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Education for Sustainability:
An Investigation of Teachers' and
Students' Perceptions and
Experiences

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A research thesis submitted in partial fulfilment of the degree
of Master of Education
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Dedication

This thesis is dedicated to my Grandparents, Maureen and Brian (Nana and Saba)

x

There is sufficiency in the world for man's need but not for man's greed

Mohandas K. Gandhi

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Thank you to my supervisors, Dr. Sally Peters and Associate Professor Jenny Young-Loveridge for their expert guidance and support.

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Abstract

Human activity and the mismanagement of this generation and the previous, has resulted in large-scale environmental and social damage associated with climate change, ecosystem destruction, resource depletion and pollution (Littledyke, Taylor & Eames, 2009). This has caused concern for the future of our planet, and it is this concern that introduced Environmental Education/Education for Sustainability (EE/EFS) in the 1960s and 1970s. EE/EFS has been shaped by international conferences and publications to reach the notable status that it currently holds today. *The New Zealand Curriculum* (Ministry of Education 2007) stopped short of mandating EE/EFS, but ‘sustainability’ is woven throughout the document, offering potential for EE/EFS to be effectively expressed in teaching and learning.

This qualitative study sought to obtain rich qualitative data to investigate and gain a better insight into the EE/EFS learning experiences currently taking place in five Bay of Plenty primary classrooms. It explored the perceptions that were held by teachers and students participating in EE/EFS. The methods used for data collection included interviews, observation and questionnaires.

The study found evidence to suggest that teachers and students lacked a general understanding of the terms ‘environment’ ‘EE/EFS’ and ‘sustainability’, and their views of these concepts were predominantly ecological in nature. A gap between what current research and literature on EE/EFS stipulates, and what was known

by the teachers in this study, was clearly apparent. Teachers had received very little, if any tertiary education or professional development in EE/EFS, and therefore, although more specialised views exist amongst educators and specialists of the area, the teachers had not been well introduced to the current trends and issues in EE/EFS, and therefore, relied on their 'lay' understandings.

Waste management and recycling activities, were the topics most frequently focused on within each of the schools, and activities appeared to address the symptoms of the waste issues rather than focusing on underlying causes or the wider issue. Examples of education 'For' the environment were generally absent. Barriers to EE/EFS existed, with challenges in its implementation most commonly mentioned by teachers being time limitations. The value of teachers' personal passion and enthusiasm for EE/EFS was highlighted in this study, and as EE/EFS remains non-mandatory, its future relies on teachers with this personal interest.

This study's findings suggest that quality professional development is needed, both conceptual and pedagogical, as students and teachers had limited understandings of EE/EFS. Universal, clearly stated guidelines, containing information about the contemporary focus of EE/EFS should be introduced and presented to teachers, as although there are supporting resources and literature available, they were not being accessed by the teachers in this study. The implementation and development of whole school approaches to EE/EFS should continue to be encouraged, and school leaders need to play a part in initiating this. Therefore, support for school leaders may be needed to encourage collaborative EE/EFS initiatives to take place in schools.

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Chapter 1

Introduction

Overview of the chapter

As concern for the environment has increased and developed, so too has the field of Education for Sustainability/ Environmental Education (EFS/EFS). This research was undertaken in an attempt to learn more about EE/EFS in New Zealand classrooms. This chapter introduces the study. Firstly, it provides a brief introduction and background to EE/EFS. Next it describes the motivation for the study, giving some detail of my own background and reasons for my interest in EFS. The aim of research is then presented, and the research questions are outlined. Following this, the significance of the study is provided. The chapter closes with an overview of the thesis structure and chapters.

1.1 Background of the Research

EFS/EE is an issue of great concern which gained international prominence through a number of intergovernmental conferences and publications in the 1960s and 1970s (Fien & Gough, 1996; McKenzie, 2006; Mtaita, 2007; Palmer 1998;). In the 1980s a focus on ‘sustainability’ progressed, which gave attention to the fact that environmental issues are also affected and caused by social and economic factors, not only physical and biological factors. Today, EE is commonly referred

to as Education for Sustainability (EFS). For the Purposes of this study, and from this point onwards, Education for Sustainability (EFS) will be the term used to describe what has generally continued to be called, Environmental Education (EE) until recent times. However, in certain places it seemed only appropriate to use the term EE or another title to describe EFS.

EFS within New Zealand was influenced and shaped by the international conferences and publications of the 1960s and 1970s, but it was from the 1990s onwards, that some of the most notable developments and milestones were achieved in EFS within New Zealand. These included, but were not limited to: the publication of *Learning to Care for our Environment* (Ministry for the Environment, 1998), the release of the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999), the launch of the Enviroschools initiative in 2001, and the release of *The New Zealand Curriculum* (Ministry of Education, 2007). As an awareness of environmental concerns continue to grow globally, considerable research both international and within New Zealand, has been undertaken and the field continues to be actively researched.

Despite these developments, in New Zealand schools, the teaching of EFS remains non-mandatory. Therefore, it relies on there being sufficient interest from a school or enthusiastic teachers, in order for it to occur. Although the formal teaching of EFS is in its infancy, there are motivated schools and teachers who are actively implementing EFS.

1.2 Personal Motivation for the Research

EFS initially appealed to me due to my upbringing and the values instilled within me throughout my childhood. My family have a strong connection to the natural environment, always having made the effort to try and live at peace with nature, in the most sustainable ways possible. From a young age I was involved in activities such as hunting, fishing and gardening, and these activities are still an important part of my day to day life. As my appreciation for the natural world has grown, so too has my awareness that it is at risk, and that appreciation alone, is not enough to ensure the future of our environment.

Tertiary education further developed my interest in the topic. In particular, the postgraduate EFS paper that I completed in 2010 developed my knowledge and understanding of EFS. Prior to the completion of this paper, EFS was something that I was interested in, but like many other New Zealanders, knew little about. The paper broadened my understandings, as I was able to make connections between what I had observed taking place in the form of EFS during my in-school experiences, and the gap between these observations and what the experts and literature were suggesting.

These interests have strengthened my concern for the need to promote the effective teaching and learning of EFS in New Zealand schools. It is vital that children are not only aware of environmental issues, but are given the opportunity to develop the knowledge and skills in order for them to take action addressing these issues with intent, now, and in the future. This study sought to explore what

teachers and students believed about EFS and what types of EFS experiences students and teachers were involved in regarding.

1.3 Aim of the Research

This research project aimed to obtain rich qualitative data to investigate and gain a better insight into the EFS learning experiences currently taking place in Bay of Plenty classrooms. It explored the perceptions that are held by teachers and students participating in EFS.

Research Questions

What are the understandings and perspectives held by teachers and children participating in EFS?

What types of learning experiences are taking place in EFS classrooms?

1.4 Significance of the Research

This study offers a detailed insight into the perspectives and experiences of five EFS teachers and their students, within five Bay of Plenty primary schools. The research is significant for a number of reasons. Firstly, although it could be said that EFS research in New Zealand is still in its infancy years (McKenzie, 2006), past studies, involving both large numbers of participants, and some smaller case study type projects, have recently been undertaken in New Zealand. However, unlike this study, few were conducted post the release of the present *New Zealand Curriculum 2007*. In addition, this study aimed to include the voice of EFS

students as well as their teachers, which has not often been included in past New Zealand research. While the overall state of EFS in New Zealand classrooms cannot be determined by a small study such as the present, the findings can offer rich, up to date, qualitative data that can contribute to theoretical knowledge about EFS in New Zealand. The information in this study may be of interest to all stakeholders of EFS including: teachers, students, parents, curriculum developers, school leaders and boards of trustees, those concerned with teacher education and professional development, universities, governmental and non-governmental organisations, and anyone else interested in the future of EFS.

1.5 Thesis Overview

This thesis is organised into five chapters: *Chapter one* introduces the research. It provides a brief background to EFS, describes the motivation for the study, giving some detail of my own background, it outlines the general aim of the study, presents the research questions, explains the significance of the study, and provides an overview of the thesis structure and chapters.

Chapter two provides a review of relevant literature pertaining to the research. It gives an overview of the historical trends and developments in EFS worldwide, definitions, and the shift from EE to EFS. It outlines the development of EFS in New Zealand, discussing some key concepts and misconceptions in EFS. Teacher education is discussed, relevant studies are reviewed, and barriers to the implementation of EFS are described.

Chapter three outlines the methodological basis of this research. The theoretical framework is touched on, literature to support the three research methods used in

this research is presented, the focus of the study is introduced, and the research questions are outlined. A description of the participants is provided, the research procedures are outlined for each method, quality of research is discussed, and ethical issues are considered.

Chapter four presents the findings for this study through the identification and analysis of key themes. An exploration of the teachers' and students' understandings, beliefs, knowledge and attitudes regarding EFS is presented. Structure of EFS within the schools and teachers' classrooms is examined. The content and focus of the teachers EFS programmes are investigated in detail, and finally, teachers' perceived barriers are considered.

Chapter five presents a discussion and summary of the study's findings that were generated in the results chapter. This discussion chapter makes clear links to the literature. Teachers' and students' concepts of 'environment', 'EFS', and 'sustainability' are discussed. An argument regarding the recycling, waste management, and learning taking place within the schools and classrooms is presented. Teachers' and student's attitudes and knowledge are focused on, current EFS structures within schools and classrooms are examined, barriers to the implementation of EFS are presented. And finally, the research implications, limitations and recommendations are presented.

Chapter 2

Literature Review

Overview of the Chapter

This chapter begins with an overview of the historical trends and developments in Environmental Education/Education for Sustainability (EE/EFS), definitions, and the shift from EE to EFS. It then outlines the development of EFS in New Zealand and discusses EFS in the curriculum. Some important elements of EFS are presented including: EFS research on students, values education, the three dimensions: *In About* and *For* the environment, Action Competence and misconceptions among teachers in EFS. This is followed by outlining the value of teacher knowledge in EFS. Next, teacher education is considered including both formal training and professional development. Barriers to the implementation of EFS are identified, and the chapter then concludes by providing a summary of the reviewed literature, and a rationale for the present study.

2.1 History and Development of Environmental Education/ Education for Sustainability

International input over the past 60 years, involving a number of influential meetings and conferences, has seen EFS grow to reach international and national status (Fien & Gough, 1996; Palmer 1998).

2.1.1 The International Development of EFS

The roots of EFS date back to the 1960s and 1970s, where a global movement emerged around the world out of a growing awareness of the threat of environmental degradation (Gough, 1997; Parliamentary Commissioner for the Environment, 2004). As a result of these concerns about the future of the planet several international meetings took place and reports were written (Chapman & Eames, 2007). These included the *Belgrade Charter* in 1975 (United Nations Educational, Scientific, and Cultural Organisation [UNESCO], 1976), the *Tbilisi Declaration* in 1977 (UNESCO, 1978), the *Brundtland Report* in 1987, (World Commission on Environment and Development [WCED], 1987), and *Agenda 21* in 1992 (United Nations Conference on Environment and Development [UNCED], 1992), which drew attention to the need to give an international prominence to environmental issues and their possible solutions, through EFS. However, despite the attention that EFS has received over the years, it seems that it has not gained sufficient recognition and commitment until more recent times.

EFS has since evolved from its obscure beginnings in the 1960s and 1970s, continuing to be discussed, critiqued and developed as it finds the place it deserves in the curriculum, after all “environmental education is an investment in our future” (Ministry of Education, 1999, p. 3). For a timeline of influential events in the development of EFS (see appendix A).

In 1975 the International Environmental Education Programme was founded by UNESCO and United Nations Environment Programme (UNEP), and was then launched at an international workshop held in Belgrade. As a result of this workshop, the first inter-governmental statement on EFS was launched now

known as the *Belgrade Charter*, which listed the aims, objectives, key concepts and guiding principles of EFS (UNESCO, 1975 as cited in Palmer, 1998). The three objectives for EFS written at the *Belgrade Charter* follow:

To foster clear awareness of, and concern about, economic, social, political and ecological inter-dependence in urban and rural areas;

To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;

To create new patterns of behaviour of individuals, groups, and society as a whole, towards the environment (UNESCO, 1975 as cited in Palmer, 1998, p.7).

The world's first inter-governmental conference on EFS, organised by UNESCO and UNEP was convened in Tbilisi in 1997. *The Tbilisi Declaration* built on the work of the *Belgrade Charter*, marking the beginning of international efforts to educate the world's citizens of the need to protect and improve the environment.

The Declaration demonstrated the interdependence between the environment, and social, political, and economic activity. One of its central ideas is the notion of 'interdependence': environmental issues are human issues, "Implicit in these concepts is the realisation that attention must be given, not just to solving problems arising from past behaviour, but also to living sustainability in the future" (Chapman & Eames, 2007, p. 180). The Tbilisi Declaration continues to

serve as a blueprint for the development of EFS within New Zealand and internationally (Palmer, 1998).

A focus on sustainability continued through the 1980s. In 1987, the World Commission on Environment and Development (WCED, 1987), in its report, *Our Common Future* (referred to as the *Brundtland Report*), presented a major statement on a 'global agenda' to reconcile environment with development, and suggested the focus on environmental problems to consider social and economic factors, often the major causes of environmental problems. Education was a focal point of the *Brundtland Report's* agenda (Mtaita, 2007; Palmer, 1998). Debate arising from the *Brundtland Report* led to the United Nations Conference on Environment and Development, The Earth Summit, held in Rio de Janeiro in 1992. *Agenda 21*, a plan for achieving sustainable development, was the centre piece of the conference and called for EFS to be the central goal of Environmental Education in the 1990s (Tilbury, 1995). The essence of *Agenda 21* is described by Sitarz (1993):

Agenda 21 is not a static document. It is a plan of action. It is meant to be a hands-on instrument to guide the development of the earth in a sustainable manner. Recognising the global nature of the environmental problems that face humanity, it is based on the premise that sustainable development of the earth is not simply an option: it is a requirement- a requirement increasingly imposed by the limits of nature to absorb the punishment which humanity has inflicted upon it. Agenda 21 is also based on the premise that sustainable development of the earth is entirely feasible (p. 6).

2.1.2 The Shift from EE to EFS

The roots of EFS are in Conservation Education, Nature Study and Outdoor Education, (Heimlich, 2002). However, it has long been known that EFS is much more complex and encompassing than any of these subjects alone. It appears that the confusion around what EFS actually is, has been evident since its original movement in the 1960s, as there was a common misconception suggesting that EFS was concerned primarily or entirely with Biology and Nature Study. However, attempts to clarify this misconception were later made:

It is true that the nature around us is an important part of our environment but we would be remiss if we ignored the social, cultural, technological, esthetic and religious aspects of our environment. The resource or nature-centered content of environmental education must give way to the one that is man-centered (Bakshi & Naveh, 1980, p. 12).

Traditionally EFS appeared to teach children about the natural world, with a passive approach, as there was a belief that teaching them about the environment would result in pro-environmental behaviours (Littledyke, Taylor & Eames, 2009). The last two decades have witnessed a major shift from educating for ‘environmentalism’ to ‘sustainability’, and, during the 1990s the language of ‘sustainability’ began to creep into the vocabulary and discourses of many EFS educators. However, much debate concerning the best language for communicating the role of education in environmental and sustainability issues exists (Parliamentary Commissioner for the Environment, 2004; Summers et al., 2003; Taylor et al., 2009; Tilbury, 1995).

The word sustainability has been used in a number of ways giving it various meanings. Commonly used titles include: Environmental Sustainability, Education for Sustainability, Education for Sustainable Development and Environmental Education for Sustainability. All of these terms have been subject to a variety of interpretations and have been used interchangeably. Littleddyke, et al., (2009) suggest that the evolving terminology of EFS has possibly caused this confusion.

EFS is now a popular term and is often universally seen as the new, and improved Environmental Education (Parliamentary Commissioner for the Environment, 2004). EFS is said to be broader in scope and more forward-looking and proactive; it examines how people in society can learn to live in more sustainable ways. It aims to empower people to help contribute to creating a better future, and addresses the causes of environmental issues rather than just their symptoms (Parliamentary Commissioner for the Environment, 2004). It supports an educational approach that not only considers immediate environmental improvement, but addresses education for ‘sustainability’ in the long term (Eames, Cowie & Bolstad, 2008; Tilbury, 1995).

One of the most notable differences in the shift appears to be the other disciplines that EFS more completely encompasses, “after all, a decision on an environmental issue requires all facets of society to be considered” (Heimlich, 2002, p. 25). It is more than perceiving the environment as just nature, and rather, acknowledges the entirety of the surroundings and the links between lifestyles and nature (Tilbury, 1995). EFS places stronger emphasis on the integration of social, cultural,

political and economic concerns and their effects on environmental issues. Moreover, it has been widely acknowledged as being 'holistic' in nature (Tilbury, 1995) and recent literature in EFS supports the its 'holistic' view, which involves the simultaneous application of the whole wide range of human faculties (Barker & Rogers, 2004; Bolstad, Cowie & Eames, 2003; Littleddyke, et al., 2009).

EFS was steadily growing in the literature of EE in the 1990s. However, Tilbury (1995), commented that although literature has dealt with education for 'sustainability', it failed to outline the essence of the new focus and avoided questions about how it differed from previous environmental education approaches. It must be considered that this comment was made by Tilbury some time ago and there is certainly more literature available now presenting explanations regarding EFS. The question is whether teachers are accessing it or not.

Others believe that EE and EFS aim to achieve the same goals. The Parliamentary Commissioner for the Environment (2004) suggests that EFS could be looked at as a more relevant and contemporary form of EE and that EE is still important. They claim that "Both Environmental Education and Education for Sustainability aim to enable learners to question unsustainable practices. They also aim to empower people to make changes, in their own lives and in the institutions around them" (Parliamentary Commissioner for the Environment, 2004, p. 39).

Scepticism regarding the shift to sustainability exists, and apprehension has been expressed by some. It is argued, that the shift is causing social, political and economic issues and perspectives to be favoured over environmental ones.

McKeown and Hopkins (2007) are concerned that the underlying concept of EE which sees humans as part of nature may be lost, as the focus of EFS is centred far more on humans. Jickling and Wals (2007) claim that the shift from EE to Education for Sustainable Development (ESD, another term used), is problematic. They believe that EE is being increasingly altered by globalising forces that have witnessed the push from EE to ESD. Jickling and Wals (2007) argue that power is slipping away from citizens, to ‘corporate elites’ like The World Bank, who view education simply as a means of strengthening and nourishing the economy. According to Jickling and Wals (2007), ESD favours transmissive approaches to teaching, which change students’ behaviours in pre-determined directions, leaving less space for self reflection and autonomous thinking.

Jickling and Wals (2007) are not alone. Other writers mention similar insights as they discuss ideas around behaviour change and the economy driving the world (Sipos, Battisti & Grimm 2008). Heimlich and Ardoin (2008) argue that “education is at odds with sustainability when modern economies function to damage and destroy the ecological systems that support human and non-human communities” (p. 120). Hart (2003) has also mentioned that the shift seems to attest to the politics of the field rather than the practice.

It is clear that some are not so welcoming of the shift from EE to EFS, and confusion exists. However, it seems that the majority of writers are in support of this improved approach to EE, and although the terminology continues to cause confusion, concepts of EE remain highly valuable, and continue to be used in EFS.

2.1.3 The Meaning of 'Environment'

It is not surprising that there is confusion with the shift from EE to EFS, as confusion exists regarding the meaning of 'environment' itself (Hargreaves, 1996). It seems that in spite of all that has been written in recent years, widespread confusion about what 'environment' means, prevails. To countless people, both government and public, 'environment' continues to be essentially 'green'. Smyth (2006) believes that it is therefore constantly necessary to remind people that our 'environment' is the totality of what we live in, natural or constructed, spatial, social and temporal. It is an extension of ourselves. Its health requiring the same care as our own health. And because we share it with other people its care is a shared responsibility. Definitions of 'environment' concur that the 'environment' is what surrounds us, tangibly and intangibly (Hargreaves, 1996; Ministry of Education, 1999; Palmer, 1998).

