue, (b) reflexive action, and (c) outcomes.

When developing Fourth Generation Evaluation, Guba and Lincoln (1989) identified three major flaws in the first three types of evaluation which had preceded it: (a) A tendency towards managerialism, where the targets are set by the managers concerned, (b) a failure to accommodate value pluralism (accepted societal values) and (c) an over-commitment to the scientific paradigm of inquiry.

Constructivist evaluation is based on the gestalt psychologist's principle that people will not implement what they are told is real but only what they believe personally or socially. Fourth Generation Evaluation begins with the premise that there are no tangible physical realities which stakeholders respond to. Stakeholders respond to social-psychological constructions which are formed by meanings developed from their values, beliefs, situations and events they are engaged with. These meanings are extremely important for evaluators as they inform behaviour and ultimately shape which activities are undertaken. Stake (1975) proposed responsive evaluation where boundaries are established through interactive negotiations.

Responsive evaluation has advanced organisers as well as claims, concerns and issues. These claims, concerns and issues (C. C. & I) may be different depending on which stakeholder the researcher is negotiating with. It is the job of the researcher to search these out and address them during the evaluation. Guba and Lincoln (1989) described three classes of stakeholders. The first were classified as agents, or persons involved in delivering the evaluand, in the study report his thesis the agent is the Ministry of Education. The second beneficiaries were grouped together under this umbrella as the direct target group.

In this study, teachers involved in the professional development programme were the beneficiaries. Indirectly these would also include the students and the contractor who may get publishing rights and a financial incentive. The third and final class of stakeholders were described by Guba and Lincoln as victims, or people who were negatively affected by the research. For example, if there were financial incentives for participation then those who could not participate would be deemed to be negatively affected. Stenhouse (1981) identifies this financial incentive when he describes a move towards an evaluative model of research. This could be seen as negative, suggesting that some undertake this kind of research because of the obvious

financial gain. However, according to Stenhouse, the main reason for the growth of this kind of research is linked to the instance in action.

If a researcher wants to have a link to actual practice and hopefully identify areas for further research which might, in turn, have some positive effect on that practice, then they must firstly ascertain what is actually going on. It is the role of the researcher to address all these different stakeholders' needs.

This can be partly achieved through the hermeneutic dialectic process, whereby the researcher tries to interpret the stakeholder needs and these interpretations are discussed back and forth like a conversation until clarification occurs. This human dialogue is not seen as a threat to the research process under Fourth Generation Evaluation. Moreover, it is a key opportunity to see how and why stakeholders make meanings from their lived experience (Turner & Bruner, 1996). Research of this nature is an interactive epistemological undertaking where both sides the researcher and the stakeholders develop and construct knowledge which is more informed and sophisticated. In New Zealand the main purchaser of educational research contracts is the Ministry of Education. There are few other sources. This issue is addressed openly in this thesis.

Guba and Lincoln (1989) established a methodology for Fourth Generation Evaluation with a twelve-step operational guideline. Although portrayed with a logical sequence it should not necessarily be adhered to strictly as a linear process. The twelve steps are:

1. Initiating a contract with the client or sponsor commissioning the evaluation.
2. Organizing the evaluation.
3. Identifying the stakeholders.
4. Developing within stakeholder group collaborative constructions via the hermeneutic/dialectic circle process, specifically focusing on claims, concerns, and issues.
5. Testing and enlarging within-group constructions. This is done firstly by introducing new or additional information and also by enabling group members to achieve higher levels of sophistication in dealing with such information.

6. Sorting out resolved claims, concerns and issues those on which consensus has been achieved.
7. Prioritizing unresolved claims, concerns and issues.
8. Collecting information bearing on unresolved claims, concerns and issues.
9. Preparing an agenda for negotiation.
10. Carrying out a negotiation.
11. Reporting via the case study to show the joint construction as a product.
12. Recycling.

(p. 185)

This 12-step operational guideline formed the framework for data generation, collection and analysis of this study and is discussed at length throughout the thesis. Guba and Lincoln (1989) describe Fourth Generation Evaluation as a means to empowerment, and although it may be a long cumbersome process, the report generated should highlight the mutual accomplishments of all the stakeholders. Fourth Generation Evaluation allows for an expanded methodological repertoire to be used by researchers. Researchers must acknowledge their own preferences and persuasions, and move beyond these to allow the methods to reflect the best transformative research design. Interpretive researchers must embrace an open-ended design process which will support and develop emergent themes and an emerging reporting structure (Taylor, 2008).

A number of researchers have been influential in the development of pluralistic approaches to methodology; that is, using the constructivist paradigm along with qualitative methods when conducting this type of evaluation (Guba & Lincoln, 1989; Patton, 1997; House, 1999; Stake, 2004). According to Stake and Schwandt (2006), evaluation studies are fundamentally a search for and a claim about quality.

This notion of quality is not to be confused with the term validity as used by positivist researchers. Lincoln and Guba (1985) initially proposed four criteria for naturalistic enquiry: credibility, transferability, dependability and confirmability. In their later works (Guba & Lincoln, 1989, 1994) they give an account of a fifth criterion, authenticity, which is supportive of the relativist view that qualitative research findings do no more than represent a sophisticated but temporary consensus

of human views. ‘Credibility’ for this study has been optimised by member checks through feedback sessions held at the workshops. There has been prolonged engagement via the education facilitators working alongside the teachers in the classrooms.

‘Transferability’ in any research is in my view limited because each situation has special circumstances that recognize the use of thick descriptions of settings, participants and generated data from this study does allow the reader a greater amount of understanding to draw their own conclusions. ‘Dependability’ comes from my documentation of generation methods and data emergence. Combined with disconfirming evidence via researcher/participant triangulation has informed the research decisions and encourages confident interpretations. ‘Confirmability’ is achieved via audit and reflexivity trails. Importantly I have endeavoured to be transparent, to facilitate an honest and fair response in every facet of the research. I believe there has been a self-critical reflexive analysis of the methodology used in this research.

The standard of fairness which links to ‘authenticity’; coupled with an acknowledgement of values, is a key component of Fourth Generation Evaluation and is afforded a central role in the understanding of my research. Fourth Generation Evaluation carried out in an educational arena is infused with a multitude of human values and beliefs, and to ignore this would be erroneous. Constructivist evaluators realise that the research endeavour cannot be value free.

According to Madill, Jordan, & Shirley (2000), “*Qualitative researchers have a responsibility to make their epistemological position clear, conduct their research in a manner consistent with that position.*” (p. 17) Stakeholder views are represented in a fair and balanced way in the final report. This is supported by Guba & Lincoln, (2004), “*In the minds of constructivist evaluators, truth is greatly constrained by the time, context and particular experiences of the stake holding community that generated it.*” (p. 231)

The nature of this kind of study means that the findings of the final report may not be generalizable outside this context and these particular stakeholders. This thesis and

the findings presented in the following chapters follow the use of a general inductive approach to data analysis. This data analysis has been organised by both the original research objectives of the project (deductive reasoning) and also by multiple readings and interpretations of the raw data (inductive reasoning). Multiple voices are heard including the researcher's own, each of the main voices has been coded. Inevitably, the findings are shaped by the interpretations and preconceptions of both the facilitators who were heavily involved in conducting the research and by the researcher when carrying out the data analyses. The trustworthiness of the findings can be judged by a range of techniques such as triangulation within the research project itself, feedback from participants in the research, and feedback from users of the research findings. All of these techniques were employed during the different phases through the workshops and beyond.

The following chapter reports on Phase one of the research and introduces the other phases which combine to form the basis of the findings of this study.

CHAPTER FIVE

PHASE ONE

Education is the great engine of personal development. It is through education that the daughter of a peasant can become a doctor, that a son of a mineworker can become the head of the mine, that a child of farm workers can become the president of a great nation. It is what we make out of what we have, not what we are given, that separates one person from another. (Nelson Mandela)

INTRODUCTION

Chapters Five through Eight present accounts of the four workshops which were the focus of the four research phases that comprise this study. For ease of reporting I have reported on the four workshops and associated activities in separate chapters. Each research phase consisted of a professional development workshop and commentaries from the two education facilitators about the school facilitation and consultation visits carried out in schools to help them implement Education for Enterprise activities. Each phase chapter has a similar format this includes: (a) an introduction, (b) a workshop report including reviews of the workshop activities, (c) a school facilitation and consultation report, and (d) any claims, issues and concerns raised during the particular phase.

According to Guba and Lincoln (1989), the intention of Fourth Generation Evaluation is to allow the participants to make sense of their undertakings and the situations in which they find themselves. Chapters Five through Eight include analysis of the data generated, culminating in discussions of claims, concerns and issues raised in each phase. A number of tables are included to represent synoptic analyses of the general trends arising from the data.

The research questions identified in Chapter One were originally devised from the beliefs and interests of the Education for Enterprise team. Questions 1 and 2 were

developed mainly from my personal interest in the ideologies that have driven technology education and Education for Enterprise to become part of compulsory schooling in New Zealand. These two questions informed, the additional more focussed questions which were partly addressed by the literature reviews contained in Chapters 2 and 3. Research questions 3, 4 and 5 are considered more closely here in Chapters Five through Eight. These questions reflect more particularly the interests of the Ministry of Education curriculum facilitator and the professional development facilitators.

The technology education curriculum injector model introduced in Chapter One is a metaphor for the type of teaching and learning that might occur when the various components are brought together. The questions identified in Chapter One, although initially separate, have become nested within each other via the responses of the participants. In doing so they have facilitated shared beliefs and understandings about the research itself, the questions asked and the data generation methods used to answer them. Each phase highlighted in Chapters Five through Eight developed multiple purposes and these purposes were adapted successfully in response to emerging claims, issues and concerns raised by workshop participants. The purposes were:

1. To provide opportunity for participant professional development in all of the feeder components of the technology curriculum injector.
2. To develop understanding about the nature of technology education and its relationship to a connected curriculum.
3. To develop formative evaluation exercises.
4. To ensure credibility of research findings through clarification, feedback and discussion.
5. To inform summative evaluation meetings and discussions for milestone reports to the Ministry of Education.

Each of these purposes was intended to contribute to enfranchising all participants. This is an important feature of Fourth Generation Evaluation, as it allows for pluralistic values to be expressed, acknowledged and incorporated. I was an active participant in both the design and delivery of all workshop programmes.

Additionally, in discussion with the education facilitators, I devised appropriate data generation strategies. The ethics of my involvement were made clear from the outset, both as the researcher and professional development facilitator. Fourth Generation Evaluation is most successful where mutual understandings of participant roles are made explicit.

My main construction from this thesis was the technology curriculum injector model (Chapter One). Guba and Lincoln (1989) suggest that any constructs developed are inextricably linked to the contexts in which they are formed. It is important, therefore, that I provide background information about the participants and the surrounds of the schools in which they work. The three school clusters discussed later in this chapter were chosen to offer variety.

PARTICIPANTS

The Education for Enterprise project team was made up of two experienced education facilitators and a university researcher. For the purpose of auditing the research data, each contributing participant comment has been allocated an identifying code. For the purpose of enhancing readability each of the professional development team members has been allocated a pseudonym.

Education facilitator one (Frank) was the main project facilitator who liaised with the MOE (Ministry of Education) and facilitated the project with the primary schools. He was a former primary school principal with extensive professional development experience. Education facilitator two (Dean) facilitated the project with the secondary schools. Dean is a former secondary school head of department, curriculum subject advisor and experienced facilitator.

The university senior lecturer who devised the methodology was Gary (myself). I scheduled, organised collection of the data and subsequently its analysis. I had worked with Dean before on other research activities but this was the first time that Frank and I had worked together. A significant number of the teacher participants had worked previously with one or more of the Education for Enterprise project team

members. These previous dealings helped to develop trust and mutual respect which was evident in all the phases of the research. Qualitative researchers, such as Lincoln and Guba (1985) and Erlandson, Harris, Skipper, & Allen, (1993) support the notion of prolonged engagement between researcher and participants in order for the former to gain an adequate understanding of the place and work of the participants and to establish a relationship of trust between both parties.

Purposive sampling of participants was undertaken to represent the main issues arising from the workshops. Research procedures employed to generate and collect the phase data included questionnaires and observational field notes. Both the facilitators and I kept field notes from the workshops, which we checked for consistency by discussing and member checking at the end of each workshop and data generation point. Audio and video recordings were taken of the main workshops. Interviews were undertaken by the facilitators with selected teacher participants and were transcribed verbatim and member checked to ensure credibility. These participants were selected based on their personal involvement in the Education for Enterprise project.

As is usual with Fourth Generation Evaluation studies a major emphasis was placed on data generation through praxis. Because not all participants were able to attend all the research activities, it is important to note that throughout this thesis what I am reporting on are actual participant responses. There may have been differing viewpoints that were not expressed or recorded due to participant absence. However, by auditing, triangulation and reflexivity, I have attempted to report a fair consensus.

Workshop participants belong to two categories for coding. “Workshop number Teacher Response number” (for example, workshop one teacher response 1) refers to information generated from a particular teacher participant attending workshop number one. “Workshop number Community Partner Response number” (workshop one community partner response 1) refers to information generated from a particular community partner participant attending workshop number one.

The Ministry of Education allocated a curriculum facilitator to oversee the project. She has been given the pseudonym of Samantha.

THE RESEARCH STUDY

The project began in June 2005. The early stages involved extensive communication between Frank and Samantha. These discussions focussed on:

- administrative issues pertaining to the contract service agreement;
- the professional development outcomes and the focus of the research;
- the schools selected for the project- a brief report was emailed 5 September outlining the schools and initial progress;
- the first round of workshops - dates, content and programmes;
- the general progress of the project, including thoughts on the Primary Enterprise Programme (Prep) and its relationship to Education for Enterprise.

Frank reported that, “*Communication with the curriculum facilitator has been clear, concise and very worthwhile*” (Milestone Report One).

Invitations were sent to a wide selection of schools outlining the project and were followed up with phone calls. Although almost all principals expressed an interest, some were already involved in contracts and were unwilling to commit their staff to another one. Most expressed a willingness to take part in the future but a mid-year start for this project didn't suit. Sixteen schools signed up as participants; these were clustered in three regions classified as (a) rural, (b) coastal, and (c) city. Eight of the schools had been involved in a previous Enterprise project; the other half were new to this undertaking. The three clusters were selected from positive responses and by proximity to each other and the facilitators. This was done to keep travel costs manageable.

SCHOOL BACKGROUND INFORMATION

The following provides a synopsis of participating regions and schools. It was my intention to adopt research methods that had been well established in responsive evaluation studies. The process begins with establishing early familiarity with the

backgrounds of participating schools. The description of the schools was obtained from materials offered by the schools themselves.

Schools were organised into the three clusters; rural, coastal and city. Tables 1, 2 and 3 give a brief overview of the schools originally involved in the Education for Enterprise project. The decile rating a school is allocated relates to the economic and social factors of the community surrounding it. It is determined by the Ministry of Education. There are ten deciles, starting with decile one and moving through to decile ten. Schools in decile one have the highest proportion of students from lower socio-economic backgrounds. Schools in decile ten have the highest proportion of students from high socio-economic backgrounds. For a more detailed description of each of the participating schools (Appendix 9).

The Rural cluster comprises two significant river catchments with different populations. One is open plain and was heavily settled by Europeans. The other is more Māori-dominated, remote and independent, and is still heavily forested. This region is one of the most important agricultural areas of New Zealand.

Table 1

Rural cluster schools

School	Number of students	Decile rating	Age of students	Education Facilitator
Rural C one	40	na	5-21	Dean
Rural C two	200	7	5-10	Frank
Rural C three	94	5	5-12	Frank
Rural C four	550	2	13-18	Dean
Rural C five	160	4	13-18	Dean
Rural C six	850	7	11-18	Dean
Rural C seven	166	1	5-12	Frank/Dean
Rural C eight	250	10	13-18	Dean

The Coastal cluster surrounds a volcanic peak which is the dominant feature of the region. The region has an area of 7258 km² and a population of around 110,000. The region is very fertile, due to generous rainfall and the rich volcanic soil. Dairy

farming is very popular. There are also, however, oil and gas deposits in the region, both on- and off-shore.

Table 2

Coastal cluster schools

School	Number of students	Decile rating	Age of students	Education Facilitator
Coastal C one	350	5	5-12	Frank
Coastal C two	200	9	5-10	Frank
Coastal C three	81	5	5-12	Frank
Coastal C four	240	8	5-12	Frank

The City cluster is the most populous region of New Zealand, as well as being the most economically. Approximately 34% of New Zealand’s 4.405 million population live in this region. One city dominates it has an area of 4,894 km² and has the largest Polynesian population of any city in the world. It is one of the few regions in the world to have harbours on two separate major bodies of water.

Table 3

City cluster schools

School	Number of students	Decile rating	Age of students	Education Facilitator
City C one	250	10	5-12	Frank
City C two	320	10	5-10	Frank
City C three	300	1	5-12	Frank
City C four	380	10	5-12	Frank

According to Frank, *“The marketing phase was time consuming but the advantage is that a wide range of schools now have a clearer picture of the aims of Education for Enterprise,”*. (Milestone Report One)

Attempts were made to include schools with large numbers of Maori/Pasifika students; however, it was difficult as the principals reported a high involvement in

other projects. Very small rural schools who may have wanted to participate were omitted due to their relatively small numbers of students.

BASELINE DATA COLLECTION AND ANALYSIS

To collect the baseline data for the Education for Enterprise project I devised a simple questionnaire (Appendix 4) and were formulated as a best fit with perceived intentions for the project at the time. Had I developed the technology curriculum injector model before the research began I may have asked different questions. But there again the model may have influenced my thinking too much. I am happy that in this regard any personal biases were kept out of my thinking. This questionnaire has four main sections (Appendix 4). The questionnaire was completed by participants attending the first workshop. It was my intention to ascertain the participants' backgrounds and current dispositions towards future components of the technology curriculum injector model. There were four sections to the questionnaire.

1. Demographic information was requested.
2. Since Education for Enterprise is based around a professional development programme; therefore it was appropriate to consider the participants' experiences of previous professional development projects.
3. A section to ascertain the participants' attitudes and experiences of working in community partnerships were included. Community links play a significant role in enterprise, technology education and a connected curriculum.
4. Dispositions towards enterprise education were sought. Obviously strongly held participant dispositions will impact on the Education for Enterprise project outcomes.

The questionnaire data are summarized in tabular form below. Thirty two participants attended workshop 1 was (N=32) all of whom completed the questionnaires.

Demographics:

(A full primary is a primary and intermediate school combined.)

Cluster Name	Number of returns	Number of schools	Primary	Full Primary	Intermediate	Secondary
Coastal	8	4	2	1	1	
City	10	4	3	1		
Rural	14	8	2	2		4

Question 12 - Number of years teaching experience:

Answer	1-5 years	5-10 years	10-15 years	15+ years
Response	3	6	6	17

Professional Development:

Question 16 - Have you attended P.D. in the last five years?

Answer	Yes	No
Response	32	0

Question 17 - List P.D. attended

Answer ranged from 2-12 items per respondent.

Question 18 - Do you think the P.D. impacted on your teaching?

Answer	Yes	No	Unsure	Nil reply
Response	30	0	1	1

Question 19 – Feedback on P.D.

Answer	Positive	Negative	Unsure	Nil reply
Response	27	1	1	3

Community Partnerships:

Question 20a - Are Community partnerships good for student learning?

Answer	Yes	No
Response	32	0

Question 22 - Are you aware of the community partnerships involving your school?

Answer	Yes	No
Response	30	2

Education for Enterprise:

Question 26 - Do you consider yourself to be an enterprising teacher?

Answer	Yes	No	Unsure	No reply
Response	21	1	8	2

Question 28 - Do you consider Education for Enterprise to be important for New Zealand?

Answer	Yes	No	Unsure	No reply
Response	27	0	3	2

Analysis and consultation occurred between Frank, Dean and myself, and I drafted some initial observations, which were fed back to Samantha as part of Frank's milestone reports. These initial findings are listed below:

1. The project involved working with a very experienced group of participants.
2. The participants indicated they were active in personal professional development.
3. Generally the participants indicated a positive attitude towards professional development.
4. The participants seemed to believe that community partnerships are good for student learning.

5. Mostly the participants claimed to know about the community partnerships in their schools.
6. The majority of participants appeared to believe they were enterprising teachers; however, approximately 30% indicated they were unsure if they were or not.
7. The majority of participants seemed to believe that Education for Enterprise is important for New Zealand.

PARTICIPATION IN THE PHASES AND WORKSHOPS

Of those schools interested in taking part in the project, almost all wanted their staff to see a presentation before coming to a decision. Both facilitators (Frank and Dean) prepared PowerPoint presentations using some of the material gathered from an earlier pilot project carried out in 2004 and these were given in a range of schools within the cluster areas. A list of responsibilities and key tasks for Frank and Dean were developed:

- orientation;
- planning and preparation;
- school visits - modelling, coaching, recording, planning with teachers and principals;
- cluster workshops - development and delivery;
- liaison with the project researcher for the management of data gathering and evaluation;
- liaison and management of community personnel;
- best practice in administration including records of finance, school activity records, workshops and term by term development;
- performance evaluation.

The project included four scheduled workshops during the two-year period. These workshops were used to inform and shape both the project and my research. All four workshops were repeated in each of the three geographical and population clusters - coastal, rural and city. Most of the workshops were attended by all three of the

Education for Enterprise project team. Each team member undertook an aspect of the workshop designed to facilitate the intended purposes outlined earlier in the chapter.

The workshops were conducted as a partnership between the ‘local’ experts (the teachers) and ‘non-local’ experts (the facilitators and researcher). Frank and Dean were involved heavily with planning sessions as well as being in the classroom whilst projects were being undertaken. The focus was on ‘mutual aid’ provided to improve teaching and learning of ‘Enterprise for Education’ through the learning area of technology. A timeline of the workshops is given in Table 4.

Table 4
Workshop dates timeline

	Phase one Workshop 1	Phase two Workshop 2	Phase three Workshop 3	Phase four Workshop 4
Session 1	Coastal cluster schools: Friday 16 September, 2005. N=10 teachers attended 2 apologies.	Coastal cluster schools: Wednesday 15 March, 2006. N=11 teachers attended 1 apology.	Coastal cluster schools: Wednesday 30 August, 2006. N=12 teachers attended	Coastal cluster schools: Wednesday 16 May 2007. N=10 teachers attended
Session 2	City cluster schools: Tuesday, 20 September, 2005 N=11 teachers attended	Rural cluster schools Friday 17 March, 2006. N=10 teachers attended 1 apology.	Rural cluster schools Friday 1 September, 2006. N=11 teachers attended	Rural cluster schools Friday 18 May. 2007. N=11 teachers attended
Session 3	Rural cluster schools 17 October, 2005. N=11 teachers attended	City cluster schools: Tuesday 21 March, 2006. N=11 teachers attended	City cluster schools: Tuesday, 5 September 2006. N=10 teachers attended 1 apology.	City cluster schools: Tuesday 22 May. 2007. N=7 teachers attended

The project phases were designed around the workshops, each of which was conducted in the same way but with slight variations of the programme in response to evaluations from the previous workshops and discussions between Frank, Dean and myself. The workshops were either video or audio recorded. These recordings were transcribed verbatim and checked by participants for accuracy. The workshops and associated follow-up support in classrooms by the education facilitators helped to generate the information presented in this thesis. The three cluster meetings for workshop 1 followed the same format with the exception of session two at the coastal cluster workshop. Secondary and primary teachers attended, and each group worked with their respective facilitator.

WORKSHOP 1 REPORT

Four main activities were devised by the Education for Enterprise project team for workshop one. These activities were repeated in all three clusters. As stated earlier, these clusters were made up of a number of schools from each geographical region. In total, for the three clusters for workshop one, N = 31 teachers participated.

Activity one - An Icebreaker

This activity was designed, organised and presented by Frank and Dean. The aim was to display the holistic approach of Education for Enterprise, that is, how it can be integrated into the curriculum in an engaging way. The focus was on the relationship between task setting, teaching, learning and assessment. Each pair of teacher participants was given a dart-making pack - paper, coloured pens, paper clips and a web page of dart information. They were told to make a dart and it would be assessed. Participants were not allowed to ask any questions.

After the activity Dean led a discussion that addressed previously identified components for the task. Most notably how not to do it! The questions are followed by typical examples of recorded, transcribed and checked responses.

Dean “How did you feel about the task?”

It was good fun but we weren't sure of the point (Workshop one teacher response 1).

Dean “How did you feel before the assessment?”

We were a bit worried because we didn't know how it would be assessed (Workshop one teacher response 2).

Dean “And after the assessment?”

We weren't too worried we got it wrong because it wasn't that important (Workshop one teacher response 3).

The data indicates that nearly all (N=27) teacher participants could identify that the way the task was set up didn't allow for full engagement and that it worked only because of the teachers' trust in the facilitators and their own implicit knowledge: that is, what they already knew about darts and how to work well in a group.

The icebreaker seemed to have achieved its aim of engaging the participants in thinking about Education for Enterprise and how to, or in this instance how not to, teach for it. The Education for Enterprise team discussed the activity and agreed that it had achieved the main aim of getting the participants talking and that it set up the day well. The data indicates that all workshop participants seemed to have engaged fully in both the activity and subsequent discussion.

Activity two - The Research

I introduced the research aspects of the project. This included the framework for gathering data, the issues to be discussed and the techniques used to generate the data. Participants were given a copy and discussed a critique of Enterprise Education found in the New Zealand Journal of Educational Studies, vol. 39, number 2, 2004. The article by John Clark has the title “Enterprise Education or Indoctrination?”

The following section highlights data samples which are representative of the full range of responses received from participants in response to questions asked by me at during the workshop. The purpose of the questioning was to ascertain perceptions held about Education for Enterprise and to elicit some early claims, concerns and issues they may have had about its role in education. My reflective commentary follows each question so my interpretations are made explicit. The researcher commentary should be included in what Guba and Lincoln (1993) term progressive

subjectivity. This is helpful to aid the monitoring of the researcher's own developing constructions; Guba and Lincoln consider this to be critical in establishing credibility.

Gary question one - Education for Enterprise, is it nature or nurture?

Sample workshop participant responses:

Both..... Children have an innate ability to create

They are always asking why, why, why? (Workshop one teacher response 4).

At school many children can work away well without being asked but they are not being innovative whereas the enterprising disruptive children can be very successful later in life. (Workshop one teacher response 5).

It is a genetic thing but schools are really good at knocking the enterprise/creativity out of children. Pre-School is very innovative but there is possibly less emphasis when the same children come to school. (Workshop one teacher response 6).

You notice children with Lego or Mobilo who are very creative when they are young but display less creativity with the same thing when they are older. It may be that the motivation isn't as good as it once was. (Workshop one teacher response 7).

As soon as children are born they are asking questions, being discoverers and innovators but at school, as they get older it begins to disappear. If we can build in things naturally like risk taking and the chance to seize opportunities in our everyday programmes it will happen. Cavemen were enterprising but somewhere along the line in education teachers and then children didn't have to be enterprising. (Workshop one teacher response 8).

With the advent of technology perhaps we don't need to be as enterprising. Children aren't being as enterprising anymore and they are not as inventive now because the innovation that comes through play station for example isn't real it doesn't matter if you get it wrong - whereas in making a trolley using a hammer, saw and nails its real- it does matter. (Workshop one teacher response 9).

But the invention, innovation is still there in PlayStation. Children have to be just as inventive. All that's happening is that it is being redirected. Children' use of cell phones is innovative. (Workshop one teacher response 10).

Parents play a big part in developing these enterprising characteristics because some children are naturally more enterprising - more into taking risks than others. They need to be risk takers and give their children some responsibility.

They need to create this environment for children to grow up in. They need to realise there are lots of answers to the one question and provide all sorts of experiences for them to be creative, inventive. (Workshop one teacher response 11).

Sometimes the most successful outcome is one that didn't work and one that we come back to and look at again later. (Workshop one teacher response 12).

Children need to be in an environment that fosters a "don't know if you don't try attitude." (Workshop one teacher response 13).

If the process is going to be meaningful the assessment has to be meaningful. (Workshop one teacher response 14).

These are interesting responses in that the participants seemed to be a little negative about what schools can actually do to encourage and foster Education for Enterprise experiences. A common disposition revealed (N=24) by the participants was a belief that less formal education, like that found in early childhood or kindergarten centres, might be more conducive to creative and enterprising endeavours. Participants also identified an association between risk taking and being enterprising. There was some discussion about changes in technology and how they may have an effect on how enterprising people are. There was also identification that parents and the community have a part to play in developing enterprise in students.

Gary question two - Should schools be enterprising organisations?

We should be out there much more - out to businesses because we need all the resources and we should be up to date. We don't go out enough. I go to other schools and ask how they got things. Schools need to be enterprising. (Workshop one teacher response 15).

Enterprising shouldn't just be linked with money. We need to be enterprising to offer the best of possibilities. Enterprising schools are finding money in creative ways but doing all sorts of others things in creative ways. A lot of schools equate enterprise with PReP but we need to get away from that. (Workshop one teacher response 16).

After many years in teaching to turn around and then deal with business people you have to stop thinking like a state servant (Workshop one teacher response 17).

Some schools have to be enterprising organisations. They are not financially viable otherwise. (Workshop one teacher response 18).

It's not what we are about really. I'm wary about resources and events like the BP Challenge and those that come out with companies' names. Part of their strategy is to make it all right. They go through schools so they can become "all right" in society. While we continue to allow things like international students and take money from Rotary and Lions clubs we won't get the funding we need from the Government. (Workshop one teacher response 19).

This question revealed that some participants believed that schools should have closer connections with business and others in their community. They identified that being enterprising is not just about economics but that there is a relationship between enterprise activity and an economic imperative. Additionally it was revealed that businesses may have different reasons for their involvement with schools and programmes involving Education for Enterprise and technology education.

Gary question three - Are the economic aspects a current component of Education for Enterprise?

The business side isn't a focus. It may happen incidentally but it's not a focus. (Workshop one teacher response 20).

We wouldn't have been able to see Charlie and the Chocolate Factory if we hadn't raised the money ourselves. The children know that. We talked about what people did when they wanted money. We worked out how much it would cost and we went ahead and raised it. It was incidental but important. (Workshop one teacher response 21).

The teachers identified a connection between economics and enterprise, but there was recognition that this connection may or may not be a driving factor.

Gary question four - Is the business association with schools an attempt at indoctrination on the part of the businesses?

It pretty well documented that many companies have a hidden agenda when setting up a school association. (Workshop one teacher response 22).

Business association is a necessary evil. (Workshop one teacher response 23).

Look at the Beach Education Programme. Here's a voluntary organisation that needs the funds BP provides to survive. Without them there is no beach education - similarly the BP Technology Challenge. (Workshop one teacher response 24).

The McDonald's voucher system benefits McDonald's. You use their vouchers when you buy something else. (Workshop one teacher response 25).

Critiquing enterprising projects and or companies shouldn't be the driving force. In the primary schools that may come across as part of the project to talk about. (Workshop one teacher response 26).

It depends on which level you are working at. (Workshop one teacher response 27).

We survey at the end of units. We do reflections after a school production for example. (Workshop one teacher response 28).

The Young Enterprise Scheme is critiqued but not ethically. (Workshop one teacher response 29).

Companies are still legitimizing what they do and it is very deliberate but who else is going to do the BP challenge or the Beach Education Programme? (Workshop one teacher response 30).

We should say to the children, “this is where we are in regards to funding.”

We used pokey machines funding and it is quite sad that the playground depends on something that is quite devastating in our community. (Workshop one teacher response 31).

It's important that children are aware and aren't afraid to ask. They should know about cheap “slave” labour overseas for example. (Workshop one teacher response 32).

The difference with New Zealanders is that perhaps the ethical side is more important than making money. We like to think it is anyway. (Workshop one teacher response 33).

Raising money shouldn't be the focus of schools. If we become too enterprising will our budgets hold up? (Workshop one teacher response 34).

I don't like the idea of some commercial enterprise in school, e.g., Coke sponsoring schools. (Workshop one teacher response 35).

Teachers need to be critical but keep an open mind about the products they promote. We need to look closely and see if the children are the key market.

If we aren't careful then companies like BP will pull out when we do need their support at times. (Workshop one teacher response 36).

We need to teach the children to be critical - do it as a skill in class so they learn to look below the surface. (Workshop one teacher response 37).

This was a focussed question and the responses were quite revealing. Some participants expressed an opinion that businesses have their own agendas for being involved with schools. In discussions it was revealed that the extra funding that may come from these associations is welcomed and in some cases needed. In line with developing true technological literacy as discussed earlier, the participants noted that students should be encouraged to critique school and business links.

Gary question five - How should we promote enterprising attributes in schools?

It's important to link in enterprising things that are naturally important.

Some things just need a hook. The boys in my class weren't into wearable arts so I linked it to a rap song. The words of the song had a lot of history there – Martin Luther King that we could use. That got them hooked and they all wanted to get up on the stage to model their garment. (Workshop one teacher response 38).

It's important that what we do reflect the values and beliefs of the school. It's also important to show parents what has been done, show the whole procedure. (Workshop one teacher response 39).

You get the buy-in from the parents if they come and see what is going on. (Workshop one teacher response 40).

Dialogue with adults is really important especially at upper end of primary years. The teacher's job is to facilitate this dialogue so the children see them as partners in the learning process. If you get this dialogue going you see the children come up with ideas that are better than anything you thought of. (Workshop one teacher response 41).

It's important that children are given a lot of responsibility around school. We already do that. (Workshop one teacher response 42).

Things like ICT. The boys relish being given responsibility in areas like that. We make sure they are involved and make sure they see the reason for being involved. (Workshop one teacher response 43).

The participants' responses included an identification that the context for learning was important and that teachers need to facilitate negotiations between students and the outside community. Frank and Dean were shown the responses and they made some general observations:

- *The economic side of Education for Enterprise was seen as a low priority by most teachers. Education for Enterprise as an approach to learning found favour with the teachers.*
- *Participants believed the enhancement of enterprising attributes in students could be fostered by creating situations where the attributes will be needed.*

My intention was to begin to generate consensus and understanding about the research and to establish some agenda for negotiations about future intentions to address claims, concerns and issues raised. According to Patton (2001) qualitative content analysis should go beyond merely extracting numeric content from data. It allows researchers to explore and understand social reality in a subjective manner.

Activity three - People Hunt

Frank and Dean took participants through a number of activities designed to focus on the dimensions and attributes of enterprising learning. They highlighted some of the findings from the previous project in 2004 and utilized these to explain our developing philosophy of Education for Enterprise.

They began with a People Hunt based around the dimensions of Education for Enterprise. The activity allowed teachers to become familiar with some quotes from the two year Australian Research project in Enterprise Education: *Action research to Identify Innovative Approaches to and Best Practice in, Enterprise Education in*

Australian Schools 2004.

Using the quotes from the 2004 Australian research workshop participants explored examples of enterprising learning and teaching they already had in place. They also looked at creating new situations within the identified dimensions. These included:

- learning;
- teaching;
- leadership and management;
- student well being;
- parent and family participation;
- community partnerships;
- curriculum;
- monitoring and evaluating.

The enterprising attributes were introduced through a series of stories about local innovators. They were sourced through the Puke Ariki website and the attributes were displayed on the stories. Teachers read the stories and identified and discussed the enterprising attributes displayed by the inventors.

The session finished with two of the teachers from the 2004 programme linking these attributes and dimensions to the work they had done last year. One example was a landscaping project at an example school. The workshop participants were able to discuss and reflect on the project with a teacher who was involved in delivering the unit. The second example was an events programme from another primary school. A lead teacher took the workshop participants through the project with the aid of a PowerPoint presentation compiled by the students from the primary school.

In the City Cluster Schools a similar format was used, and Frank and Dean presented the project examples through a PowerPoint presentation. Frank and Dean had a wide selection of photographs so participants were able to clearly see the progression of each project.

Frank and Dean focused again on the dimensions and attributes of Education for

Enterprise at our rural workshop and presented case studies, but this time the primary and secondary teachers split into two groups. Dean took teachers through a PowerPoint presentation with the 2004 teachers outlining their involvement and findings. Discussion centred on the quote: *Students become enterprising when they apply their learning*. Findings from the project: *Action research to Identify Innovative Approaches to and Best Practice in, Enterprise Education in Australian Schools 2004*.

The group discussed the qualities of *a connected learner, an engaged learner, a resilient learner, a responsible learner and an ethical learner*. Again Dean and the teachers from the 2004 pilot used concrete examples from that experience. The primary teachers facilitated by Frank began with a reinforcement of the icebreaker exercise. This time the learning intentions were identified as:

1. Recognise enterprising attributes.
2. See the difference between implicit and explicit learning.
3. Recognise examples of implicit learning.
4. Recognise the dimensions of enterprising learning.
5. Look for opportunities to apply enterprising learning.

Using a story of Michael Lawley, an eco-innovator from Puke Ariki's Taranaki Stories, teachers identified the enterprising attributes Michael displayed and shared their findings. Then they looked at implicit and explicit knowledge and came up with their own definitions of these two terms. Then, as an additional aspect, they looked at a written definition and discussed which aspects of Michael's knowledge were implicit and which were explicit.

A lead Education for Enterprise teacher at an example school in 2004 took participants through their Vision Time project and teachers identified examples of implicit and explicit learning. They also looked for examples that illustrated particular attributes.

The consequence was that the participant teachers could see that Education for Enterprise set up situations that allowed teachers to recognise the implicit knowledge

held by students and that it created opportunities for students to develop and use this knowledge further. Participants at all three clusters (N=23) reported the second and third activities of workshop one were very useful and indicated that they had a good grasp of the attributes and dimensions of Education for Enterprise.

Activity four - The Technology Curriculum

Dean introduced the draft of the new New Zealand technology curriculum document and outlined the changes that had been made and the reasons for them. He showed the links between technology and enterprise learning and showed why technology is a focus for this project described in this thesis.

Dean used two case studies to show the link between technology and Education for Enterprise. One was from a New Zealand Trade and Enterprise DVD that traced the development of a New Zealand business making natural cosmetics. The business started small, and with some major investment, grew very big. It illustrated the enterprising solutions that had to be found during the period of development and also highlighted certain ethical questions such as the owners wish to retain the core values of the initial small business.

Dean then presented a case study from an intermediate school which almost paralleled that shown on the first DVD. A group of students had branched off from a unit of work and set up a small business selling lip gloss. It had proved very successful and the students were faced with similar decisions that the natural cosmetic manufacturer had to make. Along the way they had to make some ethical decisions after creating a fund-raising venture (selling sherbet at school), that was very successful in raising money for their business development but was recognised as not being healthy for their student market.

Discussion and evaluations indicated a good understanding of the draft technology document and a willingness to explore its aims in relation to Education for Enterprise. The twenty eight participating teachers were generally able to identify links between technology education and Education for Enterprise as demonstrated by the following comments:

Almost every word on the page is a link to Education for Enterprise. Meeting needs, innovation, real needs, multiple solutions though divergent thinking encourages risk taking, more responsibility, work collaboratively with others, reflection. (Workshop one teacher response 44).

The children are learning there is a world beyond their own school gates and we have got away from the traditional boys and girls tech. (Workshop one teacher response 45).

Is enterprise education in danger of falling down because of health and safety issues? (Workshop one teacher response 46).

It showed that people can encourage others to try what they believe in if they feel positive it will work. (Workshop one teacher response 47).

There are a lot of connections between enterprising learning and the new technology curriculum - a lot of key words. (Workshop one teacher response 48).

The key link to Education for Enterprise is to have a purposeful outcome. It's a long-term thing that the children are doing for a purpose. We used to make model boats and test them in the swimming pool but I don't know if the children knew why. It must be authentic right from the start. (Workshop one teacher response 49).

Working at its best students should own the technology outcome - not like the pencil case- that was the teacher's idea. (Workshop one teacher response 50).

The participant teachers who commented (N=17) were able to make links between their practice, technology education and Education for Enterprise.

CLAIMS, ISSUES AND CONCERNS RAISED FROM PHASE ONE

Recorded and transcribed discussions revealed that the participants (N=19) seemed to believe that the characteristics of Education for Enterprise and successful learning in technology were compatible, and that in many cases they were the same. One issue the project leader would later address was the evaluation form. The participants thought the workshop evaluation form was too generic. In response I designed a new workshop evaluation form using a similar format to 2004, but for this project the form was altered to be more specific. It was also decided by Frank, Dean and myself that the workshop participants would complete it directly after each of the sessions. Fourth Generation Evaluation, as described by Guba and Lincoln (1989), utilizes an inductive approach to data generation and analysis. This methodology grounds the examination of topics and themes, as well as the inferences drawn from them, from within the data.

Teacher participants from three schools listed *“encouraging other staff to come on board because of the already tightly packed curriculum”* as an issue related to an extra involvement with Education for Enterprise, but this hadn't proved a problem in the past. Frank and Dean found that as soon as teachers were given some practical ideas that fit in with what they already had planned their outlook changed to become more positive.

One secondary teacher noted the importance of setting up a *“franchise in the school”* for Education for Enterprise, and another indicated that the financial constraints in schools might be a barrier. *“The money required to take a product to a marketable product may be a problem.”* Two teachers listed *“only the normal thing, time”* as being a concern. *“Time is a large influencing factor - it is so limited.”* The education facilitators found that this time commitment issue usually changed when they started the first planning session and showed the direct link to classroom programmes.

Health and safety issues were mentioned as a possible concern more from the length of time it takes to complete administrative details like risk plans than actual safety

concerns for the students. Exchanges between Samantha and the project team led to a negotiated focus on community partnerships. This was to be achieved by the project team working with teachers to identify and develop more authentic links between classroom programmes and the wider community. It was at this point that notions of a ‘connected curriculum’ began to be incorporated into both the thinking behind this project and the technology curriculum injector model I developed later. These changes and tweaks may be seen by some researchers to be disruptive or not necessary, but in Fourth Generation Evaluation they are to be expected and welcomed. They reflect the underlying philosophy of this emergent type of methodology.

The connected curriculum focus centered on developing enterprising attributes, capabilities and competencies and technological skills that students can identify with. To achieve these additional aims Frank, Dean and I assisted teachers to find, observe and use models of best practice in the community. This included organising mentors from the community to work alongside students. Strategies for mentor training were put in place so that they became aware of enterprise goals which would enhance the work they do with their students. The professional development programme was altered to ensure that parents and their communities were involved in the Education for Enterprise programme in the participant schools. This was to be facilitated by regular information newsletters, use of community members, as mentors and by organizing community sharing days and workshops for parents.

According to Miles and Huberman (1994) qualitative content analysis begins during the early stages of data generation. This early involvement as participant and researcher in the workshops helped me to move back and forth between concept development, data generation and data analysis. Utilising this approach within Fourth Generation Evaluation helped me to focus my subsequent data generation endeavours towards activities that were more useful for addressing the research intentions.

In the next chapter I discuss what occurred during Phase two and highlight the research findings.

CHAPTER SIX

PHASE TWO

A critical social science will provide the kind of self-reflective understanding that will permit individuals to explain why the conditions in which they operate are frustrating and will suggest the sort of action that is required if the sources of these frustrations are to be eliminated.

(Carr & Kemmis, 1986, p. 136)

INTRODUCTION

During Phase two of the research four workshops were held rather than the planned three. This was to accommodate a separate meeting for the primary and secondary teachers in the rural cluster schools. This change was due to a commitment clash for two of the schools involved. The aim of this workshop was more focussed. It had two clear targets; (a) to identify good practice in technology education, and (b) identify good practice in Education for Enterprise.

WORKSHOP 2 REPORT

In this phase of the project, each workshop consisted of three activities; (a) techno links, (b) your brief is . . . and (c) resources. The phase ended with a data collection component. Frank and Dean led these sessions in a much more formal way than the previous workshops. This was a professional development workshop designed to facilitate the participants' ability to meet the learning intentions identified in the draft technology curriculum discussed in Phase one.

Activity one - Technology and Education for Enterprise Links

The first activity called 'Techno-Links', was led by Dean and had as its focus technology processes and their links to Education for Enterprise. It began with Dean identifying the technology and Education for Enterprise links in an environmental initiative carried out by a school working in partnership with the Department of Conservation. The participants viewed a video called *Technology and Community*

Links produced for the Centre of Technology Education, Auckland College of Education.

The discussion following the video revealed a focus from participants on identifying some examples which combined technology education and Education for Enterprise. Workshop participants then viewed one school's results after they had trialled a more enterprising approach in the planning and running of a traditional school event. This was presented with a PowerPoint by the teacher involved in the planning of the unit. I suggested that this involvement should be a continued theme in the workshops this was achieved by participant involvement in presentations which seemed to encourage buy in and shared ownership. This deliberate interaction allows participants to explore each other's beliefs and persuasions and is noted as an important characteristic of responsive evaluation (Abma et al., 2001; Greene, 2001).

Each of the participants were then asked to identify the links between technology education and Education for Enterprise in any work they had planned in the near future. A community partner involved in the Institute of Professional Engineers of New Zealand (IPENZ) Futureintech programme then addressed participants with a presentation outlining the opportunities available to schools through Futureintech's established mentoring programme.

Activity two – Developing Briefs

This activity was called '*Your brief is . . .*' Workshop participants were asked to follow a technology design process to find the solution to a real problem. Working in groups they had to create a presentation that showed how they would use the New Zealand Trade and Enterprise DVD *Education for Enterprise Inspiring Growth*. Frank, Dean and I felt it would be a good idea to show how the DVD could be used as a resource for staff development and then help with the introduction of Education for Enterprise in schools. It had to be used in an enterprising, but highly effective way. This activity also facilitated participants' ability to evaluate the New Zealand Trade and Enterprise (NZTE) DVD as a teaching resource. This activity was a responsive activity designed to meet a request from Samantha to include this resource in the project work.

Activity three - Resources to Develop Participant Understanding

There were two aspects to activity three. The first was a resource session where participants looked at helpful resources to support and increase their personal understanding of technology education. The second aspect was to analyse the future components of the technology curriculum injector and their own pedagogy. Teachers appeared to respond well to this activity. This kind of pedagogical opportunity is important for teachers attending workshops, as it justifies their time away from the classroom. The workshop participants would have to report back to their senior managers identifying the benefits of the workshops; as professional development is time consuming and expensive. This activity was focused around a technology education website called *Techlink*. There is an increasing international trend towards professional development using web-based materials (Lee & Choi, 2008; Van Zee & Roberts, 2006). So it was an appropriate activity for the participants to undertake.

The *Techlink* website was established in 2003 with support from New Zealand Trade and Enterprise, through the Enterprise Culture and Skills Activities Fund. In 2005 a partnership between the Ministry of Education and IPENZ resulted in the continued development of *Techlink* to provide resources to support the planning and implementation of programmes in technology education. The site contains a range of materials, including such things as case studies of classroom practice, technology practice case studies, curriculum support material and assessment information and examples.

The fourth and final part of Workshop 2 focused on the generation and collection of more data. Participants were involved in gathering the data themselves by working in pairs, with one interviewing the other. This activity was called 'The Daily Snoop' (Appendix 7). It was designed to be an interview scenario/role play where one participant acted as an interviewer and the other as the interviewee. They recorded their interviews via notes and reported back their findings to the whole group. The participants were provided with a number of starter questions but were also encouraged to ad lib. There were 18 individual teacher responses and some findings are listed below.

Question four: Do you have the support of the Senior Management Team of the school?

	Teacher participant responses
Yes	12
No	2
Unsure	4
No response	0

Question four sample participant comments YES:

- *Principal attends workshops. Frank has come and done staff meetings. Principal monitors progress. (Workshop two teacher response 1).*
- *Given provision of resources and space. Teacher release for course. (Workshop two teacher response 2).*
- *Anything which might improve the teaching in the school is supported. (Workshop two teacher response 3).*

Question four sample participant comments NO:

- *Barely, haven't had time to fill them in properly yet. (Workshop two teacher response 4).*
- *A gut feeling – an idea that Education for Enterprise has been added on top of other strategic plan 'focus areas'. The project does not appear to be valued, and time is not available for us to try and test these valuable ideas. (Workshop two teacher response 5).*

Question four sample participant comments UNSURE:

- *Teacher release for course. Workload restricts me from implementing programme. (Workshop two teacher response 6).*
- *I have recently returned from a year's leave so my experience with the project is very new. The project appears to be secondary to what is already going on in the school – an 'add on' because we 'have to'. (Workshop two teacher response 7).*
- *Fundraising project. We have funds but we don't have the freedom to buy things. Too much red tape. Must have all receipts. Will be interesting to see at next staff meeting how things are spent. (Workshop two teacher response 8).*

Question seven: In what way do you think the children have shown enterprising attributes give examples?

Responses were classified under the four criteria.

	Teacher participant responses
Yes	14
No	1
Unsure	3
No response	0

Question seven sample participant comments YES:

- *I can honestly say that the children in my class have shown what makes an “enterprising” person as pertaining to the Education for Enterprise attributes sheet. Interacting with school community and beyond, using more tech. tools to create and design their product, teamwork – realise working as a team you achieve more. (Workshop two teacher response 9).*
- *Being creative in designing ‘Games’. Co-operative working. Planning and organising. Working with community – letters. Started analysing the info – making instructions clear – pertaining to teaching the sport. (Workshop two teacher response 10).*
- *A lot better at working in groups. Driving their own learning. Asking their own questions. Better at inquiry process. Managing themselves. (Workshop two teacher response 11).*

Question seven sample participant comments NO:

- *They haven’t yet! (Workshop two teacher response 12).*

Question seven sample participant comments UNSURE:

- *Not obvious as yet – students have yet to really have the opportunity to develop skills – listening to others opinions. (Workshop two teacher response 13).*
- *Children have had little opportunity as yet to show enterprising attributes, over and above what is being introduced through Co-operative Learning Strategies and teacher’s natural interest in fostering risk taking, creativity, problem-solving, initiative, flexibility, independence(Workshop two teacher response 14).*
- *Not a lot as yet – promising after site visit – now starting to visualise. (Workshop two teacher response 15).*

Question nine: Do you think that school-community partnerships have been good for student learning?

	Teacher participant responses
Yes	14
No	0
Unsure	0
No response	4

Question nine sample participant comments YES:

- *Children are inspired by the real-life experiences of the speaker and are motivated to know more. (Workshop two teacher response 16).*
- *Yes definitely – could not do without community support. Acknowledge the support – letters etc. People willing to help out and donate. Lets children see what they are doing is part of the real world. Need to see that they are worthwhile contributors to society – learning the skills from/at school. (Workshop two teacher response 17).*
- *Motivating links with authentic situations. Direct feedback and informed research. (Workshop two teacher response 18).*

Question eleven: Do you think the professional development from this project has impacted on your teaching?

	Teacher participant responses
Yes	15
No	0
Unsure	2
No response	1

Question eleven sample participant comments YES:

- *Thinking about how I teach and in planning for more informed results. (Workshop two teacher response 19).*
- *More focus on enterprising attributes. Raised awareness. Shift in focus. Reassurance of importance of these attributes. (Workshop two teacher response 20).*
- *I am always now seeking curriculum opportunities to implement enterprise education possibilities. (Workshop two teacher response 21).*

Question eleven sample participant comments UNSURE:

- *Some I am starting to look for Education for Enterprise opportunities across my term planning.* (Workshop two teacher response 22).
- *Too early to say how well – first P.D. session today.* (Workshop two teacher response 23).

The Education for Enterprise project team reviewed the responses and some trends were used to inform future facilitation. Twelve of 18 respondents felt supported by the senior management teams of their schools. We had identified this as an important aspect and had tried to involve senior managers to actively engage with the Education for Enterprise project. Fourteen of the 18 respondents suggested that by undertaking the negotiated activities students were showing enterprising attributes. When asked to comment on school-community partnerships and their value for student learning 14 responded positively. When asked if the professional development programme we had offered had impacted on their teaching 15 indicated “yes”.

The last part of activity three involved the participants being asked to circle the enterprising attributes that they felt were quite difficult to enhance through their programmes. Some answered this in relation to bringing other teachers on board while others related it to their own classroom programme. One finding was that *working with others* seemed to be the most difficult attribute to enhance and yet is perceived as vital for Education for Enterprise. The responses to this part of activity three are highlighted in Table 5.

Table 5
Enhancement of enterprising attributes

Enterprising attribute	Teachers that think this is a more difficult attribute to enhance?
Look for and create opportunities	4
Identify and manage risks	2
Organise and analyse information	2
Generate and use creative ideas	3
See, solve and prevent problems	3
Gather and manage resources	1
Use their capabilities to go for goals	3
Work with others	6
Are flexible and handle change	4
Negotiate and influence	4
Use initiative and drive	2
Communicate and receive ideas	1
Plan and organise	4
Are fair and responsible	2
Work with the community	3
Reflect on what has been done	0

CLAIMS, CONCERNS AND ISSUES RAISED FROM WORKSHOP TWO

An evaluation form (Appendix 8) was completed by the participants attending the workshops. Analysis of these evaluation forms identified only one real issue from workshop two. All the participants were very positive about their experience at the

workshops. The only highlighted claims, concern or issue was that in some schools it is difficult to get the same amount of commitment to Education for Enterprise from other staff not specifically involved in the project.

The following discussion, taken from a video recording of one of the workshops, illustrates the implementation feelings among teachers. The participants reported that it was important to “*show that Education for Enterprise wasn’t another add on but simply another way of thinking, of using what was learnt in an authentic situation.*” (Workshop two teacher response 24). The participants felt that the best way to do this was to take small steps and show others what was being achieved in their classes. As a result of Phase 2 findings Frank, Dean and I decided to revisit the risk and mitigation analysis table and expand it slightly. The results are contained in Appendix 5B.

Frank and Dean were asked by Samantha to provide a synopsis of the project progress and identify any needs presented from each of the schools involved in the project. The consensus from both education facilitators was that all schools involved in the project were making good progress. Some were further along the enterprising pathway than others. They highlighted the main inhibiting factor was commitment to other projects and activities undertaken when the project began. This is why two of the original schools pulled out.

SCHOOL FACILITATION AND CONSULTATION VISITS

This section highlights information generated from additional activities undertaken outside of workshop during this research phase. The information comes from the school facilitation and consultation visits carried out by Frank and Dean. Descriptions of previous undertakings and shifts being made by schools involved with the Education for Enterprise project are portrayed. These portrayals are in response to research questions 3, 4 and 5. Frank and Dean worked closely with the schools to ascertain their progress and develop ‘where to next’ scenarios. An abridged version of their reports, discussed prior to submitting progress reports to Samantha, is highlighted in this section. It is useful in detailing the different projects

and implementation approaches taken. Where appropriate, and for clarity, an overview supplied by the education facilitator working with the school is provided in italics before a deeper analysis is reported. According to Guba and Lincoln (1989) and Holloway (1997) thick descriptions are utilized to detail the experiences of the participants and the phenomenon being studied. This section highlights the projects the schools had undertaken and the growing facilitation offered by Frank and Dean in response.

I have included these thick descriptions as they highlight shifts in undertaking and a growing appreciation and understanding of the components which make up the technology curriculum injector model. They also allude to the extent to which the findings of this research have been shaped by the work of the participants and are not a reflection of researcher bias, motivation or interest. These thick descriptions also add to the credibility and confirmability of any such findings. The thick descriptions have been developed from (a) facilitator reports, and (b) member checked recorded interviews and discussions.

City School One (Frank)

Some very enterprising plans are in the pipeline for City School One with the opening of the new Poutama Centre. There is a need to find the best way in practical terms to use this space and other teaching areas in the school so they can best enhance the plans we have for an enterprising integrated programme. Early indications are that everyone wants to use the Poutama Centre at the same time. Another need is ensuring the plans and hopes in Education for Enterprise that senior staff have, are carried through into all teachers' programmes.

This is the only school with a background in the Primary Enterprise Programme (PrEP) and it was fairly ingrained in the school. The Primary Enterprise Programme and Community Enterprise programmes are designed to provide authentic contexts for students to practice and enrich their enterprise and financial literacy skills. The Young Enterprise Trust offers a suite of primary enterprise and financial education programmes, resources, and competitions for students from Years 1-8. The first couple of visits were spent discussing the programme and its set up with staff and

seeing a PrEP day in action. Frank also worked alongside a group of students as their 'expert' while they developed a PrEP magazine.

In November 2006 Frank attended a whole school staff meeting that was part of a planning session for teaching and learning developments for that year. The main thrust was that students should become enterprising when they apply their learning. Frank looked closely at what the school did then in relation to the promotion of enterprise learning and where future work could fit in.

City School One had a major technology block nearing completion and this was designated to become one of the learning centres for a very enterprising integrated programme. In line with our desire for Education for Enterprise to fit into what was already planned, some ideas were discussed and possible briefs formulated for trial in the school. These ideas were linked with the 2006 programme of inquiry, the first of which is Tu Rangitira - An exploration of the nature of self. It ran in Term 1.

The focus for the junior students was themselves and their families. The focus for the middle school was themselves, each other and their school community. The focus for the senior school was themselves and their global community. The Commonwealth games would play a big part as an underlying theme in the development of these units. Cooperative learning packs compiled by the facilitator were also distributed throughout the school for the staff and collected. Feedback indicated the learning tools ideas contained in the notes were being well used.

A meeting between Frank and senior school staff members revealed the following key actions being undertaken:

- the development of self-assessment and the importance of it in the school;
- the opening of the new Potamu Centre and how it will be used;
- the use of mentors in the school through the Futureintech programme;
- the viewing and discussion around a planning guide that matches attributes from the technology essence statement with desirable outcomes for Education for Enterprise;

- a discussion about the role of the envirogroup in the school and the opportunities for the gifted and talented students that could be offered through Education for Enterprise;
- the organisation of meetings with the director of technology and the food technology technician.

A second meeting with senior staff on 4th April focused on planning in term 2. The main aspects discussed were:

- the development in the use of the Potamu Centre in an enterprising way. The integrated approach is proving very popular as all class levels want to use it at the same time;
- how the gifted and talented students of the school will be given opportunity for some enterprising units of work that will run alongside their class-based enquiries;
- the syndicate themes and the necessity to create the authentic learning experiences by moving forward from the initial stages and creating the need for any gathered information.

City School Two (Frank)

This school is making excellent progress with many of the characteristics of an enterprising programme evident at the beginning of the project. Enterprising student input into the development and opening of the new performing arts centre will be a priority for this year and the inclusion of expert mentors in this initiative.

The school has been engaged with enterprise activities for a number of years. Their vision statement talks of providing a framework to challenge students to develop skills of excellence in their lives within this supportive community. School Principal A stated that:

“we want children to develop skills that will allow them to cope with, and to be able to operate in, a competitive world when they leave school but be able to work supportively and collaboratively with others so they can

get out there and cope with all the demands that life out there will obviously challenge them with.”

The whole school uses an enquiry-based approach to learning and for the last four years they have been moving steadily to the point where embedding it in is taking place. There are a lot of shared planning and syndicates meetings so everyone knows what is happening. Student input/ownership comes fairly soon after the skeleton of the teaching and learning plan has been developed by the teachers. The students are involved in forming rubrics for self-assessment.

There is a big emphasis on the *knowledge attack* at the beginning of the unit. School Principal A states: *“Unless they build the knowledge the students don't know what they don't know and they don't know what path they want to follow.”* Much of the success of the units is based on the use of authentic contexts. The students are expecting to see a real need now. According to Frank the students get so enthusiastic because they know that the outcome of the end of the unit is something that is tangible and something where they can contribute and get something quite substantial from when they complete it.

Frank reported that they have started to bring in the enterprising aspect although some aspects of an enterprising culture were embedded in the school before this project began. Models of the enquiry approach tended to end at the presentation and a further enterprising approach could help increase the use of knowledge and skills gained. The early facilitation meetings with Frank focused on existing pre- planned units.

For the senior school there was a wearable arts unit and they had identified some enterprising aspects which were built into the unit:

- the unit would involve the community at a fashion parade and also involve parents helping with the gathering of resources;
- there would be student input in the organization of the event;
- the students were involved in formulating the assessment criteria;
- the students worked to a planned brief;

- opportunities were built in to ensure the students could be flexible in what they did;
- the students had to negotiate within their groups
- the students worked to a deadline.

Once the unit was completed there were two shows held for the local community both of which gained positive responses and feedback. Most of the students involved had dedicated roles to undertake, some examples included speakers, photographers, assistants, ushers etc. One of the students was the show host and announcer. The script used was a collaborative effort between the staff and students. Students chose the music, which a teacher controlled it from her laptop. A DVD was made by a teacher with student help.

One of the teachers believed that a small student team could event plan the next show alongside the teachers. This would allow for even more student input - but she doesn't believe it is something that could be given over completely to the students: *"In terms of handing it all over it is too much to expect that it will all come together and then find the time to plan and have all the meetings and do all of the things that you are expected to do - too stressful."* (Phase two teacher response 1).

More control of the music and the making of the DVD by the students are two things that would have enhanced the enterprising attributes further and it is likely these things would have been done if time had permitted. One interesting development at City School Two that illustrates the students taking more ownership of the learning process is in the way they self-assess their work and take part in planning.

Meetings with the middle school syndicate focused on the planning of a spider unit with the enterprising aim of the students teaching their parents through a Spider Expo about the worth of spiders. Enterprising aspects which were built into the unit included:

- the students were to keep a photographic record of the unit's progress;
- the information was to be shown in an interactive way;

- the plans were made for student input in aspects such as hall layout, design of invitations, learning about the sound system, booking the hall and equipment and setting up data projectors etc.;
- the teachers also showed Frank how they would formulate their rubrics for assessment.

There were some interesting examples of enterprising characteristics and technology education achievement objectives being exhibited throughout this unit. Students were working towards addressing an agreed brief and working towards a deadline. They were connecting with the community by devising and conducting surveys with their parents. The students liaised with experts such as Ministry of Agriculture and Fisheries (MAF). Inviting and working with a spider expert from the research institute Landcare that visited the school with her spiders.

Frank reported that there was a little more teacher input in the presentation than originally planned, but the expo was held in the last week of term and time became a factor once again. The comment below from one of the teachers shows that although the outcome wasn't exactly the one that was hoped for, the students had to engage in some enterprising learning in their attempts to change their parent's attitudes

“The children in the spider study learnt a lot and they realize now that all spiders are not big monsters. I still don't think the parents have had that communicated to them. I still think the parents' influence and fear is coming back on the children”.
(Phase two teacher response 2).

An interesting piece of enterprise that has begun at City School Two was the formation of sports mentoring groups. Groups of Year 7 and 8 students were mentoring the younger students in their lunchtimes and this was proving successful. Another project that Frank had started with a teacher in a Year 6 class, was to implement a fundraising idea for the school with the class using the Trade Me (Like eBay) website. The final comment from Frank was that there were some excellent examples of enterprising learning happening at City School Two and the future looks positive.

City School Three (Frank)

Comments from staff indicate that Education for Enterprise helps draw the class together and that there is a heightened sense of engagement among the students. This has been evident in my visits to the school. We will try to increase the level of community involvement in the next unit of work and we need to formulate a plan for showing the rest of the school what Education for Enterprise is all about.

The Education for Enterprise work at City School Three stems from a major planning day in December 2005 during which Frank linked Education for Enterprise concepts and ideas to the school's Learning Pathways overview. The day was based on the following Education for Enterprise aspects outlined below:

- Education for Enterprise education promotes the critical importance of areas such as literacy, numeracy and technology within a life skills approach;
- Education for Enterprise does this by continuously reinforcing the relevance and personal meaning of the knowledge and skills that students are acquiring;
- Education for Enterprise education enables students to apply their literacy, numeracy and technology knowledge and skills to real-world problems in ways that make sense to them;
- students become enterprising when they apply their learning;
- a focus on the development of enterprising behaviour in authentic situations and make the learning environment as real as possible;
- in this way students become actively involved in and own what is occurring.

These aspects were linked to the following units, each of which lasted a term:

1. Do we need leaders?
2. How do the arts help me learn?
3. How do structures and mechanisms make life fun?
4. How does my brain work?

The first three of these units were planned in advance but it was thought Frank and the school staff would reflect on these before planning the fourth later in the year. Subsequent visits by Frank were spent in observing and discussing the progress of

the first unit, 'Why do we need leaders?' Frank attended one of the Commonwealth Games Days organised by a Year 5 and 6 class for their younger Year 1 and 2 buddies. The following eight examples of enterprising behaviour were observed:

- (1) The students were setting up the hall for the big day themselves and had been doing so from well before the schools usual opening time - they were very keen to be involved.
- (2) One team was engaged in face painting the faces of their younger buddies.
- (3) During the Games it was noticeable how much the older students looked after their younger buddies and there were very few students not engaged.
- (4) Student leaders were engaged in giving instructions but teacher input was needed for vital instructions.
- (5) The students had organised morning tea, including the choice and negotiation of supply from a school contact. It was based on what they thought should be a healthy meal.
- (6) Flags of the countries had been researched and painted by the students.
- (7) The students had organised the booking of the hall, grounds, tennis court, video camera gear microphone and sports gear. It was quite a big logistical exercise.
- (8) The students organised and ran the closing ceremony, dance and presentation of certificates. They had written speeches, made medals and they made sure everyone got one. Following the event Frank and the teachers at the school discussed ideas for self-reflection and an example format was prepared.

City School Four (Frank)

The need here is to slowly introduce aspects of Education for Enterprise into classroom programmes and promote the idea that students use what they learn. City School Four has had a big turnover of staff in the last 18 months and the principal sees the integration of Education for Enterprise concepts into classroom programmes as an important aspect of having Education for Enterprise as part of the school culture. The new building programme sees several environmental projects that can be worked on and these are about to be started in an enterprising way. There is a real culture developing, of promoting enterprising behaviour among individual students and the encouragement for students to form, run and promote

their special interest through a club based at the school. We need to closely follow the impact of these initiatives on student learning.

It was decided at an initial meeting between Frank and the school that a link to the Enviroschools contract would be an ideal way to build on the work they had completed in 2004. The school had already been involved in projects like zero waste and, with the local council, creating a safe park to walk through on the way to school. Big building projects at the school ended in 2005 and a number of areas of the school needed to be landscaped. It was agreed that this could be achieved through a combined environmental enterprise technological problem solving approach. Further discussion centered on the development of Education for Enterprise concepts and authentic areas of study within the school's existing teaching and learning units.

At this meeting it was also deemed important that (a) teachers' time is not taken up by organising projects, (b) that the students should be enterprising and set things up themselves, (c) that the teachers don't see Education for Enterprise as an add-on, and (d) that reporters from school will help get the ideas back to the community.

It was agreed that the lead teacher would work with the education facilitator in integrating some Education for Enterprise ideas into existing units. The progress of these would be weaved into a staff meeting in November where they would introduce Education for Enterprise to the whole staff. This workshop would also show how Education for Enterprise links with the Enviroschools project. Frank attended the initial staff meeting run by the Environmental coordinator for the staff and the idea was to continue the planning from there. However, both the lead teacher for Education for Enterprise at City School Four and the Enviroschools coordinator left on maternity leave and this stalled the project's progress.

Frank did hold the introductory staff meeting and presented a PowerPoint presentation outlining the ideas behind Education for Enterprise. This gave the opportunity to show how Frank had linked some enterprising ideas to a school unit that was already planned. A wide variety of ideas were put forward for possible inclusion in the unit entitled *Customs, Traditions and Festival*.

A whole school staff meeting on meeting 15 November covered the following points:

- Education for Enterprise is about giving students opportunities to apply their learning in authentic situations
- Education for Enterprise can cover three aspects: (a) special projects, (b) school events and, (c) the school's teaching and learning units
- There is a strong link to the Key Competencies from the curriculum
- Together teachers identified what is enterprising at City School Four now
- Together teachers identified examples of explicit and implicit learning
- Together teachers looked at Education for Enterprise and its relationship to technology and in particular the technological practices strand
- Together teachers looked at the research process and what teachers would be trying to find out.

The first visit in 2006 looked at the Education for Enterprise connections in the Veolia transport competition. City School Four had been involved in Wainona Park; an initiative which finished in January 2006. By working alongside the council, parents, local community and the travel-wise coordinator the students were involved in putting tracks through the park. They were also involved in eliminating the weeds, planting native plants and monitoring and clearing up the waterways. The idea was to make the local environment not only attractive but safe, with off-road walkways to school and any crossing points patrolled. The walkway is shared by cyclists and pedestrians. Thirty to forty school families currently used the walkway.

To increase enthusiasm a presentation on Education for Enterprise was organized. Frank, a teacher and the school's coordinator for the travel wise programme showed the students how the park was currently being used. Improvements and new ideas for a travel wise system for the rest of the school's catchment area were identified. A further research model was presented for discussion that followed a similar scenario and they looked for obvious links. They looked at an example of a brief and it was decided to try, within a very short timeframe, to prepare something for this international competition.

Other initiatives that were discussed as opportunities for Education for Enterprise included a school magazine, which was already up and running in the school. The magazine staff already cover events such as school sports events. It was decided, however, that students should work with mentor experts and visit places where publishing takes place. The teachers agreed to look to coordinating this in the near future.

Students were to organise a Commonwealth Games Challenge Day with their peers competing in houses. When reviewing the teaching and learning topics, they discussed the necessity of learning pathways rather than putting subjects in their own boxes. It is through this integrated approach that the aims of Education for Enterprise are to be addressed. In the third and last visit for the year Frank met with the principal, and later the senior staff, for a school-wide planning session. The main points covered were:

- the necessity to begin the environmental options themselves rather than wait for the new enviroschools coordinator. They examined alternatives from around the school;
- that the travel wise competition was not completed because of a lack of time;
- an innovative fundraising idea was examined which would involve coordination by the students.

Coastal School One (Frank)

There are some good things being tried here and it will be important to share them over a whole staff to get buy in and continuity for the project. The REACH programme shows that this can be done. Here, too, there is a need to promote the idea that Education for Enterprise is a vehicle that enables students to use what they learn in an authentic setting. This is how enterprising attributes will be enhanced in the students.

Three syndicates at Coastal School One all plan their units of work fairly independently, but they are bound by the REACH programme that is part of the culture of Coastal School One. The REACH programme is the key for behaviour expectations and part of a positive behaviour support programme which aspires to

develop in students the desire and capacity for: learning to think, learning to do, and learning to be.

REACH is:

Respect - Respect your school, your community, yourself, others, learning.

Expect - Expect the best that you can be.

Achieve - Challenge yourself.

Communicate - Communicate actively.

Hauora - Feel good, be safe.

Coastal School One was the first school in New Zealand to implement and trial the introduction of this programme. Part of Frank's time had been spent talking to teachers about this programme and analysing some of the literature in the school. Building partnerships with the school community is a REACH goal. The students also plan and run the school assemblies. A different class has this responsibility each week which works out three times a year for each class. Assemblies last from 8.45 to 10.30 am so they require organisation, cooperation and communication from the students - all goals identified for Education for Enterprise.

The students have plenty of opportunity to become independent users of ICT aids such as PowerPoint the school has engaged an IT consultant, an expert mentor, to teach them these skills which are another goal for Education for Enterprise. Working with the students in term 4 of 2005 Frank saw the benefits of this mentoring as he worked with students on a publication. The REACH programme is fairly prescriptive. There are manuals which detail lesson content. These tell the teachers what to say and do. This is deemed necessary to get consistency in the approach across the whole school. Consistency is believed to be a factor in gaining a successful outcome.

This approach does stifle the enterprising aspect of teaching for this part of the teachers' planning. Frank, Dean and I believe that enterprising teaching and learning activities demands creativity on the part of the teacher. Just how the REACH programme affects what can be achieved in Education for Enterprise would be

interesting to observe. The middle school syndicate had been part of the Education for Enterprise contract in 2004 so initial input from Frank went into the Year 3 and 4 syndicate.

A year 3 and 4 *Paper Day* activity was part of a unit of work that revolved around change. By working with a small group from each class Frank saw it as an opportunity for the teachers to come to grips with some aspects of Education for Enterprise and a good chance to gather some data. Some students had worked out their activities but in most cases they had taken the easy option. The activities were fairly simple and not as challenging as the ones they had been doing in the class. The students reported they weren't given the time to get the things done. An interview was carried out with the teachers and audio recordings were sent to me.

With the Intermediate Syndicate a number of possibilities were explored for a beginning project. Frank met with the syndicate and they planned to add an enterprising element to the REACH work, which was to be completed in term 1. This term the school focused on the respect element and together they came up with a brief that could form the enterprising aspect of the unit. Unfortunately, the brief wasn't utilized because of other commitments in the syndicate over the first term. They met as a team again at a later stage and the teachers were committed to adding an enterprising element to the next unit - a Rocky Shore study. They had already brought in an expert from the Regional Council to work with the students on an introduction to this unit.

As a group they considered an idea that stems from some research by David R Schiel, a marine biologist from Canterbury University. Dr Schiel had found that the seaweed Neptune's Necklace was being destroyed as tourists tramp along the rocky shore. It was thought that this seaweed would regrow quickly, but his work shows that regrowth either doesn't happen or happens very slowly. They knew that a large number of local schools use these reefs for their studies. The brief would be to examine the effect of this traffic on Neptune's Necklace, find out just how many classes visit the reef, and design with a very simple education package that will explain the problem to teachers and classes and offer solutions. Teachers involved with this idea were concerned about the lack of resources for their Rocky Shore

study so Frank prepared a photo pack and CD based on the reef to use as a main resource.

Frank met with middle syndicate to check on their progress. Two of these teachers were involved in the enterprise project in 2004. The early part of that year's work didn't seem to involve anything that was uniquely enterprising and, as with a lot of classes, the time has been spent in setting routines and introducing early programmes to build good work habits. Frank and the teachers discussed future work and went over planning guides which show the links between enterprise and the technology achievement objectives.

Coastal School One has had major road works outside the school gate and the road dynamics had changed considerably. The syndicate decided to incorporate this authentic context into their planning, with the students involved in solving some very real problems, including safety issues. The students don't, for example, know much about cycle lanes, they had been put in the town for the first time. Educating the locals will be part of an enterprising brief.

A discussion centered on the actual use of project research. Students had been involved in an enquiry approach but the only purpose for the enquiry was to present their findings. Talking about how the work can actually be used seems to help teachers to direct their thinking along more enterprising lines.

Frank met with one of the Year 7 and 8 intermediate syndicate teachers and they outlined plans for the redevelopment of a gully area in the school. This would be a landscaping project and would be one of the activities students from the whole school could opt into, Since Tuesday afternoon they have the opportunity to take part in one integrated activity.

A trail had been set in a gully with native trees, streams, a waterfall and a glow-worm area. Over the last few years it had been neglected. The teacher wanted different groups to work on different parts of the area and each group would be responsible for one aspect. Mentors were planned for, including people from the Regional Council. There was also a possibility of obtaining some funds through the

technology and science budget within the school. Local sponsors might also be found. It was decided that the gully redevelopment would be a reasonable enterprising project.

A second project was identified relating to healthy eating. The teachers identified a need to change from a traditional canteen that sells a range of pies, sausage rolls and chips changed to a healthy canteen, with student input on the menu. It was eventually agreed that four different groups could be set up, one per class, each following a different brief. For example, one would work on the surveys; another would carry out the research. This would be conducted within the planned unit of work.

Teachers were concerned that the students would need lots of direction and there will not be time to do it. Project discussion would continue at the next meeting.

Coastal School Two (Frank)

The main need here is to promote the concept that Education for Enterprise sees the students using what they learn and that this can be done by looking and modifying topics already planned. Somewhere along the unit's track there needs to a pathway to achieve this and this will be our focus in term 2. There is a real need to show the whole staff that Education for Enterprise isn't an add on and this will be a priority in the next phase.

Coastal School Two had a major event focus for Term 4 of 2005. It was called ZOMAD, an art's and music festival based on WOMAD. WOMAD is New Zealand's largest world celebration. WOMAD is a three-day festival featuring music, art and dance from around the world. There were a number of enterprising aspects in the running of ZOMAD. It involved coordinating acts from other local schools and it was held on a Saturday. It was not, however, organised as part of this Education for Enterprise project and being a major event it meant little enterprising preparation outside of this event could be done in this term. A whole school staff meeting in the week before the start of the new school was held with the following aims: (a) to review the philosophy and attributes being promoted through Education for Enterprise. To (b) show how Education for Enterprise links to both the National Curriculum Key Competencies document and the schools own philosophy.

The school conducted a cultural review which was carried out in 2004 and 2005 the suggestions were:

- to link a major school goal writing to a practical beginning-of-the-year Education for Enterprise activity;
- to introduce more cooperative learning ideas to enhance the work already carried out in this area;
- to introduce the concept of brief writing to staff and students understanding of working to a brief.

Frank and the junior syndicate staff discussed long-term plans and possible inclusion of Education for Enterprise aspects. They identified and discussed a possible major landscaping project. Frank and the teachers went over the planning guides linking Education for Enterprise attributes with technology achievement objectives. They also examined ideas for writing and involving students in briefs and covered some examples being trialled in other schools. They reviewed a forthcoming unit based on control technology and ways in which the enterprising way of learning could be fostered during this unit. It was suggested that after the knowledge-building phase a real school problem is addressed with the students coming up with a solution. Teachers studied a research model that could be used as the base for planning the unit and in the knowledge building phase went over a range of cooperative activities that would encourage an enterprising way of thinking. A cooperative learning pack was left with the teachers, as were all examples of ideas shown.

Coastal School Three (Frank)

The community project with the local fire brigade needs to continue and our early website needs to be built at the beginning of term 2. This will add impetus to the project and a base to build from. Students need regular contact with their mentors involved in the project and they need to continue to keep a photographic record of progress. This main project is being carried out by the senior class in the school and it's important that the rest of the staff and students in the school follow the progress. The enthusiasm from the rest of the staff must also be maintained as they look for ways to include an aspect of Education for Enterprise in their programmes.

Early meetings at Coastal School Three focused on the setting up, in an enterprising way, the school gardens. They were going to be built by the Board of Trustees but students designed, prepared and planted them. This work progressed over the term and proved a useful introduction to Education for Enterprise, for both the staff and the teachers. Frank attended a morning where a class harvested the garden and made healthy hamburgers for lunch. The students worked with mentors from the local community throughout the term. The garden work was evaluated at a later session with the staff and the following concerns were raised:

- the difficulties encountered came because teachers weren't working well with the mentors;
- the mentors weren't always delivering what teachers wanted because the teachers would be working inside and they would have a group of students outside;
- the students were disappointed because they had some great ideas but the mentors who knew these ideas wouldn't work weren't prepared to let them try
- there were some great ideas that they didn't get to do;
- they couldn't, for example, plant in the shape they wanted. The mentor knew things wouldn't grow too well that way so they stopped that. At least some ideas should have been trialled;
- one mentor was excellent but the other wasn't as good in terms of facilitating the students;
- the timing wasn't too good for harvesting because a lot was ready in the holidays and the (Principal) ate all the corn instead of the students.

The good thing about the mentors controlling the exercise and the time of year they planted was that the students did see some excellent results and they were really enthusiastic because they know their gardens will work. Some positive directions and ideas had emerged:

- the gardens had been cleared and they were ready to begin planting again;
- the mentors should be clear in their role this time for example, to monitor and guide students;
- to plant at the correct time so they can harvest during the term;

- to use a planting calendar book to get the right plants;
- it was decided that the students need to do a presentation to the mentors and show them what they really want to do and be allowed to do it;
- the mentors have limited time, which can cause a problem because it doesn't always fit in with class times;
- The students should take photos of what there is in the beginning so there is a timeline right throughout their endeavours;
- The caretaker needs to be involved in mentors' meetings;
- The students love the idea that it is their garden;
- There is a possibility of each house group preparing a garden

Frank noted:

The main thing they need to do is for the students to work out what they want to do and formulate a plan and present that to the mentors. That way, the mentors will get to see that the students really want to be doing everything themselves. It's hard for the adults involved to stand back.

The second major project they had set up was a relationship between the school and the local fire brigade, who were having a 50-Year Jubilee. The brigade was restoring their original 1932 V8 fire engine and students were following the progress and creating a website to highlight this project and promote the jubilee. The students would also have input into the design of the museum being built at the fire brigade. The students were introduced to the project with a trip to the restoration site and they were able to interview the restoration team.

A whole school staff meeting was held on 28 March to look at the progress made and to reinforce the ideas behind Education for Enterprise and its links to the technology curriculum. They looked again at the things they should be fostering, including enterprising learners taking more ownership. They used the event organisation of an event as an example. They next looked at the technology links and Frank introduced a planner that links the technology achievement objectives from the new essence statement to the enterprising attributes. From this they broke the process down into stages and looked at a design process. Using an empty design process template the teachers were given a scenario - the same one the principal and Frank are using in the

senior room. That is, the local fire brigade is having a jubilee and there is a need that the students can try to meet. What might the brief be?