2.2 Education for Sustainability in New Zealand Schools

EFS within New Zealand schools has been influenced and shaped by international conferences, publications and ongoing public and political pressure, and has grown and evolved over a significant period, to achieve the recognition it currently holds. Although events and development concerning EFS in New Zealand schools occurred in the 1970s and 1980s, some of the most notable developments and milestones were achieved since the 1990s.

Learning to Care for our Environment was a discussion document published in 1998 by the Ministry for the Environment in association with the Ministry of Education. It "intended to contribute to the development of a national strategy for Environmental Education" (Ministry for the Environment, 1998, p.3) In this

document education was seen as the key to helping people play their part in sustaining the environment's future, and EFS was described as a lifelong commitment and priority for all people, not just school students (Treeby, 2001).

In 1999 the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999) were released to respond to the commitment made by the government in *Learning to Care for our Environment* (1998). Although the guidelines were not an official part of the curriculum statements, and EFS continued to hold no mandatory status, they provided a framework showing how the aims of EFS could be achieved through the seven learning areas in *The New Zealand Curriculum Framework* (Ministry of Education 1993). The guidelines identified the environment as an important area of learning (Ministry of Education, 1993). Law and Baker (1997) who produced the guidelines, expressed that "legitimising Environmental Education would give those who wanted to see it in their programme something to justify their claim" The guidelines dismissed EFS as a subject on its own, suggesting that it is a multidisciplinary theme within all areas of the existing curriculum (Treeby, 2001).

The requirements of Guidelines for Environmental Education in New Zealand Schools do not add to curriculum requirements of schools. Instead, they will assist teachers to identify opportunities within existing national curriculum statements to plan and provide education about, for and within the environment. The extent to which environmental education is incorporated within the curriculum will continue to be determined by the board or trustees of each school (Ministry of Education, 1999, p. 5).

The five objectives identified in the *Tbilisi Declaration* were framed as the five main aims of EFS in the *Guidelines for Environmental Education in New Zealand Schools* (1999):

1. *Awareness and sensitivity to the environment and related issues;*
2. *Knowledge and understanding of the environment and the impact of people on it;*
3. *Attitudes and values that reflect feelings of concern for the environment;*
4. *Skills to identify and help resolve environmental challenges;*
5. *Participation and action in activities that lead to the resolution of the environmental challenges* (Ministry of Education, 1999, p. 9).

Although the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999) were distributed to New Zealand schools, they did not appear to have been widely used. In fact, during the research process for the development to the *Sea Change* report, it was found that many teachers were unaware of the document's existence (Parliamentary Commissioner for the Environment, 2004). In support of this, the findings of Mclean's (2003) qualitative study, which investigated the state of EFS in Otago primary schools, found that less than seven percent of teachers had read the guidelines and almost 20 percent were unaware that they existed.

In 2001 Hamilton City Council launched a successful initiative titled EnviroSchools. EnviroSchools has been operating for almost 10 years now, and has become increasingly popular throughout New Zealand, growing to embody a quarter of New Zealand schools. In 2009, there were 79 EnviroSchools in the Bay

of Plenty (38% of schools in the region) (Enviroschools, 2009). Enviroschools is a collaborative network made up of people from a range of organisations, which seek to engage students in creating healthy, peaceful and sustainable schools and communities. The Enviroschools encourages students to work on projects that involve decision making, planning, budgeting, implementation and monitoring (Enviroschools scrapbook, 2009).

Some EFS programmes including Enviroschools, have received support from non-governmental organisations, local government and the central government (Taylor et al., 2009). Literature emphasises the need for action and support in EFS from all sectors and arenas including: local and central government, primary and secondary schools, tertiary education, community organisations and businesses etc. This outside support appears to be fundamental to the effective development of EFS in primary schools (Heimlich 2002; Littleddyke et al., 2009; Ministry for the Environment, 1996).

2.2.1 EFS in the New Zealand Curriculum

The New Zealand Curriculum (Ministry of Education, 2007), like the past curriculum, once again stopped short of mandating EFS. However, the curriculum offers potential for EFS to be effectively implemented in teaching and learning (Taylor et al., 2009). EFS is emphasised in *The New Zealand Curriculum* in a number of ways. ‘Sustainability’ is a theme interwoven throughout different areas of the document and is acknowledged in the Vision, Values, Principles and Achievement Objectives.

The curriculum points to future focused issues and one of these is ‘sustainability’. “The curriculum encourages students to look to the future by exploring such significant future –focused issues such as sustainability, citizenship, enterprise and globalisation” (Ministry of Education, 2007, p. 9). The document’s Vision places an emphasis on EFS stating that “our vision is for young people who will seize the opportunities offered by new knowledge and technologies to secure a sustainable social, cultural, economic, and environmental future for our country” (p. 8). The level of inclusion of EFS appears to be an obvious improvement on previous curriculum documents, and although it still holds no mandatory status, it has given teachers good opportunities to get involved in EFS.

The complexity of EFS appears to have not only presented challenges in its interpretation, but also in the way it has been implemented. The way in which EFS should be put into practice in schools, has been the subject of much debate (Hargreaves, 1996). There have been arguments against establishing EFS as a separate subject, as it has been commonly accepted within New Zealand and overseas, that EFS is not a subject, a body of knowledge or skills like other curriculum disciplines (McKenzie, 2006; Tilbury, 1995). It should be an orientation or emphasis permeating the whole curriculum, creating opportunities for collaborations among different subjects and disciplines by a central theme, issue, problem, topic or experience (UNESCO, 1978).

However, counter to this rather long established, commonly accepted idea of EFS being cross curricular, in the 1990s EFS was still often taught as a separate discipline (Gough, 1997). This is supported by the more recent research of Bolstad, Cowie and Eames (2004), who, in 2002 and 2003 conducted a national

study which investigated the nature and current practice of EFS in New Zealand schools. Their study involved a sample of over 200 schools, with a more in-depth case study within eight schools. The report of their study indicated that EFS was still not being effectively integrated across the curriculum, as very few respondents described learning activities that had a clear cross-curricular focus (Eames & Cowie, 2004).

2.2.2 The State of EFS: A New Zealand Study

A recent study commissioned by World Wide Fund for Nature (WWF) that examined the level of EFS in New Zealand Schools, has provided the field of EFS with valuable information. Bolstad, Eames and Robertson (2008) conducted this study in 2006 and later wrote a detailed report: *The State of Environmental Education in New Zealand: A baseline assessment of provision in the formal sector in 2006*. The methods of data collection included interviews, questionnaires, and document analysis. A series of eight indicators that fell into four categories were identified and provided information about EFS in New Zealand schools. These four categories were teacher education, school operation, research and evaluation, and advocacy.

The findings from Bolstad et al., (2008) suggested that although professional development opportunities in EFS existed, and some schools were taking these up, more of this engagement needed to be encouraged. The study also found that some EFS pre-service teacher education was available, but highlighted that efforts to ensure that every new teacher receives EFS training needed to be made. The writers acknowledged the status of EFS improving in the new curriculum, but drew attention to the fact that the non-mandatory status EFS held, meant that it

continued to rely on the interests of schools. The research showed that whole school approaches were on the rise and should be further supported. Their findings suggested that Education Review Office reports seem to under-report EFS in schools. It was also found that schools were interacting with their communities in EFS, and these interactions needed more encouragement. Finally, the writers acknowledged that EFS research was increasing, but argued the need for more research-active practitioners, better dissemination of research findings, and more advocacy and action to recognise the United Nations' Decade of Education for Sustainable Development 2005-2014.

The study of Bolstad et al., (2008) seems to have covered a wide scope of areas that are vital contributing factors to the implementation of EFS. Unlike some past New Zealand studies, which often appear to focus mostly on EFS practice (Bolstad et al., 2004; McKenzie, 2006; McLean 2003), a strength of this study was that it did not, and instead provided baseline information on EFS. The data obtained from this study could prove useful in times ahead, as future comparisons could be made by repeating similar research in years to come, to measure and investigate the development of EFS in New Zealand over time.

2.2.3 Students and EFS: Past Research

According to writers in the field, it is common knowledge that students are key stakeholders in EFS (Hart, 2003; Ministry of Education, 1999; Mtaita, 2007; UNESCO, 1975). As present and future citizens, students are affected by environmental decision-making and therefore, have a right to be involved in it (Hacking, Barratt & Scott, 2007). International research on EFS and students, is growing internationally. However, Loughland, Reid, Walker and Petcoz (2003)

argue that past studies examining students' ideas about EFS topics have often been ineffective to a degree, as students have often been too passive in the research process. The writers believe that relatively little is known about the true environmental understandings held by children. Loughland et al., (2003) suggest that more effective EFS programs could be developed if children's environmental understandings and beliefs were known and treated in a non-dualist manner. Perhaps more attention needs to be paid to children, and their views, beliefs, understandings and learning developments in EFS, based on students' understandings of environment rather than on assumptions of what children know and believe.

An analysis of EFS studies published between 1993 and 1999 that focused on students, (both primary and secondary) found evidence to suggest that past research on students has provided more information about students' environmental knowledge and attitudes, and less about their educational experiences and preferences. The review also suggested that research on students and learning, is considerable in size, but, is less diverse in terms of methodological and theoretical approaches than other areas of EFS research within which it is situated (Rickinson, 2001).

It seems that past New Zealand research on EFS seems to have had more focus on teachers' views and perceptions (Brown, 2003; Hargreaves, 1996; Iles, 2004), fewer studies have included the direct voice, understandings and beliefs of students (Leith, 1996). More focus on current research involving students and EFS will surely result in valuable information that can contribute to the development of EFS in New Zealand.

2.2.4 Values in EFS

There appear to be many views on values education in general, and the place that values should have in EFS. The politics of values education has always raised conflict (Hart, 2003). However, values are inevitably embedded in education today. This is shown in *The New Zealand Curriculum* as it instructs that values should be encouraged, modelled, and explored, suggesting that values education is needed (Ministry of Education, 2007).

When one considers values in EFS, they are often invariably understood as ‘green’ values; values that directly support action aimed at environmental care. However, although ‘green’ values should be explored and encouraged, literature suggests that these are not the only types of values systems important in EFS. Values relating to social, political and economic issues are also encompassed in EFS values education (Guerrier, Aleander, Chase & O’Brien, 1995; Hart, 2003; Tilbury, 1995).

Oulton and Scott (1998) assert that:

No matter how much our thinking about environmental education has changed over the years, and irrespective of whatever ideological perspectives have held sway, the notion that the consideration of values should have a central part in the process of such an education has been an enduring theme (p. 209).

EFS aligns well with the teaching of values encouraged by the New Zealand Curriculum (Ministry of Education, 2007), as it places a strong emphasis on

dealing with peoples' values. However, although it appears that most agree that values education have an important place in EFS, many have highlighted the difficulty and issues that the teaching of values can raise. EFS's approach of fronting up to values is seen as problematic to some, who believe that education should be value-free. These people often believe that values education is linked to indoctrination (Parliamentary Commissioner for the Environment, 2004). For example, Cotton (2006) warns teachers to be cautious around the teaching of values, and suggests that although it is commonly stated that no learning is value-free, believes that teachers need to be aware of the ways in which their own values and attitudes are embedded in, and transmitted through their teaching practices. Bakshi and Naveh (1978) also highlighted the political complexity of values in EFS and related it to the teaching of health, peace or sex education; fields of education that have to do with strong emotions on the side of the learners, as well as the teachers.

Despite some issues that are raised when values education is considered, literature generally concurs that 'good' EFS involves presenting students with opportunities to reflect on their own values and the values of others. It requires students to understand the consequences of their value positions, explore alternative values, and justify their particular view points. Hart (2003) claims that when EFS teachers create effective learning environments, desirable EFS values grow without being directly taught. Others would argue differently, and suggest that values should be explicitly taught. Tilbury (1995) believes that teachers should not hold a neutral stance in EFS, and need to actively promote the values which are required for sustainable development.

Overall, most writers would agree that education is not a neutral process. Young people do not make moral decisions in isolation, and action, both individual and collective is formed by values (Guerrier, et al., 1995; Hart, 2003). So, despite some fair argument opposing the teaching of values, the aims of EFS may not be achieved without challenging and exploring our own, and others' beliefs and values systems.

2.2.5 The Three Dimensions of EFS

The three dimensions *In*, *About*, and *For* the environment first appeared in 1958, and continue to form an important part of EFS. In New Zealand and other countries the dimensions have been used to define EFS, and they remain to hold their place in the shift from EE to EFS (Barker & Rogers, 2004; McLean; 2003; Tilbury, 1995).

The Guidelines for Environmental Education in New Zealand Schools (Ministry of Education, 1999) outline the three dimensions of EFS, and claim that a balanced EFS programme addresses all three dimensions. Education *In* the environment involves experiences beyond the classroom, in both natural and built environments. This gives students opportunities to gain first-hand experiences in the environment, and also enhances classroom-based learning. The main concept in education *About* the environment, is helping students to know and understand natural and built environments, while appreciating the key social, political, ecological and economic factors that influence environmental issues. And finally, education *For* the environment “is intrinsically linked to the “affective” aspects of Environmental Education as it deals with people’s emotions and their willingness

to make lifestyle choices that help maintain and improve the quality of the environment” (Ministry of Education, 1999, p. 14).

Although the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999) claim that EFS involves a balanced integration of the three dimensions, literature appears to suggest that education *For* the environment is almost universally considered to be the fundamental element in EFS (Barker & Rogers, 2004; McLean, 2003).

2.2.6 Education *For* the Environment: A New Zealand Study

It appears that Education *For* the environment has caused much confusion, and there are many misunderstandings regarding what the dimension entails (Barker & Rogers, 2004; Bolstad, 2003; McLean, 2003). McLean (2003) claims that effective teaching of education *For* the environment results in improved environment and changed behaviours, attitudes and values. In her research, McLean (2003) investigated how, and to what extent, EFS was implemented by teachers in Otago primary schools. Her study had a particular emphasis on education *For* the environment. Mclean used surveys and case studies, and her research was largely qualitative.

McLean’s study found many misconceptions among teachers, in particular, regarding education *For* the environment, which she believed was the most important of the three dimensions. All schools were implementing education *About* the environment, and 98% were implementing education *In* the environment. However, few were providing education *For* the environment in their programmes. Most of the examples given by teachers as being education *For*

the environment, were actually examples of education *In* the environment, as students were not involved in the decision making process, and the activities did not work towards the resolution of environmental issues. McLean made the recommendation that teacher education in EFS for all primary school teachers is needed.

McLean did however, find some effective examples of education *For* the environment, and the following scenario is an example observed in her study:

Scenario: The class have been discussing wai, the Maori word for water. The teacher describes waimate, dead water. A student said that her local stream was dying. This 11-year old student remembers playing in the stream, catching crayfish and other creatures five years earlier. The teacher sees this as a learning opportunity. Students visit the “dying” stream, write a report, and liaise with the local iwi and council to conduct water monitoring. Subsequently the stream is fenced off from farm animals and the students help to plant the riparian strip.

Figure 1: Scenario of Education *For* the Environment (McLean, 2003).

As mentioned earlier, McLean also found that fewer than seven percent of the teachers in her study had read the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999), and almost 20 percent were unaware that they existed. Considering this, it is no surprise that education *For* the environment was seldom prevalent.

McLeans’s study has provided a good picture of the general state of EFS in Otago primary schools, as the response rate out of 150 schools was over 50%, meaning that at least 75 schools in one part of New Zealand contributed to the results of this study. The findings derived from her further case studies into three Otago

schools, provided fruitful rich data. However it must be considered that this included only three of the many schools in the study.

McLean talks about the idea that ‘sustainability’ is related to education *For* the environment, and this term is very prevalent and woven throughout the most recent curriculum; *The New Zealand Curriculum* (Ministry of Education, 2007). Hence, although Mclean’s study is quite recent, it was conducted prior to the release of *The New Zealand Curriculum* (Ministry of Education, 2007), so it would be interesting to see how the release of the new curriculum may have affected the results. McLean describes education *For* the environment and its relation to “sustainability”:

In recent times, education “for” the environment has been equated to “education for sustainability”, “education for sustainable development”, “sustainable education”, and “education for a sustainable future” In effect, the use of the terms “sustainable” or “sustainability” distinguishes this type of education from the broader concept of “environmental education”, which often emphasises education “about” and “in” the environment (McLean, 2003, p. 201).

McLean’s findings make a significant contribution to EFS in New Zealand and internationally, as it is commonly agreed that education *For* the environment is an integral part of an effective EFS programme (Barker & Rogers, 2004; Bolstad, 2003; Ministry of Education, 1999; Tilbury, 1995). Her study has found that this important dimension in EFS; education *For* the environment, is missing in many Otago primary schools.

2.2.7 Action Competence as an approach to EFS

The Action Competence approach was developed by Jensen and Schnack (1997) and allows students to act according to their own values and experiences. Action Competence seems to align well with EFS as it is very strong on democracy and is not about collecting batteries, sorting waste and conserving energy, which could be seen as traditional environmental activities. It is a more holistic approach which allows students to determine things for themselves, and is an alternative to some traditional forms of EFS. The Action Competence idea arose around the mid 1990s and “one of the overall objectives of environmental education is to build up students’ abilities to act - their action competence - with reference to environmental concerns” (Jensen & Schnack, 1997, p.163).

According to Jensen and Schnack (1997), Action Competence is not behaviour modification. It is based on the idea that *action* is intentional and that it is not forced. Jensen and Schnack (1997) emphasise a clear difference between *action* and behaviour. With *action* there will always be a conscious making up of one’s mind. This is not often the case with behaviour change, as behaviour change can be influenced and caused by pressure. Jensen and Schnack (1997) suggest that one therefore, cannot presume that students are *acting* if their behaviour changes. Heimlich and Daudi (2002) support these ideas by stating: “nor does changing behaviour necessarily alter attitudes or knowledge” (p. 111).

A strong idea in Action Competence is *action* versus activity, and the difference between the two. Activities can consist of things like investigations of polluted water or field trips into the environment. However, the approach suggests that

although these experiences are valuable, they are not *action* as they do not address solutions to environmental issues, and focus on symptoms rather than their causes. This part of Action Competence links with education *For* the environment which also aims to address and explore causes and issues rather than symptoms.

Although independent, Action Competence is the ultimate goal, behaviour change in EFS that makes a positive change, even if it was perhaps influenced in some way, should surely still be viewed as a valuable achievement. Perhaps Action Competence is not a realistic goal to be setting in some New Zealand schools at this stage. This is because research has shown that EFS is still an area that needs a lot of development within schools, beginning with basic concepts and foundations. Therefore, without effective professional development on Action Competence, it would seem that the concept will remain to be unheard of by many New Zealand teachers. Despite this, Arthur's (2011) study which involved a senior secondary school Environmental Science class, found evidence to suggest that the Action Competence approach may work effectively in New Zealand secondary schools. Arthur's (2011) study was concurrent with the present study.