Discussions revolved around finding real needs and having the students follow a design process to find a solution. Coastal School Three was finding the integrated approach with a whole term study best met the enterprise approach. It was identified that extra time would be needed to be there to develop the knowledge and go through the process in depth. The old timetable allocation of three-week units just didn't work. The next step at Coastal School Three is for the teachers to include an enterprising aspect in their next unit and for the Jubilee project to continue with the development of the website.

Coastal School Four (Frank)

Here they need to bring the enthusiasm and sense of worth for Education for Enterprise that is shown by the principal and lead Education for Enterprise teacher to the rest of school. This will be done partly through highlighting the progress of a couple of special projects, but there is a need for more classes in the school to introduce an enterprising aspect to their programme and share what they have done with others.

This school was involved in the Education for Enterprise project in 2004. It involved one syndicate but the aim this time was to involve the whole school. They began with a whole school staff meeting. They held an Education for Enterprise review. The main points raised were:

- Education for Enterprise is an approach to learning;
- students become enterprising when they apply their learning;
- teachers should focus on making sure the students connect why they are doing things;
- Education for Enterprise is about the pedagogies that promote students as enterprising learners;
- it is important that students develop skills that they can transfer from one situation to another.

Frank and the teachers looked at the project *Children's Corner* (a newspaper) and how they could turn it into something that all students in the school have a share in. They explored the reasons for setting this up in the first place and the benefits for teaching and learning. They identified that through the newspaper project that students grow to appreciate that they write for the reader. There was a real context: they write to share. As a teaching staff they looked at ways the whole school could have ownership and ways of producing the newspaper regularly in a hassle free-way. Frank worked with the senior classes in the school to introduce the idea.

The students wrote job descriptions and vacancy advertisements and these were displayed around the school. A *Human Resources Team* was set up; this team comprised four students who had shown ability in enterprise in previous work. It was agreed that this team would sort through applications and shortlist applicants. The teams of publishers were engaged and at a meeting the students decided to get out a big Christmas edition of the *Children's Corner* newspaper.

At that stage of the year, teachers were busy so it was seen as an opportunity to let the human resources team take control. An email was sent which reminded them of their tasks. Two student accountants had worked out how much the newspaper would cost and a team went out into the local community to raise the necessary finance. The students were successful in this endeavour and raised around \$250 to fund the feature paper. The Christmas edition of the paper was published for the whole community. The Coastal School Four principal praised how the students worked and also the impact their endeavours had on the local community. Frank noted: *I went back to the local business community to thank them and they were buzzing and very eager to see this continue. They talked about the business-like approach of the students and were very impressed with the polite way they dealt with them. The P.R. for the school was really very, very good.*

The students reached a stage where they could have continued this venture independently and they made sure that at least half of the chief organizers would return to the school in 2006. Unfortunately, the Year 5 student groomed to be the next editor-in-chief left the country over the Christmas break and the Children's

Corner didn't evolve independently as expected. They tried however to re-launch Children's Corner with students taking as much ownership as possible.

Rural School One (Dean)

Rural School One operates as a series of satellite units, each based in different locations around the city. The study unit which is referred to as '41' within the school operating structure has around a dozen special needs students in the 18-25 age bracket. The school principal and lead teacher both took part in the 2004 enterprise education project.

As a result of discussion following the first cluster workshop, a major whole unit focus for staff and students at 41 over 2006 would be, on the production of goods which were to be marketed and sold within the schools immediate community. This would involve student and staff activity across the whole teaching and learning spectrum within the unit. In term 2 this activity was to be enhanced by the redesign and hopefully rebuilding of the front garden of the unit to create a growing area for specialist plants which could be used to supplement the enterprise activity.

This was a fundraising project and a small budget had been set aside to pay for purchases. There were concerns raised by the class teacher that the red tape surrounding the budget might affect the freedom to quickly buy things and sustain the project. This issue would have to be addressed, as would other issues relating to finance as they might result in a loss of student ownership and involvement. A number of general observations were made by Dean, in consultation with the teaching staff:

- goods produced so far have included cooking, mosaics, growing seedlings, preserves, pickles and painted pots;
- two teacher aides control the two main areas. Fundraising slots are timetabled and goods are sold on Thursday in selected schools. These schools are faxed a list of items a day earlier. The response has been excellent;
- the students loved it. Faces light up when money goes in the container;
- there is a belief that the Education for Enterprise exercise benefits these particular students. For example, the autistic students are out of their comfort

zones and are going into environments they wouldn't normally go in. They want to go out to different places and sell when normally they like routines and familiarity. These students are 18 to 28 years old; all have intellectual challenges and some have physical disabilities;

- the staff are enthusiastic and are looking at ways of spending the money;
- the students also go to various places to obtain raw products;
- this enterprise project is almost a necessity.

Out of 10 students only three received funding and to take these students on trips, the school has to fundraise. So this is an Education for Enterprise project was based on a very real need.

Rural School Two (Frank)

Frank noted: *It was important to harness the enthusiasm of the two lead teachers to create an enterprising aspect to their programme and then allow time to share the ideas tried with the rest of the staff. The middle and senior school favours units of work that were a little shorter in time span than other schools in the project and it can be more difficult to develop the enterprising aspects as these often come after a good period of knowledge building. Rather than suggesting wholesale changes in organisation it was decided to show the results of those few initially involved and then discuss the changes and look for more inclusion at a later stage.*

Rural School Two joined the project with the view that Education for Enterprise could help achieve the goal in their strategic plan of providing relevant and meaningful learning programmes and learning opportunities for students. As with other schools, the education facilitators began this phase with a presentation to the whole staff that introduced Education for Enterprise concepts and the research part of the project. It was deemed important to show teachers where they were already involved in aspects of Education for Enterprise with their students. Examples found in Rural School Two included: (a) Kite making, (b) students and parents creating a mural in the school bike sheds using mosaics, and (c) bike safety, where the students are involved in working out a bike safety course.

One teacher commented that: “*We’ve been doing some of this stuff but Education for Enterprise just makes it a little more deliberate*” (Phase two teacher response 3).

At another meeting with the principal and senior staff Frank established the following ideas and plans were put in place to facilitate them:

- the importance of beginning with something small that is already planned; for example link aspects of technology to the Commonwealth Games studies;
- role models in the school, particularly for boys, was identified as an important part of the strategic plan. This was seen as an area to involve mentors in the enterprise projects as it would get them into the school for a specific purpose. It was agreed that this was a better approach than just inviting them in to show what they do for a job;
- Thinking Hats - a goal for this school was to see the De Bono’s *Thinking Hats* used more regularly as a learning tool and Frank arranged for another teacher to give a presentation at a staff meeting to show how she uses the hats in her classroom and how the school uses the ideas in a whole school way;
- the Thinking Hats process would be utilized in a staff meeting to plan the native bush development area in the school.

Further discussion between Frank and the senior teacher with responsibility for Education for Enterprise at Rural School Two identified some issues:

- the importance of presenting to staff something that won’t be too overwhelming. Ideas for the proposed native bush development were shared and examples and models left in the school;
- the coming Commonwealth Games was an area where resources would be shared;
- Enterprising ideas within this theme were designed for sharing at a later staff meeting.

Then at a full school staff meeting later:

- introduced the planning guide that focuses on the technological practice strand of the new technology draft curriculum document;
- discussed the possibilities for native bush development. Main point to come out was that every teacher knows his/her strength and the opportunity to do a lot of little projects within the main one would be good;
- a timeframe was established. Planning with the teachers was to begin late term one with a view to starting term two. Teachers would in the meantime try some enterprising ideas within their existing Commonwealth Games units.

A full school staff meeting was held at the end of the term with the outside teacher giving a presentation on the Thinking Hats. The next steps would be for the two lead teachers in Education for Enterprise to plan a unit together based on the early development of the native bush area. Each step made would be communicated to the rest of the staff as a way of slowly bringing them on board.

Rural School Three (Frank)

Education for Enterprise is becoming part of the culture of the school and teachers are constantly looking at ways of enhancing their programmes through its inclusion. It's important for the facilitators and staff to continue to share the good work and ideas and focus closely on the impact it is having on student learning. This school was involved with the enterprise project in 2004 and a culture of Education for Enterprise is now embedded throughout the school. Education for Enterprise had been introduced through a major school environmental project and it was important to sustain the enterprising way of thinking and ensure that Education for Enterprise became a part of the planned units in the school.

Growing and Change was identified as a theme for Years 1 and 2 the *knowledge attack* began with a Garden World Garden Centre visit and four different growing activities were put in place with students working in groups of four to produce the following: (a) a caterpillar in muslin, (b) plastic bag plants, (c) jar plants, and (d) a growing mat.

The class had been focusing on halves and quarters in math so each group of four students produced a garden guide using digital photography on a circular spinning disc. The disc is divided into quarters with a stage in the groups growing activity illustrated in each corner. With Frank they looked at examples of briefs. Students worked to a simple brief prepared by the class teacher. The students would work with mentors-parents but the teacher would guide parents, first in the importance of working as facilitators and not doing the tasks for the students. In response to concerns raised it was established that reflection would play a big part and diary writing would be done throughout this project as part of the present writing aim.

A *Growing and Health* theme was used as a motivator for Years 3 and 4. The students grew tomatoes and made use of the worm wee that the senior school processed. They recorded the growth progress of their plants. The enterprising activity centered on healthy lunches. The students began with a survey to find out what others in the school would like to see in a healthy lunch. Frank and the teachers discussed briefs and examples were prepared that could be used as a starting point for this activity. Students in one class surveyed other groups in the school following a brief. Working to this brief the students decided what would go in the lunches and they designed the order forms and did all the tasks parents usually do. Each group did a different job. A follow-up survey gauged the rest of the school's thoughts to find out whether the wider school thinks there should be changes to the school lunch system.

The Year 7 and 8 classes had set up a worm farm in an old bath and wanted to market and sell their product at the annual pets' day. As a class they brainstormed for ideas and came up with these categories of participants: (a) *The promotion group*. These students would be responsible for advertising the product. They had to come up with a name, a way to label it and advertise, (b) *The stall holders*. These were the sellers. They had to liaise with the home and school association to find where they could have their stall and then organise what they would need for their stall and set it up, and (c) *The knowledge group*. These students would gather information about their worm wee and use this knowledge in activities such as designing customer satisfaction surveys etc.

Students had worked out the attributes that would be needed for the different jobs. Students were very enthusiastic and applied for jobs in one of the three groups after They ranked the jobs in a preference order and because of lack of time the teacher appointed them to a group. Within the group the students decided who would do what job. As the unit progressed some things worked and others didn't. These had all been documented. Frank looked carefully at the enterprising aspects of the unit and made the following suggestions: firstly, that the students need to find out more about the worm wee they have and see if the claims they are making are indeed valid. Second, they should test the different types of worm wee for effectiveness and look at the conditions that affect growth. The technology aspect would result in students researching and then designing and make a worm farm of their own.

A short overview plan was developed:

Session 1

- (a) Reflection using the Thinking Hats. Yellow hat: What were the good things about our promotion and sales? Black hat: what were the not so good things?
- (b) Setting up experiments aimed at finding out if different worm wee gains different results. The idea was to grow water cress "animals" with the students in groups using different products and photographing, measuring and recording results.

Session 2

- (a) Research different types of worm farms and visit a commercial worm farm. Students were to keep a photographic record. Working to a brief the students would begin to design their worm farm.
- (b) Record and photograph results from their worm wee cress animal progress.

Session 3

- (a) Complete their design; prepare a presentation to the class for assessment. Each of the other groups has an assessment sheet.
- (b) Discuss assessments from each group. Designers make modifications.

Session 4

- (a) Create animal records and photos.
- (b) Making the worm farms.

Session 5

- (a) Presenting the farms to a panel of “experts” and receiving expert feedback.

In Years 5 and 6 the chosen unit was named *Weed Busters* and was adapted from a Department of Conservation unit on noxious weeds downloaded from the net. The students identified what a weed was and looked at examples of some of the most invasive species. Several more innovative knowledge-building activities followed. The technology/enterprising input began with a visit to Bushy Park (the inland island) where the students worked with the teacher there to identify weeds in the park and the problem they caused.

They looked at a recently cleared area and could see how weeds easily took over if left uncontrolled. The Year 6 students were at Bushy Park fortnightly grubbing the weeds. These Year 6 students later became the mentors for the Year 5 students. Next the class visited a garden centre to look at examples of weed busting tools - those on the market. This was arranged with the garden centre, but unfortunately the staff were not as helpful as they could have been. The students did, however, have a good opportunity to examine the tools. Students also found out about the type of tools used at home and their brief now is to design a tool with a particular purpose in mind. For example, it may need to offer some form of protection because it will be used in a thorny area.

Students considered important technological aspects like anthropometrics and ergonomics. They worked in groups of three and hoped to video an advertisement for their tool. Video skills were also expected to improve as the unit progressed. Students created a model of their weed buster using materials that mimicked the actual materials; dowel, for example, for handles and aluminium blades recycled from cans. There was also a possibility that the students would see some of their designs made up: for example, watching a welder in action.

Part of the brief involved a presentation to a panel of experts, old gardeners from the district or perhaps the gardening writers for the local paper. Interviews were carried out with the teachers and students involved in these projects. Visits to Rural School three in term one continued to reinforce Education for Enterprise as a way of learning within the planned units. One successful unit was *Hats* which was carried out in the Year 5 and 6 class. The students had been working within the local community to obtain sun hats for the school that would be both popular and free.

These activities served as an illustration of how the classroom teachers establish encourage and enable students to recognise the importance of human resources in the community and to use them to inform and enhance their work. The students have been out into the community since this interview and gathered data at local schools. According to Frank, this met with an excellent response from the schools concerned and some real benefits for the students involved.

Rural School Four (Dean)

Due to an Education Review Office (ERO) visit the school was unable to be represented at the first cluster workshop in term four 2005. However, follow-up discussion confirmed that the HOD Technology would co-ordinate the enterprise education activity over the term of the project. Staffing changes meant that only one teacher would be able to participate in 2006. The initial planning session held at the end of term four confirmed that the focus for the year would be on the Year 12/13 graphics class. The teacher involved has had no formal contact with enterprise education but has considerable experience in encouraging wider community participation in his programmes.

This class is now working with the lead teacher at Rural School One as the client on the redesign of their front garden area. Through the local enterprise group the teacher incorporated initial mentoring is provided by a landscape architect. The project was scheduled to conclude at the end of term 2. The second major project for the year would be a focus on advertising media and students will be assisted by on-going contact with a local graphics and design company.

Rural School Five (Dean)

Three of the staff who took part in the 2004 enterprise education project were able to attend the first cluster workshop in term 4 2005. Follow-up planning in term four and in term 1 2006 had confirmed that two of the staff were able to participate during the year. These two, plus an additional staff member, attended the second cluster workshop in term one. The enterprise education activity during 2006 would be centered on three classes. The first is a Year 10 general studies class which is timetabled outside the core curriculum activity and which is able to focus on 'interest areas' such as 'enterprise'. This class is presently working on a canteen redesign project. The second is a Year 12/13 materials technology class and the third is the Year 13 graphics class – all would be working on client-related outcomes and all had an enterprise focus. Two of the three teachers were experienced in developing an enterprising approach to learning and the third, while new to the project, considers her teaching style to embrace this approach to learning.

Rural School Six (Dean)

After the first cluster workshop in term four 2005, the Head of Department (HOD) Graphics and Technology, took on the role of enterprise coordinator within the school. He organised a presentation to a full staff meeting and an enterprise education group was established within the school structure of professional learning groups. One planning meeting was able to be held with the group before the end of that term. Unfortunately the agreed plan was thrown into disarray when the HOD was appointed to another position outside the school taking effect from the beginning of the 2006 school year.

Following a meeting with the assistant principal it was agreed that Dean would co-ordinate a small group of three teachers who had expressed an interest in maintaining their involvement in enterprise education. These teachers considered themselves to be new to Education for Enterprise, but expressed a strong interest in using this approach to learning. The group had met for two 90-minute sessions during term one. As nobody from the school was able to attend the second cluster workshop the first session in week three focused on a discussion of the nature and intent of the enterprise education project and the developing of a structure which would fit in with the school professional learning groups (PLG) cycle for the year.

The New Zealand Trade and Enterprise (NZTE) Enterprise for Education DVD was introduced to the group and each of the three teachers were given a copy and assigned an area to investigate and report on at the next meeting. The group met again during week eight and a productive session with Dean clarified expectations and established areas within the teaching programme which each of the three teachers would be focusing on during term two. The curriculum areas covered health and physical wellbeing, computing, electronics and economic studies. Dean provided input into the individual planning via Email. The next group session had been scheduled for week four of term two.

Rural School Seven (Frank)

Some very good progress has been identified, so the need was to sustain it and ensure there is a degree of Education for Enterprise in the next unit of work. Term 1 saw some excellent work in a technology project but once the term ended so did the topic. This reached the stage for some real enterprise so there is a need for finding some way for the student's innovative fitness trail idea to become reality.

This school's involvement began in term 3, 2005 with a whole school staff meeting that introduced the aims of Education for Enterprise and the reasons for the research. Teachers shared several examples of Education for Enterprise gathered from schools in the 2004 project. Rural School Seven was one of those schools. A goal for the school in 2006 was an emphasis on developing written language and planning. This was to be achieved through the teaching of the deeper features of writing. It was thought that this could be a focus for the initial Education for Enterprise work by introducing real-life connected writing to both the teachers and students. A teacher-only day was held at the beginning of term one, 2006 and in a practical session staff looked at:

- using writing - the reality is that it can be quite hard;
- visual techniques to catch the eye and the use of magazines as writing resources. Examples were discussed and a resource was left with the teacher to remind them of real-life writing techniques, including bio boxes, vox pops and step by step guides;
- using these techniques in a get to know your students activity. The aim of the

activity was for the teachers to come up with some enterprising example that would link the home and school;

- setting up a student-led newsletter;
- linking some purposeful writing to a planned Commonwealth games unit.

A second visit and staff meeting where teachers looked at the setting up of a school newsletter which had begun with a group of four Year 7 and 8 students. The newsletter is published once a week and is sent out to all parents. Students are given time on a Wednesday afternoon to compile it, but do a lot of the work in their own time. Frank reported it was pleasing to see a number of the ideas from the practical writing workshop being used by students in this newsletter and in the class writing programmes. Dean identified that during the staff meeting aspects of the project were developed. For example, teachers discussed the technology process and its link to this project. Then the teachers related it to the fitness trail unit the Year 7 and 8 students were working on. Together they broke down the achievement objectives at level 4 and looked in particular at the important place of gathering stakeholders' ideas and feedback in the whole process. This was to become a big aspect of the fitness trail design around the school.

Frank covered the likely progression of the unit with staff so they could see the process and how it related to the enterprising attributes. Planning guides were left with the teaching staff. These guides included achievement objectives for each level according to the technology essence statement, as well as their link to the enterprising attributes. Frank introduced some ideas for the *Festival/Commonwealth Games* unit the classes were planning. These were starter activities that could be used as part of the *knowledge attack*. Frank also discussed the importance of building knowledge as a base for later enterprising activity.

Together they looked at a brief another school was following and decided that after researching the different sports, the students would be given the task of developing with one activity that the whole school could take part in as part of their Commonwealth Sports day. The students would decide the rules, equipment and a set of standards and present their ideas to the stakeholders the teachers. Any issues or problems would be explained and the students would work at adapting their game.

Each class would research a Commonwealth country and prepare a presentation to give to another class.

One group of at-risk students would work to a brief which involved working as mentors for junior students in the manufacture of medals. Discussions between senior and junior staff as to just how much the junior school could do. The point was stressed by senior staff that junior students can do a lot more than they are sometimes given credit for and this interaction between seniors and juniors is important. It was interesting to see one or two teachers revert back to making decisions that could be made by the students - what the activities will be, for example. They were quickly brought on track by the Year 7 and 8 team leader who would say, "*we are losing the enterprising aspect here.*" (Phase two teacher response 4).

Frank met with the Principal and lead teacher for the technology-based fitness trail. The Year 7 and 8 students worked on this every Wednesday between 9.30 am and 12.30 pm. The goal was to build a fitness trail around the school. The first three weeks had been spent in knowledge building activities exploring exercise programmes, how they relate to particular muscle groups and viewing examples of equipment. The design brief required to devise a fitness circuit within the brief detailing conditions such as including activities for upper body strength, endurance and agility. The next step was to contact, visit and talk to professionals. Examples discussed were the P.E. departments at the Wananga, Massey University, the army base, personal trainers and physiotherapists. The students were encouraged to write emails to these people and arranging contact times.

As part of the planning stage the students built models of their circuit and these models would be used in presentations to the various stakeholders. Other examples of business links/mentors would be design engineers and signage companies. In another visit to Rural School Seven Frank worked with the Year 7 and 8 technology class on their fitness trails. They covered the following areas in a very practical half day:

- the need;
- what a brief would be if we actually constructed one;

- who the stakeholders would be and how they would gauge their interest;
- what skills the students would need;
- the design process;
- the muscle groups that they wish to exercise.

The groups then used construction equipment to make models of fitness equipment they could possibly build at school. At this point they had talked to experts including personal trainers and physiotherapists, and they had visited fitness centres and gymnasiums and seen the equipment employed. According to Frank, the results were excellent and each group presented their model with an explanation of how it would work. The challenge next was to reach a compromise between the temporary fitness circuits the students had already set up and the models, some of which are fairly ambitious building projects. The problem was this was at the end of the term and in usual circumstances it would be the end of the project. This was discussed with the Principal and the enterprising aspect of this project may be carried on next term with a small group taking the initiative in the same way that the newsletter group did.

Rural School Eight (Dean)

Following the first cluster meeting, one follow-up planning session was held during term 4 2005. At this meeting it was agreed given the likely timetabling situation for 2006, that the focus class should be the Year 10 graphics group. The teacher involved was part of the 2004 enterprise education project. The graphics programme is, of necessity, largely skills-based, but there are three open-ended projects embedded in the programme which provide opportunity for enterprise activity.

The first of these design projects started in week 6 of term 1. The focus of this project was on the creative use of materials in the presentation of design ideas. Over the four weeks of the project Dean was able to visit the school and work alongside the class during three of the lessons. After each, a debriefing session was held with the teacher. This first project was scheduled to finish at the end of the second week of term two when a detailed evaluation would be undertaken.

CLAIMS, ISSUES AND CONCERNS RAISED FROM PHASE TWO

At both of the workshops thus far the groups of local and non-local experts were exposed to the research procedure and progress via an address that I gave which included PowerPoint presentations and question-and-answer sessions. These meetings served a number of purposes: (a) they helped to clarify the role of both the researcher and the research, (b) to explain the methodology and, (c) to highlight the participatory nature of this form of research. It was decided in response to a issue raised to save workload and create the least amount of disruption to teachers and students. This meant that, where appropriate, the project would focus on existing planned units of technology education. It was also agreed that the teachers and facilitators would work together to enhance these offerings to further develop Education for Enterprise activity.

A list of enterprising attributes was considered by the project team:

1. Identifying, recruiting and managing resources.
2. Working with others and in teams.
3. Communicating and receiving ideas and information.
4. Negotiating and influencing the decisions made.
5. Generating and using creative ideas.
6. Identifying, solving and preventing problems.
7. Identifying and creating opportunities.
8. Planning and organizing both the research stages and the planned units of technology education.
9. Being flexible and dealing with change.
10. Identifying, assessing and managing risks.
11. Using initiative and drive.
12. Reflecting on what has been done.
13. Working with the community.
14. Using their knowledge and skills to achieve their goals.
15. Being fair and responsible.
16. Collecting, organising and analysing information.

These enterprising attributes, which had been considered and developed by the project team in consultation with Samantha, were inspired by previous projects undertaken both in New Zealand and internationally. They were to form the basis of the data analysis of the Education for Enterprise component in Phases three and four. Phase one of the research had revealed some scepticism around teachers ability to foster Education for Enterprise, the data revealed that by Phase two, after the professional development intervention, attitudes were shifting. The data also suggested that the teachers' understandings of the feeder components from the technology curriculum injector model such as technology education, Education for enterprise and community partnerships were improving.

These improvements in understandings and shifts in perception were important for the Education for Enterprise project team, as they allowed for further more explicit facilitation to take place in Phases three and four. The data findings from Phases two and three also gave early indicators of what practices would support or undermine the Education for Enterprise project. These early indicators related directly to research questions three and four and so shaped what would happen in Phases three and four.

Miles and Huberman (1994) identify the value of displaying data to develop researcher understanding and for presentation of conclusions from the data. Chapters Five through Eight of this thesis have attempted to meet both of these concepts. There has been rich description and discussion of the places, the actors involved and the emergent data. My understanding of the technology curriculum injector model and its relationship with this study was growing out of the data that has been presented. Chapter Seven highlights the responsive nature of the research and how the phases enact Guba and Lincoln's (1989) description of Fourth Generation Evaluation.

CHAPTER SEVEN

PHASE THREE

The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn. – Alvin Toffler

INTRODUCTION

This chapter reports on the work carried out during Phase three of the research project. It portrays the responsiveness of the Education for Enterprise team in facilitating changes in the professional development programme. These changes were aligned with particular research questions and with claims, issues or concerns raised by participants in research Phases one and two. Although Koch (1994) described claims, issues or concerns in relation to a nursing evaluation study, these descriptions are useful here in structuring this chapter.

According to Koch (1994), a claim is any assertion that a stakeholder may make that is favourable and is a platform from where the team can take the next steps. There are numerous claims discussed both in this chapter and then further in Chapter Nine. A “concern” is identified by Koch as any assertion that is unfavourable. The purpose of concerns is to highlight potential barriers: personal, systematic or organisational, real or perceived. An issue is described as a reasonable question raised through better understanding of claims and concerns.

The importance of research questions three and four, highlighted in Chapters Five and Six, focused and shaped what happened in Phase 3, which is reported in this chapter. The Education for Enterprise project team identified a need to further investigate research question five. Chapter Eight highlights how the professional development workshops and facilitation programme developed and influenced what took place in the school clusters and then reports on the research findings. These

findings are discussed and suggestions as to how the technology curriculum injector model might be used are developed in Chapter Nine.

For this Phase of the research transcribed participant interviews were mapped against three focus areas that originated from research questions 3, 4 and 5. The development of these focus areas from the original research questions resulted from discussions between Samantha and the Education for Enterprise project team. It was clear that the research had shifted from description and evaluation to responsive evaluation. These focus areas, as well as the 16 enterprising attributes discussed in Chapter Six, were used to analyse the data and to inform the professional development programme.

The research findings were discussed with all parties involved so the different realities of what was occurring could be identified. A meeting was held on Tuesday July 4th 2006 with Samantha, Frank and me. The discussion centered on progress so far and the preliminary data that had been reported via milestones. It focused on:

- teacher practice that supports the development of enterprising attributes, capabilities and competencies of students;
- school-wide practices that support the development of enterprising attributes, capabilities and competencies of students;
- the impact and influence that school-community partnerships have on student learning.

In addition, Dean scheduled meetings with Samantha to discuss the Education for Enterprise project in detail, with particular emphasis on the secondary component. I discussed with Frank and Dean their roles to ensure they were involved yet remained detached. I needed to ensure that neither Frank nor Dean took a controlling function in their dealings with participant teachers. Participant observers yes, facilitators yes, controllers no.

A third workshop was held in each of the three clusters. The following is an analysis of these workshops and their outcomes. These thick descriptions show significant developments in the types of activities undertaken. Additionally, they show the

dispositions of the participants involved and their increasing understanding of the curriculum injector components.

Fourth Generation Evaluation involves subjective interpretations that can be generated by both participants and researchers. According to Churchill (2000), researchers should present analysis of interpretations as tentative statements that are open to alternative viewpoints. By supplying rich description and analysis my intention is to give access to the complexity of the data generated. When discussing participant observers, Cohen (2000) notes the use of informants to provide an insider perspective of the world being studied. There are multiple layers of informants used in this study. Frank and Dean became informants as they worked alongside the teachers planning and implementing units. The teacher participants selected to feedback information are also informants. Cohen also states that the researcher participant observer (in this project myself) needs to consider how informants are selected as they influence data collection. Frank, Dean and I discussed and reviewed at length the informants to ensure they reflected reality.

WORKSHOP 3 REPORT

Activity One - Participant Presentations

This workshop included presentations from participants reporting on the Education for Enterprise projects that they had implemented in their schools. This idea was a continuation of a method employed successfully by the Education for Enterprise team in Phase two. These participant presentations involved supplying descriptions of the specific class, special group, or syndicate involved and how teachers created opportunities to support the development of enterprising attributes. The influence of mentors or community partnerships on student learning was discussed, and the positives and negatives were highlighted. These presentations were organised to focus the discussions around research questions 3, 4 and 5.

Each presentation was video recorded and followed by a discussion/question time, which gave me the opportunity to generate and validate the research information. The presentations reflected the wide range of enterprising activities, units and

approaches being undertaken in the participant schools. This sharing session was appreciated by the attendees and reflected in the evaluation notes and comments including:

- *Really enjoyed school presentations - seeing different approaches* (Workshop three teacher response 1).
- *Great to have feedback from the facilitators about our pathway on the project* (Workshop three teacher response 2).
- *Good to share and listen to genuine and positive truthfulness* (Workshop three teacher response 3).
- *Good to affirm ideas and confirm what we are doing* (Workshop three teacher response 4).
- *This is a good opportunity to stop and take stock of what teachers are doing - good discussion* (Workshop three teacher response 5).
- *Gives me ideas as to how I can include different aspects/ideas in my own planning/teaching programmes* (Workshop three teacher response 6).
- *Generated plenty of ideas and I could gauge progression through the levels - motivating* (Workshop three teacher response 7).
- *Great to see links between this and our recent unit - back to a smaller amount done more deeply* (Workshop three teacher response 8).
- *Great to see the growth* (Workshop three teacher response 9).
- *Interesting and motivating to see what others are doing at the same level of teaching -makes me want to have a go* (Workshop three teacher response 10).
- *Useful so we can avoid barriers and plan appropriately and celebrate the successes* (Workshop three teacher response 11).
- *It's good to see any barriers are common to all situations* (Workshop three teacher response 12).
- *Teachers need to give children more opportunities to develop their ideas and stop being control freaks. It's useful to know the challenges we have encountered are not unique* (Workshop three teacher response 13).

These responses highlight claims that the participants particularly valued the Education for Enterprise team's approach to include participant involvement in the professional development programme presentations. They indicate a positive

response to Fourth Generation Evaluation as a methodology by acknowledging the feedback and shared *truthfulness* of the experience. Participant responses highlight a concern that it is important to have stocktaking opportunities to identify any *barriers* which may impinge on Education for Enterprise initiatives. They also identify an issue around who *controls* the Education for Enterprise undertaking.

Follow-up work carried out by Frank and Dean with the participant schools revealed an increased enthusiasm for developing enterprising characteristics. This enthusiasm was a direct response to the exploration of the various presentations they were exposed to during Workshop 3. The most positive outcome came from schools that were having difficulty accommodating the additional time requirements. These were schools where the time-table organisation created barriers for an integrated approach and left less time for enterprising unit work or schools where traditionally they had focused on short, perhaps two-week, units of work. Teachers could now appreciate that the really successful ideas took a term to develop and that schools either changed their organisation or created within their identified Education for Enterprise units a structured timetable with sufficient detail to ensure enterprising aspects were included. As the participant comments reveal, there are barriers to successful Education for Enterprise work, but participant teachers could see that other schools were running into similar barriers and that there were ways to overcome them.

Activity Two - Introducing the Fuzzy Front End

One of the concerns reported from Phases one and two of the study concerned the ‘lack of time’ teachers and students had for the action/doing part of Education for Enterprise and technology education. This concern is basis for an emergent research question: how do we find the time for an Education for Enterprise activity within technology education? In response to the concern raised about a lack of time I devised a professional development session which identifies how this issue is addressed by the wider technological community.

To facilitate understanding of why ‘lack of time’ happens I gave a presentation on the the fuzzy front end of technology and project management. According to Kuemmerle (2005), entrepreneurs can be distinguished from others by their ability to accumulate and manage skills and knowledge as well as mobilize resources to

achieve specific goals. They steward resources whilst remaining open-minded and continue their learning as they find a way forward to develop responses with some merit or value (Sarasvathy, 2004).

The fuzzy front end is how practicing technologists describe the confusing early establishment stages of a design or problem-solving process. Typically this is the stage where the technologist is trying to establish what the real need, want or opportunity is, followed by asking how they might begin to address or solve the problem. Often it involves a particular type of cognition and an iterative process that can lead to early ideas being discarded for a number of reasons. These can include viability, cost effectiveness, originality and functionality.

I showed the importance of the fuzzy front end and the planning and preparation stage by relating actual examples from industry. Teachers found that taking time in this area was an important part of the technology process and that they shouldn't worry if it takes them longer than they think it should. In the real-world this fuzzy front end can account for 50% of development time.

I used a videoed case study to give a practical example of project management in the classroom using the acronym JUGGLE:

- Justify - just what is it we are doing.
- Unravel - looking at the task in more depth.
- Gathering information.
- Generating ideas.
- Looking for opportunities.
- Evaluation.

When applied in a junior class where students are designing and making masks this became:

- Just what is it we are doing?
- Usually good masks need?
- Get more information.

- Get some ideas in my head.
- Let's see if I can make mine different.
- Evaluation.

This helped teachers to understand that when a project is broken into smaller chunks it becomes more manageable. I also introduced the teachers to a product called *Plastazote* to show how use of new materials adds to students' engagement both in the task and in their technical knowledge. The data indicated that this session was well received and some teachers, in both primary and secondary, had been trying the JUGGLE process in their classrooms. They also included Plastazote use in their planned units of work.

In accordance with Responsive Evaluation methodologies, this is an example of how I operated as a participant observer. I was seeking to gain an *emic* or insider's perspective. This is where the researcher takes an active position with the purpose of stimulating participants to think about things they might never have thought about before Lincoln (1989).

Participant feedback pertaining to this session included:

- *Very interesting. I could see the framework working within my classroom* (Workshop three teacher response 14).
- *Excellent - thanks for that* (Workshop three teacher response 15).
- *The framework will be very helpful* (Workshop three teacher response 16).
- *Excellent discussion - JUGGLE will be explored further - very informative and reassuring again about the early stages* (Workshop three teacher response 17).
- *Excellent to see how the teacher was able to change the language into "children speak"* (Workshop three teacher response 18).
- *Great idea for project management - will use* (Workshop three teacher response 19).
- *Enjoyed framework discussion and how it can help with project management* (Workshop three teacher response 20).

- *I now know it's okay to take a long time to discuss and plan - being flexible and adapting ideas is the way to achieve some completed projects (Workshop three teacher response 21).*
- *Showed the learning and planning that is involved in the getting started aspect. The JUGGLE framework was excellent - can't wait to get started (Workshop three teacher response 22).*
- *I felt inspired by Gary's JUGGLE mask unit - want to try plastazote.*
- *Fantastic - looking forward to receiving Gary's email about JUGGLE (Workshop three teacher response 23).*

These claims indicate that teachers appreciated frameworks such as JUGGLE to help them develop passages through the Education for Enterprise and technology education process. I believe that the technology curriculum injector model developed from this thesis may also help as a framework to increase awareness of the connectedness of these subjects. The responses also indicate a growing understanding from the professional development programme about an earlier issue of time management and the fuzzy front end. Frank reported that: *“JUGGLE won't solve all the issues of time that teachers have but they appreciated the framework that gives them more control over the time they do have. The pleasing part is that they are using it.”*

Activity three - The New Technology Curriculum

In Activity three Dean analysed the new technology curriculum to identify with participants what is different and why it has been changed, followed by a 'where to from here' scenario. They considered technology education in relation to some connected real-life case studies of technology projects that New Zealanders had been involved in. This demonstrated the relationship between what was proposed for the new curriculum and what the technology process involves in the world outside of school.

The session seemed to be well received, as a dissection of the case studies highlighted by teachers showed that the same process was being followed by experts to develop valuable, innovative technological responses. Comments from teachers included:

- *Great - I have not looked at the draft curriculum yet so I have found it very helpful to have an inside view (Workshop three teacher response 24).*
- *It clarified the confused (Workshop three teacher response 25).*
- *Good to have the knowledge to gain a better understanding (Workshop three teacher response 26).*
- *Good to see how all three areas could be integrated (Workshop three teacher response 27).*
- *Good to see more info is on the way (Workshop three teacher response 28).*

Most teachers had not read the draft technology curriculum, since it had only recently arrived in schools. So they were pleased they could develop some understanding for the proposed teacher only days. The Education for Enterprise project team noted that this session was particularly important for the primary schools, as their level of understanding of the technology curriculum was in need of development. Overall the feedback on Dean's presentation was positive:

- *It kept the technology aspect of the project up there and provided a framework for future planning (Workshop three teacher response 28).*
- *It showed the frameworks we have been using are applicable to the draft curriculum and latest research (Workshop three teacher response 29).*

Throughout the workshop three cluster meetings, the participants were given information that updated them on the project and introduced some of the research observations generated so far. In summary they were shown:

- the school's progress to September 2006;
- what was making Education for Enterprise work?;
- a feedback sheet relating to involving people from the wider community and its impact on teachers and the work they planned to be involved with;
- observations on why Education for Enterprise ideas don't always go according to plan.

The following analysis is of the individual schools' feedback for strategies they undertook and education facilitator interventions.

SCHOOL FACILITATION AND CONSULTATION VISITS

What follows are the rich descriptions of school-based Education for Enterprise activities that developed after Phases one, two and three in the participant schools. These rich descriptions are the basis of transferability within a responsive evaluation study. They relate to the extent to which a reader might recognise similarities in the findings and may relate these to other settings. This transferability requires the researcher to provide a lot of detail about the setting and the events taking place, and is described as thick description by Lincoln and Guba (1985). The Education for Enterprise project team was trying to facilitate greater utilization of the characteristics of enterprise activity highlighted in Chapter Five, particularly within technology education units. This was in keeping with and developing data for addressing research questions 3, 4 and 5.

City School One (Frank)

Frank reported that: *Education for Enterprise is becoming part and parcel of this school. There is a real aim to have students take more ownership of the learning process and across the school they are involved in activities that challenge them to connect enterprising skills to practical situations.*

Frank followed the progress of a group of students as they prepared for the opening of a new technology centre (Poutama Centre). This was a major occasion, and this enterprising group had taken complete ownership of catering, publicity, the budget, guests, invitations and speeches. One of the students did a presentation for teachers at the City Cluster workshop. Frank discussed with the principal an idea for an eco-friendly classroom to be erected at the school, incorporating as much student involvement as possible. An application had been forwarded that may see this venture happen at a later date.

Frank facilitated a whole school staff meeting aimed at showing the links between Education for Enterprise and strategic plans that City School One already had in place. Quotes from the community members involved in the Poutama Centre opening were displayed. These quotes praised the way the students had complete ownership of an important function. Examples were shown of how schools had

turned traditional science units into enterprising ones with a technology link. The design process was shared and discussed. Frank linked Education for Enterprise to the City School One inquiry model, and a template for the coming school production displayed the difference between a traditional production and the enterprising way City School One would organise it.

The school staff and Frank discussed authentic links and how they can add focus to a unit. This was all done in relation to units planned. Frank and the teachers studied the relationship between enterprising learners and the key competencies from the New Zealand curriculum. Frank worked with the principal on the revised inquiry model. This notion of authenticity and its importance for technology education has been discussed throughout this thesis and will be highlighted in Chapter Eight. According to Snape and Fox-Turnbull (2011) technological literacy occurs through the authentic development and critique of products and systems designed to meet identified technological needs.

Frank discussed enterprising links with senior staff and the presentation by students of their findings from their environmental study. Other Education for Enterprise initiatives included framed environmental posters erected on the school fence to share with the community and a pamphlet drop in the community. The pamphlets included environmental messages and were designed by the students and then computer generated.

Frank was also closely following the progress of an independent group of students that work outside the normal classroom situation on a number of set tasks, some of which were extremely enterprising. The students were interviewed regularly by and the education facilitator offered advice which the group seemed to pick up on and use. Frank closely followed the student organization of a major school production through regular observations and interviews with students involved in its various aspects.

All of their work was within authentic contexts and with the opening of the new technology centre they were in the enviable position of being able to integrate the use of this space into units of work. Enterprise for Education was being written into

the school's strategic plan and formed a key component of the planning process. Some innovative and extremely enterprising ideas were implemented at the City School One and while there was a community link to almost all that is done, the principal constantly ensured that the concept of student ownership and its benefits were brought to the wider community.

City School Two (Frank)

According to Frank: *This school continues to implement Education for Enterprise in a positive way weaving it into the very successful enquiry process that is well established in the school. The technology links to every unit are based on some very real needs within the school and the enterprising nature in which they have been met has led to continued opportunities for students to apply enterprising attributes.*

Frank discussed a possible fundraising venture with the principal that involved associations with local business. A group of students later initiated this venture. The principal and Frank looked closely at the relationship between the key competencies and Education for Enterprise in this project. Notes from a conference on the key competencies were shared and a copy was left with the school.

Teachers initiated ideas for an Education for Enterprise technology-based link with a planned science unit on light. The students came up with security ideas to combat a spate of school burglaries. This unit had them working with experts including security people and lighting firms and the school was the first in the country to have their important items micro-dotted. The students took part in this process. All ideas were presented to the Board of Trustees.

Frank followed the progress of the *Trade Me* venture set up by a Year 5 and 6 class. Frank introduced students to the idea of stakeholders taken from the technology curriculum and ensured that the class liaised with all those involved in the venture. As an introduction, the students studied the list of Education for Enterprise attributes and they were interviewed during the venture to see how they were applying them. They looked closely at *Are we enterprising people?* and looked at success criteria. They studied practical aspects including photographing the items, writing descriptions and answering queries. They looked at the start-up cost, collection,

storage and resources needed. They have had some very big sales and a CD on setting up the process was shared during Workshop three.

Frank discussed the Education for Enterprise links with the teacher coordinating the opening of the newly-built performing arts centre. This was for research purposes as he hasn't been involved in the Education for Enterprise work thus far and Frank wanted to find out how much control the students would actually have. This teacher had responsibility for this opening so in terms of ownership he sees it more in his hands and will direct the students. Frank discussed this outcome with the principal.

Frank set in place a strategy to link a technology/Education for Enterprise aspect to a science unit based on fabrics. The students put a proposal to the principal regarding the school purchasing beanies. They linked with local businesses for their research and the facilitator supplied a DVD he had filmed at an embroidery factory. This showed what was available and the steps in the process from computer-generated logo to finished article. This was later shared at the workshop and taken and used by a textiles technology teacher in one of the project's secondary schools.

Education for Enterprise appeared to be most successful in the middle school syndicate area, where the lead teacher had been both innovative and organised. Although the philosophy and teaching practice at City School Two naturally enhanced the development of enterprising learning, the aim was to take the very best that has been achieved at the middle schools level, particularly in relation to working with the community and meeting a real need, and have it happening across the school. This would involve whole school sharing of ideas and planning for the final part of the project.

Another aim was to observe some of the students' innovative ideas being implemented. The school administration had been significantly involved in the building and opening of a performing arts centre. The students made presentations to the Board of Trustees, their workload had made it impossible to get any practical follow up.

City School Three (Frank)

Frank designed an individual reflection plan that the students used to assess their performance in a unit on *Why do we need leaders?* The reflection plan focused on the enterprising attributes. Frank helped to assess the first unit with staff and identified key elements needed for development in future work. These included (a) sharing the Education for Enterprise work with more staff, (b) creating opportunities for student involvement in planning and, (c) working with the community. The first unit had received very little community support.

Frank met with the teachers midway through the second unit, which was Arts-based. He discussed their observation that their students learn through the practice of art and they should use it and hands-on technology more to obtain interest and lead them into literacy. Regular reflection was encouraged and practical ideas were put in place. Frank implemented strategies that would allow students to manage their time better, students could now see their deadlines being met and the importance of this. Frank introduced a new material, hebel, to the students and worked with them to model simple carving techniques that reflected their own culture. Frank encouraged the use of mentors from the local community and sourced possible mentors from the community that could be called upon.

Frank attended the street arts party which was the culmination of the term two work. This was filmed and a short movie was used as part of a workshop. The community support had increased considerably since the first unit, as has the students' confidence and willingness to communicate with peers and adults. Frank assessed unit two with the staff and made changes to earlier plans that we had made for unit three. These revolved mainly around introducing the Education for Enterprise concepts to more staff members.

Frank attended one of the presentations to classes and discussed the interest the programme was generating amongst parents as they saw their students keen to read and get to school. Frank facilitated a syndicate meeting aimed at building the final unit for the year which was based around the big question *how does our brain work?* Frank introduced planning guidelines and possible resources, including people. Frank introduced the idea of basing the unit around *When things go wrong* and

looked at the unit in relation to three aspects of authentic learning. Frank introduced a technology planning format which allowed the teachers to stay on track in relation to both technology education and Education for Enterprise goals. At this meeting the participants came up with numerous members of the community who could be called on as mentors.

The Education for Enterprise project appeared to have a positive impact in this school - particularly in the class of the lead Education for Enterprise teacher. An innovative teaching approach saw this school as the only one in the project where the students think of Education for Enterprise as a subject area. For the other schools it was viewed as a way of learning that the teachers implement but for students at City School Three it had developed its own identity.

This school, like others, has been heavily involved in improving literacy and numeracy standards, and early indications are that this Education for Enterprise work was having positive impacts on literacy levels. Teachers made the point that their students learn through the arts and hands-on technology; it's this that engages them and builds the motivation to read. Indications from the lead Education for Enterprise teacher are that parents have noticed very positive changes in their student's attitudes to school and they are showing real interest in Education for Enterprise. Frank and Dean would continue to assist in planning and follow their progress through interview and field observation.

City School Four (Frank)

Education for Enterprise strategies were focused on a gifted and talented group involved in a small task within what had become a larger overall environmental task. They found a real need to present a proposal to New Zealand Glass for environmental funding. The students were involved in organizing some creative and innovative ideas to fit the proposal's format. The students were introduced to success factors by Frank and a working flow chart was modelled for the students and teachers to show what steps were needed if the students were to complete the task.

Organization templates were left at the school to help students work independently. The Thinking Hats strategy (which was a teaching tool in the school) was used to

generate the ideas. The results were all recorded and interviews took place with the principal and students. Discussion with the principal focused on the strategies teachers need if independent learning groups including these are to reach their potential. Frank had been interviewing other groups in the school and following their progress as they set up various fundraising ventures for school camps.

The principal and Frank were working towards introducing more Education for Enterprise/technology into the classroom to better meet the goals of the school's strategic plan. They were doing this by meeting with teachers and including an enterprising and technology aspect in every unit. An example is a link they have set up with another school in Wellington. In exchange for information from the Wellington students about their electronic tablet trial, the City School Four students shared what they had found out about clay tablets used in Egyptian times.

Initially the principal was keen to see Education for Enterprise introduced through selected groups of students and the work they did, and through them introduce the ideas to the rest of the school. This had been deemed successful where a staff member has had the time to work with enterprising groups. Interviews with staff and students report many opportunities for students to apply enterprising attributes. The concept had floundered, however, with those groups that had been left to their own devices.

The senior staff could see the positive impact of enterprising programmes and Education for Enterprise had become written into the annual and strategic plan: for example: *integrate enterprise education and autonomous learning - involve children in enviro-projects through Education for Enterprise.*

The initial Education for Enterprise plan had been built around environmental education projects. As a result of the major rebuilding in the school there were many opportunities for enterprising projects to be linked to changes in students' environment. Unfortunately, when key personnel left, plans were slow to be implemented and it was noted that if teachers were to be successful Education for Enterprise had to come through existing classroom programmes. They decided to look closely at planned technology units and find ways of adding an enterprising

link. This was proving a challenge at times because existing topic selection was not always conducive to either the technological curriculum or Education for Enterprise. Dean was stressing the importance of being involved in planning sessions as teachers decide on topics and it is at such meetings teachers will get a chance to see models of planning from other schools.

Coastal School One (Frank)

Frank continued to work alongside the Year 3 and 4 syndicate teachers working on their enterprising technology-based project on the Rocky Shore. The work was based on research by Professor David Schiel of Canterbury University who found that the seaweed Neptune's Necklace was being killed by foot traffic on the Kaikoura Coast. This, in turn, affected the whole reef. Two syndicate trips to a local reef had to be cancelled because of poor weather, so Frank visited the reef and took a series of photographs that would be used as a classroom resource. Students used the photographs and text to create a CD to build their knowledge of the possible problem. Teacher's notes were also distributed to teachers.

Following a design process the students were then given the task of finding out whether the problem was a real one . . . the photos indicated it was. Working with Frank they found out who they should contact and came up with ideas for getting the message across. The students phoned the Regional Council's Education Officer to tell him of their finding and to ask if they could include an article in the regular environmental newsletter to schools.

They also emailed Professor Schiel for more information and received helpful replies. The students have decided to make a DVD which introduces the problem to regional schools and asks them to protect the seaweed when they visit the reef. Frank worked with them on a possible storyboard and plans were made to film in November when there was a chance for better weather. The students advertised their DVD in an environmental newsletter, which included an article they had written about their endeavours.

As part of a social studies unit that looked at the mail/postage system Frank prepared an illustrated timeline that showed the history of mail in New Zealand. This resource

linked to both technology and enterprising aspects of the unit. It showed how people met real needs throughout history by solving problems and being enterprising. The next step was to give the students an issue to solve a real problem following a brief. The students had to design a letterbox to replace Frank's letterbox which had been smashed by vandals. To ensure the students with limited reading ability really understood the problem, a teacher asked if a video could be made to show exactly what happened to the letterbox and where it had to be replaced. Frank filmed a movie to show the *villain in action* and these students ran this movie over and over again until they knew exactly what was required. The students' designs were presented to a panel of experts which included a local builder and the best design was built with the builder acting as a mentor for the winning designers.

Frank had been following the progress, through interviews and discussion, of two enterprising projects in the Year 5 and 6 syndicate. One had focused on creating an awareness of road safety issues after major alterations to a road outside the school gates. The other was a health-based unit which would culminate in a health expo for parents. Dean assisted with the planning for this and arranged a link with another project school so staff and students could see a healthy school *Kid's Café* in action.

Frank worked with the teachers on a unit *Behind the Scenes*. This involved the students writing and producing a simple play in an enterprising way and the technology link would be from the students making masks using Plastazote, which was introduced during the workshop. They would also follow the JUGGLE process discussed earlier in this chapter.

Coastal School Two (Frank)

The lead teacher for Education for Enterprise was involved in a Middle Ages social studies unit. It was agreed that an opportunity needed to be provided for the students to take more ownership of the learning process to improve their enterprising capabilities. Frank and the teacher worked on a framework that would allow the students to organise and run a medieval fair. They wanted to be guides on the side, with the students making and implementing all major decisions. Learning tools were developed that allowed the students to focus in on their research using the Thinking Hats from De Bono (1992). The students worked on a timetable so they knew when

things would happen and with the help of these learning tools a successful day was held. This was videoed and the movie created was used at a teacher workshop. The activities the teachers chose had a technology base, whether it was making bows and arrows and finding a way to hazard proof them or working with their parents in baking food to sell.

Three other Year 5 and 6 classes were involved in a unit that centered on a Leonardo de Vinci machines exhibition that was being held at the local museum. The classes visited this exhibition and took special interest in the flying machines. There were models exhibited and a documentary portrayed de Vinci's attempts at flight. Frank worked with all three classes comparing the De Vinci gliders with today's hang gliders. Groups were then given enough materials to design a model of a glider that combined the properties of the old and the new. They presented their gliders in a Dragon's Den scenario to a panel of teachers and others, working for the right to build a full-sized model of their glider. The group, with Frank as a mentor, built and "flew" their glider at the Market Day mentioned above. The whole school was in attendance as the juniors were also involved in an enterprising/ technology flight unit at the same time.

Frank worked with the junior syndicate to plan the flight unit and, in particular, the links to Education for Enterprise and technology. Experts from the local community were invited to school to work alongside the students as they compared the flight of birds and man-made gliders. The senior school marae (Maori meeting house) visit was the focus for term 3 and Frank worked with staff to find an enterprising link that would improve student achievement in technology. They created two units for classroom use, one based around traditional Maori gardening and another focusing on the creation of lip balm using traditional plants.

This school had just purchased unicycles for student use and with the principal and lead teacher in P.E. it was decided to coordinate two of the Education for Enterprise project schools: a large city school and a small rural one. This facilitated a student mentoring programme, where unicycle experts from one school would coach the novices at the other. Frank was setting this up in an enterprising way so that it challenged the students to connect enterprising skill to practical situations.

Frank worked with a group of gifted and talented students as they developed a way to implement a new recycling initiative for schools being proposed by the local council. The students had contacted personnel from the council, worked alongside an expert at the school and arranged for a trip to the local recycling plant. They planned to film what they saw, make a movie and use it to help launch the programme with their peers. The whole school was involved in Education for Enterprise projects and they were incorporating Education for Enterprise aspects into increasingly more units of work. The principal sees Education for Enterprise as a way to develop the key competencies contained in the New Zealand curriculum. At a teachers' only day to introduce the draft curriculum teachers were very positive and could see that what Education for Enterprise project team had done so far linked closely with the goals of the new draft curriculum.

Coastal School Two had a slow start with their project as they were involved in a number of other initiatives, but staff were keen to work on ideas in the units they had already planned. In the senior school teachers were moving towards doing longer units rather than the traditional two-to-three week ones and this had made it easier to incorporate Education for Enterprise ideas through technology units linked to the topic. The future goal would be to finish the school year with students across the school having opportunities to apply enterprising attributes. Input into plans for 2007, based on what had been achieved, would be the next priority in implementation.

Coastal School Three (Frank)

At Coastal school three a website was the lynch pin of the main Education for Enterprise/technology project. This is a community-based website designed by the students to help the local volunteer fire brigade celebrate its jubilee. It would also become the school website. Frank worked alongside the principal and a community mentor to select a web site host from a number of options, one of which they had on trial.

Frank worked with the community mentor (a computer expert) that the students had contacted, to learn web building techniques. This was necessary because the mentor couldn't work with the students due to work commitments. In this case Frank, who

lives in the community, would also become a community mentor. In Responsive Evaluation the role of the participant observer can be influenced by his or her membership characteristics (Delaney, 1988). In this project those characteristics include Frank as an experienced teacher, Frank as a trusted facilitator and Frank as a community mentor.

Frank initiated, with the students, a technology design process which involved them meeting with older fire brigade members on a regular basis and tracking the renovation process of the brigade's original vintage fire engine. This facilitated the students in organizing visits, interviews, photos, website design, editing and updating. In addition, Frank formulated a plan with staff to introduce the students to their new computer network. This was to be achieved in an enterprising way, using the newly created website.

Frank facilitated other participants to help meet a real need, in this case a school evacuation exercise which linked to a disaster unit the school was involved in. The Year 2 and 3 class emailed and liaised with personnel from the local fire brigade to organise the day. Frank also worked with staff on creating an enterprising technology link to a kiwi fruit conservation unit that the whole school was working on. This involved community personnel working with the students in partnership. Students researched best predator traps, obtained some materials and made the bird-proof boxes to house them. These would then be placed in the school's native bush area.

This school continued to work with the community on an enterprising project that involved building a website to promote district happenings. The school's computer network had just had a major upgrade so the work done so far could be used as the base for further work involving web-based resources. This is something new to the students and teachers, as the network in this rural school has not allowed for work of this nature until now. The students had designed their website and worked alongside community members now they would be able to access it from their classroom.

Another aspect needing to be developed further at Coastal School Three is the inclusion of enterprising aspects in general classroom units. This has been happening

but, as with other schools, a couple of projects were stopped before the really enterprising work could be done. Introducing frameworks like JUGGLE will assist in this area and it will be important to ensure future topics chosen would have scope for innovative and enterprising links.

Coastal School Four (Frank)

As part of a major unit of work that was to culminate in a promotional advertisement for the International Triathlon Union (ITU) triathlon in the region, the students investigated their region with the aim of designing a representative logo. Frank introduced students to a design template and, using photographic iconic images of the region, the students created logos that would become part of the promotion they were planning. Frank assisted in sourcing a community expert who had worked in promoting the region. Students contacted him and invited him to school to work alongside them. The mentor was the council's event and promotions coordinator. He worked with a class with the aim of students making a documentary which would film the enterprising aspects of this unit to share with parents. Frank assisted the students with some on-location filming at the site of the ITU triathlon.

Frank continued to coach a group of students who had set up a school publication, *Children's Corner*. This group was producing a regular student-based newsletter which included advertising from local shops in a nearby shopping centre. Frank helped put in place a template that would help the students meet deadlines and an organizer's task list that would help them plan their work. This group got to the stage where they could put out the newsletter without assistance but the lead Education for Enterprise teacher has recently retired so it would be interesting to see if the new appointment would be prepared to let the group have time to continue with this enterprising activity.

Children's Café has been set up in this school as an offshoot of *Kid's Corner*. A parent mentor with experience in catering and event organization had been working with groups of students throughout the year to provide healthy lunches at a sit down café type meal every Friday. The students work together to choose recipes, prepare budgets, go shopping and prepare and serve the meal. It was a very successful venture that had students applying all of the enterprising attributes. It made the front

page of the local newspaper. Frank had been following the developments of this venture closely, interviewing students and the mentor as well as filming the operation at work. A short movie was produced and shared with teachers during workshop 3.

Another venture had developed from *Children's Café* and *Kid's Corner*. Kid's cartoons linked with a unit of work that a class was doing on traditional stories and the morals that went with them. Frank worked with the class on storyboards and then taught PowerPoint animation and groups of students each produced their own animated movie. Morals are messages so the students decided to spread the message by working with the *Children's Café* students to offer a special Friday movie/meal pass whereby the school get purchase a meal in the café and then attend a showing of the animated cartoons. All promotion, advertising and organization were carried out by the students.

Another venture that Frank helped organise in a more enterprising way was *Kid's Cam*; a regular news broadcast that a beginning teacher was keen to see running on the school's intranet. The teacher wanted the students to own this venture but their IT and organisational skills were not at the necessary level. Frank worked with a small group to teach these skills and set up a format that would help the students plan their broadcast. While it worked well with Frank's help, the project seemed a bit ambitious for a beginning teacher. The students needed guidance and time and this proved difficult for a young teacher who had to cope with a lot of new skill building.

Midway through this project Frank met with the principal in an effort to get more of the school staff involved with Education for Enterprise. They had met as a school on other occasions but apart from the senior syndicate the rest of the school hadn't done anything particularly enterprising. Another meeting reminded staff of the learning opportunities the school was trying to create and they looked at practical ways to bring these into school events, special projects and classroom units. One issue at this school was to explore with the whole staff the benefits students have gained through some excellent Education for Enterprise work.

Another issue was to keep some of the group projects running with new staff. Unfortunately, the lead Education for Enterprise teacher had left the school and this had impacted on at least one project. The replacing staff member took time to develop a rapport with their new class. So the aim at Coastal School Four would be to continue the special projects that were running, share with all teachers the enterprising work and having input into the planning sessions for the future.

Rural School One (Dean)

Rural School One is another school that has successfully integrated an Education for Enterprise approach into one of its core operating units. The programme, which has been developed for the senior students, has both enterprising outcomes and is delivered in an enterprising manner by the staff and teaching aids involved. Links with the wider school community had strengthened through the Education for Enterprise interactions and planning was underway to extend the range of collaborative enterprise projects.

Rural School Two (Frank)

This school has one major Education for Enterprise project which involves returning a waste area of the school ground into a native bush area/garden that could be used for both a teaching and learning programme and a quiet area for students. Frank has worked with two lead teachers on strategies to facilitate what appears to be a huge problem-solving project into manageable chunks. The work to be done also needed to fit naturally into planned programmes of work as the staff didn't want to see this as an extra.

Houghton (2004) proposes that problem-solving is what engineers do. Talking specifically about engineering and technology students, Houghton contends that problem solving skills may be the most important thing to teach. This notion of problem solving chunks or modules has been utilized throughout the Education for Enterprise project. Khan and O'Rourke (2004) contend that in problem-based learning the handling of a problem drives the whole learning of the student. By creating knowledge builders and starter chunks, Frank and the teachers included a People hunt, a conservation survey (adapted for younger students) and these were given to all teachers.

Giving the students an appreciation of *the way we were* so they could gain an idea of what the land around their school was once like and why they should recreate it helped as a starter chunk. Strategies included a visit by some classes to a local inland island. The two lead teachers provided all contributing teachers with an initial brief and a deadline, while two classes (the lead teachers' classes) began some actual work on the area. The brief involved the teachers and students using The Thinking Hats to decide what they liked about the area then and what they didn't like and this was used as a base for their own landscape plans. Frank led a staff meeting where staff shared their classes' ideas and created their own landscape plans so that they, too, had input into the project.

With the lead teachers Frank worked on further strategies to bring staff on board, noting it was important to create different types of jobs to match the teacher's strengths and interests. Some parts may be purely technology-based, such as building bird houses; others may be more environmental such as clearing the dead poplars. Yet others may focus on the communication aspect such as keeping a newsletter going to inform the stakeholders. Another may focus on fundraising portfolios. They discussed the stakeholders and the importance of students grasping the concept of keeping all involved in what was happening. When a class decides on an idea and makes suggestions the plans are presented at an assembly so everyone knows what will happen.

Discussions with the principal noted that teachers are using this authentic experience to teach new skills. An example was the teaching of keys when making a plan or a map. In the past this would have been done by viewing examples in an atlas. This project is one that is being planned very carefully. This has the advantage of focusing everyone on a single goal and it proved to be a successful way of introducing Education for Enterprise across the whole school.

Frank worked with lead staff to plan a proposal framework which students could use to apply for funds from the WWF for part of this project. Progress was being recorded by interviews with both staff and students. The lead teachers, with the education facilitator, looked for opportunities to involve community experts. The teacher and students have worked with the Department of Conservation personnel

and they were also to work alongside a landscape gardener. An expert in flax was also identified and will work with the students when the project reaches the appropriate stage.

Frank introduced magazine ideas to a group of students, who published their first issue of *Green Scene* to inform stakeholders of the project's progress. The goal was to make sure every class had input and teachers had a chance to work within their particular strengths. A lot of work had been done but it was still in the planning stages.

Rural School Three (Frank)

Frank facilitated some of the teachers who were trying to develop an arts language based unit that centered on puppets and puppet-making. Ideas were formulated via a design plan. They followed the process used by a Year 7 and 8 teachers in creating a short drama performance where students were able to take complete ownership of the writing process and get plenty of opportunities to apply a range of enterprising attributes. Frank interviewed the teacher and introduced the process to another of the Education for Enterprise project schools.

Frank discussed ideas for sponsorship and organisational ideas for the Year 7 and 8 teacher who wanted her students to put a fundraising venture into place that links the school with local businesses. Frank worked with the principal on a project where students were tasked with designing a new entrance way to the school. Alterations in the school meant this was an authentic opportunity. Together they worked on a brief and an action plan to meet deadlines. In the class, Frank worked with students on ideas for landscape plans and introduced the concept of stakeholders. The building material, hebel, was introduced to the students for carving. The students created designs and models and presented their ideas to the Board of Trustees. Frank had tracked the project and carried out interviews.

Frank worked with a Year 1 and 2 and a Year 3 and 4 teacher on the Education for Enterprise/technology part of their environmental unit which aimed at encouraging native birds back to Rural School Three. The students designed birdfeeders and worked alongside parents to build them as part of a social studies/science unit that

looked at processes. Frank worked with the classroom teacher to add an enterprising link aimed at improving achievement in technology. A resource was sourced by Frank that focused on the butter-making process from early times and the students worked in groups to source materials from home that they could use to make their own butter. The butter was made and used as part of a class lunch.

Frank attended and took part in a planning day for Term 3 and, with the school teachers, looked at enterprising links for their final units for the year. Plans were put in place for Frank to work with the junior class on a calendar project which matched the unit *Feeling good about ourselves*. Later, working alongside the teacher and Frank, the students chose a career they were interested in. Then personal digital photos were taken these were combined with a cartoon to produce the images for their own calendars which would become Christmas gifts for parents.

A plan for a fitness trail unit was discussed with the lead Education for Enterprise teacher and ideas were offered based on Frank's experience with another project school. Students were also involved in a web design energy-based project. This enterprising project involved working closely with a community mentor. Plans were discussed with the principal involving the students in riparian margin work on a local polluted stream. This would allow for a close association with community resource people and would be on-going for a couple of years.

As a result of a very innovative and committed lead teacher and a principal keen to have students take more ownership of the learning process. Education for Enterprise has become part of the culture at Rural School Three. They have identified enterprising technology units as part of each term's work right across the school. The school has two major projects on the go that involve close association with the community and Frank would be following these closely. They have planned units for the fourth term and, as with the other schools, the priority would be to take part in the planning of topics for further Education for Enterprise engagement.

Rural School Four (Dean)

The joint planning with another school of a senior graphics module on garden design achieved only limited success. The range of graphics ability and experience within

the composite Year 12/13 class limited the scope of the outcomes and the enterprise links which had been established proved difficult to follow through due to organisational issues. A second graphics unit focusing on designing promotional material for a local catering enterprise proved more successful. This was partly due to the more focused nature of the project and better on-going access to support personnel.

Rural School Five (Dean)

The technology department at Rural School Five had successfully integrated Education for Enterprise into all of its programmes. In 2006 all Year 9 and 10 classes had planned with an Education for Enterprise focus. Links had been established with the local Art Gallery and a variety of enterprises. The senior Year 11-13 technology and graphics programmes had continued to develop their enterprise links and a spin-off from the junior programme had been a senior National Certificate of Educational Achievement (NCEA) Art module which was being delivered with the help of a local graphic designer.

Rural School Six (Dean)

Education for Enterprise had been implemented by a group of three staff in 2006 working as one of a number of professional learning communities established within the school P.D. programme. Trial projects had taken place in junior computing and economics and in senior Health and Physical Education. An evaluation session including discussion of student feedback, was held at the end of Term 3.

Rural School Seven (Dean & Frank)

Frank and Dean worked with the principal to reflect on the Commonwealth Games Day the students had organized. From their observations the next steps with staff in implementing a more enterprising approach were planned. The examples from the discussion help to explain where the teachers were and where they were heading.

The junior teachers didn't think they could be involved because it was too difficult. So together they worked out a compromise. They thought their students wouldn't be able to learn things quickly enough. There were barriers put there by the teachers but when the students came out as the country to do their ceremony the buddy

classes got up and supported them and got all excited and said, *“the others taught us this.”* Frank reported that: *“From my perspective I saw a lot of schools in a state of being together and the whanau (family) that came on that day saw that too. The teachers didn’t see but circulating with the whanau I saw how impressed they were that the teachers and the children had done the learning for this Commonwealth Games day and this had encouraged whole families to find countries on the map and there was a spin-off into the homes that I saw going around.”*

The next challenge was to decide what events would be. The staff said they would get the students to identify them and trial the events but the teachers found it too difficult. So the staff changed the organization structure. Researchers such as Brears McIntyre and O’Sullivan (2011) noted that in a supportive problem-based learning environment students can take ownership of their learning and develop the metacognitive skills of synthesis, analysis and evaluation. There has been some resistance by the teachers saying that doing it this way will take more time, but Frank and Dean suggested there was a lot of enterprising opportunity if the students were in control of what they did and how they did it.

The school fitness trail, an enterprising/technology project described in the last workshop report, was researched by students while they worked with experts from the community. The trail was designed by the students and then models were made, finally, presentations were given these were recorded for research purposes. The term was ending so a strategy was put in place to ensure that work was continued by a group of students rather than it become a project that merely made it to the planning stage. Someone else had come to offer support - an army health and nutrition officer through the Rangitane Iwi (Maori tribe) so he was supporting a small group of students to continue with the project had volunteered and he took a group of students outside and showed them what could be done. The students responded really well he was able to achieve what the teachers struggled with; he was able to set it up so it’s a 30 minute a day Push Play activity (30 minutes physical activity). The students were also going to talk to other stakeholders. However, the army health and nutrition officer was checking with the council about regulations.

The student-generated newsletter outlined in the last workshop report had been reported as a success story for Education for Enterprise. Published by the students, it was the only newsletter sent to the student's parents and caregivers and it came out every week. It had now reached a very professional level with the students using it as a vehicle to share enterprising ventures with the parents and the wider community. This hasn't happened without failures, however, and the education facilitator and principal had followed and recorded its progress carefully to determine what needs to be in place if this enterprising venture is to continue to be successful.

Another strategy being explored at Rural School Seven is the use of Education for Enterprise concepts as a way of dealing with two students with extreme behaviour problems. The teachers have developed an education plan that has some of the attributes pulled out from enterprise thinking. It may, for at least one of the students, get them back into school. For the other, it may be a way of monitoring him until he can get into a school or into a secondary school next year.

Frank and Dean worked with the senior teacher in the Year 7 and 8 syndicate to develop their careers related unit. As an enterprising exercise the students were following the design process to create a CD that contains their curriculum vitae, handy hints for future use and options for updating. It contained a record of their time at Rural School Seven and was to be presented to the Year 8 students at the leaving ceremony at the end of the year. The planning session in November would be very important in determining the outcomes for Education for Enterprise in the final part of the project. According to Frank some excellent work had been achieved but this needed to be shared with staff and a conscious effort made to build on the success in the units planned for 2007.

The principal was very keen to see the students and teachers continue to work within authentic contexts, to see the relevance in what they do and the link to the wider world. Frank or Dean would take part in a planning session and would work alongside teachers in developing units, especially in relation to technology that offer full opportunity for students to apply the enterprising attributes.

Rural School Eight (Dean)

The initial aim of organising the planned project work in the Year Ten graphics programme with an Education for Enterprise approach had continued. Analysis of student, teacher and facilitator feedback from the first project had been incorporated into the planning of the second project which was being introduced to the class. Planning for 2007 would be informed by the evaluation of the results from this second project. According to Dean the student reaction had been overwhelmingly positive – teacher reaction mixed.

CLAIMS, ISSUES AND CONCERNS RAISED FROM PHASE THREE

The main focus of participant concerns was time management, for both the teachers and the students. Throughout this, and Chapter Nine facilitation reports and comments regarding the JUGGLE framework and presentations on the fuzzy front end are discussed as responses to these claims, issues and concerns. These strategies were introduced as a direct response to participant concerns.

There is evidence of school-community partnerships that enhance school curriculum learning. As part of the facilitation work a number of community partnerships were established. The concept of keeping stakeholders informed had seen students involve Boards of Trustees, fundraising groups such as the Home and School, Whanau and the wider community in their plans and work they carried out. At times this had meant keeping these groups informed of progress by student generated newsletters, and at other times they have worked alongside them as they made presentations and asked for feedback.

Some students were also involved in planning and implementing major events, such as the opening of new school buildings, and they shared the work they had done during exhibitions, expos sports days and performances. In other community partnerships students worked alongside: council experts, builders, Landcare scientists, marine biologists and a variety of small business people. In addition, sports and exercise specialists, environmental specialists, communication specialists, publishing and IT specialists, expert gardeners, catering and event planners supported Education for Enterprise initiatives in the participant schools.

Personnel from other schools, travel-wise coordinators, Department of Conservation (DOC) personnel, drama specialists, people involved in a variety of retail outlets, and clients including art gallery directors, and owners of private gardens gave their time freely. Comments gained in interviews with students and teachers point to an increased level of engagement whenever community members are involved, either as mentors or simply as stakeholders who should be kept informed.

When working with students the information and learning tools provided by such experts were highly regarded by students and often added to the motivation of the topic. Students contacted mentors independently by phone, fax or email. In most cases the response was positive; however, at times feedback was slow, which caused problems when students had a set deadline. In other activities business people refused to deal with students and preferred to speak with the teacher. The best mentors are often very difficult to obtain because they are very busy people. This can cause issues when a mentor is ready and willing but school and work times clash or when the students are relying on the expertise of someone who is sure they can work with the school but then finds work commitments limit the contact.

There were cases when the mentor was used more as a guest speaker and was given the task of talking to a whole syndicate or half school. This is a fall back to the “*old days*”, and teachers were encouraged in this project to involve community people more as mentors. As Frank commented:

I have noticed that community people who have been working with students follow the results keenly and are a little surprised at times at the slow pace of getting things done. This is simply because of the range of other work that has to be done in a school, i.e. unlike in business the project can only be worked on at specific times.

There were occasions when the mentor was too active and actually changed the students' ideas to make them better. An example was in a web design activity where students learnt a great many new skills with a mentor while they designed a web site for an exhibition. Unfortunately the mentor altered much of what they had done in an attempt to improve it. Another developing aspect is that most teachers involved in

the Education for Enterprise project looked for opportunities to involve the community. Evidence does point to a higher level of engagement when community people, especially experts in their field, are involved but how it impacts on students' performance is yet to be determined. As Dean commented:

The community adds an extra pressure for the teachers. As soon as an outside person is involved there is an expectation to get units of work finished or at least reach the outcome the mentor is expecting. With the myriad of things happening in schools teachers sometimes adapt units to meet a shorter timeframe but this becomes more difficult when others are involved.

A positive relationship seemed to develop between the participant teachers and Frank and Dean. Teachers willingly engaged in the research part of the project by collecting specific samples of student work and giving their time for interviews and arranging for interviews with their students. The teachers were responsive to suggestions and were keen to share ideas in the building of units of work. Both facilitators ran into problems contacting teachers at times: some teachers were further advanced in their email skills and their use of computers than others.

The project seemed to make more progress when the facilitator offered something tangible in terms of ideas for a unit, a method of assessment, or a new look at a design process. The focus in schools was very much on the draft curriculum and teachers were quick to see the relationship between Education for Enterprise and the key competencies within the New Zealand Curriculum. The release of the draft curriculum was a bonus for the project, particularly for those teachers who were not quite as willing to give something their full commitment until it became official.

There were deeper levels of learning indicated by teachers' responses at workshops and in interviews and a growing willingness to incorporate enterprising features into their classroom programmes. All participant schools had at least one syndicate committed to Education for Enterprise and in some it had become part of the philosophy of the school and was written into strategic plans. There were some schools where there was commitment across the whole school and others where the

major work happened within one or two syndicates only. Every endeavour was made by Frank and Dean to share ideas with the entire school.

Horn and Little (2010) suggest that teacher collaborations can occur across an entire school or in a particular content/subject area. Teachers who have the ability to truly engage in a collaborative effort to improve student learning and who receive the necessary support to do so are in a position to transform not only their individual practice, but to transform the culture and practice of a group of teachers.

As one would expect, the levels of enterprise initiated by teachers working in this project varied. The naturally creative and innovative participants took on board an idea, ran with it and improved it. These teachers displayed evidence of best practice in Education for Enterprise. According to Frank and Dean, they see Education for Enterprise as a way of learning, a way to give students more ownership, a way of building creativity. Professional development that aids this was welcomed by them and initiated straight away. Many of these teachers had always run enterprising programmes; this P.D. project helped to refine their ideas further.

Frank and Dean reported that teachers who were less creative needed the props that a planned unit of work gives. They have more difficulty seeing the Education for Enterprise picture and without the facilitator's assistance and regular presence there must be doubt at this stage as to whether they will continue to follow the principles. This is merely an empirical response but it does seem it is difficult for these teachers to get into the creative mind-set that Education for Enterprise demands. There are some teachers, too, who find giving the students ownership a little difficult particularly if the end result is something that is to go to the community, such as a production or a magazine. They tend to direct the project and put a lot of their own work into it to ensure success. There are examples of this happening, despite the best efforts of the principal who sees the Education for Enterprise pathway as being a good one. Similarly, there are teachers who are reluctant to involve experts in their classrooms because they believe they have all the skills their students need. Overall, though, the feedback from the professional development thus far was positive. Teachers had asked for facilitator input, invitations were extended to take part in planning days and the commitment by the teachers to show their work was being

valued. Grossman, Wineburg & Woolworth (2001) identified the need for teachers to establish productive collaborative group processes in order to fully engage in productive conversations. The workshops had provided these collaborative group processes.

There was growing evidence of increased teacher and student knowledge of the roles and needs of technology and enterprise in the wider world. The various technology projects carried out as part of this project all focused on established needs. Students were identifying and investigating real issues, existing knowledge and solutions, generating ideas, developing design briefs, organising and managing resources and time, carrying out on-going informed and critical evaluations, and developing and communicating outcomes. Examples of such units were:

- students finding solutions to their schools burglary problems by investigating and coming up with security lighting systems;
- students investigating the production of beanies and initiating reports to the Board of Trustees that will lead to the purchase of beanies for their school;
- students investigating an environmental problem on a local reef that may in part be caused by high numbers of school visitors. From the investigation the students have generated a solution based on educating and informing other schools;
- students investigating the history of a closed amenity in the local town and publishing resource material that not only highlights the amenity and what it does for the town but also offers solutions to the council when they consider whether it be reopened.

Other examples are described earlier in the reviews based on education facilitators were reporting on individual schools. Examples of good practice in Education for Enterprise from schools involved in this project were constantly shared with participants. Real examples of technology in action in society were used with teachers to illustrate both the technological process and its link to Education for Enterprise. These had been used to introduce teachers to the draft technology curriculum along with notes to explain the document.

Students at some schools used self-assessment strategies that focused on the enterprising attributes and the interviews indicated that teachers were analysing the impact of the work on their students.

School-wide changes

The notes pertaining to each school and the examples already referred to reflect evidence of teachers using teaching strategies that demonstrate authentic links between classroom learning and the world. Additionally, there was development of an enterprising culture in participating schools that values school and community partnerships and the link between curriculum learning and wider-world contexts.

School ownership of the development was demonstrated by the enthusiasm of the participants, the work that had already been done and the inclusion of enterprising components into plans and strategies. The short first term in 2007 made it difficult for teachers to develop units that produced quality learning through Education for Enterprise. A continuing theme of this research had been that developing Education for Enterprise characteristics needs time, particularly at the emerging, knowledge building stage, if students are to really take ownership of the learning process and improve their enterprise capabilities.

All teacher participants commented on the need in Term 1 to settle their class into routines and rebuild basic skills in aspects such as cooperative learning. Regular breaks for swimming tuition and early year assessment and testing left little room for developing an enterprising unit of work, so contact in Term 1 mostly focused on planning for enterprise in term two.

Frank and Dean identified a point of difference between Education for Enterprise and other quality learning. They suggested that successful Education for Enterprise is based on a real need that students can identify with from the start. Activities that worked well were those that linked to practical undertakings and included tangible outcomes. Hence connecting technology education and Education for Enterprise has been a good starting point. This also supports discussions about the technology curriculum injector model proposed in this thesis.

There were successful examples in event management, publishing, school productions and the development of product or resources for the school. There were comments from students that signal the importance of these authentic contexts and these had been shared with participating teachers. For example: *“It was a lot different to normal maths because I guess this is real-life - this is real problem solving. If I make one mistake I can ruin everything.”* (Workshop three teacher shared pupil response 1)

According to Frank and Dean, group projects that didn't have a teacher acting as a facilitator seemed to fail. Additionally, when participating students returned to their normal class and routines, then general class work took precedence. Time wasn't available for further development and the teacher facilitation just didn't happen. Education for Enterprise seemed to be successful when students were given a controlling function within the project, for example, ownership of individual learning. Ownership is enhanced if the time is given in the early stages of the unit to really build students' knowledge. Without this time the work tended to become more teacher directed. As one teacher noted, *I'm working at a ratio of 90/10 with the kids. 90% of the management and ideas come from them. When I run out of time this ratio will drop to 60/40. I give more direction and do more myself to get things finished.* (Workshop three teacher response 1)

Frank and Dean identified that students needed frameworks to manage their projects. For example, success factor charts, timelines displayed in class and structured inquiry processes to follow were deemed important. When teachers and students regularly took time to reflect on progress learning, opportunities were reported as enhanced. Frank and Dean noted that students and teachers should strive to move beyond the presentation stage and ensure time is scheduled to actually use that learning by designing, constructing, producing, generating, making in an enterprising way.

93% of the Education for Enterprise projects completed at this point had the opportunity for community input and 83% made these community connections. Most of the community partners were friends of the school, for example: parents, Boards of Trustees, grandparents, rather than outsiders. Much of the community input was

passive, watchers or listeners rather than mentors. A lot of the contact had been where students phoned, faxed or emailed community people to find information and the fax was by far the most successful way for students to get a response.