2.2.8 Teachers' Misconceptions and Misunderstandings of EFS

Literature and past research suggests that teachers' poor understanding of EFS is perhaps one of the underlying barriers to the success of EFS (Chapman & Eames, 2007; Littledyke et al., 2009). A good general understanding of the essence of EFS and what it entails, appears to be lacking. As although there are enthusiastic teachers in New Zealand schools implementing EFS, the focus in many cases, still appears to be based on nature studies, and recent research has highlighted this (Chapman & Eames, 2007; Smyth, 2006). Unfortunately, learning practice that

represents sustainability as a whole, encompassing social, economic and political issues appears to be much less evident (Chapman & Eames, 2007). As mentioned earlier, ‘sustainability’ seems to be a term that has raised confusion. Chapman and Eames state that:

In one sense sustainability is a simple idea with which we can almost all agree – the notion of sustaining the future of the Earth and for all who live upon it. However, in today’s world, the consideration of environmental, social, cultural, political and economic perspectives within it renders the concept dauntingly complex. Perhaps because of this complexity, sustainability is increasingly being used in common parlance in ways that seem to focus on only one or two of these perspectives, rather than an interplay between them all (Chapman & Eames, 2007, p .4).

2.2.9 Teachers’ Perceptions of EFS: A New Zealand Study

In 1996 Hargreaves undertook research to explore teachers’ perceptions of EFS, and to identify the structures which schools had in place to address EFS. Participants included a co-ordinator and four teachers from each of four urban schools (two primary and two secondary, in Hamilton). The research was qualitative and involved questionnaires, interviews and a concept mapping exercise. Because of the small sample size, Hargreave’s (1996) results cannot be generalised to the wider population, but have still, however, made a valuable contribution to the field of EFS.

Hargreave’s (1996) study highlighted teachers’ uncertainty with the meaning of EFS. She found that very few teachers had a clear definition of EFS. When asked

about the term EFS, 16/16 teachers predominantly mentioned the natural physical environment, and only four teachers mentioned other types of environment including cultural social, political and economic. Although all of the participating schools were already committed to EFS in various ways, two teachers had never even heard of the term 'Environmental Education'. Five teachers used alternative titles such as 'Conservation' and 'Environmental Science'. The general struggle in defining EFS was expressed by four teachers, who acknowledged that they were either uncertain about the correct meaning, or that theirs' was a personal interpretation. These results are a concern especially because these teachers were nominated as having a special interest in EFS (Barker, 1997). Hargreaves also found that there was a mismatch between the teachers' current classroom practice and their desired aims of EFS.

Hargreave's (1996) recommendations highlighted the need for the development of EFS guidelines, which were later produced in 1999 (Ministry of Education, 1999). However, this study took place prior to the release of the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999) and *The New Zealand Curriculum* (Ministry of Education, 2007), which may have yielded much different results if repeated today. However, the research of McLean (2003), which was conducted after the release of the much needed *Guidelines for Environmental Education in New Zealand Schools*, showed that the guidelines had not had much effect since the study of Hargreaves in 1996, as teachers were still often unaware of their existence. Producing guidelines was a step in the right direction, but it seems that the guidelines have in the past, and possibly to this day, not been used to their potential.

The need for teacher education and training was another recommendation made by Hargreaves (1996), which is a concern and is still very valid today, despite the years that have elapsed (McKenzie, 2006; McLean, 2003). Interestingly, the same recommendation was made by Scott (1983) close to 30 years ago. More positively, Hargreave's (1996) study found that most teachers had a personal interest and enthusiasm for EFS, and the value of igniting and fostering a voluntary passion and enthusiasm for the environment and EFS has been well documented in past and present EFS research and literature (Eames, Cowie & Bolstad, 2008; Hart, 2003; Ministry of Education, 1999).

2.3 Teachers Knowledge in Education for Sustainability

A common thread throughout literature highlights the need for EFS teachers to have a sound understanding of the ecological concepts that they are teaching, in order to implement EFS effectively (Taylor et al., 2009; Zak & Munson, 2008). Findings from studies in other countries have indicated that environmental knowledge amongst teachers is often limited, particularly in the primary sector. (Spiropoulou, Antonakaki, Kontaxaki & Bouras, 2007; Taylor, Doff, Jenkins & Kennelly, 2007).

Summers, Kruger, Childs and Mant (2000) argue that sound subject knowledge is an essential prerequisite in providing students with quality EFS programmes. In their qualitative study, Summers et al., (2000) interviewed 12 primary school teachers in England (eight who had strong science backgrounds), to explore in depth, the teachers' understandings of seven environmental issues. The environmental issues focused on included: biodiversity, the carbon cycle, global warming, ozone, energy sources, life-cycle analysis (of a manufactured product),

and sustainability. Although the carbon cycle is not an environmental issue, it was included because a good understanding of it is a necessary prerequisite for a scientific understanding of many environmental issues.

Their study found that although teachers had substantial understanding and knowledge of some aspects of the science underpinning the environmental topics investigated, uncertainty, misconceptions, and a lack of knowledge underlying other key scientific ideas were prevalent.

The findings of Summers et al., (2000) can assist in informing programmes of professional development for EFS teachers. However unlike their study, EFS teachers in New Zealand more often than not, do not have strong science backgrounds. Therefore, the fact that their study found subject knowledge gaps and misconceptions amongst teachers trained in relevant disciplines, certainly highlights the need to provide professional development on subject knowledge for EFS teachers in New Zealand schools.

Although the need for sound levels of conceptual knowledge amongst EFS teachers appears to be well supported by literature, some academics tend to place less importance on teachers' scientific subject knowledge regarding EFS. For example, Hart (2003) claims that effective EFS requires:

rethinking of both educational aims and values, the role of teachers as researchers, and teachers' ability to not only have subject expertise but to know how to use it in the process of issue investigation (p. 41).

Hart (2003) seems to place more value on teachers' ability to engage in active research, reflecting critically on their work and on the work of their students. Hart (2003) raises the point, that even most scientists would not claim to know the breadth and depth of scientific knowledge sufficient to discuss environmental issues in detail, and believes that whether teachers do or do not have the background knowledge in EFS is not highly important (Hart, 2003). Treeby (2002) also claims that there can be strong emotional support in EFS without an in-depth understanding of EFS.

2.4 Teacher Education in Education for Sustainability

Literature suggests that teachers' lack of knowledge of EFS is one of the significant underlying factors affecting the quality of EFS being practiced (Cutter-Mackenzie & Smith, 2003; Morgado, 2004; Parliamentary Commissioner for the Environment, 2004; Summers et al., 2000; Taylor et al., 2009). According to Treeby (2002) the general New Zealand public also lack knowledge and understanding of sustainability issues. This poor knowledge highlights the need to have teachers that are well equipped for the teaching of EFS, and this can perhaps only be achieved through formal training and/or continuous professional development in EFS.

2.4.1 Formal Training in EFS

Teacher education is necessary in improving the quality and long-term success of EFS (Hargreaves, 1996; Bolstad et al., 2008; Mckenzie, 2006; Mclean, 2003). Many in-service teachers have completed their studies with little or no formal training or background in EFS, possibly making it difficult for them to be confident and competent facilitators. The *Critical Stock Take* revealed that only

six percent of teachers implementing EFS had received any relevant pre-service training (Parliamentary Commissioner for the Environment, 2004). Although there is some form of EFS education being offered in New Zealand Universities, in most cases it is fairly limited in scope or in numbers of students accessing it. The University of Waikato is the only institution that makes an EFS paper compulsory for all teacher education students (Bolstad et al., 2008).

2.4.2 Professional Development in EFS

A common thread throughout the literature suggests the need to provide teachers with quality professional development in EFS (Bolstad, et al., 2008; McLean, 2003; Morgado, 2004; Parliamentary Commissioner for the Environment, 2004; Treeby, 2002).

In 2006, Bolstad et al., (2008) found that approximately one third of New Zealand schools reported having no form of EFS professional development for their staff. This is a concern, as research findings in the field of EFS continue to highlight the importance of professional development. One of Bolstad's et al., recommendations included the need to provide teachers with professional development in various EFS knowledge areas in order to spread the focus wider than the predominant focus on waste.

2.5 Barriers to the implementation of Education for Sustainability

Literature on EFS has frequently given reference to barriers that are affecting its implementation within schools and classrooms. It appears that one of the underlying barriers which continues to affect the degree to which EFS is implemented, is its non-mandatory status, meaning that the structure of EFS

within each school and classroom varies, according to the importance given to it as a learning area by teachers and school leaders.

Milne (1994) outlined barriers inhibiting the implementation of EFS. These included: tightly structured disciplines, traditional teacher-transmitting knowledge pedagogies, tightly structured days, assessment demands, and lack of curriculum materials. Many of these barriers found in 1994 are consistent with the barriers that remain today. Some writers (e.g., Cowie & Eames, 2004; Eames et al., 2008; The Parliamentary Commissioner for the Environment, 2004) all discuss challenges and issues in teaching EFS that arose in their studies. Challenges included: provision of teaching and learning resources, professional development, time for planning and action, funding for equipment and projects, external support, in-school leadership and support, whole-school involvement, and the non-mandatory status of EFS.

According to Archie, Simmons, Heimlich and Daudi (2002), in America the implementation of EFS is affected by the accountability held against teachers to ensure students meet standards and benchmarks in set time frames. This has meant that EFS is often seen as an 'add-on'. In addition, Andrews, Tressler and Mintzes (2008) claim that EFS assessment may also present challenges for teachers, as there appears to be little consensus about how to best assess environmental concepts. Sund and Wickman (2008) believe that an underlying barrier to EFS is what teachers perceive as being 'good' education, and what curriculum areas teachers perceive as having the most 'educational value', and this is often not EFS.

Time limitations are a frequently appearing factor. For example, Ham and Sewing (1988) explored and identified barriers to EFS over 20 years ago, finding that time was the teachers' most commonly perceived barrier. Time factors were also prevalent in the perceived barriers held by teachers in more recent studies of other researchers (e.g., Brown, 2003; Heimlich, Braus, Olivolo, Mckeown-Ice & Barringer-Smith, 2004; Mckenzie, 2006; Summers, Corney and Childs, 2003).

2.6 Summary and Rationale

The literature reviewed suggests that EFS is a complex and evolving field. The review has shown that there are challenges and gaps in its interpretation and in the way it is being approached and practised. However, there *are* examples of successful EFS appearing in literature (Arthur, 2011; Bolstad et al., 2008; McKenzie, 2006; Volk, 2003). While there is now a considerable amount of research taking place in the field of EFS, compared to other areas of the curriculum, it could be said that EFS is still in its infancy years of research. Therefore the need for further research has been identified (Bolstad et al., 2008; McLean, 2003; Rickinson, 2006).

Although the status of EFS remains non-mandatory, it is woven throughout the most recent *New Zealand Curriculum* (Ministry of Education, 2007). Much past research on EFS was conducted prior to the release of this new curriculum document. Therefore this study can contribute to the field by providing an example of how EFS learning and teaching has or has not been affected by *The New Zealand Curriculum 2007*.

Lack of teacher professional development and training in EFS is an underlying issue affecting the way EFS is being implemented. Therefore, it is hoped that the findings of this study will contribute useful information regarding the content of professional development that may be needed for some teachers in Bay of Plenty classrooms.

It seems that New Zealand EFS research in general appears to have been more focused on teachers of EFS and perhaps less on students. However, two new studies (Arthur, 2011; Wake, 2010) that were carried out at the same time as the present study have made contributions in providing information on EFS students, particularly Wake's (2010) study which investigated learning outcomes in primary students, as a result of their involvement in an EFS project at their primary school. When the research proposal for the present study was submitted however, these studies had not yet been conducted and were also in initial stages. Therefore, this study which sought to include students' voice as well as teachers', on general EFS perceptions and experiences, still makes a valuable contribution to the field of EFS.

This study is also of value as it is broad in scope. Some other recent studies in the field have focused more on a specific area of EFS (e.g., Arthur, 2011; Mckenzie, 2006). This study, intended to provide broad and general information, with less predetermined aims. This research will provide an up to date insight into teachers' and students' understandings, perceptions and experiences of EFS, and could assist in future efforts in many areas of EFS development in New Zealand.

This study sought to add to current and past research in EFS by providing a lens into the present perceptions and experiences of teachers and students in five Bay of Plenty schools. It aimed to provide detailed information about teachers' and students' current understandings and experiences of EFS.

The next chapter presents the methodology for this study.

Chapter 3

Methodology

Overview of the Chapter

This chapter outlines the methodological basis of this research. Firstly, the theoretical framework is touched on, which situates this study within an interpretative paradigm using a qualitative approach. Following the focus of the study and an outline of the research questions, a section providing literature to support the research methods used in this research is provided. Next, quality of research is discussed, followed by a description of the participants. The research procedure for each method is discussed, and finally, ethical issues are considered.

3.1 Theoretical Framework

A paradigm is a lens through which we view the world, a set of basic beliefs, accepted on faith, that present a basis for the total research process (Schnelker, 2006). Each paradigm has consistent views about ontology (nature and form of reality), epistemology (nature of knowledge) and methodology (procedures used to investigate, and the rationales behind the procedures). Today, there are three prominent paradigms in educational research. These are, scientific and positivist methodologies, naturalistic and interpretive methodologies and methodologies from critical theory (Cohen, Manion, & Morrison, 2000). The first two

methodologies will be described, but due to the scope of this thesis, critical theory will not be touched on in any detail.

Educational research has generally been dominated by traditional objective scientific models. The scientific, positivist paradigm is primarily concerned with investigating what is happening in a particular context by controlling the variables. Cohen et al., (2000) propose, that in a positivist paradigm there is a consistent belief that all genuine knowledge is based on experience and can only be advanced by the way of observation and experiment. The positivist paradigm is generally concerned with quantitative research. Quantitative research generally asks specific, narrow questions; collects quantifiable data; analyses these numbers using statistics and carries out the study in an unbiased, objective manner. Quantitative purists argue that the observer/researcher is separate from the research (Creswell, 2008).

From the 1960s and onwards, there has been a strong shift in educational research towards more qualitative, naturalistic and subjective models (Burns, 2000). Rather than replacing early paradigms with newer paradigms, the repertoire of possibilities for carrying out research, have broadened (Schnelker, 2006). Similarly, in earlier times, the positivist paradigm tended to govern and overshadow research in EFS (Palmer, 1998). However, it has recently been recognised that the positivist approach is not entirely effective in examining the complex nature of EFS (Mtaita, 2007). However, although there has been a realisation in the value of interpretive methodologies, we are warned that despite the criticisms levelled at positivist and quantitative traditions, we must

acknowledge the valuable contributions that have been made to the field so far, from these traditional approaches. (Palmer, 1998; Scott, 2009).

Some believe that the field of EFS will advance through a more diversified approach to research. For example, Walker (2006) argues that researchers must not dismiss the knowledge that has built up in the field of EFS over the years, but urges for researchers to be open to new and unfamiliar ways of doing research. Walker (2006) and Scott (2001) highlight the value of using a broad spectrum of research approaches and theoretical underpinnings.

3.1.1 Interpretative Paradigms

An interpretive paradigm is concerned with learning more about individual phenomena. It differs from a positivist model as it generally shifts from quantitative to qualitative research, but a mix of both quantitative and qualitative methodologies are often used (Cohen et al., 2000). The central endeavour in the interpretive paradigm is to understand the subjective world of human experience. To retain the integrity of the research, efforts are made to understand from within the person (Cohen et al., 2000), and the focus is on constructed worlds/realities as opposed to found worlds (Lather, 1992). Interpretative research typically occurs in natural rather than contrived settings, with both the participants and researcher contributing to the construction of meaning, with the perspectives of the participants' at the heart of meaning (Burns, 2000).

Qualitative research relies on the world views of participants; asks broad questions; collects data consisting largely of words, and describes and analyses these words for themes. Qualitative research is subjective and often biased, but efforts are made by researchers to seek, understand and acknowledge how bias may have encroached on their research process (Creswell, 2008). In qualitative research the idea that knowledge is hard, objective and tangible is left behind and replaced with the notion that knowledge is personal and subjective (Cohen et al., 2000). Qualitative research has established the belief, that reality should never be taken for granted, and that multiple realities and socially constructed meanings that exist in every social context must be considered (Burns, 2000).

3.2 Focus of the Study

This research was a small-scale investigation which explored the perceptions and experiences of teachers and students participating in EFS in five Bay of Plenty primary schools. The research aimed to gain a better insight into the EFS learning experiences that were currently taking place within the five schools. The questions guiding this research were broad, allowing for a wide range of data to be collected from participants. Semi-structured interviews, observations and questionnaires were used. This approach enabled me to obtain information such as understanding, opinions, points of view, attitudes, values and perceptions of participation in EFS from the participants. Researching, through an interpretive paradigm, allows for a deeper understanding on the part of the investigator about the issues under investigation (Cohen et al., 2000). Interviews allowed for rich and descriptive data to be collected from participants, and observations were used

in order to help make sense of what was occurring in the schools. I had no prior expectations as to what would be discerned in the research.

3.2.1 Research Questions

As noted in Chapter One, the study focussed on two broad research questions.

These were:

What are the understandings and perspectives held by teachers and children participating in EFS?

What types of learning experiences are taking place in EFS classrooms?

3.3 Methods of Data Collection

3.3.1 Observation

Observation is a popular and commonly used research method, as it is a means of finding out what actually happens in situations of interest. It is the process of collecting first hand, open-ended information through observing people and places at a research site. There are various ways to conduct observations. One common technique involves the researcher continuously recording the incidents as they occur with reference to what the research question is. Observations can be recorded in a variety of ways, including videotape recording and transcriptions (Cohen et al., 2000).

Advantages of observation include, the opportunity to record information as it occurs in a setting, to study actual behaviour, and to study individuals who have difficulty verbalising their ideas. Observation requires good listening skills and meticulous attention to visual detail (Creswell, 2008).

Observations can offer rich portraits and in-depth data (McDevitt & Ormrod, 2002). However, they also have their weaknesses. One of the most prominent disadvantages of observation as a research method, is the risk of observers' biases and expectations influencing the data collected. The presence of the observer is an influential disadvantage of observations as it needs to be taken into account that participants may behave differently when an observer is present (Cohen et al., 2000; McDevitt & Ormrod, 2002). Davidson and Tolich (1999) suggest that great care must be taken during observations, as inaccurate observation may lead to inaccurate conclusions.

Although observation as a research method does have potential difficulties and disadvantages, it remains to be a popular form of qualitative data collection (Creswell, 2008).

3.3.2 Interviews

Interviews are another popular research method. Interviews are a research method that can serve a number of purposes. The type of interview selected for an investigation is chosen to fit with the particular project. A variety of research interview formats are used to obtain qualitative data. The main difference is in relation to how structured the interviews are. The qualitative interview is typically

more probing, open-ended and less structured than the interview used in quantitative research (Ary et al., 2002). There are a range of diversely labelled interviews that can be placed on a continuum, from open-ended interviews to survey type interviews, which require responses to fit into predetermined options (Cohen et al., 2000).

Interviews allow us to explore and discover, what is in and on someone else's mind, and to enter another person's perspective, as these are things we cannot directly observe (Patton, 2002). Kvale (1996) states "an interview is literally an inter view, an inter change of views between two persons conversing about a theme of mutual interest" (p.2).

A semi-structured interview, like many other interviews, is a conversation between two people, in which the interviewer is seeking responses from the interviewee for a particular purpose (Gillham, 2000). Questions are worded in an open-ended format, so the researcher can get a more in-depth understanding of the topic or issue from the participant's perspective (Patton, 2002). The researcher often audio tapes the conversation and transcribes the information into words for analysis (Creswell, 2008).

One of the prominent advantages of a semi-structured interview is its flexibility (Ary et al., 2002). Questions can be repeated and their meanings clarified, in case they are not properly understood by the interviewee. The interviewer can also ask for additional information when a response seems incomplete or when an answer

seems irrelevant. Another important advantage is in relation to the response rate. The proportion of the selected sample who agree to be involved is usually very high, often 90 percent or better (Ary et al., 2002). The personal contact involved in an interview, increases the chances that individuals will participate and provide the information required by the researcher.

One of the most significant disadvantages of the semi-structured interview is that face to face interviews can also be highly time consuming, considering not only the time conducting the interview but other aspects such as, developing the interview, setting up and travelling to and from the interview, transcribing the interview data, and finally analysing the data (Gillham, 2000).

Despite its disadvantages, open-ended interviews continue to be a popular method used in qualitative research (Creswell, 2008).

3.3.3 Questionnaires

A questionnaire is a form used in a survey design that participants complete and return to the researcher. Questionnaires continue to be one of the most used techniques for obtaining information from research participants (Creswell, 2008). The research method often involves asking both closed ended and open ended questions. Questionnaires are generally simple to use compared to interviews. They have the ability to reach respondents who live at widely distributed addresses. Additionally, questionnaires may encourage greater honesty, as the researcher's presence does not influence the nature of participants' responses (Cohen et al., 2000). However, these strengths may be compromised by

incomplete or unanswered questions, and participants' misunderstandings of questions (Cohen et al., 2000). Typically, qualitative researchers analyse questionnaire data by looking for overlapping themes in the data and counting the number of themes, and the number of times that participants mention the themes (Creswell, 2008).

3.4 Quality of Research

To maintain quality in educational research all aspects of the process need to be both reliable and valid. Validity and reliability are two fundamental keys to effective research (Cohen et al., 2000). Three approaches were used in the present study: interviews, observations and questionnaires, in order to try to triangulate the evidence.

3.4.1 Validity and Reliability

Validity is generally concerned with whether a particular instrument measures what it sets out to measure (Bell, 1987) In qualitative research validity could be addressed through the honesty, depth, richness and scope of the data achieved, and the extent of triangulation (Cohen et al., 2000). Cohen et al., state that "if a piece of research is invalid it is useless" (p. 105).

Reliability is concerned with research results being consistent and replicable over time, over instruments, and over groups of participants (Cohen et al., 2000). It means that individual scores from an instrument should be nearly the same or stable, on repeated administrations of the instrument. In quantitative research it is reliability is concerned with concurrent results, whereas qualitative research it is

generally about collecting a range of research data to ensure there rich, sufficient information is gathered.

A strength of qualitative research is that the phenomena is not controlled or manipulated, and therefore interpretations of researchers will be unique (Cohen et al., 2000). For example, numerous researchers could experience or observe a particular phenomena, but because of the different bias they each bring to the situation, could walk away with many different interpretations and understandings. Therefore, reliability could be regarded as a fit between what researchers' record as data, and what actually occurs in the setting being researched (Cohen et al., 2000).

Reflexivity, which is when one recognises their own biases and actively seeks them out, is a way of controlling researchers' bias in qualitative studies (Ary, Jacobs & Razavieh, 2002). Researchers are required to 'come clean' about how subjective and intersubjective elements have encroached on the research process, in order to increase the trustworthiness and integrity of their research (Finlay, 2002).

3.4.2 Triangulation

Triangulation is a method of ensuring validity and reliability (Cohen et al., 2000). It is the process of corroborating evidence from different individuals, types of data, or methods of data, in descriptions and themes in qualitative research. The researcher examines each information source, finding evidence to support a theme

(Creswell, 2008). When different procedures or different data sources are in agreement, the information attained is more credible (Ary et al., 2002). However, triangulation can also disconfirm results, as results from different methods may be inconsistent and not in agreement.

3.5 Participants

Five Primary schools (A to E) located in the Bay of Plenty district participated in the study. The intention was to use one teacher from each of the schools who had already demonstrated a level of commitment to EFS.

3.5.1 Recruiting participants

I personally approached Anne and Cathy to participate in the study prior to making any formal contact with their schools, as I knew them well enough to do so. Both Anne and Cathy agreed to take part. The remaining three teachers (Betty, Dora and Elle) were chosen based on the schools that were chosen, given that they then agreed to participate (see table 1).

Schools in the Bay of Plenty area were contacted via phone call, to firstly find out whether their school promoted EFS and secondly which teachers in the schools taught EFS. Schools were chosen based on information that I already had about particular schools in the Bay of Plenty, through personal contacts and experiences in local schools. I had become aware, through practicum placements and word of mouth, of schools in the area that were involved in EFS. There was no particular

reason for choosing any of the schools, other than the fact that they were teaching EFS. The first schools that gave consent were the schools that participated.

Children were asked by their teacher to volunteer to participate in interviews and from these volunteers, five children were then selected by their teacher. Teachers were encouraged to select five children with good communication skills, whose abilities across all measures varied.

Each of the five teachers were European females, each with varying general teaching, and EFS teaching experience. The teaching experience of the 5 teachers ranged from 2-30 years and collectively they represented approximately 54 years of teaching experience. The school rolls and deciles varied considerably (see table 1). The majority of students were Pakeha New Zealanders. Of the 25 students, 19 identified themselves as Pakeha New Zealanders, four as New Zealand Maori, one student was American and one Dutch. There were more females (15), than males (10), in the study, but not for any particular reason. Table 1 presents basic information about the schools, teachers and students. Further information on individual students can be found in the appendices (see appendix B).

Table 1: Information about Teachers, Students and Schools that Participated

SCHOOL	TEACHER PSEUDONM	SEX	YEARS OF GENERAL TEACHING EXPERIENCE	YEARS TEACHING EFS	STUDENT YEAR LEVEL	SCHOOL ROLL	SCHOOL DECILE
School A	Anne	F	10	6	3-4*	255	3
School B	Betty	F	5	5 months	5-6	432	5
School C	Cathy	F	2	2	4-5	86	5
School D	Dora	F	7	7	4	430	8
School E	Elle	F	30	4	4-6*	340	2

*The students in school A and School E were a mixture of students from within Teacher A and E's own classrooms and students in EFS school groups.

3.6 Procedure for Data Collection and Analysis

In order to best answer the research questions a qualitative approach was used, situated within an interpretative paradigm that used interpretive methodologies. The instruments used in the research included interviews, observations and written questionnaires. One classroom within each of the schools was involved in the research. Each of the five teachers participated in one interview and completed short questionnaires, and two of the five teachers (Teacher A and Teacher D) allowed me to observe four 45 minute blocks of EFS learning and teaching in action, which threw light on the interviews. The observations occurred between interviews at a time suitable for teachers and students. Five students from each

classroom participated in an individual interview of approximately 15 minutes long.

3.6.1 Observation

During the four 45 minute observations, teachers and students were to be participating in normal EFS teaching and learning. These observations took place in only two of the participating schools, School A and School D. During the observations, I used continuous narrative recording. There was no planned focus for observations, as I wanted to get as much broad information as possible on a variety of areas. For example, in each observation note of the content, focus and structure of the lesson, the teacher's approach to the implementation of the lesson, the activities in which the children were involved in, interactions between teachers and students, and students and students, and any other relevant or interesting and unplanned-for occurrences, that would provide a good insight of the lesson were recorded. The original notes were used, and were expanded on after observations had occurred, to ensure that as much clear and well described information was collected from each observation.

3.6.2 Interviews

The semi-structured individual interviews were undertaken with five students from each of the five classrooms and were approximately 15 minutes long (see appendix C). Interviews took place in a quiet part of each classroom or in some cases a room that was an extension of the classroom. Although the interviews were based on predetermined questions, conversation veering from the schedule was welcomed.

Teachers participated in one approximately 20 minute semi-structured interview (see appendix C). The interviews were based on predetermined subjects and questions. However, a relaxed conversational style environment that allowed for the addition of other comments and ideas was encouraged.

All interviews were audio recorded and transcribed.

3.6.3 Questionnaire

The teachers completed questionnaires prior to commencing their interviews. The questionnaire consisted of both closed and open questions and asked quite general introductory type questions (see appendix C)

3.6.4 Triangulation and the Value of Multiple Data

Using three methods of data collection, including semi-structured interviews, observations and questionnaires helped to validate findings by offering some degree of triangulation, as themes found in the research were supported by evidence from three data sources.

3.6.5 Analysis

Once the data were collected and the interviews were transcribed, I then developed a general sense of the data, through exploring and re-reading the information collected, as advocated by Creswell (2008). Broad themes were identified in relation to the research questions, using a method which quantified the data by counting frequencies of occurrence of ideas or themes, but, at the same time reserving the study's qualitative nature. When a theme seemed to emerge, I

then searched the other data (interviews, observations and questionnaires) in detail, to try and find information to support, or disconfirm the particular phenomenon, and responses were further analysed.

The interviews offered the most information in answering the research questions. Interview responses therefore provided the main source of data. Data from the questionnaires set the scene for the interviews, and helped teachers to think about the issues ahead in the interviews. The data obtained through observations provided further insight and offered a degree of triangulation to support the themes. The identification of a number of common themes provided the framework of data presentation of the results chapter of this thesis.

To help address the issues of validity, following each interview with students, I briefly went over each question and responses given by them, allowing the students the opportunity to correct, alter, or expand on the information given by them. To address the consistency of the research, the same questions were used for all interviewees, (students and teachers interviews were different), and in the questionnaires. And all participants were given the opportunity to add any additional information at any point.

3.7 Ethical Issues

Ethical approval was obtained from the Faculty of Education's Ethics Committee. Steps were taken to ensure that the issues of informed consent, confidentiality, potential harm to participants, and other potential concerns relevant to the research were addressed.

Informed consent was gained through formal letters to principals, teachers, parents and children. Each letter was designed to suit its audience and clearly outlined the purpose and procedure of the research project (see appendix D). Care was taken to ensure that matters concerning participants in the project were not discussed with any persons other than my supervisors. Pseudonyms were used and students' and teachers' names were not used in any discussions, and all information gathered was kept confidential. All materials including observational notes, interview transcripts, recordings and other information was stored safely in a locked filing cabinet (see appendix E).

Every effort was made to minimise classroom disruption and ensure that classroom life could continue as naturally as possible. Interviews were conducted efficiently with little learning time wasted. During interviews, participants were not expected to discuss something that they wished not to share, and could choose not to respond to particular questions. I ensured that all participants knew that this research project was not in any way a personal judgment of them, but instead, was learning about current practice, to inform and improve future practice.

3.8 Chapter Summary

This chapter has described the methodology of this thesis. It outlined the theoretical framework and situated this study within a qualitative approach, discussing the basic tenets of interpretivism. This interpretive research involved both the participants and I, in the construction of meaning. The focus of the study

was described and the research questions were presented. The chapter provided relevant literature to support the three research methods used in this research, including observation, interviews and questionnaires, and the elements of quality of research, including validity, reliability and triangulation, were discussed. The choice of both semi-structured interviews and open-ended questionnaires allowed for respondent's meanings of their EFS experiences and perceptions to be explored. The observations threw light on the other methodologies. They allowed links and comparisons to be made between observation data and information gained through interviews and questionnaires. A description of the participants was provided. The research procedures for each method were outlined, and issues related to ensuring the quality of research were discussed. Finally, efforts were made to ensure ethical issues were considered and addressed.

Chapter 4

Results

Overview of the Chapter

This chapter presents the findings for this study which explored the perceptions and experiences of teachers and students participating in EFS in five Bay of Plenty primary schools. Firstly, teachers' and students' concepts of 'environment', 'EFS' and 'Sustainability' are presented. A good understanding of each of these fundamental concepts is necessary for the successful implementation of EFS, as these are the foundations of the area. Therefore, it was considered highly important to explore teachers' and students' general understandings of 'environment' 'EFS' and 'Sustainability'. Secondly, the structure of EFS within schools and teachers' classrooms are presented, providing an idea of the general state of EFS within each school and classroom, and how each varies. Next, the teachers' responses regarding the importance of EFS are given. Following this, participants' perceptions, knowledge, and attitudes towards EFS are considered, with a focus on passion and content knowledge. Recycling and waste management was found to be the topic most frequently focused on within the study, therefore, findings related to this are presented. Next the teachers' perceived barriers are considered, as it seems only necessary to explore these inhibiting factors. And finally a summary of the chapter is provided.

4.1 Teachers' and Students' Concepts of Environment, Education for Sustainability and Sustainability

An understanding of teachers' and student's perceptions of 'environment', 'EFS' and 'sustainability' are fundamental to the interpretation of these research findings. Teachers and students were asked to give verbal definitions of 'environment' and 'EFS' and were asked to comment on the shift from EE to EFS. Interestingly, both teachers, and evidently, their students, lacked understanding in this area.

4.1.1 Teachers' Definitions of 'Environment'

All five teachers generally described 'environment' as a physical phenomenon during interviews. Social, political, economic or any other non-physical environments were barely acknowledged in any of the teachers' definitions, even when encouraged. However, Betty and Anne directly included humans in their definitions, suggesting that humans are part of 'environment'. Only Anne clearly included non-natural, human-made concepts in her definition:

The world in which we live in, including people, plants and animals and our surroundings (Betty)

The environment would be everything, so as I'm looking around, buildings, trees, footpaths, people, roads etc. (Anne)

Dora, Elle and Cathy, gave definitions which appeared to suggest that humans and 'environment' are separate such as:

A verbal definition, um, It's just the space that we live in (Dora)

It's what's around you to put it really simple (Elle)

The environment, like the world we live, our surroundings, and how everything interconnects (Cathy)

4.1.2 Students' Definitions of 'Environment'

The students had quite similar definitions of 'environment' and these tended to be limited and very brief. All 25 students described 'environment' as a natural physical environment. Nature and the things within nature were used to describe 'environment'. Trees were the most common feature, mentioned in the definitions of nine of the 25 students. Some of the students proposed that 'environment' is the trees, plants and animals etc.:

Um like trees and all the stuff that can grow (C2)

Um the trees and grass and flowers and lots of other stuff like that (C1)

Like plants and all that sort of stuff. Like um trees and a whole lot of trees and more trees (C4)

It means that the environment is like the plants and animals and leaves and stuff.

So it's like grass, trees, flowers and seeds (E3)

Um. The environment is um all living things. Like trees and stuff because when trees get cut down they get taken to a factory and the factory turns them into paper and the paper is what we use to write on. And sort of like vegetables because they get grown in the environment causes they get grown under the dirt. And sort of like flowers and stuff because you use flowers to interpret to do something. Like you can use flowers to draw or you could use it to um, my old

teacher taught me this, you get a flower and put it in a book and squish it and when it dries you made a book mark (E4)

It always keeps us healthy so we can grow food and have water, and it's the place we live in (A1)

Others said that the environment was a place that provided homes for these trees, plants and animals etc. One child made a clear distinction between 'environment' and humans:

Um, I think it means like, well you know how you have a community? Well yea, it's like that but instead of people it's about like flowers and stuff like that (D2)

Definitions from School B students contained more ideas, were broadest, and were generally the most sophisticated:

Um, it's like the nature around us to me. And it's like the trees and the plants and our habitat we live in (B2)

Like the earth, the whole planet, the ground and everything (B3)

It's our natural resources that have put together, and now it's getting used more than it's getting made (B5)

The definitions of the School C students were least sophisticated and each of the five definitions simply gave a short list of things such as, trees, animals, creatures, animals, grass, flowers and bugs.

4.1.3 Teachers' Definitions of EFS

The teachers' responses featured similar ideas and were generally quite simple. Teachers mentioned the importance of raising their students' awareness of the

need to care for the world. 'Awareness' was frequently featured in the teachers' definitions. However, the ways in which an awareness would be achieved was not mentioned. The need to and change behaviours was highlighted in both Betty's and Anne's definitions:

Environmental education would be raising awareness of the need to care for our world, and getting children to take ownership and take action, so they understand that everything that they do affects the environment. Whether they do something that is good or bad, it has an impact on the environment and that their attitudes can make a difference, everything they do can make a difference (Anne)

Um, making people aware of what we need to do to look after our planet, and it's people and creatures, why it's important, and how each of our actions has an effect whether it be a small action or a big action there will always be a reaction to that. So you may not feel you can save the world on your own, but every little thing helps. I guess I look at it from a teacher's point of view with small children, and how they do have some power to make changes (Betty)

I suppose it is about raising children's awareness and shaping attitudes that will help the environment and the world environment to stay healthy and sustained (Dora)

Cathy's definition was the least sophisticated and like her students' definitions of 'environment', trees were featured in her definition:

Yea, basically just helping our kids understand and be aware about how to care for our environment and yea, just what they can do to keep it healthy. Even things as simple as getting children to look after gardens and trees (Cathy)

Definitions were generally positive and optimistic. However, Elle's definition was slightly pessimistic in nature:

Well environmental education would be making the children aware of their physical environment, how it affects them and how they affect it, and basically what it will be like long term, which won't be good, if we don't take care of it now (Elle)

None of the teachers made comments to suggest that there was a difference between the two terms EE and EFS.

4.1.4 Students' Definitions of EFS

Firstly when interviewing students it could not be assumed that they would be familiar with the terms Environmental Education or Education for Sustainability. This became obvious during interviews as titles used to describe EFS varied. None of the students used the terms Environmental Education or Education for Sustainability. It was mostly known to students as either Enviroschools or Envirogroup. School B students identified EFS as environmental sustainability, and School A students referred to it as Enviromaniacs. I used the same terminology as each student that I interviewed.

Five of the 25 students (C1, C2, A1, D2 and E3) indicated that they were unsure of what EFS was and chose not to give an explanation. Many of the responses were brief and were not expanded on. Many students simply said in one way or another that EFS was learning about the environment:

That's a tricky one. Um learning about the environment (D3)

Just learning about the environment and stuff like that (C3)

Um, it's learning about the environment (C5)

It's when you learn about the environment and you learn about what types of stuff there is in the environment (E2)

Only just over half of students said that EFS was solely, or included learning how to 'help' the environment. All of the students from both School A and School B included helping the environment, and these children seemed to highlight the need to do this more strongly than the students from other schools:

Um I think it's about saving the world from having to dig lots of landfills (A5)

Helping to take care of our school and our world (A3)

Um it's like cleaning up the environment and like keeping it going and living (B5)

It's like keeping our environment healthy so it's ok for our future generations, so they can have it as we had it, or better. So we don't leave them with our responsibility of cleaning up the planet (B1)

4.1.5 Students' Understandings of Sustainability

Twenty of the 25 students had never heard of, or were unfamiliar with the word sustainability. The five children that were familiar with sustainability were from School B:

Like to sustain something, to like keep it how it is, or something like that (B2)

Yes, it's like, not littering and keeping whatever it is clean. So if it's environmental sustainability it's keeping our environment clean (B4)

I only heard about it this year. It means like how we all need to live on the earth and you don't just destroy things that have been on the earth for a long time. You can just leave them (B5)

4.1.6 Teachers' Understandings of Sustainability and the Shift from EE to EFS

When teachers were asked what they thought about the 'newer' focus on 'sustainability' in EFS, and the shift from EE to EFS, what it means to them, and how it has affected what they teach, the main understanding that the teachers demonstrated was that EFS is a much broader concept. Four of the five teachers claimed they preferred 'sustainability' and that is what they taught (Anne, Betty, Cathy, and Dora). The teachers acknowledged the shift in thinking, and claimed to support the more 'contemporary version' of EFS. However, although they believed they were teaching 'Sustainability' rather than 'Environmental Education', they did not appear to have a strong understanding of the shift and the similarities or difference between the two:

I didn't use to teach EE until sustainability was introduced. Before that it was more like science. So it came under the science umbrella. Um now I teach energy before it was electricity. So it has become a much broader topic (Dora)

I think I've always come at it from the sustainability side, so I haven't had to shift my thinking a lot. Um, because you know at my last school it wasn't a very big group so things that we were doing were to take care of the problems as they arose. So I guess environmental education is learning about the environment, like how the trees grow and how the sun affects and the rain fall and all that, whereas sustainability is more about learning our impact on it (Anne)

Betty's response showed a better understanding of what EFS involves:

I still need to learn a lot, but for me it is about getting children to consider other perspectives of issues, like the social implications on an environmental issue. Like we will talk about how peoples' lives affect the environment and choices they make for better or worse (Betty)

Elle who has been teaching for over 30 years, said she did not know much about sustainability or the shift from EE to EFS, and that it has not affected anything that she teaches:

Um, hasn't made any difference to the way I do things, no. And I don't really know too much about it (Elle)

Cathy also believes that the shift had not affected her as she had only been teaching for two years and she claimed to teach “*about sustainability*”:

Ok, um I think the shift would be more than just teaching them about the environment, like how we can get involved in saving and sustaining it for future generations. No it hasn't really changed how I teach because I only just started teaching, so I teach sustainability (Cathy)

4.2 Education for Sustainability Structures within Schools and Classrooms

The structure of EFS within the five schools varied. Teachers were asked to describe the current state of EFS within their schools and classrooms. All schools, other than School C had ‘Envirogroups’ which were made up of children of various levels who wished to be part of the group. However, interviews and observations showed that the way in which Envirogroups were implemented varied across schools. Cathy only taught EFS to her own classroom. Betty and Dora ran Envirogroups as well as teaching EFS to their own students, and Anne

and Elle ran an Envirogroup and did not focus on EFS with their own students. All teachers expressed that they would have liked to see more whole school involvement.