CHAPTER EIGHT

PHASE FOUR

Teachers must be encouraged – I almost said ‘freed’, to pursue an education that strives for depth of understanding. – Howard Gardner

INTRODUCTION

In Phase four of the research, participating teachers and their principals were invited to attend the fourth and final cluster workshops. The research had identified a need for senior school management to be involved if Education for Enterprise was to be sustained. Invitations sent to participating school principals highlighted this and explained that the initial findings for this project would be presented. Invitations outlined a focus for Phase four of sustaining Education for Enterprise and reporting on work done in schools to date. To facilitate this, Frank and Dean had presentations arranged by teachers who gave examples of their best practice. According to Lincoln and Guba (1985) participant feedback is a key feature of Fourth Generation Evaluation, be it descriptive or interpretive/hermeneutic and that participant feedback is the most crucial technique for establishing credibility because it allows for member checking.

Three principals attended from the 16 schools. Two others sent their apologies and one of the most committed principals in terms of Education for Enterprise leadership couldn't attend due to a family university graduation. The education facilitator later spent half a day in this school covering important aspects of the workshop. It was interesting to note that the schools whose senior management attended or sent apologies had all achieved some excellent school-wide results over the course of the project. Some good results were achieved in the remaining schools but Education for Enterprise didn't extend throughout the school quite as much.

Each school sent one or two of the lead Education for Enterprise teachers so a total of 28 attended. One city school's teachers was unable to attend due to an unexpected

appointment for our two lead teachers that fell at the last minute on our workshop day. Their facilitator also worked with this school after the workshop. One secondary school's teachers didn't turn up. The education facilitator had some difficulty working with this school in the latter part of the project, after the main team of Education for Enterprise teachers took up other positions either at the school or in another school. This issue is discussed further in the notes from individual schools.

WORKSHOP 4 REPORT

Activity one - Presentation of Data Generated Thus Far

Each participant was given a booklet comprising of a PowerPoint presentation that focused on the following:

- introduction - goal of the project, research aims and design, the Ministry definition of Education for Enterprise, the P.D. focus and the enterprising attributes we were striving to develop in students;
- the schools on the project and their baseline data;
- school involvement and how it had changed over time;
- the points of difference between Education for Enterprise and any other effective teaching;
- teacher practice analysis;
- school-wide practice analysis;
- community partnership analysis;
- benefits of Education for Enterprise as a way of learning.

The research was introduced at each workshop with the transcript of an interview of a class of Year 3 and 4 students. This introduction had the following aims:

- to show how even young students can initiate many creative ideas in a short space of time when the activity challenges them to connect these ideas to a practical situation;

- to show the tangible result of these ideas - an environmental organisational video produced by these students for other schools;
- to examine the findings of this particular project in terms of what went well and what didn't go well.

A comparison between this project and an actual real-life community project carried out by a group of engineers was provided. The purpose was to highlight key differences between an enterprising school-based project and an actual community one. Teachers could give examples of similar barriers affecting the success of the Education for Enterprise work they had been involved in. Most centred around organisational problems encountered with outside mentors. Although timing and the need to cover the curriculum remains a barrier for successful Education for Enterprise, teachers are putting strategies in place to create more time. The school projects (94 in total by the end of the 2006 school year) were collated for our course participants. This data included information pertaining to:

- each brief;
- whether it addressed a real need;
- the degree of student ownership;
- the degree of teamwork;
- the degree of opportunities available to find practical solutions;
- the degree of community involvement;
- whether an outside expert was involved in the project.

These details were discussed and provided the lead-in to surveys relating to teacher practice, school-wide practice and community input. Each workshop participant was given a resource CD with a compilation of resources gathered and used over the two years of the project. These included an introduction to the Ministry's Education for Enterprise website. Time was allocated to explore this CD.

Activity two - Theoretical Assumptions

In this second part of the workshop I described differing theories behind school and community links, particularly business links. I looked closely at what influences their success or failure. This began with the identification of the link between

enterprise and technology as stated in the supplement to the NZ curriculum - Draft for consultation (2006): “Technology education connects students with a range of employment opportunities, particularly those that are enterprising and innovative by nature.”

I then outlined the theoretical assumptions used to debate work and education links discussed in Chapter Three. The aim was to provide further background for teachers about school and industry links. Teachers still indicated that there is an assumption amongst their peers that Education for Enterprise centres on generating some form of business. Frank and Dean believed the introduction and sustaining of Education for Enterprise/technology in schools would be helped if lead teachers are aware of the reasons behind it and can take part in informed debate.

There was interest in what I had described to teachers as the “*dry theory*”, and the result was some lively discussion. The value of the exercise was summed up by the teacher comment: “*We see the end product in curriculum drafts and new ideas but we don’t really look at how or why a new initiative comes about. It’s good to be aware of these things*” (Workshop four teacher response 1).

The final part of the presentation was titled ‘*What’s in it for us?*’ The aim was to show teachers that if both parties could benefit (the school and community partner), then the link had a greater chance of success. A chart highlighted nine aspects where both parties could benefit from the link and actual examples were used to illustrate the concept further. For example, the school may benefit by improving careers information, while for industry there are opportunities for employees to develop communication skills, liaising with a different social grouping. An example came from the United States where bank employees are expected to spend time with students in schools. The aim is not to attract bankers of the future but rather to learn communication skills from an expert (the teacher) and interact with a younger and perhaps more ruthless audience (Molnar 1996). The belief is if employees can do this, their communication skills with their adult clients should improve.

Response from teachers indicated the ‘*what’s in it for us? scenario*’ would assist in developing links. Finding and using outside mentors had proved a difficult part of

Education for Enterprise and there is an increased awareness now of the importance of showing potential mentors that the assistance can benefit both parties.

Activity three - Sustaining Education for Enterprise

This session was called '*Sustainability*' and was led by Dean. It began with an identification of the key stakeholders: students, teachers, department/syndicate, school and community. The key issues around sustainability were seen as relevance, manageability and value. Dean looked at two perspectives in relation to these issues - the student and the teacher.

Key discussion points revolved around:

- the student seeing the overlap between student's classroom's learning world and their outside school world while understanding the link to the curriculum - what they were expected to learn and the authenticity of the link;
- the structure of the enterprising activity allowing for manageability. Did the students have the prior knowledge or skill to carry it out and could they really achieve the expected commitment?;
- the value others placed on what the student was doing.

Dean outlined the "what's in it for me?" factor, from the perspective of the teacher for example, how will it make life easier or better? Discussion centred on curriculum fit, benefits to students and benefits for the teacher. From a teacher perspective they also discussed manageability. Can it be done successfully without undue stress or burnout in relation to timeframes, skill/knowledge and resource requirements? Likely barriers or constraints were explored. Participants reviewed the teacher perspective in relation to value within and outside of the school and they identified actions necessary in a move towards sustainability. These included a clear articulation of the rationale for Education for Enterprise activity in the school. The setting of smart goals by the teachers involved planning for success.

In the City Cluster workshop, the principal of City School Four spoke of her school's perspective in regards to sustaining any new initiative and included some research from a Masters paper she was working on. From the Rural Cluster, a

community partner related her experiences of sustaining Education for Enterprise after some major projects in Canada. She presented participants with printed suggestions on how to further strengthen the sustainability of enterprise programmes through three dimensions. Firstly, maximising individuals' practical experience, as she felt Education for Enterprise should incorporate practical activity. Secondly, all attempts should be made to improve the quality of collaborations. Thirdly, developing closer relationships with various stakeholders should be viewed as essential.

At each of the workshops, selected teachers gave a presentation on examples of best practice in Education for Enterprise/technology in their schools. The discussion that followed reviewed whether such practice matched Dean's framework for sustainability. The teachers attending the workshops had become the schools leaders in Education for Enterprise and, as such, were committed to seeing it continue in their schools. The feedback and relevant examples of best practice offered some practical measures that could assist in the future development of Education for Enterprises.

SUPPLEMENTARY ACTIVITY COMMUNITY PARTNERSHIPS

In response to concerns raised after the conclusion and discussions of the coastal and rural cluster Workshops 4 by Frank, Dean and Myself. The seven participants from the city cluster attending the final session of workshop four were given the opportunity to respond to five statements about school-community partnerships and time management. These statements were devised by me as a response to research question five and a recurring issue raised by participants: time management. I was concerned that we were not getting enough information about community partnerships and their relationship to Education for Enterprise. The questions were given to the seven attending participants in the form of a short survey. The survey allowed for both short responses and validation statements. Each statement was designed to elicit an individual personal response in the form; I believe this to be true, partly true or false. Participants were encouraged to substantiate their position via additional descriptive justification comments. Frank, Dean and I discussed the

responses and we believe they were generally indicative of all teacher participants involved in the project.

The responses from the survey are listed below:

Statement one	True	Partly True	False
Education for Enterprise is about creating opportunities for students to apply enterprising attributes within authentic contexts. It often involves people from the wider community in roles such as mentors, as role models, as an audience of interested stakeholders or perhaps as parents who know what is happening and follow the unit's progress through their students with interest.			
Total	6	1	

Justification sample participant comments TRUE:

- *Actually would not have worked without assistance and support of parents.* (Workshop four last cluster meeting teacher response 1)
- *Gives real-life context, children can take charge of their learning. Motivates children.* (Workshop four last cluster meeting teacher response 2)
- *True learning never to be forgotten.* (Workshop four last cluster meeting teacher response 3)

Justification sample participant comments PARTLY TRUE:

- *For my rich tasks true...developing some units to apply attributes on a smaller scale.* (Workshop four last cluster meeting teacher response 4)

These responses indicate a general agreement with the claim that Education for Enterprise is about providing enterprise opportunity within authentic contexts. It should also involve people from the wider community.

Statement two	True	Partly True	False
When this happens it adds a dimension teachers haven't had to deal with in the past. Third parties are involved and they expect things to happen within the assigned timeframe. This adds a pressure that wasn't there in the past and one many teachers may not want.			
Total	4	2	1

Justification sample participant comments TRUE:

- *I need to be 'show flexibility' as a teacher.* (Workshop four last cluster meeting teacher response 5)
- *Pressure can be both positive and negative.* (Workshop four last cluster meeting teacher response 6)
- *Means you have to be more flexible.* (Workshop four last cluster meeting teacher response 7)

Justification sample participant comments PARTLY TRUE:

- *Revolves around organisational skills.* (Workshop four last cluster meeting teacher response 8)
- *Because you are never sure what the impact of the involvement may be.* (Workshop four last cluster meeting teacher response 9)

Justification sample participant comments FALSE:

- *The team is geared up before hand in the planning stage.* (Workshop four last cluster meeting teacher response 10)

The purpose of this statement was to encourage reflection about what happens when you involve people from the wider community particularly in terms of one of the main issues to arise from the research time management. The majority of responses indicate recognition of the flexibility required to be successful.

Statement three	True	Partly True	False
Indications are that many units of work are not completed - there are a number of reasons for this but most revolve around a lack of time - something that is not unfixable.			
Totals	4	2	1

Justification sample participant comments TRUE:

- *Critical thinking required here.* (Workshop four last cluster meeting teacher response 11)
- *Effective realistic planning using frameworks that are well constructed.* (Workshop four last cluster meeting teacher response 12)
- *Demands of the wider curriculum.* (Workshop four last cluster meeting teacher response 13)

Justification sample participant comments PARTLY TRUE:

- *Yeah you just need to be flexible drop some ideas and go with others.* (Workshop four last cluster meeting teacher response 14)
- *We have to work to a timetable and meet deadlines.* (Workshop four last cluster meeting teacher response 15)

Justification sample participant comments FALSE:

- *Why can't it just carry on?* (Workshop four last cluster meeting teacher response 16)

A significant component of the professional development programme was offering frameworks to enhance the participant teachers' delivery of Education for Enterprise and technology education. These frameworks were incorporated to facilitate understanding and also increase the chances of any undertaking within a given timeframe being successful. The responses here indicate a growing understanding and appreciation that better organisation is required.

Statement four	True	Partly True	False
Not finishing something is disappointing for teachers but seems to have become an unavoidable part of teaching. The only ones affected are the teachers who planned work that couldn't be done and students who don't get to do it, or are left with unfinished tasks. It remains frustrating for teachers and students see that it is okay to leave things unfinished. This has become normal and new units begin and the cycle continues.			
Totals	5	1	1

Justification sample participant comments TRUE:

- *Teachers need to be more realistic plan less and listen more.* (Workshop four last cluster meeting teacher response 17)
- *Can be unavoidable at times.* (Workshop four last cluster meeting teacher response 18)
- *Failure is a part of life.* (Workshop four last cluster meeting teacher response 19)

Justification sample participant comments PARTLY TRUE:

- *On occasions this can be a learning curve for the student.* (Workshop four last cluster meeting teacher response 20)

Justification sample participant comments FALSE:

- *It is not okay to leave things unfinished.* (Workshop four last cluster meeting teacher response 21)

In New Zealand there has always been an association between technology education and students taking something made home. However, as we move away from closed recipe type activity, where the control is all with the teacher, increasingly things are liable to be unfinished. The responses indicate recognition of this.

Statement five	True	Agree	Disagree
Involving others adds a dimension that may be too challenging. Therefore, there should be less emphasis on this aspect of Education for Enterprise.			
Totals		1	6

Justification sample participant comments AGREE:

- *Study worked when reduced from whole syndicate to just 2 classes. (Workshop four last cluster meeting teacher response 22)*

Justification sample participant comments DISAGREE:

- *As needs dictate okay if you can get others easily. (Workshop four last cluster meeting teacher response 23)*
- *Involving others is a critical element of E 4 E. (Workshop four last cluster meeting teacher response 24)*
- *Using mentors etc. let's students know that schools don't live in isolation. (Workshop four last cluster meeting teacher response 25)*

This statement was framed so that respondents could easily agree that involving others from the community was too challenging. The majority of responses seemed to disagree with that premise.

SUMMARY OF SCHOOL FACILITATION AND CONSULTATION VISITS

The following is a description of the nature, number and duration of education facilitator contacts with each school. I am aware that participation and engagement with the Education for Enterprise project was uneven. I don't believe that this is a reflection of Dean and Frank's performance or efforts. I do believe it is important for disclosure that I give an accurate portrayal of what took place. The nature of the contact was similar in each school. It involved discussions with the principals regarding the aim of the project and the gathering of baseline data, including critique

and study of any relevant documentation. There were introductory staff meetings, programme planning meetings, evaluation and reflection sessions with syndicates and individual teachers. The development of management and assessment frameworks designed to help achieve programme aims.

The following tables highlight the number of interactions between the education facilitator and the schools from each cluster.

Table 6
Rural Cluster school visits

Cluster school	Education Facilitator	Direct contacts from Frank or Dean	Amount of time spent
Rural School One	Dean	11 contacts	1 day 5.5 hours
Rural School Two	Frank	22 contacts	11 days
Rural School Three	Frank	18 contacts	8 days 6.5 hours
Rural School Four	Dean	10 contacts	2 days 3.5 hours
Rural School Five	Dean	19 contacts	4 days 6 hours
Rural School Six	Dean	6 contacts	2 days 5.5 hours
Rural School Seven	Frank/ Dean	18 contacts	7 days 6.5 hours
Rural School Eight	Dean	12 contacts	4 days 5.5 hours

Table 7

Coastal Cluster school visits

Cluster school	Education Facilitator	Direct contacts from Frank or Dean	Amount of time spent
Coastal School One	Frank	42 contacts	15 days 6 hours
Coastal School Two	Frank	52 contacts	16 days 5 hours
Coastal School Three	Frank	42 contacts	14 days 6 hours
T4	Frank	45 contacts	12 days 3 hours

Table 8

City Cluster school visits

Cluster school	Education Facilitator	Direct contacts from Frank or Dean	Amount of time spent
City School One	Frank	21 contacts	9 days 4.5 hours
City School Two	Frank	22 contacts	11 days 1.5 hours
City School Three	Frank	28 contacts	12 days 6.5 hours
City School Four	Frank	22 contacts	10 days 5.5 hours

The difference in facilitation and contact time that each school received can be explained by the school location, ease of access and also by school type in general terms. The primary schools needed more support than the secondary schools.

CLAIMS, ISSUES AND CONCERNS RAISED FROM PHASE FOUR AND THE PROJECT OVERALL

This section presents information generated from the fourth and final set of workshops carried out in May 2007, the main focus of which was a review of the professional development programme, including Workshops 1, 2, 3 and 4. This information is generated from a detailed seven-page questionnaire (Appendix 10). The questionnaire was completed by 20 teacher participants. Additional evidence is taken from four transcribed focus group interviews. Selection of the participants of the focus group interviews was based on level of participation in the project and willingness to be involved in the research.

The following section also presents the findings of an analysis by Frank, Dean and myself of 271 pages of transcribed video and audio recordings taken during the whole project. This analysis was undertaken to identify general responses/statements both negative and positive, mapped to research questions 3, 4 and 5. It is a simple frequency table which shows the number of responses under each category. It is displayed like this to give the reader a synoptic viewpoint of the responses.

Table 9

Frequency table of responses mapped to research questions 3, 4 and 5

Research question.	Recorded statements mapped to each research question.	Number of participant teacher statements mapped to each research question.
3	Teacher practice positive	268
3	Teacher practice negative	37
4	School-wide practice positive	85
4	School-wide practice negative	51
5	Community link positive	104
5	Community link negative	34

Further analysis needed to be carried out to develop a greater understanding of: (a) research question three: teacher practice that supports the development of enterprising attributes, capabilities and competencies of students, (b) research question four: school-wide practices that support the development of enterprising attributes, capabilities and competencies of students, and (c) research question five: the impact and influence that school-community partnerships have on student learning.

To generate more information in response to research questions 3, 4 and 5 during workshops four Frank, Dean and I devised a questionnaire (Appendix 10). We asked participants to respond to cuing statements or questions. These sessions were compiled and a synoptic analysis follows.

Survey question/statement one (school-wide practice research question four)

The participants were given a copy of the current Ministry of Education (MOE) definition of Education for Enterprise from the Te Kete Ipurangi (TKI) website and asked to edit it in light of their experience on this project.

Many of the responses were similar in content; a sample is shown here:

Learning directed towards developing in young people those skills competencies, understandings and attributes which equip them to be innovative and prepared for the challenges of life. (Workshop four teacher response 1)

Learning directed towards developing in young people those skills competencies, understandings and attributes which equip them to be innovative. (Workshop four teacher response 2)

Learning directed towards developing and enhancing in young people those skills competencies, understandings and attributes which equip them to be innovative, creative, motivated and inspired. Encouraging students to successfully manage personal opportunities which will automatically extend

in all facets of their lives for themselves and therefore for others. (Workshop four teacher response 3)

These responses suggest that participants had developed a growing understanding of the value of Education for Enterprise.

Survey question/statement two (school-wide practice research question four)

How important do you think the following aspects are if more teachers and students are to be involved in Education for Enterprise as a way of learning in your school?

Twenty statements were constructed by the Education for Enterprise project team and the participants were asked to respond using 4 point Likert scale ranging from ‘very important’ to ‘not important’.

The statements receiving the highest frequency of responses from respondents indicating the ‘very important’ areas were:

- the selection of learning activities across the curriculum that challenge students to connect enterprising skills to practical situations;
- the promotion of authentic contexts across all curriculum areas to help students see relevance and purpose in what they do and the link to the wider world;
- showing teachers that Education for Enterprise is an effective vehicle for delivering the key competencies;
- getting a clear understanding of the underlying principles of Education for Enterprise and how this can and should positively impact on teaching practice, engagement and relevancy;
- celebrating all successes and achievements.

The statements receiving the highest number from respondents indicating the ‘not very important’ areas were:

- focusing on the end product;

- building working relationships with the local community;
- building working relationships with local businesses;
- led by teachers from subjects where Education for Enterprise can be more easily applied are technology, business and economics.

The participants indicated a belief in the value of authentic contexts for learning. They suggested a strong connection between Education for Enterprise and the key competencies. The participants seemed to view Education for Enterprise as a good medium for cross curricular activities. The responses indicated working with the community and business and having lead teachers from technology or business was less important. The evidence suggests a focus on the benefits of Education for Enterprise in general teaching terms rather than the economic imperative of some policy makers.

Survey question/statement three (a): (teaching practice research question three)

What priorities should be given to each of these practices?

Nineteen statements were constructed and the participants were asked to respond using a Likert scale ranging from very high to very low. The statements receiving the highest number who indicated the ‘very high’ or ‘high’ key priorities were:

- encouraging students to gather information from a wide range of sources;
- putting less emphasis on curriculum content "coverage", to allow time for deeper understanding or more relevant learning to occur;
- students having the opportunity to try out new and innovative ideas and take risk;
- encouraging students to see "mistakes" as learning opportunities.

The statements receiving the lowest number who indicated the ‘very low’ or ‘low’ key priorities were:

- involving students in assessment decisions what should be assessed and how;
- students having the opportunities to use experts from the community as mentors;

- students presenting the results of their learning/activities to an audience other than their teachers or classmates;
- supporting the development of students' business knowledge and skills.

The participants identified the importance of collecting information from a wide variety of sources. The responses indicated a positive connection between Education for Enterprise and risk taking. The responses acknowledged Education for Enterprise activity as a good opportunity for students to see 'mistakes' as learning opportunities. Reflections indicate that Education for Enterprise allowed the students to learn more through trial and error. The respondents reported a lower priority rating for students developing business skills and knowledge, identifying this as less important.

Question three (b): (teaching practice research question four)

How often did these practices occur before and after the Education for Enterprise project involvement?

Nineteen statements were constructed and the participants were asked to respond using a Likert scale ranging from 'most of the time' to 'hardly ever'.

The statements showing important and significant shifts (number ten or higher) were:

- students learning the curriculum through 'real-life' projects;
- putting less emphasis on curriculum content coverage to allow time for deeper understanding or more relevant learning to occur;
- students having the opportunity to try out new and innovative ideas and take risks;
- encouraging students to gather information from a wide range of sources;
- students taking leadership in planning and organising learning activities in the classroom/outside the classroom and gathering and managing the resources they need.

These responses indicated a shift in emphasis in regard to teaching and learning as a result of being involved in the Education for Enterprise project. Teachers suggested they were more comfortable with shared ownership and acknowledged the importance of unexpected learning outcomes.

Question four (a): (teaching practice research question four)

Show how strongly you agree or disagree with the following statements about your teaching practice with regards to Education for Enterprise.

Fourteen statements were constructed and the participants were asked to respond using a 4-point Likert scale ranging from ‘strongly agree’ to ‘strongly disagree’.

The statements receiving the highest number of responses indicating the ‘strongly agree’ or ‘agree’ areas were:

- I have a good understanding of the principles of Education for Enterprise.
- I am enthusiastic about making Education for Enterprise happen at this school.
- Education for Enterprise has had a positive impact on student learning.
- Education for Enterprise has increased decision making opportunities for students at this school.

The statements receiving the lowest number of responses who indicated the ‘strongly disagree’ or ‘disagree’ areas were:

- Education for Enterprise has helped students see the relevance of the curriculum.
- Education for Enterprise has helped build positive relationships with local businesses.
- Education for Enterprise has heightened students’ interest in the community.
- Education for Enterprise is harder to plan for than conventional planning approaches to curriculum teaching and learning and it takes more time.

These responses indicate that the professional development programme had given the teachers additional confidence and enthusiasm for Education for Enterprise. Less successful had been the connections made with the community. Successful, meaningful connections can be difficult to establish and hard to maintain. According to Sanders (2001) fear of public scrutiny and teacher burnout hampers community involvement in educational programmes.

Question four (b): (teaching and school-wide practice research questions three and four)

In your view does Education for Enterprise have any special relevance or relationship to the values, philosophy or culture of your school?

Responses:

Yes	12
No	0
Not sure	6
Nil response	2

A validating statement was sought and the following were received:

Indicative sample positive statements:

It should be underpinning all enquiry learning. (Workshop four teacher response 4)

We have a very strong community and Education for Enterprise involves them in the learning experiences a lot more. (Workshop four teacher response 5)

In our mission statement we refer to 'providing students skills for life' - Education for Enterprise fits soundly into that concept. (Workshop four teacher response 6)

We want our children to have real-life meaningful contexts. We want our children to be problem solvers, have ownership, increased responsibility. I see that Education for Enterprise is an excellent 'vehicle' for this. (Workshop four teacher response 7)

Education for Enterprise has great relevance to the philosophy of our school. Our school aims to encompass each child as a 'whole' person and develop them across the curriculum. Education for Enterprise focuses largely on encompassing and including the various learning styles and thus creating motivated engaged learners. (Workshop four teacher response 8)

Indicative sample negative statements:

It could do if Principal, Boards of Trustees and other teachers took it on board. At the moment, the answer is probably more a no.

It could have if staff and management wanted it to. (Workshop four teacher response 9)

These responses indicate some progress in integrating Education for Enterprise into the school culture. The majority of respondents suggest that Education for Enterprise allowed them to address the philosophical aims of their schools in a practical and meaningful way. Those that have made progress indicated it was a positive measure.

Question five: (school-wide practice research question four)

Show how strongly you agree or disagree with the following statements about your teachers teaching practice with regard to Education for Enterprise.

Thirteen statements were constructed and the participants were asked to respond using a Likert scales ranging from 'strongly agree' to 'strongly disagree'.

The statements receiving the highest number of responses who indicated they 'agree' or 'strongly agree' areas were:

- education for enterprise is likely to change the way the curriculum is planned at a whole school level;
- education for enterprise is likely to change the way the curriculum is planned at a department/syndicate level;
- education for enterprise had helped more students see the relevance of the curriculum;
- education for enterprise had increased decision making opportunities for more students at this school.

The statements receiving the highest number of responses who indicated they ‘disagree’ or ‘strongly disagree’ areas were:

- all teachers at my school have a good understanding of the principles of education for enterprise;
- all teachers at my school are enthusiastic about making education for enterprise happen;
- education for enterprise is a central organising concept for curriculum and teaching at this school;
- teachers’ workloads will increase if they get involved with education for enterprise as a way of learning.

The positive responses indicate Education for Enterprise could be a change agent in both teacher planning and pupil ownership. The negative responses indicate there is still some way to go in convincing teachers outside of the Education for Enterprise project of its worth. However, teachers involved did not see it as significantly increasing their workload.

Question six: (school-wide practice research question four)

How would you rate the following challenges for Education for Enterprise if it is to be sustained and extended as a way of learning in your school?

Thirteen statements were constructed and the participants were asked to respond using a Likert scale ranging from ‘so challenging won’t proceed’ to ‘little challenge easily solved’.

Most responses were in the ‘challenging but likely to be overcome’ column.

There were three concerns raised from responses for ‘so challenging won’t proceed’ these were:

The time demands of compulsory programmes and initiatives such as Keeping Ourselves Safe or DARE programmes designed to challenge children, parents and their communities to develop skills in - Decision making, Assertiveness, Responsibility and Esteem. (Workshop four teacher response 10)

The need for some teachers to change their teaching style and give students more ownership of the learning process. (Workshop four teacher response 11)

A perceived ‘side-dish’ idea from the Ministry rather than an official emphasis, push and alignment with the key competencies. (Workshop four teacher response 12)

There were three responses for ‘challenging but likely to be overcome’ these were:

The demands of assessment. (Workshop four teacher response 13)

Organising people and groups outside the school to act, for example, as mentors, helpers. (Workshop four teacher response 14)

The need for teachers to be very enterprising themselves when planning units of work. (Workshop four teacher response 15)

The results from question six indicate a need for approbation of Education for Enterprise from the MOE; workload issues in other areas may take priority unless this happens.

The introduction to Chapter Seven identified a rationale for transcribed interviews and feedback. These group interviews were undertaken during workshop four and involved all the participants in attendance. Frank, Dean and I discussed the use of interviews to generate data. We felt confident that participants had grown sufficiently comfortable with each other and us to be open and honest in their responses. The importance of this trust issue is highlighted by Krueger and Casey (2000) who contend that rich data can only be generated if group individuals are prepared to engage fully. Kitzinger (1994) suggests that feedback obtained from participants who see each other as acquaintances are more willing to challenge each other's ideas. My role as researcher was to try and make sense of the individual responses, and also to be analytical enough to see any developing relationships between the responses, and the research objectives as a whole. This following section continues to probe research questions 3, 4 and 5. An additional component was trying to establish what were the perceived positive and negative impacts of the professional development programme. I was looking for trends or big ideas that emerge from an accumulation of evidence that permeate through the various discussions.

Research Question 3:

What teacher practices support or undermine development of enterprising attributes within the Education for Enterprise project?

Supportive trends:

Well that is the basis of it and why the unit is so successful. It's because it is developed within an authentic context. And the unit is to work on what the students have gained with their knowledge building - it goes on from there but the students expect to see a need - "what are we doing this unit for? (Workshop four teacher response 16)

All decisions were made by the class but at this time they were totally focused. They were regularly brought back to the mat during the day to discuss options and decide on the next step. (Workshop four teacher response 17)

All students have goals for the day which are written out at the beginning of the session. This helps them stay on track and meet their deadline. The day is broken into blocks and each block has goals. They all have different jobs which are listed, with goals set. (Workshop four teacher response 18)

Making the learning intention and purpose transparent to the students right from the start seems to be very important. In this case the students know they are not just learning animation - another skill. They are learning it to use for a purpose. (Workshop four teacher response 19)

Claims that were significant and repeated were related to students' involvement with real needs and authentic contexts. Shared ownership and transparent learning intentions were additional claims identified as positive experiences from the Education for Enterprise project.

Unsupportive trends:

I did have a brief but I must admit I did more talking and calling their attention to it. That wasn't wonderful. The other thing was that it was a rush at the time the year. (Workshop four teacher response 20)

We will finish this unit but the stop start nature of it probably doesn't maximise the potential for building enterprising learners. Unfortunately it is very difficult for the teacher to lessen the amount that needs to be done in a school day. (Workshop four teacher response 21)

It's the other factors that come into the process that can upset the time management of it. And also what I found hard was making the children try not to go so broad - too far. I found sometimes they were way out there and having to actually find out for themselves took a lot of time. (Workshop four teacher response 22)

This teacher wasn't prepared to relinquish ownership to anyone, children, parents or a community member. (Workshop four teacher response 23)

Some concerns signalled repeatedly from the workshops are the time that these types of activities take and teacher willingness to share ownership. Suggestions for minimising these concerns will be addressed in Chapter Nine.

Research question 4:

What school-wide practices support or undermine development of enterprising attributes within the Education for Enterprise project?

Supportive trends:

Probably the best professional conversations I've heard with staff is when we are planning stuff we are thinking about how things are going to work. What's our purpose? Have we got a purpose and how do we make the learning more purposeful? (Workshop four teacher response 24)

*So that's what I'm finding that the staff feel quite excited about it and we are planning things now. We are planning to build **creative children** and to **create the drive**. (Workshop four teacher response 25)*

The children are taking pride in the fact we are pushing them. (Workshop four teacher response 26)

One of the most interesting things out of it though is that the behaviour management has come down to next to nothing. (Workshop four teacher response 27)

Frank and Dean support these claims that constructive focussed Education for Enterprise planning is a key support practice for a successful outcome.

Unsupportive trends:

One or two staff members looked at the barriers to the students' ideas rather than seeing them as clever ideas than could be changed slightly to make them safe. (Workshop four teacher response 28)

The whole literacy thing – we’ve done that contract and now we are in the embedding stage. There are changes the whole time. If you try and do things on the side (as in this case) you can see why it doesn’t happen. The demands on a classroom teacher are huge these days, but something like that (Education for Enterprise) can make it easier because the students can take over but they need the guidance. (Workshop four teacher response 29)

One of the problems with Education for Enterprise is that not all teachers are that creative or enterprising in themselves. Perhaps principals should set up situations where they must become enterprising to get a task done. Then we hope they apply the same approaches to their children. (Workshop four teacher response 30)

Teachers find this too, so this becomes a barrier for successful Education for Enterprise. Some adults find it incredibly difficult to stand back.. We need to move parents and teachers away from doing things when children can do it. (Workshop four teacher response 31)

Concerns identified here have also been confirmed by other data streams. Most notably these are teachers not having shared understandings of what Education for Enterprise attributes are undermines their ability and confidence to teach for it.

Research question 5:

What is the influence and impact of school-community partnerships on teaching and learning within the Education for Enterprise project?

Supportive trends:

Getting the mentors into the school is really important. We use them on a regular basis and the mentors add that extra quality to a lot of units because they are the experts. The students have developed some good models of questioning and it's good to see experts coming in and being responsive to the kinds of questions the students are asking. (Workshop four teacher response 32)

Having those experts around does make the unit more interesting because they can bring a real-life perspective to the theme and what the students are learning. (Workshop four teacher response 33)

She was wonderful and the children had so many questions they want to ask. But they ran out of time they were so enthusiastic and at the end of the time there were 20 or 30 hands up and the bell rang and they just wouldn't go. (Workshop four teacher response 34)

Having the builder on the panel worked well. He was able to give real-life feedback to the students. For example, many had under-priced their materials and Errol knew exactly the cost of timber etc. He was also able to explain to the students why some of their processes e.g, concreting wood to a post, wouldn't work. (Workshop four teacher response 35)

The biggest trend here suggested by the data is that involving community partners within Education for Enterprise activity generates enthusiasm and motivation from the students. Additionally the mentors expertise and experience is valued by both the teachers and the students.

Unsupportive trends:

Some of the pitfalls of course are that the experts may not turn up – that's happened - or they direct the answers above the heads of the students and that is the danger. (Workshop four teacher response 36)

They need to be children friendly in terms of be able to relate information in a way children can understand and some aren't. The teacher actually does a better job. It is difficult to get mentors in work time. (Workshop four teacher response 37)

The mentors weren't always delivering what teachers wanted because we would be inside and they would have a group of children outside. (Workshop four teacher response 38)

The data suggests that careful planning is required to ensure that timely involvement is achieved and that the teacher must maintain community-partner focus to ensure learning intentions are met.

Comments about the professional development programme:

The following statements include reflections from participants about the professional development program.

Education for Enterprise has made a difference in this school since the first term. We always knew children could run with things if they got the chance and they have. They are working cooperatively doing their own research and working out their own ways to share it with others. It's how I do everything in the classroom now. (Workshop four teacher response 39)

The biggest difference has been in that everything has become that much more authentic. (Workshop four teacher response 40)

Education for Enterprise gives us the structure to allow us to develop some higher order skills that adds value to our work in literacy and numeracy. It's helped us engrain what we are trying to do in our school and developing the enterprising attributes will be a strategic goal in our school. (Workshop four teacher response 41)

Teachers are taking the big topic and working it down to something relevant. The staff are planning for the children and with the children a lot more. (Workshop four teacher response 42)

There is a more conscious effort for staff to utilize the community people around them and although this has always been an important part of the school the shift has been on enhancing their potential and enhancing their experience in the school. (Workshop four teacher response 43)

All the links with planning help anything in our class now we think about that as an aspect. I don't think I've noticed that kind of thinking before and that's quite cool. (Workshop four teacher response 44)

The parents noticed that the students' attitude to school and learning had changed; there was greater enthusiasm. (Workshop four teacher response 45)

These responses indicate some positive trends through involvement with the Education for Enterprise professional development programme. There was no negative feedback received.

CONCLUSION OF THE RESEARCH PHASES

The analysis I have presented in Chapters Five through Eight has been systematic, sequential, verifiable, and continuous. I have endeavoured to show a trail of evidence, as well as increasing the extent of dependability, consistency and conformability through rich descriptions as proposed by Lincoln and Guba (1989). There have been differences in each phase of the research which reflect the changing nature of responsive evaluation where the researcher responds to concerns raised. According to Stake and Abma, (2005), it was Guba and Lincoln's intention to promote a participatory and transformational process with and among stakeholders as co-owners of the evaluation.

The claims, issues and concerns highlighted were reviewed and discussed by the Education for Enterprise project team in line with Angen's (2000) criteria for evaluating research, as described in Chapter Four. It was felt by Frank, Dean and myself that what had been reported through the responses in research Phases one to four was a fair reflection of what had taken place as a result of the professional development programme. These responses were member checked and there was engaged, egalitarian dialogue which was based on validity claims, not power claims. Guba and Lincoln (1989) used the term circles to refer to the practical organization of the dialogical process. These *circles* have led to a number of assumptions about the various components of the technology curriculum injector model.

Based on these assumptions, what follows in Chapter Nine is further exploration of some key messages and themes which arose from the Education for Enterprise project and the development of the technology curriculum injector model which followed it.

CHAPTER NINE

A WAY FORWARD

If we teach today as we taught yesterday we rob our children of tomorrow (Dewey, 1916).

INTRODUCTION

This chapter contains further exploration and development of the key themes to emerge from Chapters Five through Eight. It also makes explicit my thinking behind the development of the technology curriculum injector model. Some claims, issues and concerns identified in the data analysis are considered and recommendations for incorporating ideas presented throughout this thesis are portrayed. These portrayals are given by the Education for Enterprise project team. It was agreed that as a team our roles through the professional development programme was to enable participants to actively engage and shape the research.

According to Guba and Lincoln (1989) claims, concerns and issues form part of a conversational process to allow stakeholders to render judgements about the evaluation that is taking place. The Education for Enterprise team challenged the participants to review and possibly alter their practices where necessary to allow for closer synergies between technology education, Education for Enterprise and community involvement. I encouraged Frank and Dean to assist in generating the information with the participants and together we drew meaning from what resulted.

In constructivist research it is important that the study is thorough, coherent and comprehensive. Results should be trustworthy and useful; the interpretation should be provocative and generative of further inquiry. A wide interpretation of constructivism includes data triangulation by allowing participants in a research project to assist the researcher in the research question as well as with the data collection. An example of how this was achieved by the project was the ‘*daily snoop*’, where the team facilitated participants to interview each other in a role play

situation. This interview was included as an indicator of what was actually taking place. Research has shown that aspects of self-understanding through construct developments play an important role in the way in which teachers ultimately teach (Boote, 2006; Day, Kington, Stobart, & Sammons 2006). These views were supported by this research.

Many of the primary schools struggled with identifying the early stages of their technology projects. The education facilitators re-acted to this need utilising the hermeneutic/dialectic opportunities of Fourth Generation Evaluation by providing a workshop on the fuzzy front end from new product development (NPD) research. These NPD sessions proved to be both popular and invaluable to the project team as it helped foster a win-win situation for the teaching staff, facilitators and researcher alike.

Some success themes have emerged from the research. There has been an emphasis on authentic needs while designing the units and on making these needs transparent to the students so they identify where their new found skills and knowledge will be utilized. There was also an expectation for students to create more than just presentations at the using and doing stage by trying to push on and develop tangible outcomes. The Education for Enterprise attributes had been a central feature when designing the whole unit rather than simply being treated as an afterthought. Curriculum integration can create more time and reflect the integration that occurs in real-life. The project team were able to ensure that the students reflected on, and revisited the timeframe, deadlines and expectations continuously. Success in Education for Enterprise requires teacher scaffolding that will help students move beyond the fuzzy front end. Teachers must help to develop the background knowledge required by getting students to ask relevant questions. As well as this, teachers should maintain a focus and continuity in terms of timetabling and commitment. Student involvement in planning, goal setting, and identifying tangents where student ideas are actually considered and used has also emerged as a theme from the research.

CONNECTION THROUGH INTEGRATION

There are many definitions of curriculum integration. Shoemaker (1989) defines an integrated curriculum as:

Education that is organized in such a way that it cuts across subject-matter lines, bringing together various aspects of the curriculum into meaningful association to focus upon broad areas of study. It views learning and teaching in a holistic way and reflects the real world, which is interactive. (p. 5)

Others, such as Fogarty (1991) and Drake and Burns (2004), have moved beyond a single definition of curriculum integration and suggested a continuum involving multiple levels. However, they share a general philosophy, which proposes a movement away from teaching isolated facts towards a more constructivist, holistic view of learning based on the principles of philosophers such as Bruner, Dewey and Piaget. Curriculum integration was an important issue identified by the teachers and facilitators during this research. Connecting curriculum integration via the technology curriculum injector model with the wider community was also an important aspect of this study. Not all attempts to include wider involvement were successful. Some of the frustrations experienced during community participation in this research project included:

- enterprise mentors taking too much control over the direction of work;
- lack of response from community experts;
- mentor's/expert's timeline and school timeline not matching;
- expert's work commitments during school time obviously taking precedence;
- experts wanting to relax from their own job in their own time. There was willingness but commitment issues came to the fore.

THE FUZZY FRONT END

As a result of this research I suggest it is worthwhile spending time developing technology teachers' understandings of the fuzzy front end. This notion initially

presented itself during the early facilitation phases of the Education for Enterprise research. Once the participants were made aware of its importance they responded favourably. The efforts made to increase their personal constructs of technology through gaining a deeper understanding of the fuzzy front end proved to be worthwhile. There is certainly some indication that further research in this area would be helpful and warranted.