An Envirogroup named the 'Enviromaniacs' was the main form of EFS taking place within School A. Due to time constraints and perhaps the low status of EFS within the school, every Monday a meeting at lunchtime was organised for the group to come together. Unfortunately, the four observations showed, and Anne explained, that these weekly meetings relied on children who were willing to give up their lunch times, and understandably most children were not willing to do so. In the initial introduction Anne said that there were between 15-20 students in the Enviromaniacs. She then commented on the difficulty she is facing with students choosing to come every now and then and other students pulling out. The majority of students in the group were in Anne's class. Fewer and fewer children from other classes were continuing to attend meetings. Twelve children were present at the first observation, nine at the second, and six at the third and fourth observations. The Envromaniac meetings were held in Anne's classroom. Children would bring their lunch, sit on the mat and discuss, but in most cases, add to, the ideas that Anne brought forward. Every meeting observed focused on dealing with waste issues within the school.

Anne has made some progress in advocating EFS with the teaching staff and the school leaders, and a whole school unit devised from the Enviroschools kit titled '*Me and My Environment*', *considering the world we are a part of and how we can make decisions to manage and improve the quality of the school's physical and social environment*' has been introduced. Anne said that some teachers were really keen and were finding time to '*really get into the unit*'. However, others

were deciding that there was no time in the school day for the teaching of EFS. Anne showed a sense of disappointment with these teachers and throughout observations and time spent with Anne, she made it clear that it was a real struggle getting the whole school involved in EFS.

Dora, who has been teaching EFS for seven years, ran the school Envirogroup on a weekly basis. From the information provided it appeared that children met with their peers who shared the same responsibility, e.g compost, making paper pads, recycling, butterfly gardens, and then carried out their roles. The EFS learning taking place in Dora's classroom was completely separate from the Envirogroup. During the four observations Dora began teaching a unit on energy. The unit was based on the following '*big ideas*':

Energy is all around us, but we do not always recognise it, energy is a natural resource, energy takes many forms and can change form, some energy sources are better for the environment than others, energy resources need to be used wisely and energy is the power that drives heat, light, movement and growth
(Dora)

Dora put aside at least two periods a week to undertake this unit with her students. She explained that it was difficult to find the time to implement EFS.

During one of the observations Dora admits:

Well it is difficult, you know. We have missed our reading block today because I have decided to focus on energy, so because reading is a must do, I try to include reading in the energy, so they are reading a short paragraph and filling in the blanks (Dora)

EFS has been integrated into the school programme at School E. However, after the initial thrust, teachers decided how they would use EFS within their

classrooms. Elle had an Envirogroup that met once a week with a different focus each term, usually aimed to improve physical things and focus on waste within the school. It appeared that Elle decides the focus and what it will include and the children take part in mostly practical learning experiences. Elle would like to teach EFS on a regular basis to her own students but due to time constraints is unable to do so:

Um, if we did, it would be a spur of a moment if something turned up or happened like a teachable moment. Um next term with technology and looking at energy, middle school are planning a two week unit and we will incorporate it into there, because myself and the other teacher responsible for Enviroschools are in the middle school, so we probably will. But because we're doing a musical we physically won't have time to do everything. But we always focus on the 'waste' issues (Elle)

Betty ran an Envirogroup, but the main focus of EFS within School B took place in Betty's classroom. Betty said she introduced EFS to her students by immersing them in the content and then slowly integrating it into everyday practice:

In term one it was our unit focus and was totally integrated to create a foundation of knowledge to build on. Now I try to integrate it so it becomes an everyday issue and practice (Betty)

Betty often began by introducing children to a 'big issue' e.g. global warming. The students then explored the issue and constructed a foundation of knowledge for the topic and then Betty slowly narrowed the focus to where the students fit into this within School B, what's relevant to them, and what part they can play in minimising the global environmental issue's effects. Betty believed that it is important to use a range of mediums and teaching approaches:

We have watched dvds. So for example they have spent a bit of time watching Radar and his sustainability programme on channel one. And from there we pick ideas out of it. So you've got the visual and the discussion. We use debating, so for example we took an idea: is it more environmentally sustainable to cook your pizza over a fire or to use electricity? And I said to them there's no right or wrong answer, you just need to do your research. So we are now half way through discussing what they found out. We have been active, as in we've done a beach cleanup and a town cleanup, we've found a garden in the school that was just covered in weed mat and was a big mess so we talked about what we could do. They did research to find out what they could do to actually make the soil reach a quality that could be useable, without buying anything. So we did that kind of research. We talk to experts that are more knowledgeable (Betty)

Cathy taught EFS to her classroom when time permitted. She had no exact timetable for when it was implemented. Although waste management within the school appeared to be the biggest focus, Due to a considerably high power bill Cathy has had a focus on energy within the school:

Um, we start with the prior knowledge of what they already know, what they want to know and you know, what we find out about it. And do heaps of hands on and make it real, so like we learn about stuff in our environment rather than something overseas, although I do sometimes link it in to what is happening in the world at the moment (Cathy)

All five of the teachers decide on the topic focus when teaching EFS. However, they explained that when possible students are given choice. They claimed to use a range of teaching approaches and mediums and try to give students choice in their learning when suitable:

It's child centred, it's hands on, and within a topic they chose what they're going to do. So like if it's making something they will choose what they make (Elle)

Um I have tried to be a facilitator rather than dictator, the garden was there, so it seemed to be a perfect opportunity to start with, but I didn't say to them you'll need to do this and this, I said what will we need to do? And then in groups they talked about it and I said "ok so where will you find that? How can you solve that problem?" that sort of thing...Then we had all this paper and said "you've discovered we've got all this paper, what are we going to do about it?" And they said they'll make note pads, so we've been doing that. The other thing was the contamination in our recycling bin, so you know, I facilitated in the fact that I knew what was going on, but they researched it and they came up with the solution. I simply said to them "now you know that so what are you going to do?" And they said they could start educating other classrooms and they've gone ahead and done that. So yeah, I try and let them take as much control as they can (Betty)

4.3 Importance of teaching EFS

All teachers expressed a need to teach EFS when asked if they believe it is important to teach EFS and why. Reasons such as, because students' actions can make a difference, students can influence other people, students are going to have some big challenges ahead of them, and it is good to start thinking about this 'stuff' young, were included in the responses given by teachers. Elle said:

Because we're part of it. We've got children of a generation that are going to be living in a different environment from perhaps people of my age lived in, and we've taken things for granted and I think they will need to become more worldly and more aware of the effects on the environment because it is changing. New

Zealand perhaps is a bit more sheltered, but if you travel overseas you can see the effects of neglect on the environment in some countries. I think that practical hands-on learning experiences out of the classroom and where possible, even out of school grounds, are really valuable and help children to become genuinely concerned about the environment (Elle)

Betty explained that she wants to foster a passion within the children to care for the environment so that pro-environmental behaviours can perhaps become second nature to them:

I think it's important because we do need to look after the world we live in, um, and I also think changes need to be made. And perhaps from my point of view, the younger generation is probably the generation that is most likely to be more aware and be able to implement those changes. And perhaps if they are more passionate those changes will come about, and also if it becomes second nature to them, it's easier to make change or go with shift (Betty)

Anne's response was based around the need for students to take responsibility for their actions and have a good understanding of environmental issues. However, her response was not reflected in other parts of her interview and during observations, as there was little learning taking place that went beyond managing school waste:

Pause, um, I think it's important because, I think it's important for children to learn that their actions can make a difference so that they can do things individually and influence other people. Yea, and just so they're not blaming other people for what's happening to the world and so they have an understanding when there's an oil spill that it affects everything, not just the media. I like to take it for like a socio-gram. So if you put you in the middle and then around you, you might have your immediate family or your school, then you

know, your community, your town, your country, your world. So I sort of want them to be thinking how it goes out and how it affects things, not just me, but in the bigger picture (Anne)

Dora's response on the importance of teaching EFS:

I have a concern for the health of our planet, and think that children now are going to have some big challenges ahead of them as adults, so um, it's good for them to start thinking about it young. And I think it's something that they are really ready to start thinking about, they have a real interest in their planet and their place in it. I also think that EFS is great because it takes the children out of the classroom and closer to nature (Dora)

Cathy's response was perhaps the least sophisticated and showed the least amount of personal interest in the area:

Ah, just so the kids can be aware of what their part in the world is, and how to best look after the earth so it can last a lot longer (Cathy)

The main ideas that came through when teachers were asked what they would like to see their students leave their classrooms with in terms of the single most valuable, learning, insight, value, and/or attitude, included: Knowing that all actions count, taking responsibility for actions, becoming passionate about looking after 'what we've got', being aware of the need to make change and where the change is needed, having an awareness rather than ignorance, and being able to share their messages with people around them

4.4 Teachers' and their Students' Perceptions, Knowledge and Attitudes

All five teachers acknowledged a personal interest in EFS. Teachers' attitudes and passions for the environment and EFS were made apparent during interviews. Four of the five teachers, Dora and Betty in particular, appeared to be genuinely passionate and enthusiastic about teaching EFS. This positivity was reflected in the interviews with teachers and their students.

Cathy on the other hand seemed to be lacking the drive and passion that the other teachers possessed. Speaking with Cathy made it quite clear that taking on the responsibility of leading EFS was her choice, but was not driven by any personal passion or interest in the area. It seems as though School C was keen to get involved in EFS, and due to the recent completion of a compulsory EFS paper attained during her degree, Cathy was most experienced in the area so she opted to take on the role. Cathy's possible, lack of personal passion and drive for EFS was reflected in both the data collected from Cathy and her students. For example, she spoke of the 'no rubbish' rule that her school had recently put into action. The way she described it, gave the impression that it did not really matter what happened to the rubbish as long as it was not left at school. Cathy also said that children had not really learnt about the wider issue and waste in general, so it appears that the children were simply expected to follow the introduced rule with little knowledge or understanding of the issue:

Kids and parents soon realised how much of a pain it was to have to deal with all this rubbish when they get home. You have to shove it all in your bag and it makes a huge mess. I was pleased with one kid the other day, he told me that he brings a little zip lock bag to school each day that he puts his yoghurt container in so it doesn't make a huge mess in his bag (Cathy)

The knowledge of Cathy's students also appeared to be considerably limited. This could be due to a number of factors, including their teacher's lack of enthusiasm for the area. Students from School C gave the briefest, least detailed, least enthusiastic responses, demonstrating a low level of knowledge, skill, experience and passion for EFS. Trees, was the most frequently appearing topic in the responses given by School C students:

What are some of the topics that you think are important to learn about in EFS?

Um, how to look after trees 'cause otherwise they'll die (C2)

What is the most important thing you have learnt in EFS?

Um, don't destroy trees and stuff, because they might die and then that's one less tree we'll have (C1)

When asked if EFS has changed how students think and act, four out of five students said that it has not changed how they act, and three out of five said that their thinking has not changed either. The two students whose thinking had changed answered:

Yes, well some people hammer nails into trees and I think now that you shouldn't really do that 'cause it could kill the trees (C2)

Yes, 'cause you think about what you're doing to trees and things and you think "should I do it?" (C3)

There were children from each of the five schools that could articulate ways in which EFS *had* influenced some of their actions. However, fewer children could explain or give examples of changes in thinking.

Students from School B appeared to show a genuine interest in EFS. They liked to talk about their experiences and share what they knew about EFS. It seemed that

Betty's obvious passion for EFS had positively influenced her students' enthusiasm towards EFS. School B students most frequently referred to EFS as being 'fun' and made other comments implying that it was something that they really valued and enjoyed being involved in:

It has changed how I do things, because like, I don't know. Um before I probably would have just said, well say we were given a choice to make a worm farm or a compost bin, I would have said 'um nah, I don't really want to' But now through all my learning in environmental sustainability, I really want to step up and do these things (B4)

School B students' interest in EFS was also reflected in their choice to do 'environmental things' at home by choice:

Um yes. I used to at home, just leave stuff outside. But now we have just changed the way we act at home. We've been getting chickens instead of buying eggs, and we've been planting heaps of stuff, and we've been making our own rope swings and stuff rather than just buying them. And we also made a flying fox out of recycled rope and a pulley. We already recycled all our plastic rubbish and stuff, but now we think it's even more important (B5)

Although many students from the other four schools also claimed to do things beyond the classroom, it wasn't as 'real' and 'genuine' as the responses given by School B students.

The teachers' content knowledge in the area of EFS was generally quite limited.

Two of the teachers openly admitted this during interviews:

Well I can't say I'm an expert when it comes to my knowledge on environmental issues. I would like to know more, so I guess that's when PD needs to come into it

for teachers like me who don't have any tertiary training in environmental education or science (Elle)

I tend to stick with what I know. I'm no scientist and I don't know too much about things like green house effects and climate change (Cathy)

Children's perceptions generally aligned closely with those of their teachers. They used the same terminology, often shared the same concerns and, when a teacher had a strong passion for an area, like gardening, for example, this shared interest came through in the interviews with their students. Dora spoke of her love for gardening in the interview and this interest was reflected in interviews with her students. Each of her five students were keen on activities based around gardening including; composting, worm farms, planting and the general maintenance of gardens, and butterfly gardens. Although the children were genuinely interested in gardening, it appears that apart from the energy unit that was currently taking place, their knowledge and ideas of EFS were limited to gardening. In the interview with Student E4, her responses were solely based around butterflies and butterfly gardens as this is what she has been doing for EFS. When asked, what is the most important thing you have learnt in EFS? Student E4 answered:

Well since I'm in the butterfly garden we mostly just weed the gardens and try and attract the butterflies, so that's just mostly what I do (E4)

Student E4 was asked, Has EFS changed how you think? She replied:

Yea. I used to think that, well I couldn't tell which was a girl and which was a boy butterfly. And I've learnt heaps of things about caterpillars and butterflies over the year (E4)

4.5 Recycling, Waste Management, and Learning taking place

Recycling and managing waste within the school was the most frequently raised topic in both the teachers' and students' interviews. Four of the five teachers expressed the idea that 'waste' and 'recycling' was the topic that they most frequently taught, although two teachers said that it was not necessarily the most important topic to teach, but that it was relevant, easy, and that it suited the age and level of the children. Elle said:

At our age it's sort of like the physical things and what we can do in the school in the small time we have them. It can be like the living world type things, recycling and the three r's. You've got to keep it really simple (Elle)

In some cases, in particular within School A, it appeared to be all that the students knew. Their understanding of EFS seemed to be limited to rubbish problems and recycling. It seems that the management of waste within the school was the only focus of EFS within School A, and that Anne believed that the sole aim of EFS was to make physical improvements within the school. The majority of Anne's interview and each of the five interviews with School A students focused on recycling within the school:

Um we always start off with waste and that's always because it's a really obvious picture in our school, how much stuff we're throwing away. So we usually start with that. I would like to move into things like energy. I'm not sure, I mean there's a unit on sustainable buildings but I'm not sure how much influence I can have on that seen as the school has already been built. So yea, waste is the main one (Anne)

Later Anne spoke of how she wants children to have a good understanding of environmental issues on a global scale and said:

So I sort of want them to be thinking how it goes out and how it affects things, not just me, but in the bigger picture. I want them to have a strong understanding on some of these big issues (Anne)

However, this type of learning and teaching was not evident in any of the observations or in the data gained through the interview and survey with Anne or her students' interviews. Although, one student, Student A1, who expressed that she 'really likes nature' knew that there was more that she could be learning and was eager to know more. She said that she reads lots of books from the library that are about environmental things of interest to her. This student, by choice was extending her learning in her own time. Throughout the interview she shared interesting facts from a book she was independently reading at home:

And no polluting because I've seen in a book how much rubbish is around the world, and I think it's about half the world is filled with rubbish

That if you ever do see and rubbish in the sea or something you should pick it up because I read that a plastic milk bottle can be in the ocean for at least 400 to 600 years. And it can also kill lots of sea creatures (A1)

Anne talked about recent learning experiences and how the 'rubbish issue' is being dealt with within the school. She talked about the different procedures that had been put in place by her and her students to help minimise the waste. During the interviews and observations I got the impression that the children had little input into most of the decisions being made. They were all assigned to a different area that they were then responsible for maintaining. Some were responsible for the pig buckets, others paper recycling etc. It seemed that the children were all more than willing to be involved in this, but they were performing all these

behaviours with little learning and understanding of the bigger picture. They just knew that rubbish around their school was a problem.

Managing litter was also the main focus of EFS at School E. However, there were other learning experiences taking place within the school. Elle said that she tried to focus on the physical things within the school that could be improved in the small time that she had with her students. Elle described the EFS taking place at School E:

As a whole school last year we sort of took it up big time where we made a strategic plan that hangs out in the foyer there. We had two representatives from each classroom and each classroom had meetings about what they thought about EFS and what they could do for this environment that they're living in and how they could take that home and do things..... It sort of goes in waves cause we get really enthusiastic and then other things happen and we kind of let it slide a bit. ...So now this year we've got an environmental group that meets once a week, and this term they're focusing on energy, and tomorrow we have someone from trust power coming in to talk to the children and do an audit looking at how we're using power and electricity at this school and after that they will come up with a plan for how we can stop wasting energy. And we have paper for trees. So we recycle paper and every class does that. Trees and plants are arriving next week. And we have a trees for survival unit out the back too where kids are taught how to propagate plants and trees and go plant them out on route K, they arrive, (the trees and seedlings) next term so we'll be back into doing that. We have a vegetable garden. And classes used to go plant out things.We have small groups going out there now and we teach them how to grow things and then they eat them, we have little cooking lessons. We are starting to look at rubbish now. As our big thing. We have miles too much rubbish being brought and left at school. So yea, little small bits. (Elle)

Many of the experiences that the students were having at all five schools, involved addressing the symptoms rather than having a focus on the causes. For example, the teachers spoke of cleaning up days where they would pick up rubbish at local beaches and in the town. Although these were definitely positive activities, they seemed to be one-off occurrences that students were expected to participate in with little or no real understanding of the issue. This lack of understanding of the issue and causes, and the performance of behaviours to address symptoms was clearly apparent in observations and interviews, and in particular, within School A, School C and School E.

Elle explained that the children loved picking up the rubbish and being responsible for recycling duties but admitted that they knew little about why they were doing so:

Um, well they actually do it, but they don't know why we did it in the first place. So they rush out with the recycled paper and that, and they put it into the big bin, but I think we've missed a step with the children that we've got now, cause we had a big push with all the bins and we had stickers and things and we were doing all this five years ago. You know, learning about trees, and buying trees, and we saved paper and showed them that egg cartons were made from paper, and we actually made a whole lot of newspaper into recycled paper and showed them why it was grey and that's why egg cartons are grey and so on. And because we've done it, as adults, we think that this lot of children understand why they're running around. All the kids think is that it's great to grab paper and put it all together and run out to the bin, I don't think they give it a single thought, why they're doing it. But that is our fault because we haven't actually told them why or learnt about the issue. But, they do it! And the fact that they do it means they'll probably keep doing it (Elle)

Children at School B seemed to have a deeper understanding of some of the major environmental issues on a national and international level, and were able to articulate ideas about landfills, global warming etc. The students also took part in 'clean up' type days in which they would pick up litter etc., but these children had a better understanding of why they were performing these actions and how it affects the bigger picture.

Betty talked about going beyond EFS within the school and also focused on national and global EFS issues. She said that she could not tell me the most important topics but explained that the students had recently been learning about global warming and carbon footprints and said:

We try to get a bigger picture of what these things mean, and try to understand some of the consequences en masse of those things. And then we slowly brought it back down to where we sit at our school and what we can do (Betty)

Betty made sure that children learned about global environmental issues. She started by building knowledge and looking at the big picture before zooming in on the school and its community. Betty said:

So you know instantly we know we couldn't solve the carbon footprint problem
(Betty)

But she then explained that there were small things that children could then do within the school and in their own lives to make a difference, and that with a better understanding of the issue, these changes in thinking and behaviour should come more naturally.

4.6 Barriers to the Implementation of EFS

The biggest barrier to the implementation of EFS appeared to be time constraints and the demand to use time to cover the core subjects; numeracy, and literacy, giving little space for EFS. Time was the only factor that all five teachers raised when asked what their biggest challenges regarding the implementation of EFS were:

Curriculum is very demanding with overly much emphasis on literacy and numeracy outcomes, giving little time for EFS (Dora)

Time! As always (Betty)

There is never enough time in the day (Anne)

The low status of EFS was initially a challenge for Dora. However, she now has the backing from her school leaders. Dora describes her challenges:

It was hard. The early times were hard. Um because it was seen as my passion or my thing, and I mean all teachers have different strengths, and I don't think it would have been possible, I mean there certainly wasn't any help from the ministry to implement it. But with enviroschools, and in particular a strong council and regional council backing, we were helped with really practical things, you know, providing funding and paid for teacher release days to help understand the programme. Without that I don't think I would have been able to do it. There are still a lot of teachers within this school that are not yet on board with it, but, there are a lot of teachers that are. And our Board is really on board with it. Part of it is because we have won some awards and have been recognised in the community outside of the school, and that's helped. And as time's gone on it is definitely becoming a lot more embedded in what we do at this school, we're still quite a long way off being a sustainable school but we've come a long way in

the past five years. And it's difficult because we have this huge, huge thrust of numeracy, literacy, numeracy, literacy and that's mandatory! And if you really follow it to then that's a good two thirds of your day over. And then you need to fit in all the other learning areas. So you can see why the likes of EFS could become, well it's either got to be sort of in the centre there, or it doesn't happen. Because the curriculum is way too crowded and there is no time. So if it's not a thing that you are particularly concerned with or you're not a gardener or whatever um yea, it probably wouldn't figure or rate very highly, but I'm hoping it will rate highly with these kids (Dora)

Being in a non-leadership position was the biggest issue for Anne as it appeared that she felt disheartened by the lack of support from leadership and other staff:

Well I guess being in a non leadership position where you're not really having influence on the whole staff, for example at my previous school, that was a big thing for me and I little bit of stress with that one here too. They wanted me to apply for awards and things but I never did because I didn't feel like the whole school was an enviroschool. Um ten percent of the school were taking it on board; ninety percent of the school had no idea. So I guess it would be just really making it important, so it's an ongoing thing, not just a one off. So yea that would be the biggest challenge I think, is to get it ongoing and part of what we do all the time. And then there's the time factor. We've got less than five hours in the day to teach all these subjects and get children up to a certain level before we pass them on, so finding the time to teach EFS among all the mandatory subjects is a real challenge for me (Anne)

Lack of resources was raised by Cathy. However, no other teachers viewed or mentioned this as a barrier. However, all five schools were involved in the Enviroschools programme which provides an abundance of teaching resources. However, several teachers did mention the lack of resources available to them

through the Ministry of Education and said that without the support from Enviroschools, EFS would become much more difficult to implement:

Definitely the time management issue. There is so much pressure to teach maths and literacy etc. giving no time for anything else. Oh and a lack of easy-to-use resources telling you exactly what and how you should actually be teaching
(Cathy)

Other challenges mentioned included: lack of display space, knowing where to start, and making it relevant to the students. Although initially the status and low profile of EFS may have presented challenges, it appeared that all five schools as a whole, were reasonably positive about EFS and welcomed its presence within the schools and classrooms.

4.7 Chapter Summary

This chapter presented the findings derived from the data. Teachers' and students' concepts of 'environment', 'EFS' and 'Sustainability' were presented. The varying structures of EFS within schools and teachers' classrooms were described. Following this, the teachers' responses regarding the importance of EFS were given. Next, the participants' perceptions, knowledge, and attitudes towards EFS were considered, focusing on passion and content knowledge. Findings related to recycling and waste management learning, the most frequently focused on topic, were presented next. Finally the teachers' perceived barriers to EFS were considered.

The main findings from these results that will be discussed in the following discussion chapter are:

- Teachers and students had limited understanding on ‘environment’, EFS and ‘sustainability’. Their definitions and understandings of ‘environment’ were predominantly limited to physical and natural aspects of environment. Teachers’ definitions of EFS were all quite broad and rather simplistic. The most common concept featured in the teachers’ definitions was based around raising students’ awareness. Students’ definitions of EFS were also very brief and simple. The teachers were aware of the shift from EE to EFS, however, all five teachers lacked a clear understanding of what this actually meant and had little knowledge on the similarities and differences between the two. Teachers seemed to use the word ‘sustainability’ quite freely and confidently throughout the study, yet were not aware of its meaning.
- Waste management and recycling within the school, were the most frequently focused on topics within the study, and each of the five schools. The recycling activities taking place tended to focus on addressing the symptoms of the waste issues rather than having a focus on the whole picture in any way.
- The non-mandatory status of EFS meant that the structure of EFS within each school and classroom varied, usually according to the importance given to it as a learning area by the school leaders. All of the schools (perhaps some more than others) claimed to be advocates of EFS, and

have, or are planning on attempting to integrate throughout their schools. However, no true whole school approaches seemed to be evident. Dora's school (school D), seems to be the exception, and they have received school awards through Enviroschools. However, interviews and observations with Dora showed that there is still more development and commitment needed to achieve a 'true' whole school approach to EFS.

- Teachers seemed to have poor conceptual knowledge of environmental and sustainability issues, and some of disclosed this. This was reflected in interviews with their students also. Passion for EFS was clearly evident with four of the five teachers. However, one teacher seemed to lack the enthusiasm and passion. The teachers' enthusiasm for EFS was also reflected in the enthusiasm of their students.
- The teachers expressed the idea that the teaching of EFS was challenging, and that underlying barriers were affecting the degree to which EFS was being taught. The challenges in the implementation of EFS most commonly mentioned by teachers were time limitations.

Chapter 5

Discussion

Overview of the Chapter

This chapter presents a discussion and summary of the study's findings. The results chapter generated several themes which are highlighted in this discussion. The key findings for this particular study are further explored in more depth. Firstly, a brief background to the discussion is provided. Next the teachers' and students' understandings of environment, EFS and sustainability are discussed, followed by a section addressing the recycling, waste management, and learning taking place within the schools and classrooms. Teachers' and students' attitudes and knowledge with regard to EFS are then explored, followed by a discussion on the current EFS structures within the schools and classrooms. Barriers to the implementation of EFS are then presented. The thesis then concludes, providing implications, limitations and research recommendations.

Background

In initial surveys, four of the five teachers indicated that they had had no relevant work experience, tertiary training or education in EFS. Cathy completed a first-year EFS paper at university. Three teachers said that they had been involved in some professional development run by Environment Bay of Plenty. The present

study found no pattern to suggest that the quality of teaching and the teachers' general understandings of EFS are determined by the length of general teaching experience. There was a wide range in years of general teaching experience ranging from two years to 30 years, and this factor did not produce any considerable findings in the results. Likewise, the amount of experience in teaching EFS also did not seem to make a substantial difference, as Betty, whom had had the least experience teaching EFS, and had been implementing it for five months, showed the highest level of understanding and appeared to be teaching EFS to the same, if not, better standard than most of the other teachers.

5.1 Teachers' and Students' Concepts of Environment, Education for Sustainability and Sustainability

5.1.1 Teachers' and Students' Definitions of Environment

The definitions of 'environment' described by the teachers seemed to lack clarity and confidence. The results showed that the teachers' understandings of 'environment' were predominantly limited to physical and natural aspects, with no mention of social, political, economic or any other non-physical concepts of environment acknowledged. This finding is consistent with the research of Hargreaves (1996), who found during interviews with 16 EFS teachers, that their biggest emphasis was placed on the physical and natural environment, with very little mention of any other aspects of environment. Unfortunately, the present study's findings show that some teachers' ideas about 'environment' have remained the same, despite the attention given to EFS in intervening years.

The meaning of ‘environment’ and what it entails, with regard to EFS has evolved from an almost solely physical/natural focus to one that equally encompasses and acknowledges all facets of ‘environment’. The Parliamentary Commissioner for the Environment (2004), demonstrates that although nature alone, was once the focus of EE, EFS can now be seen as more future and human focused than EE, and experts of the field advocate the need to integrate all areas of environment in current EFS practice including cultural, social, political and economic aspects and their effects on environmental issues (Smyth, 2006).

Not surprisingly, like their teachers, the students’ understandings of ‘environment’ were also limited to natural and physical aspects. Humans, and the relationship between humans and the environment was barely mentioned in any of the students’ definitions, and ‘environment’ was described as an object separate from humans. Although it must be considered that the students in this study were much younger, this finding aligns with Shepardson’s (2005) study of 81 junior-senior high school students in Indiana, America, which found that:

In general, students understood an environment from a limited ecological perspective; that is, an environment is a location where animals live and or an area that support animal life. An environment is a natural landscape; human-managed or built landscapes were not seen as environments by these students. For these students, humans do not appear to be a part of an environment but are separate from it (p. 49)

This was also a concern highlighted in the research of Loughland et al., (2003), who found that the majority of students in their study adhered to what they have described as an ‘object’ conception of environment, while very few students expressed a ‘relation’ conception, meaning that:

The majority of young people see the environment as ‘something out there’ — a place, possibly including living plants and animals, but essentially separated from themselves. Only a minority see the environment from a relational point of view (p. 14).

Exploring teachers’ understandings about the environment is essential, as teachers transmit their perceptions to their students (Desjean-Perrotta, Moseley & Cantu, 2008). The impression given by the teachers in this study, which suggested that ‘environment’ is predominantly concerned with ecological aspects, may be problematic, as it could be said that the environmental crisis we are faced with is more social than ecological. This general lack of understanding about the entirety of ‘environment’ was evident throughout other areas of the research findings. In particular, when considering environmental issues, the teachers usually put little focus on acknowledging the social, political and economic factors. This is a concern, as a narrow and predominantly ecological view of ‘environment’ could perhaps lead to a more narrow and limited scope when implementing EFS, and considering environmental issues.

5.1.2 Teachers' and Students' Understandings of EFS

The teachers' definitions of EFS were quite similar. They were broad and rather simple. All of the definitions featured a common goal of looking after/saving our planet. This goal is consistent with definitions of EFS which have continued to evolve, with the consensus remaining, that sustaining the future of our earth is the main goal (Bakshi & Naveh, 1978; Barker, 1997; Hart, 2003; Littledyke et al., 2009; McKeown & Hopkins, 2007; Ministry of Education, 1999; Palmer, 1998; The Parliamentary Commissioner for the Environment, 2004).

Although two teachers did mention the need to take action and change behaviour, the most common concept featured in the teachers' definitions was based around raising attitudinal aims, and in particular raising awareness. Raising awareness was also the most common attitudinal aim found in the research of Hargreaves (1996) and Keown, Carstensen, and McGee (1995). This aim aligns with Aim 1 in the Ministry of Education's *Guidelines for Environmental Education in New Zealand Schools* (1999), which aims for students to develop "awareness and sensitivity to the environment and related issues" (p. 9). However, this aim is seen as equally important as the other four aims given in the guidelines which were somewhat neglected in the teachers' definitions. Although an emphasis on environmental awareness is important as a first step, educators should be aiming for the later stages of environmental literacy, responsibility, competence and citizenship (Smyth, 2006).

Raising awareness is important, and it is pleasing that the teachers mentioned this aim. However, ideally their aims would go beyond raising awareness. EFS should

aim to develop students' knowledge, attitudes, values and skills, to enable them to understand current environmental issues and make decisions towards resolving them (Littledyke et al., 2009; Ministry of Education, 1999; Parliamentary Commissioner for the Environment, 2004; Tibury, 1995). "Environmental education is a multidisciplinary approach to learning that develops the knowledge, awareness, attitudes, values and skills that will enable individuals and the community to contribute towards maintaining and improving the quality of the environment". (Ministry of Education, 1999, p. 9).

Students' definitions of EFS were likewise, very brief and simple. 'Learning about the environment' and 'helping the environment' were the most frequently illustrated ideas in their definitions. None of the students (with the exception of school B), were confident in articulating their understanding of the meaning of EFS.

5.1.3 Teachers' and Students' Understandings on the shift from EE to EFS

The teachers were aware of the shift from EE to EFS and acknowledged that EFS was the 'new and improved' EE, but all five teachers lacked a clear understanding of what this actually meant and had little knowledge on the similarities and differences between the two. Teachers used the term 'sustainability' quite freely and confidently throughout the study, yet seemed to be unaware of its meaning. Although sustainability was used often, their teaching still seemed to be leaning towards traditional forms of EFS. This is consistent with the findings of Spiropoulou et al., (2007). Their case study of in-service primary education

teachers in Greece, found that a misunderstanding of the conceptual meaning of the term 'sustainability' was common.

Although 'sustainability' appears to now be a very popular term (Bolstad, 2003; Chapman & Eames, 2007; Jickling & Wals, 2008; McKeown & Hopkins, 2007; Parliamentary Commissioner for the Environment, 2004; Tilbury, 1995), as noted above, perhaps it is a term that is being used without a clear understanding of its actual meaning. It has been suggested that the concept of EFS is poorly understood amongst primary level teachers in New Zealand schools (Taylor et al., 2009). The teachers' general lack of understanding of EFS in the present study, was therefore not surprising, and was also reflected in their students, as only five out of 25 students said that they had even heard, or knew anything about the term 'sustainability'.

Teachers and students generally, did not have good understandings of environment, EFS and the shift from EE to EFS. This lack of understanding could be attributed to many factors. One of the possible factors, is perhaps not the lack of literature available, but more so, the lack of literature that is being physically presented to teachers which clearly outlines the essence of 'sustainability' in EFS.

The teachers were involved with the Enviroschools programme, which offers valuable teaching resources, but Dora and Anne seemed to be the only teachers who were directly accessing and implementing the material to any extent. There appeared to be little in the form of, or no other supporting literature or guides,

being used by the teachers and schools in this study, as none of the teachers said that they used any other resources beyond the Enviroschools material. Although today, there is much more literature focused on EFS, the findings show that, Tilbury's (1995) suggestion, that EFS needs further definition and clear explanations of how it differs from EE, may still be valid in a sense that teachers need to be presented with it.

It appears that the teachers in this study were unaware of, or perhaps, had not been given the opportunities to learn about past and current EFS trends and issues. A gap between what current research and literature on EFS is saying, and what is known by the teachers in this study, was clearly apparent. And although academic research and other valuable literature could inform their teaching greatly, they do not seem to be accessing it. There are a number of possible explanations as to why teachers may not be accessing academic literature. One likely reason is that they may believe that the literature is written for university academics and researchers, and is not available to them as teachers. The name of an EFS book or journal alone, may be intimidating enough to put a teacher 'off', and they therefore rely on resources specifically made for teachers.

The issue with these findings may be a 'lay' discourse of environment, sustainability and EFS. Teachers in this study had received very little, if any tertiary education or professional development in EFS and therefore, although a more specialised view of environment, sustainability and EFS exists amongst educators and specialists of the area, teachers that have not been well introduced

to the current trends and issues in EFS, like the teachers in this study, may fall back on their 'lay' understandings.

5.2 Recycling, Waste Management, and Learning taking place

The results showed that waste management and recycling within the school, were the most frequently focused on topics. Literature does advocate the need to focus on waste issues within schools, but there are many other just as important topics and areas of EFS that should be focused on at primary school level. According to Barney et al., (2005), the best EFS programmes focus on the wise use of air, water, land and energy resources, preservation of plants and animals, waste management, and the humane and thoughtful stewardship of the global environmental economy.

However, although the results show that the teachers were placing a heavy focus on waste, it is argued by some, that it is a very relevant topic for students to be learning about as it is an issue that they are faced with in their daily lives. Sobel, (1996, as cited in Fisman, 2005, p.40) argues that primary level students are not developmentally equip to comprehend the more complex issues and concepts in EFS. These distant or global issues may be less relevant to children as they may find it difficult to see the relation to their own lives (Klein, 1993 as cited in DiEnno & Hilton, 2005, p.14).

In contrast, Jensen and Schnack (1997) who developed the Action Competence approach, make the point that if children are only exposed to school level issues

(as in recycling paper) then students are possibly only learning simplistic and individualistic approaches to EFS problems and their causes. Like the strong emphasis on recycling found in the results of this study, Jensen and Schnack (1997) questioned these types of school level activities, and believed there is a need to go beyond these surface level issues.

Does the action of turning out the light when leaving the room necessarily give more insight into problems concerning energy consumption and change of climate? Or more to the point: how does one ensure that the specific action contributes to developing pupils' critical and global understanding of the environmental problem in question?
(p.172).

The way in which teachers in this study approached the issue of waste appeared to be repetitive and in some cases, uninteresting. Development of knowledge of the issue, in both how it affects students directly, and from a more global perspective, and more critical thinking, analysis and investigation could be involved to ignite more of a genuine interest within students. Jensen and Schnack propose that:

A school does not become 'green' by conserving energy, collecting batteries or sorting waste. The crucial factor must be what the students learn from participating in such activities, or from deciding something else (Jensen & Schnack, 1997, p. 165).

A study that examined the current level of EFS activity in New Zealand schools in 2006 (Bolstad, et al., 2008), found that waste was the most frequently focused on topic that teachers were receiving professional development in. This may help to explain why this study has found it to be most frequently taught. The 2006 report's implications and recommendations clearly imply that professional development that focuses on other EFS knowledge areas was needed to spread the scope wider than the predominant emphasis on waste (Bolstad et al., 2008), and this recommendation can surely be applied to the findings of this study.

5.2.1 Addressing Symptoms and Education 'For' the Environment

The recycling activities taking place within the schools tended to focus on addressing the symptoms of the waste issues, rather than having a focus on the 'whole picture' in any way. One of the aims of EFS, is the need to focus on the underlying causes of environmental issues, as oppose to concentrating solely on addressing their symptoms (McLean, 2003; Parliamentary Commissioner for the Environment, 2004). The results show that although children were participating in recycling activities, there was little, if any, learning about why recycling was needed and the bigger ecological, social, economic and cultural influences causing global waste issues. EFS is learning to see the whole picture surrounding a separate problem like pollution - the history, the values, perceptions, emotions, techniques, and traditional processes that cause the problem (Meadows, 1990 as cited in Tilbury, 1995, p. 20). Children in the present study knew that if they put used paper in the paper recycling bin it would be made into paper again, but a lack of genuine understanding for the recycling behaviours that they were performing

on a daily basis was sensed. This suggests that students knew very little about why they were recycling in the first place.