The technology curriculum injector model proposed in this thesis identifies technology education as a mechanism to facilitate a tripartite relationship. This can be achieved when policy initiatives bring Education for Enterprise, community partnerships and a belief in a connected curriculum together through technology education activities. A connective curriculum acknowledges that education takes place in a community of practice and that learning is a purposive and a social process (Lave & Wenger, 1994 cited in Young, 1998). It exposes the need to relate educational activities to developments in the wider society including but not exclusively linked to industry. So connectivity could be seen as more than just a curriculum model; it is the purpose of school itself!

The professional facilitation had at its core a problem-based learning instructional strategy (Ward & Lee, 2002). This had been identified by the Education for Enterprise project team as a way to allow the students the opportunity to: (a) become authentic stakeholders in their learning, (b) identify key facets of science, technology and curriculum integration and, (c) participate in a learning environment which modelled a useful classroom approach.

REFLECTIONS AND RECOMMENDATIONS

This thesis has reported on a professional development and research project funded by the Ministry of Education (MOE) in New Zealand. Through this project a programme was developed to facilitate the development of Education for Enterprise within technology education. Ninety examples of an Education for Enterprise approach within a technology framework were observed and recorded in the primary schools and 16 examples in the secondary schools. All were based on real perceived

needs within authentic settings. After considerable review, member checks and analysis of data some success criteria have begun to emerge. These have been grouped under the following headings: teacher practice; school-wide practice; and school-community partnerships.

Teacher Practice

There is evidence to support Education for Enterprise as part of technology education when:

- the context for the activity is shared, authentic and perceived as real;
- the activity is linked to practical undertakings and includes tangible outcomes;
- students are given a controlling function within the project, and ownership of individual learning;
- the student contribution is encouraged, mentored and acknowledged;
- students are provided with flexible frameworks to facilitate project management;
- the approbation of Education for Enterprise is evident from the teacher;
- the teacher reflects on their delivery and involvement from the beginning to ensure an enterprising approach is taken and modelled;
- the teacher encourages and values reflection from the students and this is incorporated into progression and assessment;
- time management is paramount; therefore the teacher must operate both as a facilitator and goals chaser.

School-wide Practice

There is evidence to support Education for Enterprise as part of technology education when:

- support for participation and monitoring comes from the senior management team of the school;
- participation is shared to prevent burn-out and remains consistent in the event of staff changes;

- the understandings of Education for Enterprise are shared amongst all staff, not just those involved in particular projects;
- Education for Enterprise is not seen as another extra but is interwoven with key learning intentions from numeracy, literacy and the technology curriculum area;
- time allocations are flexible enough to allow for appropriate research by students and enough time to see the projects through;
- time allocations are concentrated, not too disjointed or disrupted by other activities within the school (e.g., suspended timetable alternatives);
- consideration is given to how to place Education for Enterprise within the whole school;
- recognition and utilization of quality facilitation and advisory programmes.

School-community partnerships

There is evidence to support Education for Enterprise as part of technology education when:

- boards of trustees and parents are involved in the planning stages;
- experts and mentors are sought as soon as possible and their time commitment established;
- co-operation and co-ordination of assistance occurs between mentors and teachers;
- due consideration of student participation and decision making is kept central to the project;
- there is community pride established in the activities undertaken;
- reports and updates are provided to all parties regularly using a variety of media.

There is some indication that where successful, a quality Education for Enterprise approach as part of a technology education programme can help improve:

- behaviour management and motivation;
- participation of boys;
- stronger ties between school and the community (through a connected curriculum);

- meaning and therefore a better learning experience to aspects such as numeracy, literacy and developing specific curriculum knowledge.

The findings support notions of authentic situations, shared ownership, and the integration of Education for Enterprise within existing curriculum areas such as technology education. Teachers, with support from senior managers and facilitators or advisors, can make useful connections with the wider community to enhance their teaching and ultimately the students learning that occurs has more meaning.

DEVELOPING SCHOOL-COMMUNITY PARTNERSHIPS

This thesis has highlighted a number of philosophical and theoretical approaches to the connective nature of technology education. It is clear that technology educators alone cannot help students prepare for successful adulthood. It is evident, however, that technology teachers, schools and their communities could work together to achieve this goal. Technology teachers might benefit from reflecting on why they are considering entering into a partnership and from being fully aware of the commitment, time and effort it can take to develop endeavours and see them through. Successful partnerships are likely to be built and maintained by personal relationships developing between the individual parties.

The development of successful school-community partnerships identified in this research suggests that they are dependent on numerous factors. First, the community involvement must be sought at the planning stages of the activity. Second that partnership members need to be identified. These could include boards of trustees, parents, as well as experts and mentors from the community. Third it was identified as important to establish time expectations and commitments as early as possible. Fourth teachers are likely to need to develop key roles within the partnership. Establishing learning intentions and ensuring pupil participation and their control over decision making could be kept central to the project. Fifth they might try to establish a collective community pride in the activities undertaken - this can be maintained when reports and updates are provided to all parties regularly using a variety of media.

Partnerships were deemed successful when there were perceived mutual benefits for all parties involved. Table 10 identifies possible benefits for schools and the community enterprise. This could be considered to make sure the collaboration benefits both parties. Table 11, is perhaps more important because it establishes possible benefits for teaching and learning from a teacher and pupil perspective.

Table 10

Possible benefits of school-community partnerships

School teachers and students	Community enterprise partners
Increased personal motivation working in partnership with people outside the classroom.	Increased motivation for individuals and employees able to participate in a social good.
Purposeful action working with others in the community and an increased awareness of the role enterprise plays.	Increased awareness for community enterprises of how schools work and a chance to develop some connectedness.
Improved individualised careers information.	Opportunities for employees to develop communication skills, liaising with a different social grouping.
Accurate, up-to-date information about specific enterprises and industries.	Accurate information about school technology education programmes.
Access to experts in the community/ enterprise.	Access to experts; for example, language teachers.
Access to facilities beyond the scope of the school.	Access to educational facilities beyond the scope of the enterprise for training.
Possibilities for sponsorship to support the curriculum.	Improved employer and employee relationships, allowing staff to have contact with students in their community. Giving the employee personal satisfaction.
An increased understanding of the world outside the classroom, including expectations of possible employers and how this relates to students' personal growth.	An increased understanding of the world of education, including the expectations of schools and individuals leaving school.
Increased understanding for teachers of how communities and enterprises work. Ultimately improving teaching and learning for individuals in their class.	Fulfilment of a possible personal altruistic desire to help improve the quality of teaching and learning.

Table 10 was generated after analysing the data from this thesis. It became apparent that an additional issue emerged. What might this mean for the technology teacher and the students in the classroom?

Table 11

Possible benefits for students and teachers of school-community partnerships

Benefits for pupils	Benefits for teachers
Increased motivation and a belief that what they are doing has a real-world connection.	An opportunity to regenerate their own interest in what they teach.
Purposeful action - an increased realization that the work they are undertaking in school has a place in their future lives.	To develop a sense of connectedness and an affirmation that what they teach is beyond what is required for assessment and qualifications.
An opportunity to experience a possible profession enterprise, or service.	Opportunities for teachers to look for career breaks and sabbaticals.
The opportunity to conduct research, using interviews and personal communication, with experts in the field.	Access to new teaching materials and the latest resources.
Access to experts in the community with additional skill-sets that can complement the classroom teacher.	Access to experts, to facilitate further understanding of their current practice.
Increased opportunity to access equipment beyond the scope of their technology classroom.	Opportunity to extend teaching and learning outside the classroom, with easier access to community enterprises.
Opportunity for students to establish real clientele and stakeholders for their technological endeavours.	Giving the teacher a greater access to a wider source of guest speakers/experts to enhance their teaching.
An opportunity to make connections for work placements and even possible future employment.	An increased understanding of expectations of the local community through shared exercises.
An opportunity for students to see in action both the vocational and academic aspects of technology education.	Opportunity to work with enthusiastic parents, community agencies and other enterprises. A chance to build technology-based people networks.

Table 11 suggests possible ways that the technology curriculum injector model could be utilized to enhance technology education provision. Before considering engaging in a partnership, the teacher must be clear about the learning goals for the

partnership. This includes ensuring that the partnership and any outcomes are linked to the technology curriculum. One of the ways to achieve a successful outcome is to encourage partnerships as part of more extensive technology education units and not just one-off activities with little or no connection or relevance to the curriculum.

A teacher, in cooperation with the senior management team of the school and in consultation with any health and safety officer from the community partner, must maintain a safe operating environment. It is important to ensure that both schools and the partnership have shared understandings of, and agreed targets for, the learning outcomes. To maintain integrity and continuity link pre-partnership learning activities with any site visits, and follow these up with post-visit activities. Discussions could occur about the partnership with students to ensure they appreciate that the enterprise people are giving up their expensive time. Students might try to be punctual, polite and prepared. Teachers can facilitate this by matching the partnership to the age and learning level of the students involved. Additionally they could appreciate that they are representing themselves, the school and the integrity of the partnership for future participants.

Partnership facilitators have an obligation to ensure that students are ready and able to take responsibility for their own learning and project management. This will require the explicit teaching of appropriate strategies including those required for effective resource and time management. Maintaining commitment over the entirety of the partnership can be developed when participants see the relevance and importance of the partnership. It is important that participants are ready to make the most of positive connections that may arise (Table 11). Teachers and students could be encouraged to collate, analyse, critique and reflect upon the partnership and then utilize the experience to inform their practice and improve their assessments.

School-community partnerships can be beneficial to all parties concerned; however, the onus is on the teacher to ensure that the best interests of the students are kept at the forefront of any decisions made.

UTILISING RESOURCES (PLANNING AND MANAGEMENT)

Resources for the delivery of technology education are many and varied. The focus in this thesis thus far has been on people involved in community partnerships. Here, the use of the word 'people' is in preference to 'human resources' which is associated too closely with the negative aspects of human capital theories discussed in Chapter Three. So how can technology teachers identify quality technology education resources? The following criteria are adapted from Techlink; a site dedicated to technology teachers, students and all those with an interest in technology education in New Zealand. Techlink was used by Frank and Dean to support the participants in this research in their delivery of technology education.

A quality technology education resource supports quality teaching and learning and extends best practice in technology education. It will follow government policy guidelines and meet the requirements of any current standards and codes that may apply. Quality technology education resource materials are:

- linked with a technology curriculum in a valid and correct manner;
- technically accurate;
- culturally appropriate;
- flexible in approach;
- balanced in the content;
- user friendly and functional; and
- correctly aligned with any assessment protocols.

Quality technology education resources can help teachers:

- build a positive learning environment which encourages diversity and innovation and lays the foundations for future learning in technology;
- structure tasks which motivate students to engage in and complete learning processes so that learning in technology is accepted in their practice;

- use combinations of teacher-directed groupings, co-operative groups, structured peer interaction and individual work to enhance learning cycles and encourage, scaffold and enable informed, managed learner-mentor dialogue;
- make learning processes in technology transparent, to support students in setting specific learning goals;
- reinforce the use of inclusive technological language and practices that respect cultural and gender identity;
- build constructively on students' experience and knowledge;
- make explicit links between the learning in technology in a broad variety of learning environments;
- increase alignment between classroom technology programmes and accepted best practice in technology education;
- enhance pupil motivation by providing clear information about the desired learning outcomes through effective, specific, timely, positive and responsive feedback;
- extend and improve the sustainability of school/community partnerships in technology education; and
- promote self-regulation and reflection and the use of higher order critical thinking strategies by all students.

Adapted from <http://www.techlink.org.nz/planning/Resources/resources.htm>

When considering physical resources the classroom, or technology teaching and learning space, are of key importance. A careful selection of names for the space is required here because even the naming of a teaching and learning space for technology can cause consternation and confusion.(Table 12)

Table 12

Possible names for technology teaching and learning spaces

Workshops	Laboratories	Studios	Suites	Rooms
<i>Woodwork</i>	<i>Robotics</i>	<i>Design</i>	<i>Technicraft</i>	<i>Home economics</i>
<i>Metal</i>	<i>Computer</i>	<i>3D</i>	<i>Craft</i>	<i>Textiles</i>
<i>Plastic</i>	<i>Food</i>	<i>Multimedia</i>	<i>Industrial</i>	<i>Practical</i>
<i>Engineering</i>	<i>Biotechnology</i>	<i>Fashion</i>	<i>Technology</i>	<i>Graphics</i>
<i>Hard materials</i>	<i>Digital</i>	<i>Soft material</i>	<i>Manufacturing</i>	<i>Life skills</i>

These are labels that have been placed above or next to teaching and learning spaces for technology education incorporated in the schools participating in this research. Whatever the title, these are spaces in schools which are expected to reflect a connection between education and the world outside. If we follow Dewey's notion of intrinsic motivation, these places should foster and encourage students to engage in practice, emotion and reason, doing and thinking. Unfortunately, this research found that the change to modern technology education from the previous curriculum models has not always been reflected in the facilities made available for teaching the subject.

The technology curriculum injector model proposed in this thesis favours a connective active, participatory, experiential learning style that many young people exhibit in their personal lives. Dewey advocated that school learning should have the emotional force of non-school learning. He felt that connecting students outside interests with the curriculum would increase their motivation. This is hard to achieve in a traditional technology education room, which may represent a bygone past industrial era no longer relevant in a modern educational facility. A good starting point might be to visit modern community endeavours which reflect a school's particular technology offering. Old, bolted down workshop benches or inflexible cooking classrooms do not aid the intention to connect with a changing world outside the classroom.

It would be impossible to specify exactly what is required for technology teaching and learning spaces. However, for the shift to the technology curriculum injector model highlighted in this thesis there are general considerations for technology teaching and learning spaces that could be taken into account. Architects of educational spaces talk of a built pedagogy (the ability of space to define how one teaches). This is an important concept for the technology teacher looking to develop community partnerships. Technology teaching and learning spaces could be increasingly flexible and community connectable. There might be a combination of formal and non-formal learning environments which allow for both physical and virtual interactions. First impressions count and in those early meetings between the teacher and the community partners, a school's technology teaching and learning spaces might try to reflect a robust philosophy of what good technology education is about.

ENHANCEMENT OF TECHNOLOGY PROVISION

If teachers are to change their provision and facilitate a technology curriculum injector model, they might consider how students are to connect with the community partnerships. Students are increasingly socially connected by the technologies they use. The way they do this is anything but traditional; mobile technologies combined with virtual social media have revolutionized the way we connect. Technology teachers might find new ways of incorporating these and future technologies into how they teach.

The same can be said for the modern materials that technological societies use. Smart materials including thermochromic inks; which change or reveal images when hot, are used to promote community enterprises. Whilst photochromic inks respond to changes in light conditions and can be used on clothing to promote safety at night, smart materials are developed to respond to environmental stimuli with particular changes in external or internal variables. These smart materials are also referred to as responsive materials. Depending on changes in their conditions, smart materials change their properties (mechanical, electrical, appearance), their structure or composition, or their functions. Mostly, smart materials are used where their inherent properties can be favourably adapted to meet performance needs. Sports, fashion and

music all incorporate smart materials into their production activities. All three of these areas are highly motivational and relational to the students in technology classrooms. During this research the Education for Enterprise project team used *Plastazote* and the JUGGLE framework as an example of how this might be achieved.

Amabile (1994) talks about an intrinsic motivation principle of creativity. This is where people are most creative when they feel motivated primarily by the interest, enjoyment, satisfaction, and personal challenge of the work itself—not by external pressures such as those given by the teacher. Mumford et al. (1997) noted that having appropriate resources influences those trying to be creative and indicates that their endeavours are worthwhile. While traditional materials and teaching methods are not redundant but they could be complemented by the incorporation of new smart materials and modern practices. If teachers are trying to enhance their technology provision they might consider the technology curriculum injector model as a positive way forward. As Butts (1973) noted:

Dewey argued that schools should strive to emphasize moral goals based upon democratic, civic and social experience, vocational and practical usefulness, and individual development in light of the rapid modernizing changes that were taking place in Western civilization. (p. 471)

Many technology education activities identified in this research have moved towards authentic real-world learning opportunities. However, some lacked a community connectedness that would enhance recognition of fundamental changes that are going on in society. Many current technology education offerings can be piecemeal in approach and lack cohesion. There is an opportunity to enhance the delivery of technology education by incorporating the technology curriculum injector model when planning for a connected curriculum offering. Connecting theory to practice is one of the greatest challenges facing technology education. The challenge is to foster students' abilities to integrate their learning over a period of time and employ metacognitive strategies in order to meet those challenges in the 21st Century technology teaching and learning space (Brears; McIntyre & O'Sullivan (2011)). Learning that assists in developing integrative and metacognitive capabilities is

considered important because it assists in developing habits of mind in preparing students to make informed choices relating to complexities in conducting personal, professional and civic life (Huber & Hutchings, 2008).

EDUCATION FOR ENTERPRISE

In a White Paper published by the Department for Education (2010) in England the foreword, written by the Secretary of State, identified that successful systems of education, “*have put in place comprehensive plans for school improvement which involve improving teacher quality, granting greater autonomy to the front line, modernising curricula, making schools more accountable to their communities.*” (Department for Education, 2010)

Increasingly, governments are looking towards incorporating STEM (Science, Technology, Engineering and Mathematics) educational initiatives to help shape curriculum offerings to meet their objectives. The notion of STEM originated in the United States through collaboration between the Department of Labour and various National Academies. According to Kimbell (2011) the government in the UK wants to increase STEM skills to: (a) provide employers with the skills they need in their workforce, (b) help to maintain the UK’s global competitiveness, and (c) make the UK a world-leader in science based research and development. (p. 7)

According to the STEM directory website in the United Kingdom: *Enterprise activities promote a clearly structured and accessible approach to problem solving with Design and Technology.*

(http://www.stemdirectories.org.uk/view_scheme.cfm?cit_id=383080)

In Western Australia the state government has taken this link even further by calling their subject Technology and Enterprise. They suggest that neither are new concepts; both have been a way of life since civilisations began and were developed from the core needs of humans for food, shelter and clothing. The Technology and Enterprise (T & E) learning area relates directly to the processes of applying knowledge, skills

and resources to satisfy needs and wants, extending capabilities and realising opportunities.

The Department of Education in Australia acknowledges that Technology and Enterprise plays an important role in the school curriculum by providing opportunities for students to become engaged in a range of learning experiences, set in relevant contexts with the ability to have meaning in their lives. These include: (a) meeting the demands of a changing world by addressing the needs of individuals, families and societies, (b) developing skills and experiencing systems and processes by bringing ideas from conception to fruition, (c) being enterprising while actively pursuing opportunities, and (d) Considering the social and environmental impact of solutions to achieve.

<http://www.det.wa.edu.au/curriculum-support/technology-and-enterprise/detcms/navigation/about-t-and-e/?oid=MultiPartArticle-id-10971217>

(Accessed 16/5/2011)

This enterprising theme is developed in the New Zealand curriculum when discussing key competencies which are described as capabilities for living and lifelong learning. Under the *Managing Self* competency it is suggested that students who manage themselves are enterprising. When describing the learning area of technology we are informed that technology will make enterprising use of knowledge and skills. Under the technological knowledge strand of the technology learning area, students are encouraged to develop knowledge particular to technological enterprises.

It is clear that these international policy makers see technology education as a key medium for delivering Education for Enterprise whilst involving the community. The technology curriculum injector model proposed in this thesis could help facilitate developing a connected curriculum which is more than just another attempt to meet the economic imperative. Education for Enterprise via technology education could facilitate:

- an emphasis on a real need while designing the unit;

- making the need transparent to the students so they see what their new found skills and knowledge will be used for;
- doing more than presentations at the using and doing stage;
- keeping Education for Enterprise attributes in mind when designing the whole unit rather than as an add on;
- curriculum integration which creates time. Real-life requires integration and it is the only way we get things done;
- making sure the students see the timeframe, deadlines and expectations continually;
- continued reflection on progress;
- scaffolding that will help groups organise things, initially making it simple;
- building the background knowledge to ask relevant enquiry questions;
- focus and continuity;
- not too much time spent on the fuzzy front end;
- pupil involvement in planning and goal setting;
- student ideas are actually used.

There is a growing international consensus as to essential enterprising characteristics that could be developed as part of a programme designed to increase enterprise performance of students. If a teacher is trying to develop an enterprising technology offering an awareness of the following attributes is worthy of consideration:

- Identifying, recruiting and managing resources.
- Working with others and in teams.
- Communicating and receiving ideas and information.
- Negotiating and influencing.
- Generating and using creative ideas.
- Identifying, solving and preventing problems.
- Looking for and creating opportunities.
- Planning and organizing.
- Being flexible and dealing with change.
- Identifying assessing and managing risks.
- Using initiative and drive.
- Reflecting on what has been done.

- Working with the community.
- Using their knowledge and skills to work towards goals.
- Being fair and responsible.
- Collecting organising and analysing information.

This research has highlighted a number of different approaches undertaken to develop Education for Enterprise from which some success criteria have emerged. These have been grouped under the following headings in response to the original research questions:

Teacher Practice

As a result of the professional development programme the teachers' planning focus is based on developing an authentic context and the meeting of a real-world context. Planning templates and process guides that assist this planning were used and adapted. Teachers involved in this research integrated units of work and involved students in using self-assessment procedures initiated through this professional development project. There are examples of learning tools such as the Thinking Hats De Bono (1992) and cooperative strategies being used in classrooms and evidence of professional readings such as Anderson & Krathwohl (2001) who compiled Bloom's Revised Taxonomy chart helping to move teachers beyond the presentation stage and into the usage stage which an Education for Enterprise approach requires.

With over 100 examples of enterprising concepts being woven into classroom programmes of work, there was evidence that suggests that teachers had a growing understanding of the role and value of Education for Enterprise attributes and capabilities. Responses from a data generating strategy in which participants were asked to edit the MOE definition of Education for Enterprise suggested that they developed a positive understanding of the value of Education for Enterprise.

Teachers' willingness and expertise to involve students in activities that challenge them to connect enterprising skills to practical situations reflects their faith in an enterprising approach to learning. The range of comments collected for this thesis illustrates this. Information generated from questionnaires reflects participants'

growing belief in the value of authentic contexts for learning. Examples discussed in this thesis also indicate that the professional development programme had given the teachers confidence and enthusiasm for Education for Enterprise.

REFLECTIONS ON THE RESEARCH QUESTIONS

Student use of technology had increased over the term of this project. Evidence of this lies in the new skill base that students have built up and are using as they gather information, present and use it. They are also aware of and are using community people more. Findings from this research indicate that some of these skills and particular technologies were not used at the beginning of the project. The sustainability of such use is made more likely by the authentic contexts in which they are now used.

In summary there has been a documented growth in teachers' professional understanding. There is evidence to support Education for Enterprise as part of technology education when:

- the context for the activity is shared, authentic and real;
- the activity is linked to practical undertakings and includes tangible outcomes;
- students are given a controlling function within the project, which leads to ownership of individual learning;
- the pupil contribution is encouraged, mentored and acknowledged;
- students are provided with flexible frameworks to facilitate project management;
- the approbation of Education for Enterprise is evident from the teacher;
- the teacher reflects on their delivery and involvement from the beginning to ensure an enterprising approach is taken and modelled;
- the teacher encourages and values reflection from the students and this is incorporated in progression and assessment;
- time management is identified as important; therefore the teacher might operate both as a facilitator and a goals chaser.

School-wide Practice

Case studies from this project have been published on the MOE Education for Enterprise website. Those collected and discussed at the workshops demonstrate a range of teaching strategies that teachers have put in place to enable their students to work in authentic contexts to perceive relevance and purpose in what they do and how they connect to the wider world. This thesis highlights planning notes and frameworks being used in classrooms and schools that evidence the development of enterprising attributes in students. This research has demonstrated that an enterprising culture is developing in the schools involved in the project, and the number and range of strategies trialled and reported on through the observations and recorded interviews has been substantial. There is evidence to support Education for Enterprise as part of technology education when:

- support for participation and monitoring comes from the senior management team of the school;
- participation is shared to prevent burn out and remains consistent in the event of staff changes;
- the understandings of Education for Enterprise are shared amongst all staff; not just those involved in particular projects;
- Education for Enterprise is not seen as another extra but is interwoven with key learning intentions from numeracy, literacy and the technology curriculum area;
- time allocations are flexible enough to allow for appropriate research and enough time to see the projects through;
- time allocations are concentrated; not too disjointed or disrupted by other activities within the school (suspended timetable alternatives);
- consideration is given to how to place Education for Enterprise within the school whole school;
- recognition and utilization of quality facilitation and advisory programmes is given.

School-Community Partnerships

Of the 106 units of learning involving an Education for Enterprise approach the education facilitators assessed that:

- 57.5% involved a high level of community partnership
- 18.8% involved a medium level of community partnership
- 23.7% involved a low level of community partnership.

The assessment was based on observations and discussions with the teachers involved. Based on these experiences there is evidence to support Education for Enterprise as part of technology education when:

- boards of trustees and parents are involved in the planning stages;
- experts and mentors are sought as soon as possible and their time commitment is established;
- co-operation and co-ordination of assistance occurs between mentors and teachers;
- due consideration of pupil participation and decision making is kept central to the project;
- there is community pride established in the activities undertaken;
- reports and updates are provided to all parties regularly using a variety of media.

There is an early indication that, where successful, a quality Education for Enterprise approach as part of a technology education programme can help improve:

- behaviour management and motivation;
- participation of students, especially where their learning styles do not always suit the traditional expectations of a classroom;
- stronger ties between school and the community, through a connected curriculum;
- meaning and therefore a better learning experience to aspects such as numeracy, literacy and developing specific curriculum knowledge.

RAISING THE PROFILE OF TECHNOLOGY EDUCATION

Having established a connected, relevant technology education programme by utilising the technology curriculum injector model, technology teachers might take opportunities to increase the approbation of their programmes, both within the school and to outside communities, to ensure the provision of technology education as an integral part of schooling.

When technology education is taught utilising the curriculum injector model it could reflect certain principles identified in this research. I have used the following diagram as a discussion point with pre-service trainee technology teachers to broaden their personal constructs of technological activity and to highlight the connected nature of teaching and learning.

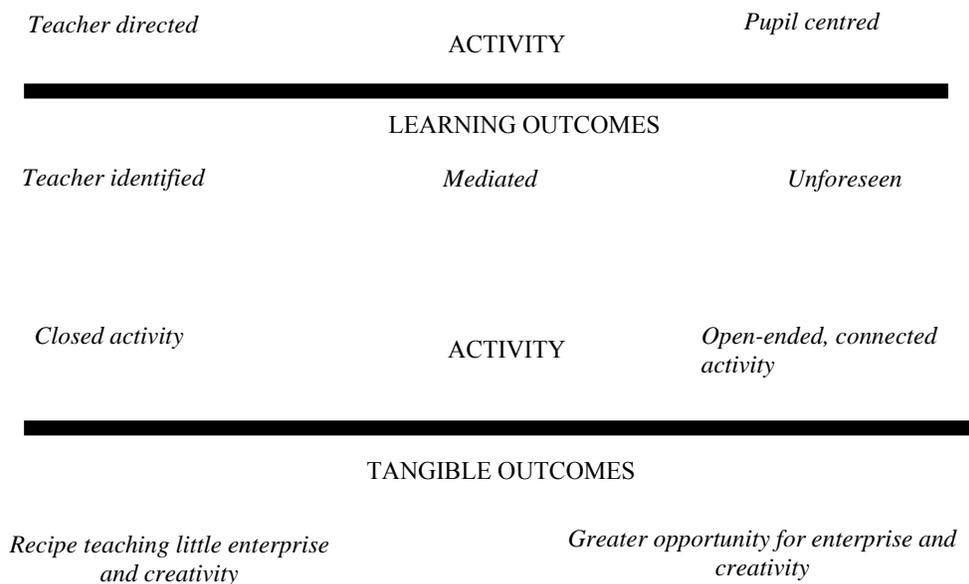


Figure 6. *Technology curriculum injector teaching and learning approach*

The top row of Figure 6 above the left-hand side shows a traditional model for the teaching of technology. The right hand side reflects the technology curriculum injector model. It is not a case of either/or; it is about striking a balance between the two models. There are times when a teacher-directed activity is appropriate. The

introduction to safe use of particular technological equipment is a good example. Using that knowledge to change a way of doing something for the better might be an example of an enterprising pupil-centred response. In the first scenario the learning outcomes or intentions are clearly defined by the teacher. In the second scenario they might be mediated or agreed between the teacher and the pupil or in a unique response unexpected by either party!

In the bottom row of Figure 6 the activity on the left is closed and probably contrived by the teacher alone. It offers little scope for enterprise and creativity and follows a recipe approach which is drip fed by the teacher. The outcome is predictable, with little variation from one pupil to another. The right-hand side is more open, giving the students scope to work with clients from the community with real needs, wants or opportunities. There is a far greater opportunity for enterprise and creativity. The outcomes from this side will show increased freedom, with much more variation in response. Again it is not a case of either/or but a combination of both which should follow the technology curriculum injector model.

The area which seemed to challenge technology teachers and students in the research project using this model is the fuzzy front end. The fuzzy front end is the messy getting started period of meeting a need, issue or opportunity. Although the fuzzy front end may not be an expensive part of solution development, it can consume 50% of development time (Smith, & Reinertsen, 1998). The fuzzy front end is a borrowed term from New Product Development (NPD) research (Koen, P., Ajamian, G., Burkart, R., Clamen, A., Davidson, J., D'Amore, R., & Wagner, K. (2001). This includes developmental work around five foundational elements: “(a) *Opportunity Identification*, (b) *Opportunity Analysis*, (c) *Idea Genesis*, (d) *Idea Selection*, and *Concept and Technology Development*.” (pp. 47-51)

Opportunity Identification is the element in technology education where the pupil is looking to take a chance on an idea. Teachers striving for a connected and relevant technology education should encourage enterprising but safe risk taking so this facet needs to be handled carefully. *Opportunity Analysis* is the element where teachers want the students to translate the identified opportunities into a specific context. Here, students can look forward and see possibilities for positive outcome

development. Extensive efforts may be made to align ideas to stakeholders and conduct market studies and/or trials and research. Strong collaboration between the connected parties improves the chances of success.

The third element is the *Idea Genesis*, which can be described as an evolutionary and iterative process progressing from birth to maturation of the opportunity into a tangible idea. The process of the idea genesis can be made internally or come from outside impulses, for example, a pupil being exposed to a new material such as a smart material or a client/stakeholder with an unusual request. The fourth element is the *Idea Selection*. Its purpose is to choose whether or not to pursue an idea by analysing its potential value. There needs to be careful questioning provided by the teacher to ensure the students entertain ideas which are in fact viable. This needs to be handled carefully. Too much intervention and we can stifle creativity and innovation. Too much hands-off might mean frustration and failure for the learner. The teacher has to decide on an individual basis how much freedom to give. Some learners may learn something new from failure but others may be switched off.

Once a programme like this has been established an additional set of challenges may be faced. Will the other teachers in your department, syndicate or faculty be receptive to this approach? Will parents be happy if students do not bring home the obligatory salad tongs, spatula, swimming clothes bag or scones? Will the students lining up outside the workshop or textiles room expect to be let loose on equipment and material? Will they appreciate spending time doing interviews with prospective clients? The answer to all these might be no! If technology teachers are to pursue innovative, creative, enterprising programmes they will have to take risks too.

The suggestion from this research is to start small, don't attempt to change a whole programme overnight. A mixture of traditional units and the technology curriculum injector model will need to be established and promoted. Technology teachers are going to have to change the perception and understandings of all the community parties involved. The technology curriculum injector teaching and learning approach discussed above will need to be demonstrated and explained to:

- fellow technology staff;

- the students;
- other teachers in the school;
- the senior management team;
- the parents; and
- any community partners.

Initially teachers should concentrate on one unit. They should look for opportunities to promote the successes. There are a number of ways to increase the approbation of technology education. Many of these were evident from this research:

- media rich displays, screened promotions running in the classroom showing students' endeavours and outcomes;
- student generated you-tube clips;
- open days;
- enter technology competitions;
- presentations on teacher-only days to other staff;
- presentations to senior management teams and governing school boards or boards of trustees;
- interactive displays for parents' evenings;
- technology awards given out regularly during assemblies;
- run and promote after school technology clubs;
- community technology open days where you invite in local partnership potentials;
- create (where appropriate) a database of parents who may offer potential support or partnership opportunities;
- conduct media releases to show off your students' work;
- create regular displays and school events;
- have a rolling display in the staffroom;
- undertake appropriate e.o.t.c. (education outside the classroom) activities which enhances your programme intentions;
- invite interesting and enterprising guest speakers to create motivation and interest;
- become an interesting and enterprising guest speaker and visit local community groups to promote what you are doing;

- look for funding opportunities to enhance your facilities and resources;
- engage with careers advisors to make sure they know what your subject is about;
- look for enterprising opportunities to work with both feeder schools and higher and further education providers.

CHAPTER TEN

CONCLUSION

Professional development is defined as activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher.

(OECD, 2009, p. 49)

INTRODUCTION

This chapter summarises the ideas and findings presented in this thesis. Guba and Lincoln (1989) suggest that trustworthiness of a research study is important to evaluating its worth. I have tried to establish trustworthiness through credibility. I have confidence in the essence of the findings and that they are likely to have applicability in other contexts. I believe that the findings are consistent and that neutrality, or at least a semblance of it, has been maintained. The extent to which the findings of this thesis are shaped by the respondents and not researcher bias, motivation, or interest has been a sustained goal.

The professional development delivered in this project supported teachers in creating programmes that encouraged enterprising capabilities in students. Education facilitators worked in schools alongside teachers coaching, modelling and mentoring them to integrate enterprising concepts into technology education classroom programmes. The project developed and trialled practical ways of including Education for Enterprise in class work and the wider school context, and aimed to increase teacher's knowledge, confidence and capability to do so.

CONCLUSIONS

Atkins (as cited by Dykes, 2002) claims that a focus on beliefs is critical to effective professional development that leads to lasting and significant change. School-based professional development that includes this focus relates to the classroom; it is

designed to be appropriate to the teacher involved; it is student orientated and involves a whole-school approach than can ultimately lead to successful development (Pratt, Lai, & Munro as cited by Lai, 2001). Effective professional development also needs to be on-going, and thus the professional development in this project was planned to spark discussions about effective pedagogies. These discussions are identified as the first step towards having a group vision that could be owned and supported by all teachers (Alexander et al., as cited by Lai, 2001). The second step was the provision of tools to put this vision in place.

The recommendations and suggestions reported in this thesis are based on responsive interpretative Fourth Generation Evaluation (Guba and Lincoln, 1989). Evaluation could be part of all professional development programmes. The project at the centre of this thesis was designed to be an iterative process where the evaluation was an integral component that ensured feedback was given which could be utilized to improve practice. Patton (2001), Rossi, Lipsey, & Freeman, (2004) and Taylor and Wallace (2007) have suggested that Fourth Generation Evaluation is the perfect foil for such a study. The development of the technology curriculum injector is seen as a model or tool to help describe both the intention and the relationship required for this process to be successful.

This research investigated the effects of a professional development programme on the quality of Education for Enterprise and technology education interactions in classroom learning environments. It also provided the participating teachers with an extended period of reflective evaluation. Because it was based in New Zealand school classrooms and involved regular classroom teachers, the study has provided valuable, in-depth information about everyday classroom practice. Early staff meetings, syndicate meetings and workshops focused on the Ministry's definition for Education for Enterprise and the recognition and promotion of the enterprising capabilities. Facilitators gathered baseline data in each school and wherever possible found links in documents, including school vision plans, planned pathways of learning and strategic plans, that showed the school had already initiated aspects of an enterprising approach or wished to follow these directions.

Ten of the 16 schools had documented evidence of aspects of an enterprising approach and discussions with teachers showed there were isolated cases of an enterprising approach to learning in every school. It was important that the teachers could see this as the project education facilitators Frank and Dean were aware that several teachers felt that Education for Enterprise was another 'add on' placed on them by senior management.

Frank and Dean used the positive experiences and the skills of teachers involved in the 2004 Enterprise Education project to introduce the rationale behind Education for Enterprise and show how it could be developed in the classroom and wider school as a way of learning rather than a subject or activity in its own right. A few participants had been part of the 2004 project and one or two teachers from schools not involved this time returned to the first workshop to add their expertise.

An early workshop also focused on explicit and implicit learning, the implications for Education for Enterprise being that implicit knowledge is invisible and often confined to the mind of a person. Implicit knowledge is hard to codify and, therefore, difficult to communicate to others but technology through an Education for Enterprise approach can create more opportunities for students to use and display this knowledge which, in turn, can increase its usability and visibility. Early identification of the enterprising attributes was very important and the first workshop had lead teachers identifying these using a videoed school case study from a provided resource.

The case study matched the technology process outlined in the new draft technology curriculum, so the pairing of Education for Enterprise and technology was identified early on. Dean, the secondary school education facilitator, had some input into the draft curriculum development for technology, so he was able to base the professional development on the new document. The key attributes and the achievement objectives of the new technology curriculum were kept to the fore by creating planning templates that featured them and in all the primary schools planning notes from the early stages were designed on these.

Much of the progress made in the professional development was a result of: (a) facilitators planning with the teachers and considering the curriculum aims; and (b) enterprising attributes and plans the teachers already had, as they mapped out the enterprising approach. Visual presentations were made for those teachers who wished to display them in the classroom. Many teachers did this and in some classes these displays were constantly referred to by the teachers to make students aware of the capabilities they were striving to develop.

A key part of the professional development in the primary schools was getting teachers to look at their planned pathways for learning and to identify the possible link to technology and then the opportunities for activities that would challenge their students to connect the enterprising capabilities to practical situations. The planning templates developed by the education facilitators allowed teachers to do plan more easily. Lead teachers did this as a jigsaw exercise in groups at workshop two and presented their results to participants for evaluation. In schools this work was done at syndicate meetings and usually involved a focus on a single theme, early identification of an authentic need, and the steps and skills the students needed to go through if they were to meet this need. This is much closer to real-life problem-solving and was identified as a key ingredient of developing a connected curriculum offering.

Teachers need to develop models of their own professional development that are based on connected lifelong learning, rather than on an “updating” model of learning, in order to have frameworks to guide their career planning (Bransford, Brown, & Cocking, 2000). Many of the teachers featured in this project progressed in their careers whilst being part of the study. Although it made continuity difficult to maintain for the education facilitators one would hope that their future classes and positions would benefit from their involvement in this professional development.

Other researchers are critical of only using; a presenting perspective which, they suggest are based on a transmission approach to learning that emphasizes finding the right answer and reproducing information that does not address learning at all. In contrast, using information requires the students to apply higher-order thinking skills to the task where the student: “*interacts with the information and utilizes information*

to build new knowledge and understanding they celebrate the understood rather than celebrate the found.

(Todd, as cited by Bond, 2005, p. 51).

Bond (2005) analysed information-based tasks from six New Zealand primary schools and found that seventy three per cent of the tasks required the students to gather and present information and only twenty seven per cent required the students to actually use the information. An awareness of research such as this helped the teachers in this project to see the purpose behind students striving for a tangible outcome in technology education.

Observations from this thesis have confirmed the findings from the Education for Enterprise project 2004, and earlier work with teachers on this project pointed to lack of time becoming a barrier to the enterprising approach and, in particular, actually reaching the outcome in technology. The amount of time a teacher had for a project was directly proportional to the amount of direction he/she would give. When time was short there was more direction and student's ownership of the learning process, which was hoped would improve enterprising capabilities, became compromised.

Teachers were spending a lot of time at what technologists call the fuzzy front end, which is the emergent or knowledge-building stage, and projects were not being finished. There was a feeling by some teachers that time here could be cut short so it was important to show that real technologists did indeed spend a lot of time at this stage. This professional development project focused on making the best use of time available. An example of project management for the classroom, using the acronym JUGGLE, stressed the importance of structures in project management. It was these practical examples of structure and planning tools that would scaffold the professional development project this thesis reports on.

Brief development was another area of focus, and facilitators and teachers worked together both on their preparation and introduction to students. These were designed to build student awareness of deadlines, the conditions of the enterprise, the resources available and presentation and assessment details of the projects. With the introduction of the draft national curriculum, the key competencies had been

identified by many principals as areas of focus and it was important to show teachers the link between these and an enterprising approach to learning. Rather than an addition to the key competencies, Education for Enterprise needed to be seen as the vehicle for key competency delivery and application by students. Links were identified using written frameworks devised by the facilitator and references to the competencies were made during the professional development.