It is commonly argued that quality EFS only takes place when education *For* the environment; one of the three key dimensions of EFS, is the underlying intention. Although the activities that were taking place within the schools, such as picking up litter at local beaches and in town centres, recycling within the school, and planting trees, could be seen as action *For* the environment, as it *is* helping the environment, these types of activities performed in isolation may do little to encourage students to take pro-environmental actions in the future. Education *For* the environment is more complex than it may appear. Bolstad (2003) argues that addressing the symptoms of an environmental problem is not enough; in fact she goes further to say that:

Education 'for' the environment suggests that it is not enough simply for students to learn about the environment or the causes and consequences of environmental problems. It is not even enough for students to be worried or concerned about environmental problems, or to accumulate the skills that might help them to identify the causes and possible solutions of environmental problems in the future. One can quite conceivably be aware of a problem, concerned about a problem, and even potentially possess skills to solve the problem, and still never actually take any action towards solving the problem (p.88).

Bolstad (2003) asserts that the underpinning philosophy of education *For* the environment is helping learners to recognise that environmental issues are structurally entered in society, which therefore must be understood as issues with conflicting interests. Tilbury (1995) goes on to define Learning for a Sustainable Future as being: relevant, holistic, values-orientated, issues-based, action orientated and critical. The findings from the present study suggest that professional development in the three dimensions is needed, and in particular, a strong emphasis on true education *For* the environment. This recommendation was also made by Mclean (2003) in her research.

Jensen and Schnack (1997) would argue that the one off ‘cleaning up the town’ activities that several of the teachers and their students were involved in, serve environmental goals, but would question whether they serve any educational goals. With the right background learning, activities like this can be valuable, but the results appear to show that there is possibly little valuable learning taking place and generally, symptoms are simply being addressed.

Liz did place emphasis on waste and other activities addressing only symptoms of environmental issues. However, she also believed it was important to teach her students about bigger more global environmental issues. The most recent learning experience that took place in her classroom focused on carbon foot prints and global warming. Although a considerable amount of research has found that teaching children about the severity of global environmental issues can have adverse effects and leave children feeling hopeless about the future (Hicks and Bord, 2001), Liz expressed that after learning about an issue from a global

perspective, she then zooms into the students themselves, and how they affect the issue and the issue affects them. After this, she would then focus on the small actions that could be taken by the students to contribute to addressing the issue. In support of Liz's approach, Jensen and Schnack (1997) acknowledge adverse effects that can be caused, but argue that it is the way in which environmental problems are presented that matters, and state that "so the question, then, is not whether we dare create anxiety in children, but whether we dare let that anxiety and worry, which of course exists, remain un discussed" (Jensen & Schnack, 1997, p.164).

5.2.2 Action Competence

It appeared that in no schools was it the intentional decision of students to pick up litter etc. It was more of a learned and expected behaviour. Jensen and Schnack (1997) would contend that the students in this study were not necessarily taking *action* because their behaviours are changed, as these actions are most likely unintentional. Behaviour change can be caused by pressure from other people, while *action*, in relation to the Action Competence approach involves personal commitment and the conscious making up of one's mind (Jensen & Schnack, 1997). If the students on their own accord for example, had decided to explore the degree of pollution in a local creek and then decided on taking steps towards solving the problem, then this could be classed as taking *action*, employing the Action Competence approach.

	Students Pushed to do something	Students involved in deciding what to do
Activity solely as a counterweight to academic tuition		
Activity targeted at solving the problem		ACTION

Figure 2: The Action Competence Approach, Criteria for an Action (Jensen & Schnack, 1997).

Jensen and Schnack’s (1997) Action Competence approach, which all five teachers were unfamiliar with, could serve as an effective guide when planning and executing EFS.

5.2.3 Values in EFS

Another area which is crucial to the successful implementation of quality EFS is the inclusion of values education. This study has suggested that values education is lacking in all schools, but perhaps not in school B. The establishment of environmentally sound values are a key factor to EFS’s success, and these values can be developed through the exploration of the values of others. Smyth (2006) states that:

Values education is a relatively new and growing element in education: resolving differences between what people need, what they want, and what their resource base can provide without jeopardising the future, falls within its scope (p. 256)

This study has found evidence to suggest that activity around recycling and waste management seems to dominate EFS learning, moreover, the way in which it has been approached within the schools was generally shallow, not allowing for children to explore and learn about the ‘real’ issue, and the implications for their actions. The teachers in this study could be aiming for a wider focus on EFS. Ideally, other local and relevant environmental issues should be explored, and links to global environmental issues should be made. Also, teaching children about the wider issue, and going beyond simply performing the behaviour of recycling, could perhaps encourage students to become more engaged in the learning process as their understanding is widened.

5.2.4 Section Summary

Although there was some valuable learning taking place, once again, like in the previous section on teachers’ and students’ understandings, it seems that the teachers’ general understanding of ‘EFS’ was limited, and that their knowledge of the science of global environmental issues was lacking. This in turn, affected what they were teaching, and dealing with waste within the schools may have been the ‘safest’ option, which was actually expressed by Elle.

It must be acknowledged, once again, that waste and recycling were not the only areas focused on within the schools. Students were involved in some other

extremely valuable activities including, making butterfly gardens, vegetable and flower gardening and other landscaping activities. These would certainly help students to ignite and foster a love for the natural environment, and during observations and interviews it was clear that the students really appreciated and enjoyed these experiences. However, EFS still needs to go beyond these experiences *In* the environment.

5.3 Teachers' and their Students' Education for Sustainability Knowledge and Attitudes

5.3.1 Knowledge of EFS

Steven Gould (as cited in Hart, 2003) argued that people are unlikely to protect what they do not love, and that we cannot love what we do not know. This emphasises the importance of developing a sound foundation of EFS knowledge within children in order to foster a voluntary love for the environment.

The previous section on recycling, waste management and learning taking place emphasised the need for teachers to develop better content knowledge of environmental issues. This would allow them to explore equally as important areas of EFS that appear to be, in most cases, not focused on. It cannot be expected that students of the age of the participants in this study become experts on global environmental issues, but, being introduced to some of these underlying issues in appropriate and relevant ways could be beneficial.

The need for teachers of EFS to have good understandings of the ecological concepts that they are teaching, in order to effectively implement EFS has been advocated by many (Taylor et al., 2009; Zak & Munson, 2008). Studies in other countries have indicated that environmental knowledge amongst teachers is limited, particularly in the primary sector. (Spiropoulou et al., 2007; Taylor et al., 2007). Furthermore, in Australia it has been found that some primary teachers tend to dismiss the importance of knowledge. This may in part be because EFS is presently poorly represented in teacher training courses (Cutter-Mackenzie & Smith, 2003). This finding is also reflected in New Zealand, as it has been found that primary teachers in general, are lacking sufficient content knowledge of environmental and sustainability issues and the social, cultural, economic and political dimensions of these issues (Taylor et al., 2009).

Anne specifically mentioned the need to develop knowledge and understanding of current global environmental issues within students. It is paradoxical, however, as her current teaching practices, and explanations of past teaching experiences were almost solely aimed at managing waste within the school. This inconsistency was also highlighted in Robertson and Krugly-Smol'ska's (1997) research, which found that teachers in their study emphasized that they believed environmental concerns were beyond recycling and related measures, yet all of the teachers focused on such activities. It seems that the teachers in the present study may have been aware of, and perhaps felt that they should be broadening their EFS teaching to include other important areas, but, were not actually achieving this, which is possibly due to their poor conceptual knowledge.

Robertson and Krugly-Smolka (1997) found that a discrepancy exists between EFS researchers and EFS teachers. The following discrepancy should be considered, and perhaps applied to the results of the present study. Robertson and Smolka (1997) comment that teachers want to provide EFS programmes, and those involved in EFS research want teachers to provide EFS programmes. However, the programmes and the methods each have in mind are different. The teachers are willing, but not as knowledgeable and skilled as the theorists would have it. Instead, researchers have in mind exciting ideas, such as socially critical action projects. But the teachers feel constrained by the apparent number and complexity of the tasks to be done and they feel that they lack a mandate to do what environmental researchers expect.

Although the teachers in the present study (primary level teachers), may never need to teach highly sophisticated scientific concepts of EFS, some development on their personal knowledge of environmental issues will perhaps give them more confidence in their teaching if they, themselves, are familiar with the content. This in turn, may encourage teachers to explore other environmental issues and broaden the horizons of their EFS implementation. This development of conceptual knowledge could be achieved through personal self-directed learning, but more so, should be encouraged through professional development.

Not surprisingly, the majority of students were also lacking conceptual knowledge. Betty's students were the exception, as they had more developed understandings of some of the bigger EFS issues. It seems that this was simply due to the fact that Betty believed it was important to introduce and expose

students to these issues. And although they were some of the older students in the study, it seems that age was not what determined their better understanding, nor was it Betty's more superior content knowledge, as the study did not find evidence to suggest that she had more sophisticated conceptual knowledge than any of the other teachers. More so, it was her eagerness and enthusiasm to explore these issues with her students. Once again, as stated earlier, and supported in the following section, this finding suggests that although professional development in conceptual knowledge is an essential element needed to improve the quality of EFS taking place, a personal interest and enthusiasm to teach EFS could perhaps be considered as an equally, if not, more important factor.

Cathy, whom was the only teacher that had recently received tertiary education in EFS through a compulsory year one paper, did not appear to demonstrate a better understanding of EFS in general, and the content of what she taught was not different from that of the other four teachers. This could possibly be attributed to the fact that Cathy also showed the least enthusiasm with regard to teaching EFS, and appeared to lack the personal interest in EFS that the other teachers clearly conveyed. She taught EFS because she was the most suitable person for the position, not because she had an intentionally wish to do so. Therefore, once again it could be said that tertiary or other education in EFS may not necessarily improve the teaching quality of EFS if the teacher lacks a passion for the area in the first place.

5.3.2 Passion for EFS

The value of igniting and fostering a voluntary passion and interest for the environment and EFS has been well documented in past and present research and literature (Eames et al., 2008; Hargreaves, 1996; Hart, 2003; Ministry of Education, 1999). Consistent with the findings of Eames et al., (2008), the findings from the present study indicated a great deal of enthusiasm towards EFS which Eames et al., suggested should not have come as a surprise in their study, as like this one, it targeted those voluntarily undertaking EFS. However, what was more surprising in this study, was the lack of enthusiasm demonstrated by Cathy.

Four of the five teachers, Betty and Dora in particular, showed a keen interest in EFS and expressed a genuine concern for the state of the environment and its future. This passion was evident throughout interviews and in the observations with the teachers. During interviews, an obvious commitment was sensed and the enthusiasm exerted by Betty and Dora made their passion for EFS so obvious. Cathy, on the other hand, was quite clearly not as passionate about EFS and did not seem to share the same enthusiasm that the other four teachers possessed. The results showed that the two teachers Betty and Dora, Betty in particular, who appeared to be the biggest enthusiasts and advocates of EFS, likewise, had students that showed the most genuine concern and interest in EFS. Like their teachers, the students enjoyed talking about EFS and their personal experiences and opinions on matters. It could be assumed that the importance in which a teacher places on EFS plays a pivotal role in determining the way in which his or her students learn to view it, as the students in this study certainly seemed to be influenced by their teachers' attitudes.

Helping students to ignite an interest and passion for the environment was often raised by the teachers, and Dora's hope was that with a passion for the environment, pro-environmental behaviours would then come naturally. This is supported by Hart (2003) who states that: "When students are willing to give up lunch hours and after-school time to talk about and work for environmental projects, we must believe that they are concerned, interested and caring" (p.86).

Cathy's students demonstrated the lowest understanding of EFS and also showed the least enthusiasm. This is not surprising, as Cathy clearly lacked the passion and perhaps the 'drive' that the other teachers conveyed. Cathy's students knew very little about the general meanings and concepts of EFS, and the most frequently occurring topic during interviews with them was 'trees' (and very little about them). Considering this, their lack of enthusiasm and interest in EFS is totally understandable. They had probably been limited in a sense and may not been given the opportunities that some of the other students were given in order to develop genuine interest in EFS.

Male and female students both appeared to be equally interested in and involved in EFS and no pattern or theme relating to gender was found in the data collected. Age did not seem to determine the level of passion or enthusiasm shown for EFS either. Dora had some of the youngest students and Betty the eldest, and both were equally interested in EFS. Therefore, although Kellert (1985) suggests that children aged 13-18 years seem to be the most suitable targets for fostering

appreciation of the natural world, this appreciation can also be present much earlier on.

5.4 Current EFS Structures within schools and classrooms/ Whole School Approach

The non-mandatory status of EFS meant that the structure of EFS within each school and classroom varied, according to the importance given to it as a learning area by the teachers and school leaders. Fortunately, in this study all of the schools (perhaps some more than others) claimed to be advocates of EFS, and have, or were planning on attempting to integrate it throughout their schools. However, until successful whole school approaches are achieved, the teachers in this study continued to fit EFS into their programmes where possible.

The *Guidelines for Environmental Education in New Zealand Schools* advocate the need to establish and promote whole school approaches to EFS (Ministry of Education, 1999). A relatively recent study of New Zealand schools found that very few schools reported taking a whole school approach (Cowie, Eames, Harlow, Bolstad, Barker & Keown, 2004). The teachers in the present study expressed that they would like to see their whole schools become more involved in EFS, and in some cases described instances of whole school involvement. However, the findings suggest that although each of the schools were involved in Enviroschools, which is based on a whole school philosophy, a true whole school approach to EFS was absent in all five schools.

Whole school approaches offer the transformative potential for EFS in schools. According to Yueh, Cowie, Barker and Jones (2010), this is because whole school approaches require all staff in a school to work collaboratively to integrate EFS across the curriculum, and to seek quality in the teaching-learning process through engaging in high level debates with global environmental issues. In turn, this contributes to sustain student engagement and greater appreciation of the holistic and integrated nature of EFS.

A sense of disheartenment was felt by Anne as she explained how, despite the fact that a whole school commitment was made to implement an EFS unit, she felt like only ten percent of the school were on board with EFS. Anne expressed that being in a non-leadership position made the implementation of EFS across the school extremely challenging. Therefore, informing and providing more guidance to school leaders could prove valuable in encouraging a genuine whole school approach to EFS. Eames et al., 2008 believe that:

“schools require sufficient guidance and support to firstly develop a clear understanding of why they should teach EE, secondly, to develop a vision for school-wide EE goals and aims, and thirdly to understand how EE can contribute to a school’s overall learning aims and to develop strategies and processes to achieve these aims” (47).

5.5 Barriers to the Implementation of EFS

Literature on EFS has frequently given reference to barriers to its implementation within schools and classrooms. Likewise, the teachers in this study expressed that

the teaching of EFS was challenging, and that underlying barriers were affecting the degree to which EFS was being taught.

The challenges in the implementation of EFS most commonly mentioned by teachers were time limitations. Sufficient time is essential in order to develop specific learning objectives and goals, to prepare lessons plans, and time to actually teach EFS is needed (Ham & Sewing, 1988). Teachers expressed that the teaching of EFS was affected by time constraints, as there was physically not enough time in a school day to allow them to assign adequate periods of teaching time to EFS. Once again the non-mandatory status of EFS and curriculum demands requiring teachers to spend certain periods of time teaching other mandatory subjects made it a challenge for the teachers to integrate EFS into the curriculum.

Ham and Sewing (1988), explored and identified barriers to EFS and also found that time was the teachers most important perceived barrier. Time factors were also prevalent in the perceived barriers held by the teachers in the research of others (e.g., Brown, 2003; Heimlich et al., 2004; Mckenzie, 2006; Summers et al., 2003).

Brown's (2003) study on the implementation of EFS in 100 secondary schools in New Zealand found that there were many conceptual, structural and educational barriers that existed within New Zealand schools, and that they mirrored those found in international literature. Challenges involving lack of time to prepare and teach EFS were prevalent, and due to the over-burden of teaching loads that many

secondary teachers face “teachers have neither time nor energy to look beyond what is necessary, and the planning of cross-curricular courses such as environmental education is low on the priority list” (p.111).

One barrier that has been found in other studies concerning lack of school support, and general negative attitudes towards EFS as a valuable discipline, was mentioned by two of the teachers, but it appears that all five schools seem to view EFS reasonably highly. This could perhaps be due to new initiatives like Enviroschools which have continued to increase in popularity among New Zealand Schools, with many schools either involved or planning to become involved in it.

The Enviroschools programme appeared to be highly valued by the teachers and seemed to be ‘all they had’ in a sense, in terms of resources and support. The research of Eames et al., (2008) found that challenges to teaching EFS, identified in their study are being met by the growth of the Enviroschools programme.

Although it appears that the schools were supportive of EFS, Dora’s story and Anne’s experiences, which both involved a struggle, show that the support has not always come easily. Although the schools may appear to value EFS, this study shows that it does not necessarily mean that they are making enough effort to implement it within the whole school, and therefore, like literature suggests, EFS often continues to rely on the work of one or two enthusiastic teachers. (Eames et al., 2008).

Surprisingly, none of the teachers mentioned the lack of sufficient professional development, as the findings of this study highlight the impact of professional development, or in this case, a lack of professional development. Professional development has a crucial impact on the success of EFS (Henderson & Tilbury, 2004). Only one of the teachers in this study had had any form of background tertiary training in EFS, and this consisted of a compulsory first year teaching paper. Similarly, a study examining the current state of EFS in New Zealand schools, found that many teachers had completed their training with little or no background in EFS (Bolstad et al., 2008).

Lack of professional development in EFS has been found to be a concern internationally. A three-year study of teacher and school responses to the introduction of EFS as a new subject within the Taiwan national curriculum found a lack of professional development. All of the 46 interviewees commented that, with the exception of one citywide workshop, there had been no professional development for EFS (Yueh et al., 2010).

Throughout the research there seemed to be a general consensus suggesting that teachers were happy with the quality and amount of resources available to them (solely through EnviroSchools). However, one teacher did mention a lack of clear guidelines outlining the areas that are most important to teach in EFS, and how to teach them. As mentioned earlier, this uncertainty about exactly what should be taught has been found in previous studies and recommendations have suggested that more clear assistance on exact goals and expectations of EFS are perhaps

needed (Brown, 2003; Gayford & Dillion 1995; Hargreaves, 1996; Yueh et al., 2010).

Additionally, teachers in the Hargreave's (1996) study said there was a need for resources that were directive. Although developments have since been made in the area of EFS teaching resources, other more recent studies and literature, continue to highlight a lack of resources, among the challenges and issues in teaching EFS (Cowie & Eames, 2004; Cowie et al., 2008; The Parliamentary Commissioner for the Environment, 2004).