Early observation in primary schools showed that units had been planned without a great deal of emphasis on the technological process. Using a camera, for example, produced a tick in the technology box. The project developed Education for Enterprise within a technology framework so teachers knew this was expected, but the facilitators saw a need to build enthusiasm for technology education in primary school participants in particular, so they would want to make technology education an important part of their planning.

New technologies were introduced. For example, at a workshop I introduced the product Plastazote, usually used in orthotics work, to teachers to use in mask-making. Teachers were immediately motivated and many ordered and used this product in their classrooms. Frank and Dean introduced students to ICT opportunities they had little knowledge or skills in, including, animated PowerPoints and video production. These new-found skills became tools for Education for Enterprise, allowing more student ownership. Frameworks were introduced to teachers to aid in student and teacher management.

Reflection and evaluation with teachers became a big part of the professional development process. A parallel was drawn between our reflection and that which students needed at each stage of the technology process. Examples of self-reflection and self-assessment templates were shared, some of which came from schools on the project and others that the facilitator provided. Methods were also introduced that allowed students to assess the likely success of an enterprise before they began.

Developing school-community partnerships was continually emphasized as an important part of the Education for Enterprise approach and teachers were encouraged to look for every opportunity to build these links. The education

facilitator was involved in all pre-unit planning, and planning templates kept the community link in the teacher's mind. The ultimate aim was have mentors working with students, but teachers were encouraged to look at four levels of interaction so that community input became a regular occurrence. Teachers were introduced to the work of organisations such as IPENZ and the mentoring programmes that were available through them. They were urged to consider specialist personnel connected with their area of focus. The designers of a fitness trail, for example, worked alongside personal trainers, physiotherapists, university physical education specialists and New Zealand Army personnel.

Emphasis was also placed on the success of partnerships in which both parties benefited and actual examples were shared in the final workshop. An important part of the community aspect of the professional development was reflecting on the success of community input and strategies that could be put in place if the contact was less helpful than had been envisaged.

The ease, buy in and effectiveness of friends of the school partnerships was highlighted and encouraged. The stakeholder concept was introduced to both staff and students and the importance of considering and consulting the stakeholders when reaching decisions saw many interactions between students and groups such as the Board of Trustees and Home and School. Examples of an enterprising approach to stakeholder reporting that had successfully been put into practice at various schools were shared between schools.

Strategies were explored with teachers and management staff for engaging Maori and Pasifika students through an enterprising approach and creating a sense of ownership while retaining a structure and framework to facilitate learning. Some successful outcomes had been promoted through teacher's skilled approaches to Education for Enterprise and quality face-to-face relationships. These were reported by project participants during the workshops. Sharing successful ideas and resources between schools played a big part in the success of the professional development. Modelling by the Education for Enterprise lead teacher was encouraged. Involved staff were able to reflect on their progress and set future expectations.

Using teaching strategies that demonstrated the link between classroom learning and the real-world was an important aspect of the professional development programme. Teachers were shown real-world examples of technologists that were following the same processes outlined in the draft curriculum, and examples were gathered and critiqued during the workshops. It was also important to show how experienced technologists faced similar barriers when working towards an outcome and failures at school were compared to failures in the real world.

PROFESSIONAL DEVELOPMENT IMPLICATIONS

Eraut (2000) suggests that routinized behaviour and implicit thinking are more easily made explicit when practitioners are encouraged to talk with their colleagues about their endeavours. This thesis evaluated one such opportunity where, as part of the workshops, teachers were encouraged to share their work with their peers. When organised into this community of practice (Lave & Wenger, 1994) the participants were encouraged to challenge themselves and each other. Participants were encouraged to work together to bring different perspectives of Education for Enterprise to the fore. In doing so it made visible what may have previously been taken for granted about teaching and learning in a technology education setting.

The evaluative nature of this project and the feedback provided within it stimulated reflection and therefore the development of new ways of connecting what teachers do to a broader community of practice outside the classroom. The opportunity to think collaboratively expanded and deepened the teachers' understanding of their own practice. With the support of experienced education facilitators to help them through the process of self-evaluation, the teachers became much more open to further learning and professional development. They gradually became more involved and proactive in the Education for Enterprise process.

Outside facilitators involved in education research projects can play a key role in establishing goals, planning the research process, collecting data, and developing tools to assist with data analysis (Mitchell & Cubey, 2003). This was clearly evident in this research. Frank and Dean, along with the university researcher, played an

active role in shaping how this project progressed. All three were involved in the generation and collection of the research data, which included conducting participant interviews, writing observational field notes, and transcribing the recorded workshop activities.

According to Mitchell and Cubey (2003), characteristics of effective professional development programmes linked to effective pedagogy can be described in eight major categories. These categories were all evidenced in operation throughout this project.

Table 13

Characteristics of effective professional development adapted from Mitchell, L. & Cubey, P. (2003).

1	The professional development incorporates participants' own aspirations, skills, knowledge and understanding into the learning context.
2	The professional development provides theoretical and content knowledge and information about alternative practices.
3	Participants are involved in investigating pedagogy within their own educational settings.
4	Participants analyse data from their own settings. Revelation of discrepant data is a mechanism to invoke revised understanding.
5	Critical reflection enabling participants to investigate and challenge assumptions and extend their thinking is a core aspect.
6	Professional development supports educational practice that is inclusive of diverse students, families and whanau.
7	The professional development helps participants to change educational practice, beliefs, understanding, and/or attitudes.
8	The professional development helps participants to gain awareness of their own thinking, actions, and influence.

Although I retained overall responsibility for conducting the research component of the project throughout the four phases and workshops, my role as the university researcher changed as the project progressed. Significant guidance was necessary at the start, when the participating teachers needed reassurance about the research process and a great deal of support to develop their reflective skills. However, as their skills and those of the education facilitators developed, the participants became more confident and less dependent on my input. Eraut (2000) argues that professionals are more likely to be able to talk explicitly about their knowledge and practice in the presence of a facilitating relationship. According to Mitchell and Cubey (2003), the involvement of participants in the collection and analysis of data from their own settings, in the form of recordings and observations, is a key process in effective professional development.

It was identified that participants lacked some of the theoretical foundations and tools for reflection that would allow them to change direction if what they were doing was not working well. It was decided to intervene early. This provision of theoretical knowledge and knowledge of alternative practices has been promoted as a characteristic of effective professional development (Hammerness, Darling-Hammond & Bransford, 2005; Mitchell & Cubey, 2003; Timperley & Phillips, 2003). Frank and Dean and the university researcher felt justified and comfortable spending workshop time helping to up-skill the participants in this important reflective practitioner ability. This time was validated by the outcomes that were achieved in the later activities.

Many experts in the field of evaluative professional development (Eraut, 2000; Hammerness, Darling-Hammond & Bransford, 2005; Timperley & Phillips, 2003) agree that unless teachers are assisted to develop their reflective skills to the point where they are able to critique and monitor their own behaviour in the classroom, routinized and unreflective practice will be unlikely to change. This was exemplified during this project, with many of the teachers initially unable to allow students to manage their own design process. It was felt that projects would fail if the students were in control. This view changed for many due to the professional development workshops.

In this project, in addition to managing the more practical aspects of the research, I also acted as an additional facilitator and mentor to the participating teachers. This was achieved by providing readings, facilitating discussion, and initiating the development of the evaluation process. I developed and delivered activities at the workshops designed to assist the teachers to develop the background knowledge, techniques and vocabulary that they needed to discuss and to effectively critique their practice. Consistent with claims made by Mitchell and Cubey (2003), the analysis of data in the present study was facilitated by my involvement. This active participation is also considered a common facet of Fourth Generation Responsive Evaluation.

By the end of the project period there had been a significant shift in the nature of activities undertaken by the participating teachers. Their growing understanding of both Education for Enterprise and technology education was reflected in the outcomes developed from the units undertaken. Although the professional development project demonstrated that bringing about changes in teachers' practices can be a slow and complex process, the systematic experiences provided within the four phases of this evaluative research eventually proved to be effective in assisting the teachers to develop the requisite knowledge and reflective skills to bring about change in their practice. Involving the teachers in the process of generating data from within their own classroom settings was a powerful catalyst that facilitated a robust evaluation process and ultimately changes in their programme offerings.

LIMITATIONS OF THIS STUDY

The usefulness of Guba and Lincoln's (1989) Fourth Generation Evaluation methodology has been critiqued and debated by many (Adelman, 1996; Greene, 1996; Laughlin & Broadbent, 1996). Somewhat ironically, the strengths of Fourth Generation Evaluation are also cited as its weakness. The inclusion of various stakeholder groups and their differing abilities to interpret what they do is often raised as problematic. In this project the ability of Frank, Dean and I to accommodate and include these differences was a positive. This limitation, when it exists, is actually organisational and arises by not creating an environment of empowerment in

which participants feel comfortable expressing their deeply held constructs, this form of evaluation would have little impact.

In this project early intervention with facilitated support managed to negate some of these limitations. This was achieved via inclusion and openness at each of the workshops. Of course, there were some participants who chose not to attend; non-participation however, is a weakness of all research not particular to Fourth Generation Evaluation. Frank and Dean were skilled in responsive evaluation strategies and they had a tacit knowledge of interpretative anthropology. This was not apparent to them until the university researcher brought it to the fore. Once released and validated the facilitators set about making sure that all participants' knowledge was given credence. This acknowledgement of unheard voices is a strength of Fourth Generation Evaluation, and is supported by the findings and outcomes in this thesis.

The measurable outcomes which are the forte of conventional scientific research may be missing in a study such as this. However, the constructivist meaning-making activities and voices are here in abundance. The limitation is primarily in the philosophical position of the reader. Where appropriate I have included samples of the qualitative data. The belief that a Fourth Generation Researcher would only use qualitative methods is a mistaken position. A thesis that includes multiple stakeholder voices from a variety of schools may suffer from anecdotal generalizations. I have tried to substantiate with data and thick descriptions the positions taken with evidence.

With this type of project evaluation there is always the question of *bang for buck*. This economic imperative has been somewhat alleviated by publication of case studies from this project on MOE-funded websites. The academic research questions have also been addressed by a number of publications and presentations taken directly from this thesis. However, Fourth Generation Evaluation researchers rarely uphold the belief in cost-benefit analysis which can be associated with some evaluation research.

The limitations of evaluating any individual Education for Enterprise programme are highlighted by Lewis (2002), who asserts that “all enterprise education programmes

have different characteristics and are delivered in a variety of different contexts (cultural and educational)” (p. 21). This research was undertaken in particular regions of New Zealand and there will always be questions of national and indeed international transferability. This, combined with notions of bias and a perceived lack of precision of this type of research, may question the validity of the findings included here. External validity, replication, and generalisation are not considered to be essential in constructivist educational research. Interpretative findings which are bound by context, condition and stakeholder participation are growing in acceptance (Scott & Weeks, 1998; Somekh, 2006).

The nature of Fourth Generation Evaluation is such that any study is a reflection on a particular endeavour; or, in this case, a professional development project. The technology curriculum injector model has evolved from the evaluation of the project. As a diagrammatic model of my interest and rationale it serves its purpose. Developed from the inductive analysis of the interactions involved in this project its usefulness outside of that scope is unclear. However, according to Patton (2001), for a research study to be useful, the researcher needs to monitor and report their analytical procedures and processes as completely and truthfully as possible. I have endeavoured to comply with this concept throughout this thesis.

FURTHER RESEARCH

The technology curriculum injector model could form the backbone of further studies examining the relationship between technology education and other connective offerings. The hopper components could be altered and a different study would ensue. The effectiveness of the technology curriculum injector model as a continuing descriptive and visual aid for teachers to gain understanding of the relationship between technology education, Education for Enterprise, community partnerships and the connected curriculum is unexplored. This, again, could be a starting point for further research and investigation.

Fourth Generation Evaluation has proven to be an effective methodological approach for this type of project. I have used it on another research undertaking and I am confident, at least in my case, that it will continue to be my preferred approach for

future evaluative studies I might engage in. Perhaps the name itself has prevented its rise in popularity. Had it been called ‘inclusive evaluation’ it may have received a higher recognition and acceptance.

One obvious research undertaking could be to re-visit the schools involved in this project in a few years and see if the professional development programme has had any long-term effect.

FINAL REMARKS

Technology education is both a new and an old subject and this research shows that its relationship to other aspects of the curriculum is multifaceted and evolving. Technology education should reflect more than a narrow economic instrumentalist focus. That, combined with a narrow interpretation of Education for Enterprise would, in my view, be a travesty. True technological literacy and the development of an inclusive technology curriculum may be some way away. The possibilities of schools achieving these laudable aims (literacy and inclusivity) will be enhanced with a greater understanding that only rigorous research will bring.

REFERENCES

- Abma, T. A., Greene, J., Karlsson, O., Ryan, K., Schwandt, T. S., & Widdershoven, G. (2001). Dialogue on dialogue. *Evaluation*, 7(2), 164–180.
- Anderson, L. W. & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching and assessing: A revision of bloom's taxonomy*. New York. Longman Publishing.
- Angen, M. J. (2000). Evaluating interpretive inquiry: Reviewing the validity debate and opening the dialogue. *Qualitative Health Research*, 10(3), 378-395.
- Adelman, C. (1996). Anything goes: Evaluation and relativism. *Evaluation*, 2(3), 291–305.
- Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. (1994). The work preference inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology*, 66, 950-967.
- Atkinson, P., Delamont, S., & Hammersley, M. (1993). Qualitative research traditions. In N. J. Entwistle (Ed.), *The nature of educational research* (pp. 16-31). Bletchley: Open University Press.
- Babalola, J.B. (2003). *Basic text in educational planning*. Ibadan Awemark Industrial Printers.
- Baird, D. (2002, Winter). Thing knowledge – Function and truth. *Techné: Journal of the Society for Philosophy and Technology*, 6(2), 13-27.
- Banks, F. (1994). *Teaching technology*. UK: Open University Press.
- Banks, F. (2002). Design and technology in the community. In G. Owen-Jackson (Ed.), *Aspects of teaching secondary design and technology* (pp. 290-298). London, UK: Routledge/ Falmer.

- Benson, S. (1991). *Science and technology school-industry links: Report to the Ministry of Research, Science and Technology*. Wellington.
- Bereiter, C. (2002). *Liberal education in a knowledge society*. Illinois: Open Court Publishing.
- Bogdan, R. C., & Bilden, S. K. (1998). *Qualitative research in education: An introduction to theory and methods* (3rd ed.). Boston: Allyn and Bacon.
- Bond, T. (2005). Information literacy: Time to untangle the confusion and move on. *Computers in New Zealand Schools, 17*(2), 50-53.
- Boote, D. N. (2006). Teachers' professional discretion and the curricula. *Teachers and Teaching: Theory and Practice, 12*(4), 461-478.
- Bradford, M. (1999). *In bright future, five steps ahead. Making ideas work for New Zealand*. Wellington: New Zealand Ministry of Commerce.
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.
- Brears, L., MacIntyre, W., & O'Sullivan, G. (2011). Preparing teachers for the 21st century using PBL as an integrating strategy in science and technology education. *Design and Technology Education: An International Journal, 16*(1), 36-46.
- Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning and innovation. *Organization Science 2*, 40-57.
- Burns, J. (1990). *Students' attitudes towards and concepts of Technology, Report to the Ministry of Education*. Wellington.

- Burns, J. (1997). *Technology in the New Zealand curriculum: Perspectives on practice*. Palmerston North, New Zealand: Dunmore Press.
- Butts, R. F. (1973). *The education of the west: A formative chapter in the history of civilization*. New York: McGraw-Hill.
- Bridges, D. (1992). Enterprise and liberal education. *Journal of Philosophy of Education*, 26(1), 36-57.
- Caird, S. (1989). Enterprise education: The need for differentiation. *British Journal of Education and Work*, 4(1), 47-57.
- Callaghan, J. (1976, October 22). Speech delivered at Ruskin College, Oxford. The Times Educational Supplement, p. 1.
- Carr W, & Kemmis S. (1986). *Becoming critical: Education, knowledge and action research*. London: The Falmer Press.
- Cave, J. (1995). *Technology education briefing paper*. London: C.T.C. Trust.
- Churchill, S. D. (2000). Phenomenological psychology. In A D Kazdin (Ed.) *Encyclopaedia of psychology* (pp. 168–173). Oxford: Oxford University Press.
- Clark, J. (2004). Enterprise education or indoctrination? *New Zealand Journal of Educational Studies*, 39 (2), 321-332.
- Codd, J. (1981). Democratic principles and the politics of curriculum change in New Zealand. In M. Clark (Ed.), *The politics of education in New Zealand*. (p. 45). Wellington: NZCER.
- Cohen, L. & Manion, L. (1990). *Research methods in education*, Routledge N.Y.
- Cohen, J. H. (2000). Problems in the field: Participant observation and the assumption of neutrality. *Field Methods*, 12(4), 316–333

- Compton, V. (1997). The Implementation of Technology in New Zealand Schools. In J. Burns (Ed.), *Technology in the New Zealand curriculum: Perspectives on practice* (pp. 60-78). Palmerston North, New Zealand: Dunmore Press.
- Compton, V. J., & Harwood, C. D. (2003). Enhancing technological practice: An assessment framework for technology education in New Zealand. *International Journal of Technology and Design Education*, 13 (1), 1-26.
- Compton, V. J., & Jones, A. (2004). *The Nature of Technology*. Briefing Paper prepared for the New Zealand Ministry of Education Curriculum Project. Retrieved from <http://www.nzcurriculum.tki.org.nz/content/download/854/6044/file/nature-techn.doc>
- Compton, V., & France, B. (2007). *Discussion document: Background information on the new strands*. Retrieved from <http://www.tki.org.nz/r/nzcurriculum/docs/technology-new-strands.doc>
- Corcoran, T. B., Shields, P. M., and Zucker, A. A. (1998). *The SSIs and professional development for teachers*. Menlo Park, CA: SRI International.
- Croft, V. (1991). *Technological literacy: Refined for the profession, applications for the classroom*. Unpublished paper presented at the 1991 annual conference of the International Technology Education Association.
- Crotty, M. (1998). *The foundations of social research*. Sydney: Allen and Unwin.
- Day, C., Kington, A., Stobart, G., & Sammons, P. (2006). The personal and professional selves of teachers: Stable and unstable identities. *British Educational Research Journal*, 32(4), 601-616.
- De Bono, E. (1992). *Six thinking hats for schools*. New York: Hawker Brownlow Education.

- Delaney, C. (1988). Participant observation: The razor's edge. *Dialectical Anthropology* 13, 291–300.
- Denzin, N. K., & Lincoln, Y. S. (Eds.). (2000). *The handbook of qualitative research* (2nd ed.). Thousand Oaks, CA: Sage.
- Denzin, N. K., & Lincoln, Y. S. (Eds.). (2008). *Collecting and interpreting qualitative materials* (3rd ed.). London: Sage.
- Department of Education (1961). *Handcraft in wood and metal for primary schools*. Wellington.
- Department of Education (1986). *Forms 1-4 workshop craft syllabus for schools*. Wellington.
- Department for Education (2010). *The importance of teaching: Schools white paper*. Retrieved from <https://www.education.gov.uk/publications/eOrderingDownload/CM-7980.pdf>.
- DePoy, E. & Gilson, S.F. (2008). *Evaluation practice*. Boston, MA: Taylor and Francis.
- Dewey, J. (1915/1980). *The school and society*. Carbondale: Southern Illinois University Press.
- Dewey, J. (1916). *Democracy and Education*. New York: Free Press Retrieved November 11, 2009 from <http://www.ilt.columbia.edu/publications/dewey.html>
- Dewey, J. (1964). *John Dewey on education: Selected works*. (R. D. Archambault, Ed.). New York: Random House.
- Drake, S. M., & Burns, R. C. (2004). *Meeting standards through integrated curriculum*. Alexandria VA: Association for Supervision and Curriculum Development.

- Dwerryhouse, R. (2001). Real work in the 16-19 curriculum: AVCE business and young enterprise. *Education & training*, 43(3), 153-61.
- Dykes, R. (2002). Information literacy - a separate skill or a new approach to learning? *Computers in NZ Schools*, 14(2), 26-30.
- Dyrenfurth, M. J. (1991). Technological literacy synthesised. In M. J. Dyrenfurth and M. R. Kozak (Eds.), *Technological literacy, 40th yearbook of the Council on Technology Teacher Education* (pp. 138-183). Peoria, IL: Glencoe Division, MacMillan/McGraw-Hill.
- Education Review Office. (1996). *School-business links*. Wellington: New Zealand.
- Eisner, E. W. (1991). *The enlightened eye. Qualitative inquiry and the enhancement of educational practice*. New York: Macmillan.
- Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work, *British Journal of Educational Psychology*, 70, 113–136.
- Erlandson, DA, Harris, EL, Skipper, BL, & Allen, SD (1993). *Doing naturalistic inquiry: a guide to methods*. London: Sage.
- Fagerlind, A. and Saha, L. J. (1997). *Education and national developments*. New Delhi: Reed Educational and Professional Publishing.
- Faure, E., Herrera, F., Kaddoura, A. R., Lopos, H., Petrovsky, A. V., Rahnema, M. & Ward, F. C.(1972). *Learning to be: the world of education today and tomorrow*. Paris: UNESCO.
- Ferguson, D. (2009). *Development of technology education in New Zealand schools 1985-2008*. Wellington: Ministry of Education.
- Filion, L. J. (1994). Ten steps to entrepreneurial teaching. *Journal of Small Business and Entrepreneurship*, 11, 68-78.

- Flick, U. (2002). *An introduction to qualitative research* (2nd Ed.). London: Sage.
- Fogarty, R. (1991). *How to integrate the curricula: The mindful school*. Palatine, IL: Skylight Publishing, Inc.
- Frederick, H., & McIlroy, D. (1999). *The knowledge economy: A submission to the New Zealand Government by the Minister for Information Technology's IT advisory group*. Wellington: Ernst and Young.
- Frezzo, D.C. (1991). *Proceedings of the 1991 International Symposium. Dilemmas confronting the practicing engineer: Reflection on the two cultures of technology technology and society*. Toronto: Canada.
- Gall M. D., Borg W. R., & Gall J. P. (1996). *Educational research: An introduction*. USA: Longman.
- Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., and Yoon, K. S. (2001), Winter. What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal* 38(4),915–945.
- Geertz, C. (1973). *The interpretation of cultures: Selected essays*. New York: Basic Books.
- Gibb, A. (1993). The enterprise culture and education: Understanding enterprise education and its links with small business, entrepreneurship, and wider educational goals. *International Small Business Journal*, 11(3), 11-34.
- Gibb, A. (1999). Can we build effective entrepreneurship through management development? *Journal of General Management*, 24(4), 1-21.

- Gibb, A., & Cotton, J. (1998). *Work futures and the role of entrepreneurship and enterprise in schools and further education*. Background paper to the conference held at the Department of Trade and Industry, 8 December, Enterprise and Industry Education Unit, Durham University Business School, Durham.
- Ginestie, J. (2005). *Teacher training, preparing young people for their future lives: An international study in technology education*. Chile, S.A.: Imprenta Salesianos.
- Greene, J. (1996). Qualitative evaluation and scientific citizenship: Reflections and refractions. *Evaluation* 2(3), 277–89.
- Greene, J. (2001). Dialogue in evaluation; a relational perspective. *Evaluation*, 7, 181–203.
- Grossman, P., Wineburg, S., & Woolworth, S. (2001). Toward a theory of teacher community. *Teachers College Record*, 103(6), 942-1012.
- Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Thousand Oaks, CA: Sage.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, and Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). London: Sage.
- Guba, E. G., & Lincoln, Y. S. (2004). The roots of fourth generation evaluation. In M. C. Alkin (Ed.), *Evaluation roots: Tracing theorists' views and influences* (pp. 225- 241) London: Sage.

- Hammerness, K., Darling-Hammond, L., Bransford, J., Berliner, D., Cochran-Smith, M. McDonald, M., (2005). How teachers learn and develop. In L. Darling-Hammond and J. Bransford (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 358–389). San Francisco: Jossey-Bass.
- Hawk, K. (1997). *Technology development schools evaluation, final report*, ERDC Massey University Albany Campus.
- Hayden, M. (1989). What is technological literacy? *Bulletin of Science, Technology and Society*, 119, 220-233.
- Hipps, J. A. (1993). *Trustworthiness and authenticity: Alternate ways to judge authentic assessments*. Paper presented at the annual meeting of the American Educational Research Association, Atlanta: GA.
- Hoare, S. (1999). Times Educational Supplement. Business Links June 4 th.
- Hoepfl, M. C. (1997). Choosing qualitative research: A primer for technology education researchers. *Journal of Technology Education*, 9(1), 47-63.
- Holloway, I. (1997). *Basic concepts for qualitative research*. London: Blackwell Science.
- Holly, M. L. & Mcloughlin, C. (1989). *Perspectives on teacher professional development*. London: Falmer Press.
- Horn, I. S., & Little, J. W. (2010). Attending to problems of practice: Routines and resources for professional learning in teachers' workplace interactions. *American Educational Research Journal*, 47(1), 181-217.
- Houghton, W. (2004). *How can learning and teaching theory assist engineering academics?* Retrieved from <http://www.engsc.ac.uk/learning-and-teaching-theory-guide>.

- House, E. R., & Howe, K. R. (1999). *Values in education and social research*. Thousand Oaks, CA: Sage.
- Huber, M. T., & Hutchings, P. (2008). *Integrative learning: Mapping the terrain*. The Carnegie Foundation for the Advancement of Teaching and Association of American Colleges and Universities (AAC & U). Retrieved from <http://www.techlink.org.nz/planning/Resources/resources.htm>
- International Technology Education Association, (1996). *Technology for all Americans: A rationale and structure for the study of technology*. International Technology Education Association, Reston, VA
- Jack, S. L., & Anderson, A. R. (1999). Entrepreneurship education within the enterprise culture: producing reflective practitioners. *International Journal of Entrepreneurial Behaviour and Research*, 5(3), 110-25.
- Johnson, S. D. (1995). Will our research hold up under scrutiny? *Journal of Industrial Teacher Education*, 32(3), 3-6.
- Jones, A. (1997). Technology Education in the New Zealand Curriculum. In J. Burns (Ed.), *Technology in the New Zealand curriculum: Perspectives on practice* (pp. 46-59). Wellington: Dunmore Press.
- Jones, A., & Carr, M. (1992). Teachers' perceptions of technology education: Implications for curriculum innovation. *Research in Science Education*, 22, 230-239.
- Jones, A., Harlow A., & Cowie, B. (2004). New Zealand teachers' experiences in implementing the Technology Curriculum. *International Journal of Technology and Design Education*, (14), 101-119.
- Jones-Evans, D., Williams, W., & Deacon, J. (2000). Developing entrepreneurial graduates: An action-learning approach. *Education & Training*, 42(4-5), 282-288.

- Khan, P., & O'Rourke, K. (2004). *Guide to curriculum design: Enquiry-based learning*. Retrieved from http://www.heacademy.ac.uk/assets/York/documents/resources/resourcedatabase/id359_guide_to_curriculum_design_ebl.rtf
- Kearney, P. (1996). *The relationship between developing of the key competencies in students and developing of the enterprising student*. Australia.
- Kelsey, J. (2002). *At the crossroads: Three essays*. Wellington: Bridget Williams Books.
- Kember, D. (2000). *Action learning and action research: Improving the quality of teaching and learning*. London: Kogan Page.
- Kemmis, S. (1980). The imagination of the case and the invention of the study. In H. Simons (Ed.), *Towards a science of the singular* (pp. 93-142). Norwich, England. CARE. University of East Anglia.
- Kenyon, P. & White, S. (1996). *Young people and self-employment in Australia*. Tasmania, National Youth Affairs Clearinghouse.
- Kimbell, R. (1987). *Design and technological activity. A framework for assessment*. London: Department of Education and Science. Assessment of Performance Unit. Her Majesty's Stationary Office.
- Kimbell, R. (2011). Handle with care... *Design and Technology Education: An International Journal*, 16(1), 7-8.
- Kitzinger, J. (1994). The methodology of focus groups: The importance of interactions between research participants. *Sociology of Health and Illness*, 16, 103–121.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

- Koch, T. (1994) Beyond measurement: Fourth-generation evaluation in nursing. *Journal of Advanced Nursing*, 20, 1148–1155.
- Koen, P., Ajamian, G., Burkart, R., Clamen, A., Davidson, J., D'Amore, R., ... & Wagner, K. (2001). Providing clarity and a common language to the "fuzzy front end". *Research-Technology Management*, 44(2), 46-55.
- Kreider, H., & Bouffard, S. (2006). Questions and answers: A conversation with Thomas, R. Guskey. *The Evaluation Exchange*, 11, 4.
- Krueger, R. A. & Casey, M. A. (2000). *Focus groups: A practical guide for applied research* (3rd ed.). Thousand Oaks, CA: Sage.
- Kuemmerle, W. (2005). The entrepreneur's path to global expansion. *Sloan Management Review*, Winter, 30-41.
- Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.
- Lai, K. (Ed.). (2001). *E-learning: Teaching and professional development with the internet*. Dunedin: University of Otago Press.
- Laughlin, R., & Broadbent, J. (1996). Redesigning fourth generation evaluation: An evaluation model for public-sector reforms in the UK?'. *Evaluation* 2(4), 431–51.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Layton, D. (1994) A school subject in the making? The search for fundamentals, in Layton, D. (Ed.), *Innovations in Science and Technology Education*, Vol. 5. Paris: UNESCO.

- Lee, G. D., & Lee, H. F. (1992). *Examinations and the New Zealand school curriculum: Past and present*. Department of Education, Massey University.
- Lee, G., & Hill, D. (1996). Curriculum reform in New Zealand: Outlining the new or restating the familiar? *Delta*, 48(1), 19-32.
- Lee, G., Hill, D., & Lee, H. (2004). The New Zealand Curriculum Framework: Something old, something new, something borrowed, something 'blue'. In A.M. O'Neill, J. Clark and R. Openshaw (Eds.), *Reshaping culture, knowledge and learning* (pp. 71-89). Palmerston North: Dunmore Press.
- Lee, K., & Choi, I. (2008). Learning classroom management through web-based instruction: Implications for early childhood teacher education. *Early Childhood Education Journal*, 35(6), 495-503.
- Lewis, K. (2002). *An Enterprising Future: Evaluating the Young Enterprise Scheme*. Enterprise New Zealand Trust. Retrieved from http://sme-centre.massey.ac.nz/files/Complete_final_ENZT_report.pdf
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Lincoln, Y. S., & Guba, E. G. (2000). *Paradigmatic controversies, contradictions, and emerging confluences*. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 163-188). Thousand Oaks SAGE.
- Lynch, I. (1993). *Technology, science education and the world of work*. CTC Trust Publications number 9, London.
- Lynch, P. (1999). *Working together: Building partnerships between schools and enterprises*. Wellington: Learning Media.
- Madill, A., Jordan, A., & Shirley, C. (2000). Objectivity and reliability in qualitative analysis: Realist, contextualist and radical constructionist epistemologies. *British Journal of Psychology*, 91, 1-20.

- Marshall, J. D. (1997). The new vocationalism. In M. Olsen & K. M. Matthews (Eds.), *Education policy in New Zealand: The 1990s and beyond* (pp. 304-26). Palmerston North, New Zealand: Dunmore Press.
- Marx, K. (1867). *Das Kapital, vol. I*. Marx/Engels: Werke, 23.
- Massengill, D., Mahlios, M., & Barry, A. (2005). Metaphors and sense of teaching: How these constructs influence novice teachers. *Teaching Education, 16*(3), 213–229.
- McCormick, R. (1993). The evolution of current practice in technology education. In R. McCormick, P. Murphy, and M. Harrison (Eds.), *Teaching and learning technology*. England: Addison-Wesley Publishing Company.
- McCormick, R. (1997). Conceptual and procedural knowledge. *International Journal of Technology and Design Education, 7*(1–2), 141–159.
- McKenzie, D. (1992). The technical Curriculum: Second Class Knowledge? In G. McCulloch (Ed.), *The school curriculum in New Zealand history, theory, policy and practice* (pp. 29-39). Palmerston North, New Zealand: Dunmore Press.
- McLaughlin, M. W., and Mitra, D. (2001). Theory-based change and change-based theory: Going deeper, going broader. *Journal of Educational Change 1* (2): 1–24.
- Medway, P. (1992). Constructions of technology: Reflections on a new subject. In J. Beynon, and H. Mackay (Eds.), *Technological literacy and the Curriculum* (pp. 65-83). London: Falmer.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.

- Miles, M., & Huberman, A.M. (1994). *Qualitative data analysis*. Thousand Oaks, CA: Sage.
- Ministry of Commerce. (1999). *Bright future, 5 steps ahead: Making ideas work for New Zealand*. Wellington.
- Ministry of Education. (1993). *Working together, building partnerships between schools and enterprises*. Wellington.
- Ministry of Education. (1995). *Technology in the New Zealand curriculum*. Wellington: Learning Media
- Ministry of Education. (1997). *Towards teaching technology: Know how 2 guidebook for facilitators*. Wellington: Learning Media.
- Ministry of Education. (1999). *Electronics and control technology, classroom practice in years 1-8*. Wellington: Learning Media.
- Ministry of Education. (2006a). *Draft curriculum: technology materials for consultation*. Wellington: Learning Media.
- Ministry of Education. (2006). *The New Zealand curriculum draft for consultation*. Wellington: Learning Media.
- Ministry of Education. (2007). *The New Zealand curriculum*. Wellington: Learning Media.
- Ministry of Education. (2009). *Te Kete Ipurangi. What is education for enterprise?* Retrieved from [http://education-for-enterprise.tki.org.nz/About-Education for Enterprise/Why-focus-on-Education for Enterprise/Defining-Education for Enterprise](http://education-for-enterprise.tki.org.nz/About-Education%20for%20Enterprise/Why-focus-on-Education%20for%20Enterprise/Defining-Education%20for%20Enterprise).

- Mitchell, L., & Cubey, P. (2003). *Characteristics of effective professional development linked to enhanced pedagogy and children's learning in early childhood settings: Best evidence synthesis*. Wellington: Ministry of Education.
- Molnar, A. (1996). *Giving children the business*. Colorado, USA: Westview Press.
- Mumford, M. D., Supinski, E. P., Baughman, W. A., Costanza, D. P., & Threlfall, K. V. (1997). Process-based measures of creative problem-solving skills: Overall prediction. *Creativity Research Journal*, 10, 73–85.
- Neuman, W. L., & Kreuger, L. W. (2003). *Social work research methods: Qualitative and quantitative approaches*. Boston: Allyn and Bacon.
- Organization for Economic Co-operation and Development. (1989). *Towards an enterprising culture: A challenge for education and training*. Paris.
- Organization for Economic Co-operation and Development. (2001). *Cities and regions in the new learning economy*. A study carried out and published by the OECD Centre for Educational Research and Innovation (CERI). (Charles Edquist, Gareth Rees, Mark Lorenzen, and Stéphane Vincent-Lancrin drafted the report, co-ordinated by Kurt Larsen of the OECD/CERI Secretariat.) Paris.
- Organisation for International Co-operation and Development. (2009). *Teaching and Learning International Survey (TALIS)*. Paris.
- O'Neill, A-M. & Jolley, S. (2004). The technology curriculum: Commercialising education for mindless consumption. In A-M. O'Neill, J. Clark & R. Openshaw (Eds.), *Reshaping culture, knowledge and learning* (pp. 25-46). Palmerston North: Dunmore Press.
- Orr, J. (1996). *Talking about machines: An ethnography of a modern job*. Ithaca, NY: IRL Press.

- O'Sullivan, G. C. (2001). *Technology education and industry links: An Exploratory Case Study*. Unpublished Thesis, Massey University, New Zealand.
- O'Sullivan, G. C. (2008). Using the depth model to facilitate learning in an integrated Science and Technology pre-service primary teacher course. *International Journal of Technology and Design Education*, 18, 247-253.
- O'Sullivan, G. C. (2009a). Technology education in New Zealand: The connected curriculum. *Design and Technology Education: An International Journal*, 15(1), 31-39.
- O'Sullivan, G. C. (2009b). Technology education: Making the difference Education for Enterprise. In C. Benson, P. Bailey, S. Lawson, J. Lunt, & W. Till (Eds.), *Seventh International Primary Design and Technology Conference* (pp. 3-8). Birmingham, England: Centre for Research in Primary Technology at Birmingham City University.
- O'Sullivan, G. C. (2011). Technology Education and Education for Enterprise (E4E). In C. Benson, & J. Lunt (Eds.), *International handbook of primary Technology Education*. Rotterdam: Sense Publishers.
- Pacey, A. (1985). *The Culture of Technology*. Oxford: Blackwell.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage.
- Patton, M. Q. (1997). *Utilization-focused evaluation* (3rd ed.). Thousand Oaks, CA: Sage.
- Patton, M. Q. (2001). *Qualitative evaluation and research methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Petrina, S. (2000). The politics of technological literacy. *International Journal of Technology and Design Education*, 10(2), 181-206.

- Phillips, K. (1985). A progression of technology in industrial arts education. *In Technology Education: A Perspective on Implementation*. International Technology Education Association, Reston, Va.
- Postman, N. (1992). *Technopoly*. New York: Vintage.
- Poulou, M. (2005). Educational psychology within teacher education. *Teachers and Teaching: Theory and Practice* 11(6), 555-575.
- Price B. (1991). *School industry links the consequences of minding other people's business*. Australia: ACER.
- Prime, G. M. (1993). Values in technology: Approaches to learning. *Design and Technology Teaching*, 24(1), 34-36.
- Psacharopoulos, G., & Woodhall, M. (1997). *Education for development: An analysis of investment choice*. New York: Oxford University Press.
- Puke Ariki website. Retrieved from <http://www.pukeariki.com/en/stories/default.asp>
- Rae, D. (2000). Understanding entrepreneurial learning: A question of how? *International Journal of Entrepreneurial Behaviour and Research*, 6(3), 145-59.
- Reason, P., & Bradbury, H. (2001). Introduction: Inquiry and participation in search of a world worthy of human aspiration. In P. Reason & H. Bradbury (Eds.), *Handbook of action research: Participative inquiry and practice* (pp. 1-14). London: Sage.
- Revans, R. W. (1991). Action learning – its origins and practice. In Pedler, M. (Ed.), *Action learning in practice* (2nd ed.) (pp. 3-15). Aldershot: Gower.
- Rossi, P. H., Lipsey, M. W., & Freeman, H. E. (2004). *Evaluation: A systematic approach* (7th ed.). Thousand Oaks, CA: Sage.

- Sanders, M. G. (2001). A study of the role of “community” in comprehensive school, family and community partnership programs. *Elementary School Journal*, 102(1), 19-34.
- Sarasvathy, S. (2004). What makes entrepreneurs entrepreneurial? *Batten Briefings*, University of Virginia (Summer), 1-8.
- Saunders, M. (2000). Understanding education and work; Themes and issues. In the *Routledge International Companion to Education* (pp. 1003-1029). London: Routledge.
- Sakamoto, A., & Powers, P.A. (1995). Education and the dual labour market for Japanese men. *American Sociological Review*, 60(2), 222-246.
- Schön, D. (1991). *The reflective practitioner: How professionals think in action*. Aldershot: Ashgate.
- Schultz, T. W. (1971). *Investment in human capital*. New York: The Free Press.
- Schlager, M., Fusco, J., and Schank, P. (2002). *Evolution of an online education community of practice*. In Building virtual communities: Learning and change in cyberspace, eds. K. A. Renninger and W. Shumar, pp. 129–158. New York: Cambridge University Press.
- Schwandt, T. A. (1998). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research: Theories and issues* (pp. 221-259). Thousand Oaks, CA: Sage.
- Shoemaker, B. (1989). *Integrative education: A curriculum for the Twenty-First Century*. Oregon School Study Council 33/2.
- Scott, D., & Weeks, P. (1998). Action research as reflective collaboration. In B. Atweh, S. Kemmis & P. Weeks (Eds.), *Action research in practice: Partnerships for social justice in education* (pp. 21-36). London: Routledge.

- Smith, P. G., & Reinertsen, D. G. (1998). *Developing products in half the time* (2nd ed.). New York: John Wiley.
- Smithers, A., & Robinson, P. (1992). *Technology in the National Curriculum: Getting it right*. London: Engineering Council.
- Smylie, M. A., Allensworth, E., Greenberg, R. C., Harris, R., and Luppescu, S. (2001). *Teacher professional development in Chicago: Supporting effective practice*. Chicago: Consortium on Chicago School Research.
- Snape, P., & Fox-Turnbull, W. (2011). Perspectives of authenticity: Implementation in technology education. *International Journal of Technology and Design Education*. Retrieved from <http://www.springerlink.com/content/578q383122163j50/fulltext.html>.
- Snook, I. (1988). Unemployment and the schools. In Corson, D. (Ed.), *Education for work: Background to policy and curriculum* (pp. 214-220). Palmerston North, New Zealand: Dunmore Press.
- Solomon, G. T., Duffy, S., & Tarabishy, A. (2002). The state of entrepreneurship education in the United States: A nationwide survey and analysis. *International Journal of Entrepreneurship Education*, 1(1), 65-86.
- Somekh, B. (2006). *Action Research: A methodology for change and development*. Berkshire: Open University.
- Stake, R. E. (1975). To evaluate an arts program. In R. E. Stake (Ed.), *Evaluating the arts in education: A responsive approach* (pp. 13-31). Columbus, OH: Merrill.
- Stake, R. (2004). *Standards-based and responsive evaluation*. Thousand Oaks, CA: Sage.
- Stake, R. E., & Abma, T. A. (2005). Responsive evaluation. In S. Mathison (Ed.), *Encyclopedia of evaluation* (pp. 376-379). Thousand Oaks, CA: Sage.

- Stake, R., & Schwandt, T. (2006). On discerning quality. In I. F. Shaw, J. C. Greene & M. Mark (Eds.), *Handbook of evaluation*, (pp. 404-18). London: Sage.
- Steffens, H. (1986). Issues in the preparation of teachers for teaching robotics in schools. In J. Heywood & P. Matthews (Eds.), *Technology, society and the school curriculum*. Manchester, England: Roundthorn Publishing.
- Stenhouse, L. (1981). *Case study in educational research and evaluation*. Geelong, Vic: Deakin University Press.
- Sterry, L. F., & Hendricks, R. W. (1999). *Exploring technology*. Wisconsin, USA: T. and E. Publications.
- Stevenson, J. (1994). Vocational Expertise. In J. Stevenson (Ed.), *Cognition at work*, National Centre for Vocational Education Research, Leabrook, South Australia (pp. 7-35).
- S Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change*, 7(4), 221–258.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. London: Sage.
- Stuart, D. (2005). The school-business relationship and the third way. In J. Codd & K. Sullivan (Eds.), *Education policy directions in Aotearoa New Zealand* (pp. 219-233). Palmerston North: Thomson/Dunmore Press.
- Tashakkori, A. & Teddlie, C. (2003). *Handbook of mixed methods in social and behavioural research*. Thousand Oaks: Sage.
- Taylor, P. C., & Wallace, J. (2007). *Contemporary qualitative research for science and mathematics educators*. Netherlands: Springer.

- Taylor, P. C. (2008). Multi-paradigmatic research design spaces for cultural studies researchers embodying postcolonial theorising. *Culture Studies of Science Education*, 4(4).
- Times Educational Supplement (1999). *Business links*. June 4th.
- Timperley, H., & Phillips, G. (2003). Changing and sustaining teachers' expectations through professional development in literacy. *Teaching and Teacher Education*, 19, 627–641.
- TKI website. Retrieved from http://www.tki.org.nz/r/education_for_enterprise/definition_e.php
- Todd, R. (1991). The natures and challenges of technological literacy. In M. Dyrenfurth & M. Kozak (Eds.), *Technological literacy*. 1991 Yearbook of the Council on Technology Teacher Education (pp. 10-27). Peoria, IL: MacMillan/McGraw-Hill.
- Tolley, A. (2009). *Trades academies one step closer*. Retrieved from <http://www.scoop.co.nz/stories/pa0904/s00248.htm>
- Turner, V. W., & Bruner, E. M. (1996). *The anthropology of experience*. Urbana: University of Illinois Press.
- Van Zee, E.H. & Roberts, D. (2006). Making science teaching and learning visible through web-based “snapshots of practice.” *Journal of Science Teacher Education*. 17(4), 367-388
- Waetjen, W.B. (1993). Technological literacy reconsidered. *Journal of Technology Education*, 4(2), 5-11.
- Wajcman, J. (1991). *Feminism confronts technology*. University Park, PA: The Pennsylvania State University Press.

- Ward, J. D. & Lee, C. L. (2002). A review of problem-based learning. *Journal of family and consumer sciences education*, 20 (1), 16-26.
- Waters, J. T., Marzano, R. J., & McNulty, B. A. (2003). *Balanced leadership: What 30 years of research tells us about the effect of leadership on student achievement*. Aurora, CO: Mid-continent Research for Education and Learning.
- Watts, A. (1983). *Education, employment and the future of work*. Milton Keynes: Open University Press.
- Wenger, E. (1998). Communities of practice: Learning as a social system. *The Systems Thinker*, 9 (5) 1–5.
- Williams, P. J. (2011). STEM education: Proceed with caution. *Design and Technology Education: An International Journal*, 16(1), 26-35.
- Williams, J. & Williams, A. (Eds.), (1996). *Technology Education for Teachers*, Macmillan Education, Melbourne.
- Willis, P. (2000). Expressive and arts-based research: Presenting lived experience in qualitative research. In P. Willis, R. Smith & E. Collins. (Ed.), *Being, seeking, telling: Expressive approaches to qualitative adult education research*. (pp. 94–111). Flaxton, Qld: Post Pressed.
- Wood, D. (2007). Professional learning communities: Teachers, knowledge, and knowing. *Theory into Practice*, 46(4), pp. 281-290.
- Young, M. F. D. (1998). *The curriculum of the future*. London: Falmer Press.
- Zuga, K. F. (1994). *Implementing technology education: A review and synthesis of the research literature*. Columbus, OH: Center on Education and Training for Employment.

"Every reasonable effort has been made to acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged."

APPENDICES

RESEARCH INFORMATION SHEET

Education for Enterprise

Researcher: Gary O'Sullivan.

Facilitators: Frank and Dean.

Nature and purpose of the study:

The purpose of this research is to ascertain the success of a professional development programme's ability to examine ways in which teachers' knowledge, confidence and capability to include Education for Enterprise in class work and the wider school context can be developed.

The procedure for gathering information will be varied including:

Observations by both the classroom teacher and the external researcher. Some videoing will occur. The intention is not to look at individuals per se, moreover to identify occasions where the professional development had some impact.

Interviewing of individuals and in some cases groups will be carried out by the researchers. Some of the interviews will be recorded and transcribed at a later stage.

There is no risk to any participant in the research. It will be conducted during normal school lessons with as little disruption as possible. All participants will remain anonymous unless prior permission to identify is sought.

All data will be held in secure storage by the researchers and used solely for the purposes of educational research. Findings will be made available to all participants upon request.

Participation in the research is voluntary.

Participants may ask questions at any time.

Participants have the right to withdraw at any time.

Participants have the right to decline to respond at any time.

All the researchers are experienced educators and will maintain the integrity of the educational experience.

Having read the information sheet if you do not want your school to be included in the research, or part thereof, please complete the non-consent part of the form.

Background

The Ministry of Education defines Education for Enterprise as:

“learning directed towards developing in young people those skills, competencies, understandings and attributes which can equip them to be innovative, and to identify, create, initiate and successfully manage personal, community, business and work opportunities, including working for themselves”.

The professional development programme will focus on innovation, leadership and risk taking as well as a number of enterprising capabilities.

The research component of this project will investigate what promotes the development of enterprise attributes in students and what school-wide practices can be introduced to support this.

The focus of the research is to develop a greater understanding of:

- teacher practice that supports the development of enterprising attributes, capabilities and competencies of students;
- school-wide practices that support the development of enterprising attributes, capabilities and competencies of students;
- the impact and influence that school-community partnerships have on student learning.

Education for Enterprise

Having read the information sheet regarding the above research:

I of
.....

Please tick

am happy for my school to be included in the research.

am happy for my school to be involved in the research except

Videoing

Interviewing

I would prefer if my school was not involved in the research.

Signed.....

Date.....

Please note a non-return will be considered as happy to be involved.

Appendix 2

**PERMISSION TO USE STUDENT WORK IN PUBLICATIONS,
ON THE *EDUCATION FOR ENTERPRISE PROJECT***

This document seeks permission to reproduce a student's work for an educational purpose. A copy of the work sample for which permission is sought is attached.

The material will not enable users to identify the student who produced a particular work sample. Not every sample for which permission is granted will be used. Work samples might not appear in exactly the form in which they are submitted. The student retains copyright in the work sample(s) but no payment for the use of the material will be made.

Student's Name _____

School _____

(Name of parent or guardian)

I, _____, give permission to the *Education for Enterprise* research

(Name of student)

team to publish material by _____ both in paper and electronic form.

Signature _____

Address _____

Date _____

If student is above year 8:

I, _____, consent to the publication of my material as above.
(Name of student)

Signature _____

Date _____

Appendix 3

PERMISSION TO PUBLISH PHOTOGRAPHS/VIDEO IMAGES OF A CHILD INVOLVED IN THE *EDUCATION FOR ENTERPRISE* PROJECT

I confirm that I, _____, am the Parent/Guardian of _____ (child's name).

I authorise *Education for Enterprise*, or its representative, to photograph/video my child and to use the photographs/video in the *Education for Enterprise publications*. The photograph/video of students is being used to illustrate learning, achievement, and quality in relation to key features of the *Education for Enterprise* project. I understand that the images may be published in print, video, or CD-ROM, and may be distributed worldwide.

I agree that the photographs/video may be used for other educational purposes (for example, in promotional or support materials) in connection with the above publication(s) or series. Copyright and ownership in the work will rest with the *Education for Enterprise project research team*.

Name of Parent/Guardian (Print) _____

Address _____

Phone _____

Email _____

Signature of Parent/Guardian _____

Date _____

FURTHER PERMISSIONS (Please circle 'yes' or 'no')

Yes	No	World Wide Web I also consent to the use of these photographs/video on the World Wide Web. (Note: Internet websites can be accessed by anyone with an on-line connection. Material published is effectively made available to the world at large.)
------------	-----------	--

Yes	No	Other Publications I also consent to <i>education for enterprise</i> re-using these photographs/film in New Zealand and throughout the world for educational purposes in other publications in print, video, or CD-ROM.
------------	-----------	---

ENTERPRISE EDUCATION PROJECT

Baseline data gathering exercise.

Background information

YOUR NAME

SCHOOL

1 Name of School

2 Address of school

3 Type of school (Please tick)

	State	Private	Single sex	Co. Ed.
Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Secondary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4 What is the number on the roll?

5 How many teaching staff does your school have?

6 What is the decile rating of the school?

8 How many teachers are involved with teaching technology education?

TEACHER

9 Are you female or male?

Female	<input type="checkbox"/>	Male	<input type="checkbox"/>
--------	--------------------------	------	--------------------------

10 Were you born in New Zealand

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

11 OPTIONAL - With which ethnic group do you identify?

Maori	<input type="checkbox"/>
Pacific Islander	<input type="checkbox"/>
Asian	<input type="checkbox"/>
N.Z. European, European, Pakeha	<input type="checkbox"/>
Other	<input type="checkbox"/>

12 How long have you been teaching?

1-5 yrs	<input type="checkbox"/>	5-10yrs	<input type="checkbox"/>	10-15yrs	<input type="checkbox"/>	15yrs+	<input type="checkbox"/>
---------	--------------------------	---------	--------------------------	----------	--------------------------	--------	--------------------------

13 Were you employed in another sector before teaching?

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

14 If yes, please describe previous experience.

15 What do you consider to be your teaching strengths?

16 Have you attended any P.D. in the last five years? Yes No

17 If so what?

18 Do you think the P.D. impacted on your teaching? Yes No

19 If yes, describe how. If no, describe why not.

SCHOOL COMMUNITY PARTNERSHIPS

20 What does the phrase school community partnerships mean to you?

20 Do you think that school community partnerships are good for student learning?

Yes

No

21 What impact if any do you believe community partnerships have on student learning?

22 Are you aware of community partnerships that your school might be involved with.

Yes

No

23 If yes, describe them.

EDUCATION FOR ENTERPRISE

24 What do you consider education for enterprise to be about?

25 What attributes, capabilities and competencies would an enterprising student show?

26 Do you consider yourself to be an enterprising teacher?

Yes

No

27 How would you justify your answer to the question above?

28 Do you consider education for enterprise to be important for New Zealand?

Yes

No

29 How would you justify your answer to the question above?

30 Is there anything you would like to add?

Appendix 5

Risk and mitigation analysis

Item Risk	Occurrence Probability	Severity of Risk	Exposure of Risk	Date of Trigger	Plan to Handle the Risk
Failure of teachers to attend P.D.	Low	Low	Low	Day one	Regular communication and backup schools, just in case.
Failure to partake in Research	Low	Low	Low	Pre sign up	Participant involvement via. Requirements not too demanding and constant feedback.

Appendix 5B

Recommendations for adjustment to the programme based on a risk and mitigation analysis

Item risk	Occurrence probability	Severity of risk	Exposure of risk	Date of trigger	Plan to handle the risk
Failure of teachers to attend P.D.	Low	Low	Low	Day 1	Regular communication and highly practical feedback for schools.
Failure to take part in research	Low	Low	Low	Pre sign up	Make sure participant involvement is not too demanding and provide regular feedback
Failure to include aspects of Education for Enterprise in regular programmes	Low	Low	Low	Day 1	Regular visits, practical facilitation and feedback.
Failure to introduce other teachers in the school to Education for Enterprise	Medium	Low	Low	Day 1	Organise a programme of regular sharing of progress so others can see and be encouraged by implementation ideas lead teachers have used.
Failure of Principals to follow aims, progress and outcomes of the project	Low	Low	Low	Day 1	Meet regularly with the Principals to discuss progress and look at next steps. Encourage Principals to attend workshops.
Failure of programmes to link with the community and organise expert mentors	Medium	Low	Low	Day 1	Introduce this concept on planning templates right from the beginning. Encourage the use of mentors and assist in sourcing them.
Going over the planned travel budget figure because of the need to visit different syndicates in the same school on different days	Medium	Medium	Medium	Early in the project	Organise meetings where possible on the same day and cover all schools in a single area while in that area. Follow budget figures closely.

**Education for Enterprise project
2005-2007 Video Record**

**A
Teacher
practice**

Teacher practice that supports the development of enterprising attributes, capabilities and competencies of students

**B
School Wide
Practice**

School wide practices that supports the development of enterprising attributes, capabilities and competencies of students.

**C
Community**

The impact and influence that that school-community partnerships have on student learning.

Movie title:

This video shows the work and presentation by Year 5&6 students to the Board of Trustees.

The aim is to build a fitness trail at school and the students visited a number of exercise experts and a school that already had a fitness trail established.

They presented their work to the Board of Trustees as part of the normal monthly meeting.

The evening began with an introduction by the principal. 3.

The next clip shows the early part of the presentation. The students adapted their own adventure playground to create their first fitness trail. They talk about the problems and solutions - Attributes 2,3,4,5,6,7,8,9,11.

Note how the teacher refers to what education for enterprise is all about as did the principal at the start of the evening.

Next clip shows students talking about the experts they have visited such as the coaches of the Wanganui Boys and Girls Gym Club. They worked out all their questions first and these can be seen in a later clip. 1, 14.

The next clip shows the BoT getting involved by trying a few exercises devised by the children. 2, 3, 4, 5, 7, 11, 13,

The students had visited another school to view, use and talk to teachers and students about their fitness trail and the next clip shows the some of the models that may be replicated in the Kai Iwi fitness trail. 1, 2, 3, 5, 6, 7, 8, 14

The next clip shows the presentation being summed up as students use stickies on a whiteboard. 1, 3

The next clip shows the interaction between community members and the children. This has become a feature of Kai Iwi School.

The last part of this video shows the questions the students began the unit with and the teacher talks about the unit and how she used the questions with the students working in groups. She also explains the benefits of using the authentic context to cover an area of the curriculum more successfully, i.e. persuasive writing. 7

1. Identifying, recruiting and managing resources
2. Working with others and in teams
3. Communicating and receiving ideas and information
4. Negotiating and influencing
5. Generating and using creative ideas
6. Identifying, solving and preventing problems
7. Looking for and creating opportunities
8. Planning and organising
9. Being flexible and dealing with change
10. Identifying assessing and managing risks
11. Using initiative and drive
12. Reflecting on what has been done
13. Working with the community
14. Using their knowledge and skills to go for goals
15. Being fair and responsible

THE E. 4. E. DAILY SNOOP

Data generating exercise

Remember you are the reporter, be ruthless, and get the scoop!

Reporter: Get some background information you need to know who you are quoting.

INTERVIEWEE NAME

YOUR ROLE IN THE SCHOOL PROJECT

(project leader, classroom teacher, senior manager etc.)

INTERVIEWEE'S SCHOOL

1 Name of School

2 Address of school

3 How many teachers are involved with teaching the E 4 E project?

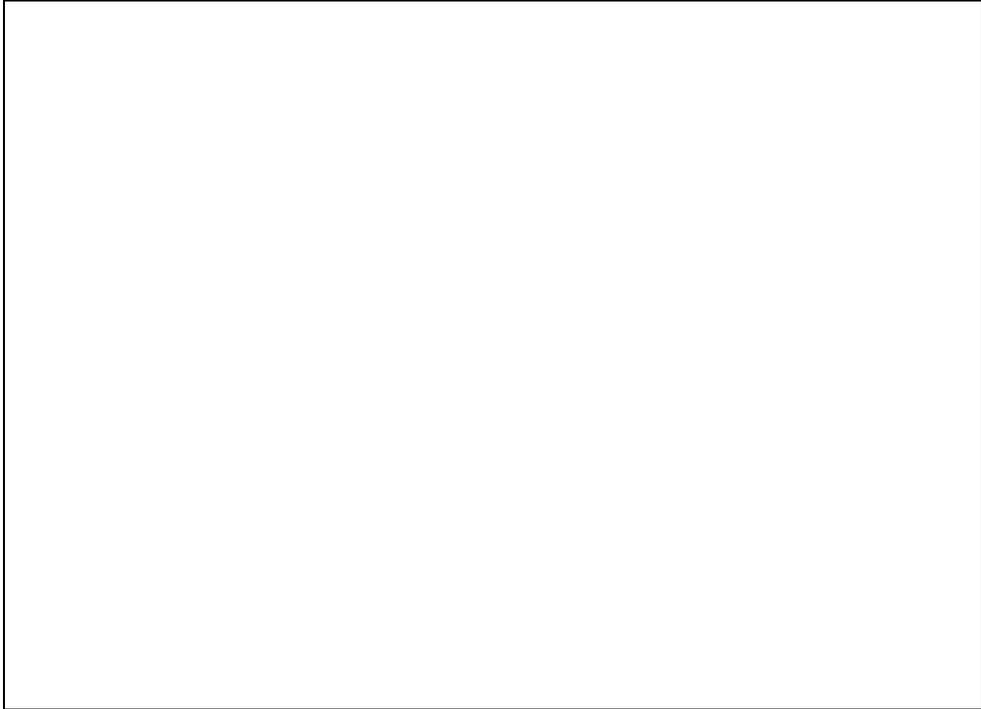
4 Do you have the support of the senior management team of the school?

Yes

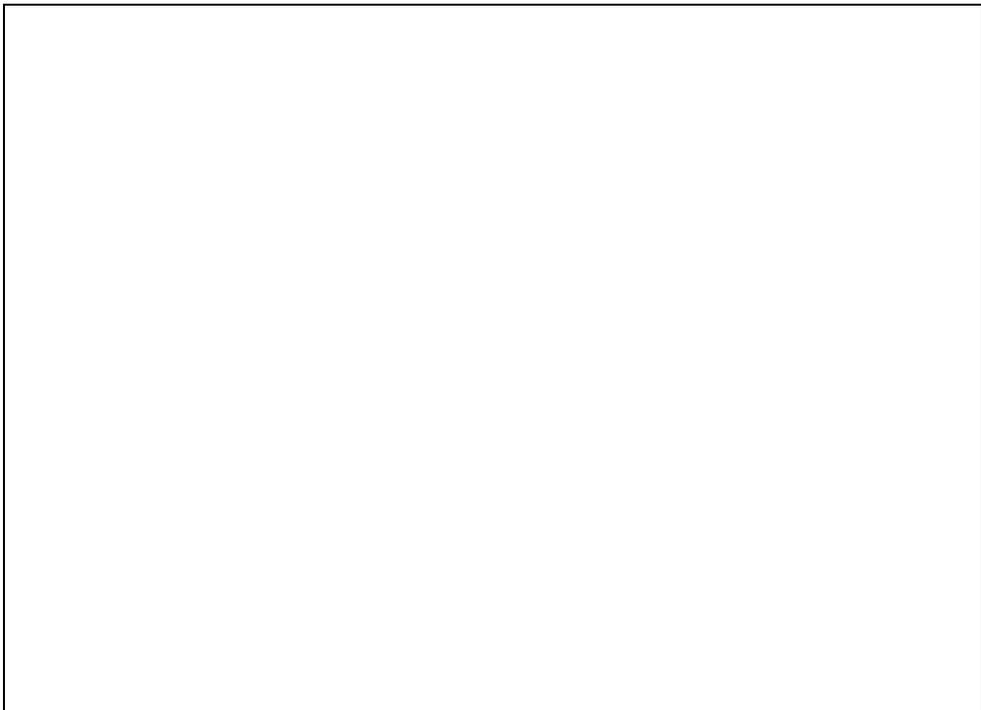
No

5 Please give some justification for your answer above.

6 Please describe your school's E4E project in detail.



7 In what way do you think the children have shown enterprising attributes, give examples?



EDUCATION SCHOOL-COMMUNITY PARTNERSHIP

8 Who are the community/business partners your school are working with?

Names, addresses, professions, etc.

9 Do you think that school-community partnerships have been good for student learning?

YES NO

10 What impact if any do you believe community partnerships have had on student learning?

Justify and clarify

EDUCATION FOR ENTERPRISE PROFESSIONAL DEVELOPMENT

11 Do you think the P.D. from this project has impacted on your teaching?

YES NO

12 If yes, describe how. If no, describe why not.

Justify and clarify

13 Is there anything you would like to add?

SCHOOL BACKGROUND INFORMATION

Rural cluster

Rural School One

This is a 10 teacher special school with around 40 students which operates from five separate sites:

- two primary satellite classes sited at local primary schools;
- the base school for intermediate and secondary aged students;
- one senior class for young people aged 18 and over who learn about community services and experience a range of work opportunities; and
- a tertiary unit where young adults develop practical skills working towards unit standards for the National Certificate of Agriculture Level 2.

In addition, a sensory pre-school group meets from time to time. Mainstream experiences are provided for all students. The school provides for the needs of a wide range of students, from 5 years old, to approximately 21 years of age. These students have high educational learning needs or require support in management of behavioural difficulties.

The education facilitator who supported this school is Dean.

Rural School Two

This school is a nine-classroom, decile 7, Y1-6 (contributing). The roll is about 200 (14% Maori) with students enjoying a semi-rural environment.

The education facilitator who supported this school is Frank.

Rural School Three

Rural School Three is a four teacher, decile 8. There is a roll of about 90 students and there are four classes. The school still enjoys the support of a range of talented

people from the community and some became the mentors for the very successful 2004 enterprise project. The project features as one of the case studies on the NZTE DVD.

The school is a committed enviro-school and last year's work fell within this framework. The principal is very keen on the enterprise approach to learning and the enterprising skills of Education for Enterprise. Some staff have already integrated the approach into different areas of the school curriculum.

The education facilitator who supported this school is Frank.

Rural School Four

Rural School Four is a co-educational Y9-13 secondary school with a decile rating of 2. It has a roll of around 550 with a graphics technology department of four teachers. It has a growing roll, with the Year 9 intake increasing annually and significant growth in the senior school as more students elect to undertake studies through to Year 13. Students are 70% male and 30% female with a high proportion of Maori students and small numbers of Asian and Pacific students. There is a strong commitment to ensuring cultural diversity is recognised and affirmed.

The education facilitator who supported this school is Dean.

Rural School Five

This a single sex girls secondary school with a decile rating of 4. It has a roll of around 550 (20% Maori) and a staffing level of about 40 with a technology /graphics department of 5. The school traditionally offers a wide range of educational, sporting and cultural activities in an attractive, well-resourced environment. The school hostel provides high quality facilities for up to 160 girls including a number of international students. Past students celebrate the college's history and tradition through their continued participation in the life of the school.

The education facilitator who supported this school is Dean.

Rural School Six

Rural school six is a co-educational integrated y7-13 school with a decile rating of 8. The school roll is around 850 with 55% female and 45% male and a Māori population of 6%. The catholic character is central to the ethos of the school and integrated bilingual classes are a feature.

The education facilitator who supported this school is Dean.

Rural School Seven

Rural school seven is a decile 1 full primary school for y0-8 students. The school enjoys the support of loyal and established whanau and community. This sense of whanaungatanga provides a strong foundation for the school. Students are predominantly Māori. The strong presence of tangata pacifica in the community is drawn upon at times to support the school. Rural school seven offers educational choices in te reo māori including rumaki reo (total immersion) and reorua (partial immersion).

The education facilitators who supported this school are Frank and Dean.

Rural School Eight

Rural school eight is a y9-13 integrated secondary school for girls. The roll is approximately 250 (10 % Māori) with 90% being boarders. The school has a decile rating of 10. It is a school of special character with high expectations and clearly defined traditions, set in spacious, park-like grounds. There are four teachers in the graphics/technology department.

The education facilitator who supported this school is Dean.

Coastal Cluster

Coastal School One

Coastal School One is a Full Primary, semi-rural, decile 5 school with a roll of 350. 14% are Maori students. Coastal School One draws students mainly from the local town and the surrounding rural area. There are 10 classes. Coastal School One

participated in the 2004 Education for Enterprise programme but it was limited to the three classes in the Year 5 and 6 syndicate. This time it was extended across the school. The lead teacher proved to be a valuable resource person at Coastal School One and for other schools involved with this professional development and research project.

The education facilitator who supported this school is Frank.

Coastal School Two

Coastal School Two is a decile 9 school in a well-established area. There are around 200 students on the roll, 85% Pakeha and 9% Maori. Learning is not seen as purely a school-based activity and there a shift towards schools as a community resource. The staff took part in a “cultural review” in 2004 and several areas that have become a focus for development have obvious links to Education for Enterprise. These include getting community personnel involved in teaching and learning programmes, giving students’ time to reflect on their learning and the promotion of flexible thinking and developing initiative in students.

The education facilitator who supported this school is Frank.

Coastal School Three

Coastal School Three is a four classroom rural contributing school situated thirty minutes north of the main city. It has a decile rating of 5 with 85% Pakeha students and 13% Maori. Coastal School Three enjoys good community support. Coastal School Three was probably the quickest off the mark in terms of introducing Education for Enterprise with a school gardens project ready and waiting for an enterprising approach in July this year.

The education facilitator who supported this school is Frank.

Coastal School Four

Coastal School Four is a contributing (Years 1 to 6) school with a roll of 240. Its decile rating is 8 and in recent years it has almost outgrown the space it occupies. Community support and trust is a feature of Coastal School Four, and much of this

comes from a high level of communication between the school and the community. Teacher aides as well as parent and grandparent volunteers work closely with teachers to provide a number of programmes designed to cater for each student's needs. Coastal School Four was an Enterprise project school in 2004. The outcomes were very successful and they are highlighted on the professional development DVD but this time we plan to take Education for Enterprise philosophy across the whole school. They intend to extend the writing project from 2004 so it involves all classes and we will look at building other enterprising elements into classroom programmes.

The education facilitator who supported this school is Frank.

City Cluster

City School One

This is a decile 10 Full Primary school that opened in January 2001. With a roll of 250 the school is becoming increasingly multicultural. 50% of the students are Pakeha, 13% Maori and 8% of the students have a Pasifika heritage. The remainder are from a range of ethnic backgrounds.

The inquiry approach to learning is a big part of this school as is an adaptation of the Primary Enterprise Programme - Prep. The Principal is keen to see the enterprising philosophy of Prep extended into classroom programmes. At first glance Prep appears to stand alone on a Wednesday afternoon. The progress of the more integrated approach of Education for Enterprise will be interesting to observe as this is the only school on our project with a strong Prep background.

The education facilitator who supported this school is Frank.

City School Two

This is a decile 10 Full Primary School with a roll of 320. Eighty-seven percent of the students are Pakeha, 2% Maori and 5% Chinese. This school serves a diverse population in a rural community. Initial visits have shown the staff to be enthusiastic

and committed to providing interesting learning opportunities in all areas of the curriculum.

Children respond positively to teachers' high expectations of their learning and this Education for Enterprise approach is seen as a natural progression for the different models of enquiry based learning already in place. It will strive to create those authentic learning situations and capitalise on the enterprising approaches to the teaching and learning programmes that the teachers are already have in place.

The education facilitator who supported this school is Frank.

City School Three

City School Three is a contributing school opened in 2004 with around 150 students. This number has almost doubled already. The local community had a high input into the design of the school. An enclosed "street" runs between the classes and each classroom can be viewed from the street through glass ranch sliders and windows. "Parents wanted this," said the school Principal. "They wanted to see what was happening all the time."

The community has a high level of pride in their school and there are no problems with graffiti or vandalism. Any issues of discipline are dealt with promptly. The school enjoys a high level of support from parents though they would rather leave the actual teaching to the teachers and they have a lot of confidence in their abilities.

There are no formal committees such as "Home and School" set up but parents have been "on site" since the school began. Things just happen and they are involved in all sorts of areas from organising lunches to helping with sports. The environment is very welcoming - there are seats for parents. This enterprise programme will focus on the Year 5 and 6 syndicate made up of five classes. The school vision is to teach all students the basics by Year 4 so they can then "diversify". Through our activities with the year 5 and 6 syndicate we will introduce the ideas to the rest of the school.

The education facilitator who supported this school is Frank.

City School Four

City School Four is a decile 10 contributing primary school with a roll of more than 380 students. Eighty five percent of these students are Pakeha and 5% are Maori. Recent housing development in the area has contributed to roll growth but the community is keen to maintain elements of its rural character.

City School Four was an enterprise project school in 2004, but following a big change of staff and redevelopment in the grounds and buildings the Principal and Deputy Principal want to maximise the opportunities Education for Enterprise can offer:

A number of enterprising attributes are part of the description of the “City School Four Learner” description. For example:

- “The heart” Values: Responsibility, Confidence and Cooperation.
- “The brain” Knowledge: Higher order thinking and the ability to make the best choice.
- “The backpack” Competencies: Reflection, Personal Management and Organisation.
- “Enterprise and innovation” Curiosity with Risk Taking, Flexibility and Active Participation in Teams.

The education facilitator who supported this school is Frank.

Ministry of Education Definition for Education for Enterprise

Q1. School wide practice. Edit this definition so that E4E as a way of learning, is more likely to be adopted in your school.

Learning directed towards developing in young people those skills

competencies, understandings and attributes which equip them to be

innovative and to identify, create, initiate and successfully manage

personal, community, business and work opportunities including working

for themselves.

What do you think?

For E4E to become a way of learning in my school it would be more likely to succeed if this definition was:

left the same because...

Or ...changed to my edited version above because...

Q2. School wide practice: Increasing Involvement of E4E as a way of learning in your school.

Please circle a number to show the importance of the following aspects in increasing the involvement of E4E as a way of learning in your school

How important do you think the following aspects are if <u>more</u> teachers and students are to be involved in E4E as a way of learning in your school ?	Very Impt	Impt	Some-what impt	Not impt
The students taking more ownership of the learning process.	4	3	2	1
The students being involved in decision making in the school e.g. event management.	4	3	2	1
The selection of learning activities across the curriculum that challenge students to connect enterprising skills to practical situations.	4	3	2	1
Getting teachers to identify and use outside experts in their teaching and learning programmes.	4	3	2	1
Ensuring students have the opportunity to reflect and learn from experiences.	4	3	2	1
Use of best practice cooperative learning strategies.	4	3	2	1
The promotion of authentic contexts across all curriculum areas to help students see relevance and purpose in what they do and the link to the wider world.	4	3	2	1
Showing teachers that E4E is an effective vehicle for delivering the key competencies.	4	3	2	1
Developing and using planning guides that keep the skills and attributes of enterprising people in the teachers eye.	4	3	2	1
Choosing topics/themes that easily lend themselves to an enterprising approach.	4	3	2	1
Focusing on the "end product", i.e. the development of students with the skills and attributes of enterprising people, <i>before</i> considering the programmes, activities and structures within the school.	4	3	2	1
Embedding enterprise in the vision, culture and strategic plans of the school, and displaying it actively in the management, vision, and activities of all areas of school life.	4	3	2	1
Getting a clear understanding of the underlying principles of E4E and how this can and should positively impact on teaching practice, engagement and relevancy.	4	3	2	1
Building working relationships with the local community.	4	3	2	1
Building working relationships with local businesses.	4	3	2	1
Celebrating all successes and achievements.	4	3	2	1
Ensuring the support of senior management.	4	3	2	1
Having a lead teacher for E4E or establishing an enterprise cell.	4	3	2	1
Led by teachers from subjects where E4E can be more easily applied– technology, business economics.	4	3	2	1
Access to an E4E advisor.	4	3	2	1

Q3(a) Teaching and Learning practice.

Statement about practice	What priority should be given to each of these practices? 	V High	H	Mod	Low	V Low
Students learning the curriculum through "real-life" projects						
Making connections with other curriculum areas.						
Putting less emphasis on curriculum content "coverage", to allow time for deeper understanding or more relevant learning to occur.						
Involving students in deciding what should be learned and how this learning could happen.						
Encouraging students to work in groups with an emphasis on quality cooperative learning.						
Students using their knowledge to create "new" ideas, products, services, or relationships.						
Involving students in assessment decisions-what should be assessed and how.						
Finding out about students' personal interests.						
Students using a range of information technology to support quality learning behaviours.						
Discussing with students the relevance of their learning to their futures.						
Students having opportunities to practise communicating their learning in a range of different.						
Students presenting the results of their learning/activities to an audience other than their .						
Students having the opportunity to try out new and innovative ideas and take risks.						
Encouraging students to see "mistakes" as learning opportunities.						
Students having opportunities to use experts from the community as mentors.						
Encouraging students to gather information from a wide range of sources.						
Encouraging students to think critically about where their information comes from.						
Students taking leadership in planning and organising learning activities in the classroom/outside the classroom and gathering and managing the resources they need.						
Supporting the development of students' business knowledge and skills .						

Q3(b) Teaching and Learning practice.

Statement about practice	How often did these practices occur before and after E4E involvement? 	Hardly ever/ never	Occasionally	Often	Most / all of the time
Students learning the curriculum through “real-life” projects	Before				
	Now				
Making connections with other curriculum areas	Before				
	Now				
Putting less emphasis on curriculum content “coverage”, to allow time for deeper	Before				
	Now				
Involving students in deciding what should be learned and how this learning could happen.	Before				
	Now				
Encouraging students to work in groups or teams with an emphasis on quality cooperative learning.	Before				
	Now				
Students using their knowledge to create “new” ideas, products, services, or	Before				
	Now				
Involving students in deciding what should be assessed, how assessment should be carried out, and what the next steps are.	Before				
	Now				
Finding out about students’ personal interests.	Before				
	Now				
Students using a range of information technology to support quality learning behaviours .	Before				
	Now				
Discussing with students the relevance of their learning to their futures.	Before				
	Now				
Students having opportunities to practise communicating their learning in a range	Before				
	Now				
Students presenting the results of their learning/activities to an audience other	Before				
	Now				
Students having the opportunity to try out new and innovative ideas and take risks	Before				
	Now				
Encouraging students to see “mistakes” as learning opportunities	Before				
	Now				
Students having opportunities to use experts from the community as mentors.	Before				
	Now				
Encouraging students to gather information from a wide range of sources.	Before				
	Now				
Encouraging students to think critically about where their information comes from.	Before				
	Now				
Students taking leadership in planning and organising learning activities in the classroom/outside the classroom and gathering and managing the resources they need.	Before				
	Now				
Supporting the development of students’ business knowledge and skills	Before				
	Now				

Q4 Teaching practice: Show how strongly you agree or disagree with the following statements about your teaching practice about E4E. Just circle a number on the grid below for each statement.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I have a good understanding of the principles of E4E.	1	2	3	4	5
2. I am enthusiastic about making E4E happen at this school.	1	2	3	4	5
3. Students at my school are enthusiastic about being involved in E4E activities.	1	2	3	4	5
4 E4E planning is part of my class planning and infrastructure.	1	2	3	4	5
5. E4E is harder to plan for than conventional planning approaches to curriculum teaching and learning and it takes more time.	1	2	3	4	5
6. E4E is more motivating for students than conventional approaches to curriculum teaching and learning.	1	2	3	4	5
7. E4E has helped my class/group of students interact more with the community.	1	2	3	4	5
8. E4E has heightened students interest in the community.	1	2	3	4	5
9. E4E has made my students more enterprising.	1	2	3	4	5
10. E4E has had a positive impact on student learning.	1	2	3	4	5
11. E4E has helped build positive relationships with local businesses.	1	2	3	4	5
12. E4E has helped students see the relevance of the curriculum.	1	2	3	4	5
13 E4E has increased decision making opportunities for students at this school.	1	2	3	4	5
14. E4E can be completely cross curricular. It integrates across across all subject learning areas.	1	2	3	4	5

Question 4 continued.

In your view does E4E have any special relevance or relationship to the values, philosophy or culture of your school.

Please circle

1. Yes 2. No 3. Not sure

If yes, please describe below

Is E4E or the teaching philosophies behind E4E included or mentioned in the following kinds of school documents. Please circle a number on the grid.

	Yes	No	Not sure
1. Policy documents (eg school charter, strategic plan, annual report)			
2. School level department level or syndicate level curriculum plans			
3. Teacher's own curriculum, teaching and assessment plans			
4. Teacher appraisal processes			
5. School newsletters			
6. Reports of student learning/achievement to parents			
7. On the school website			
8. In prospectuses/ information to parents			

9 Other (Please specify)

Q5 School wide practice : Show how strongly you agree or disagree with the following statements about your teaching practice about E4E. Just circle a number on the grid below for each statement.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. All teachers at my school have a good understanding of the principals of E4E.	1	2	3	4	5
2. All teachers at my school are enthusiastic about making E4E happen.	1	2	3	4	5
3. Some teachers at my school don't understand E4E and are not keen to see it happen.	1	2	3	4	5
4 E4E is a central organising concept for curriculum and teaching at this school	1	2	3	4	5
5. E4E is discussed in staffmeetings.	1	2	3	4	5
6. E4E is discussed in school assemblies	1	2	3	4	5
7. E4E is discussed in classrooms.	1	2	3	4	5
8. We still have a long way to go in developing an enterprising culture in my school.	1	2	3	4	5
9 E4E is likely to change the way the curriculum is planned at a whole school level.	1	2	3	4	5
10. E4E is likely to change the way the curriculum is planned at a department/syndicate level.	1	2	3	4	5
11. Teachers workloads will increase if they get involved with E4E as a way of learning	1	2	3	4	5
12.E4E has helped more students see the relevance of the curriculum.	1	2	3	4	5
13 E4E has increased decision making opportunities for more students at this school.	1	2	3	4	5
	1	2	3	4	5

Question 6. School wide practice: Challenges for E4E in the school.

How would you rate the following challenges to E4E if it is to be sustained and extended upon as a way of learning in your school? Please choose and tick a column.

Challenges	So challenging E4E probably won't proceed.	Challenging but likely to be overcome.	Little challenge. Easily solved .
The time needed to plan for E4E approaches.			
The demands of assessment			
Curriculum coverage requirements.			
Organising people and groups outside the school to act as mentors, helpers etc.			
Lack of resources in the community.			
The time demands of compulsory programmes and initiatives such as Keeping Ourselves Safe or DARE .			
The administrative requirements of risk management.			
The need for some teachers to change their teaching style and give students more ownership of the learning process.			
The need for teachers to be very enterprising themselves when planning units of work.			
Lack of resources in the school			
A perceived "side-dish idea" from the Ministry rather than an "official" emphasis, push and alignment with the key competencies.			
A perception of an emphasis on teaching students to be entrepreneurial and the 'insidious infiltration of free market values into the curriculum.' -Quote from <i>A Quality Public Coalition objection to the draft Curriculum.</i>			
A lack of resources such as quality E4E case studies, units of learning and access to advisors.			