The Ministry of Education's (1999) *Guidelines for Environmental Education in New Zealand Schools* are somewhat outdated. However, they can still be used as a valuable reference when planning and implementing EFS. The teachers in this study were either unaware of the documents existence, or, had heard of or seen the guidelines but had never used them in their teaching. This finding is consistent with McKenzie's (2006) findings. The teachers in her study were unaware of their existence. "The guidelines while regarded by many environmental educators as a valuable resource, remain unrecognised, and often un accessed" (McKenzie, 2006, p.iii). An unawareness of EFS resources has also been found to be an issue in international EFS research for example the research of Heimlich et al., 2004)

5.6 Implications

This study found evidence to suggest that:

- Quality professional development is needed. The limited understandings of EFS held by teachers and students as revealed in this study, leads to the recommendation that teachers require support to develop better understandings of the contemporary focus of EFS. Professional development in both conceptual and pedagogical knowledge is needed. Perhaps beginning with an introduction to EFS- its philosophy, and what it encompasses, as one of the main findings in this study suggests that this basic foundational knowledge is lacking. These same recommendations are not only evident in research findings today, but were highlighted in Hargreave's (1996) recommendations that were made over 15 years ago, and also Scott's (1983) research conducted close to 30 years ago.
- Teachers need to be introduced to, and have access to, universal, clearly stated guidelines, which contain information about the teaching of EFS and its essence and aims as a whole. This could improve the quality of EFS that is being taught. Because although there are supporting resources and literature available, teachers in this study did not seem to be accessing it to their advantage. For example, none of the teachers had used the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999).
- Passion for EFS is important and we must continue to acknowledge the value of the wonderful teachers who continue to implement EFS with

enthusiasm in their classrooms. It is teachers like this that we rely on as the status of EFS remains non-mandatory, meaning its future remains uncertain.

- The implementation and development of whole school approaches to EFS should continue to be encouraged and teachers and school leaders need to initiate this, therefore, more support for school leaders may also be needed to encourage collaborative EFS initiatives to take place in schools.

5.7 Limitations

The sample size of this research was considerably small, and therefore findings should be viewed tentatively. For example, due to the size of the study the results cannot be generalised to the wider population. However, they can still make a valuable contribution to current EFS research.

Children's ages varied and there was a considerable range - seven to 10 years of age. This was considered during the interpretation of the research results and when making judgments on the teachers and the students. However, it did not seem to have an impact on this particular study, and the ages were quite evenly spread across the schools.

It must be noted that the participants were not prepared for the interview questions and could have perhaps generated better responses to the questions in all areas if more time had been given. For example, more developed responses regarding

understandings of ‘environment’ may have been generated, had participants been allocated time to prepare for interview questions. Therefore, it cannot be assumed that their understanding and knowledge of EFS is poor, although some evidence from this research project may suggest so.

General factors that can influence the quality of research must be taken into account. For example, although care was taken to make participants feel comfortable, observer presence during the observations could have affected the data collected. There is also always the danger of bias influencing an interview, as interviewers are human beings, not machines, and their manner may well have an effect on the interviewees (Bell, 1999). Interviewees may respond to the questions in a way that they think the researcher wants to hear, as the presence of the researcher can affect how the interviewee responds (Creswell, 2008). “The interviewee may verbally or nonverbally encourage or reward ‘correct’ responses that fit his or her expectations” (Ary et al., 2002).

Qualitative data analysis is inevitably interpretive, “hence the data analysis is a less completely accurate representation (as in the numerical, positivist tradition) but more of a reflexive, reactive interaction between the researcher and the data” (Cohen et al., 2000, p. 282).

5.8 Research Recommendations

This research was a small scale exploration of teachers' and students' views, understandings and experiences of EFS. It could therefore be useful to undertake similar, further research employing a larger number of participants, to clarify some of the outcomes of this study, as the scale of this study does not allow for any generalisations to be applied to other New Zealand schools.

Further research could also focus on the implementation and value of teacher and school leader professional development, using action-based professional development. Action research could serve as a valuable research tool for exploring personal development in EFS, and it would be beneficial to measure the development and personal growth of the EFS teachers in this study for example.

Studies that follow EFS learning, experiences and attitudes through not only childhood, but adolescence, adulthood, and eventually old age would be of value. As we know little about what EFS learning looks like at different stages through the life course. For example, the students from this study could be involved in longitudinal research that explores their development and life experiences regarding EFS over time.

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Appendix

Appendix A: Timeline Showing the History and Development of EFS 1948-1996 (Palmer, 1998).

- 1948** ---- International Union for the Conservation of Nature and Natural Resources (IUCN) Conference – Paris – first use of term ‘Environmental Education’
- 1949** ---- Founding of IUCN
- 1965** ---- First use of term ‘Environmental Education’ in UK
- 1968** ---- UNESCO Biosphere, Paris
- 1970** ---- Founding of Council for EE (CEE) UK
- IUCN meeting, Nevada, USA. Definition of EE
- 1972** ---- UN Conference on the Human Environment, Stockholm, Sweden
- 1975** ---- Founding of (United Nations Environment Programme (UNEP) and International EE Programme (IEEP)
- UNESCO/UNEP international workshop on EE, Belgrade, The Belgrade Charter
- 1977** ---- UNESCO – First inter-governmental Conference on EE, Tbilisi, USSR
- 1980** ---- *World Conservation Strategy* (ICUN, UNEP, WWF)
- 1987** ---- UNESCO/UNEP Educational Congress on EE and Training, Moscow
- European Year of the Environment
- World Commission on Environment and Development – *Our Common Future* – The Brundtland Report
- 1988** ---- European Resolution on EE
- 1990** ---- Publication of National Curriculum Documentation for EE in England
- 1991** ---- Publication of *Caring for the Earth: A strategy for Sustainable Living*, IUCN
- 1992** ---- UN Conference on Environment and Development – ‘The Earth Summit’
- 1996** ---- Publication of *Government Strategy for EE in England*

Appendix B: Student Information

School A Students

STUDENT	GENDER	ETHNICITY	YEAR LEVEL
A1	F	Pakeha New Zealander	4
A2	F	New Zealand Maori	4
A3	F	Pakeha New Zealander	3
A4	F	Pakeha New Zealander	4
A5	F	Pakeha New Zealander	4

School B Students

STUDENT	GENDER	ETHNICITY	YEAR LEVEL
B1	M	Pakeha New Zealander	6
B2	F	American	5
B3	M	Pakeha New Zealander	6
B4	M	Pakeha New Zealander	5
B5	F	New Zealand Maori	5

School C Students

STUDENT	GENDER	ETHNICITY	YEAR LEVEL
C1	F	Dutch	5
C2	F	Pakeha New Zealander	5
C3	F	New Zealand Maori	5
C4	M	Pakeha New Zealander	4
C5	M	Pakeha New Zealander	4

School D Students

STUDENT	GENDER	ETHNICITY	YEAR LEVEL
D1	M	Pakeha New Zealander	4
D2	F	Pakeha New Zealander	4
D3	F	Pakeha New Zealander	4
D4	M	Pakeha New Zealander	4
D5	F	Pakeha New Zealander	4

School E Students

STUDENT	GENDER	ETHNICITY	YEAR LEVEL
E1 M	M	Pakeha New Zealander	6
E2	M	Pakeha New Zealander	6
E3	F	New Zealand Maori	4
E4	F	Pakeha New Zealander	4
E5	F	Pakeha New Zealander	4

Appendix C: Student and Teacher Interviews and Teacher Survey

Student Interview

Introduction

I am trying to find out more about Environmental Education. I am especially interested in what kids themselves think about learning Environmental Education. Would you be willing to talk to me about Environmental Education?

I can't write very fast, so it would help me if I could turn on the tape recorder. Then I can concentrate on listening to you without having to write. Is that OK with you?

If there are any questions you want to skip, just let me know.

If you want to stop talking to me, that's fine too.

Everything you say today will be kept completely confidential.

This piece of paper [consent form] says:

I've explained what we are going to do.

You are happy about the tape recorder being on.

You know you can skip a question, or stop talking at any time.

Everything you say will be kept confidential.

Your name will be changed in the report so no one will know it's you.

Is all that OK with you?

Sign your name here to show that you are happy about this.

Interview Questions for Students

What is the environment

- What is EE? Can you explain to me what you think the meaning of EE is?
- Have you heard of the words Education for sustainability? What do you know about this?
- Do you think it is important to learn EE? Why?
- What are some of the topics you think are important to learn about?
- What is the most important thing you have learnt in EE?
- Has learning EE changed how you think? How?
- Has learning EE changed how you act? How?
- Talk about children's experiences in the environment. (use prompts)
What kinds of things do you do at home?
- Do you ever go on trips away from school with your teacher?
- What do you expect your teacher to teach you about in relation to EE?
- What else would you like to tell me about in relation to EE?

Paper and Pencil Survey for Teachers

Your EE Background

- How long have you been a primary teacher?
- How long have you been teaching EE?
- How did you come to teach EE? And why do you teach EE?
- Do you have a passion/personal interest for EE/environmental issues if so why?
- Have you had any work experience or training in environmental education, environmental studies, or science?

Your School and EE

- How is your school involved in EE?
- Has your school developed a policy for EE? If so what?

Implementation of EE

- Is EE usually taught as a separate discipline or is it integrated into other subject areas? Why?
- What resources, support do you use to guide your teaching?
- What experiences are your students involved in beyond the school grounds?
- What are the biggest challenges that you face regarding the implementation of EE in your classroom?

Interview Questions for Teachers

View of Environmental Education

- Can you give me a verbal definition of the word 'environment'?
- What is your understanding of EE? Can you give me a verbal definition of 'environmental education'?
- What do you think about the shift from Environmental Education to Education for Sustainability? What does the shift mean to you? How has it changed what you teach?

Importance of Environmental Education

- Why do you feel that it is important to teach EE?
- What do you feel are the most important topics that you believe your students should learn about in EE?
- What would you hope that students that leave your classroom would take with them in terms of the single, most valuable learning/insight/value/attitude?

Implementation of Environmental Education

- Can you describe the current state and structure of EFS within your school/classroom?
- What teaching and learning approaches do you implement during EE? How should children be learning EE?
- Do you incorporate values education in EE/EFS? How? Eg. Are children given opportunities to discuss value judgements of themselves and other groups in society?
- Are there are certain values relating to sustainability that you should transmit to students? Which values do you think should be transmitted?

- Have you seen the Ministry of Education's Environmental Education Guidelines? How are these used and of what value are they to you?
- What does the term action competence mean to you?
- How do you feel about/go about teaching and developing values related to environmental sustainability?

Future Thoughts

- What would you like to see happening with EE in the future?
- Are there any other comments you would like to make?

Appendix D: Consent and Letters

Informed Consent – Principal

I agree to be involved in a research project giving Jade Chalmers, a Masters student from the University of Waikato the opportunity to conduct research focusing on Environmental Education taking place in classrooms. I understand that the research project will involve the researcher spending time in classrooms observing two approximately 45 minutes sessions of Environmental Education, and conducting individual interviews with the teacher and five children focused on their perspectives of Environmental Education. My name, the school's name, the teacher/s name/s and the children's names will be kept confidential to the researcher and supervisors concerned. I understand that there is a possibility of presenting the information gained from this research in articles or presentations.

Signed

Name

School

Date

.....
.....

Dear Principal,

I am a Masters student at the University of Waikato, Faculty of Education. The research project that I will be undertaking this year aims to investigate and gain a better insight into the Environmental Education or Education for Sustainability (EE/EFS) learning experiences currently taking place in some Bay of Plenty classrooms. My research will explore the perspectives that are held by children and teachers participating in EE/EFS.

For my research, I would like to spend some time in classrooms observing EE/EFS in action. I intend to learn more about the way in which EE/EFS is implemented in your classrooms. I would like to observe two approximately 45 minute sessions of EE/EFS. Another part of my research will involve individual interviews with the teacher and five of his/her students. The interviews will explore the perspectives that the teacher and the students hold towards EE/EFS. The research would be done at a time that is convenient for the teacher and the students. I will ensure that my presence causes the least possible disruption to the classroom. Field notes will be made during observations.

Participation in this research is entirely voluntary. The participants (children and their teacher) may choose not to answer a question, or stop the interview at any time. The interviews will be audio-taped with the participants' consent (you and children's caregivers will also be asked to give consent). Pseudonyms will be used in the final research report and everything that participants tell me will remain confidential. The only people to have access to the audio-files will be myself and my supervisors. What is said will remain confidential to myself and my two supervisors. When the thesis is complete and has been awarded a final grade, I will ensure that a summary of the findings from the thesis will be sent to your school and will be made available for anyone interested in accessing it. There is a possibility of presenting the information gained from this research in articles or presentations.

A consent form for you to complete is attached to this letter. If you have any questions or require further information, please feel free to call me on 021 1107906 or email jadechalmer@hotmail.com or, contact my chief supervisor Professor Jenny Young Loveridge on (07) 838 4353 educ2233@waikato.ac.nz.

Yours sincerely,

Jade Chalmers

Informed Consent – Teachers

I agree to be involved in a research project giving Jade Chalmers, a Masters student from the University of Waikato the opportunity to conduct research focusing on Environmental Education taking place in classrooms. I understand that the research project will involve the researcher spending time in my classroom observing two approximately 45 minute Environmental Education lessons, and conducting individual interviews with myself and five children focused on our perspectives of Environmental Education. I understand that children who decline to consent will still be part of the observation and note-taking conducted by the researcher. However, care will be taken to ensure that the researcher does not intentionally focus observations or note-taking on the particular child/children. I am happy to complete a brief paper and pencil survey to bring to the interview. My name, the school's name, the principal's name and the children's names will be kept confidential to the researcher and supervisors concerned. I understand that there is a possibility of presenting the information gained from this research in articles or presentations.

Signed

Name

School

Date

.....

.....

Dear Teacher,

I am a Masters student at the University of Waikato, Faculty of Education. The research project that I will be undertaking this year aims to investigate and gain a better insight into the Environmental Education or Education for Sustainability (EE/EFS) learning experiences currently taking place in some Bay of Plenty classrooms. My research will explore the perspectives that are held by children and teachers participating in EE/EFS.

For my research, I would like to spend some time in your classroom observing EE/EFS in action. I intend to learn more about the way you implement EE/EFS in your classroom. I would like to observe two approximately 45 minute sessions of EE/EFS. Another part of my research will involve individual interviews with you and 5 of your students. Would you mind asking your children who would be interested in being involved, and then select five children with good communication skills and with a range of ability to be interviewed. The interviews will explore the perspectives that you and the students hold towards EE/EFS. The research would be done at a time that is convenient for you and the students. I will ensure that my presence causes the least possible disruption to your classroom. Field notes will be made during observations.

Participation in this research is entirely voluntary. The participants (children and their teacher) may choose not to answer a question, or stop the interview at any time. The interviews will be audio-taped with the participants' consent (principals and children's caregivers will also be asked to give consent). Pseudonyms will be used in the final research report and everything that you and the students tell me will remain confidential. The only people to have access to the audio-files will be myself and my supervisors. What is said will remain confidential to myself and my supervisors. When the thesis is complete and has been awarded a final grade, I will ensure that a summary of the findings from the thesis will be sent to your school and will be made available for anyone interested in accessing it. There is a possibility of presenting the information gained from this research in articles or presentations.

A consent form for you to complete is attached to this letter. If you have any questions or require further information, please feel free to call me on 021 1107906 or email me on jadechalmer@hotmail.com or, contact my chief supervisor Professor Jenny Young Loveridge on (07) 838 4353 educ2233@waikato.ac.nz.

Yours sincerely,

Jade Chalmers

Informed Consent – Parents

I agree for my child to be involved in a research project giving Jade Chalmers, a Masters student from the University of Waikato the opportunity to conduct research focusing on Environmental Education taking place in classrooms. I understand that the research project will involve the researcher spending time in my child’s classrooms observing Environmental Education lessons, and conducting interviews with the teacher and some of the children, including my child. The interviews will focus on the children’s perspectives of Environmental Education. I am aware that interviews will be audio taped, but will remain entirely confidential to the researcher and her supervisors. All records will be destroyed six months after the researcher’s grade has been assigned. I understand that if my child declines to consent he/she will still be part of the observation and note-taking conducted by the researcher. However, care will be taken to ensure that the researcher does not intentionally focus observations or note-taking on my child. The introductory letter has provided an explanation of the study details to my satisfaction, and I understand that I may ask further questions at any time. I am free to withdraw my child from the study and my child may withdraw herself/himself from the study within two weeks of the interviews taking place. The principal’s name, the school’s name, the teacher/s name/s and the children’s names will be kept confidential to the researcher and supervisors concerned. I understand that there is a possibility of presenting the information gained from this research in articles or presentations.

Signed..... Your Name..... Child’s Name.....

School..... Date.....

Dear Parent or Caregiver,

I am a Masters student at the University of Waikato, Faculty of Education. The research project that I will be undertaking this year aims to investigate and gain a better insight into the Environmental Education (EE) learning experiences currently taking place in some Bay of Plenty classrooms. My research will explore the perspectives that are held by children and teachers participating in EE. As part of my research, I will be interviewing the teacher and some students in individual interviews to explore their perspectives. Your child volunteered, and was then selected by his/her teacher to participate in a brief conversation/interview. Your child's teacher was encouraged to select five children whose ability across all measures varied.

Participation in this research is entirely voluntary. Your child may choose not to answer a question, or stop the interview at any time. The interviews will be audio-taped with your child's consent. Your child's name will not be used in the final research report and everything they tell me will remain confidential. The only people to have access to the audio-files will be myself and my supervisors. What is said will remain confidential.

When the thesis is complete and has been awarded a final grade, I will ensure that a summary of the findings from the thesis will be sent to your school and will be made available for anyone interested in accessing it. There is a possibility of presenting the information gained from this research in articles or presentations.

A consent form for you to complete is attached to this letter. If you have any questions or require further information, please feel free to call one me on 021 1107906 or email me on jadechalmer@hotmail.com or, contact my chief supervisor Professor Jenny Young Loveridge on (07) 838 4353 educ2233@waikato.ac.nz.

Yours sincerely,

Jade Chalmers

Informed Consent – Students

My teacher and Jade have explained to me what Jade will be doing with us, and she is having an interview/conversation with me. I am happy for a tape recorder to be on while I am being interviewed. I know I can skip any questions that I don't want to answer, or stop talking at anytime. I know that if I choose not to participate in this interview I will still be part of the observations. However, Jade will try not to focus any of her observations or note-taking on me. I know that what I say will be kept private and my real name will not be used in the written report. I am happy to participate in this research project.

Signed

Name

Date

.....
.....

Student's Consent

It has been explained to me what we are going to do. I am happy for the tape recorder to be on. I understand that I can skip a question, or stop talking whenever I want. I know that everything I say will be kept private, and that my name will not be used in the report.

Signed:

Name:

School:

Room: Year:

Age:

Date of Interview:

Gender: Male or Female

Ethnicity: NZ Maori
 Pasifika: Island group.....
 Pakeha New Zealander
 Other

Appendix E: Ethics Application

THE UNIVERSITY OF WAIKATO

SCHOOL OF EDUCATION RESEARCH ETHICS COMMITTEE

**APPLICATION FOR ETHICAL APPROVAL OF
SUPERVISED GRADUATE/POSTGRADUATE RESEARCH PROJECTS**

DETAILS OF THE PROJECT

Research question(s)

What learning is taking place in EE/EFS classrooms?

What perspectives are held by teachers and children participating in EE/EFS?

Justification

Environmental education is not a new fad, its roots date back to the 1960s. It has become more of a priority as it has been discussed, debated, developed, and evolved over the years to become known as Education for Sustainability. Experts believe that this type of Environmental Education should be holistic, value laden and action orientated if it is to produce positive outcomes (Taylor, Littledyke & Eames, 2009). The most notable difference in the shift from environmental education to education for sustainability appears to be the other disciplines it more completely encompasses. Heimlich asserts that “A decision on an environmental issue requires all facets of society to be considered” (Heimlich, 2002. p. 25). Education for sustainability aims to educate future citizens, placing a stronger emphasis on trying to integrate environmental, social, cultural and economic concerns. “The central purpose of EFS is to for students to develop a disposition to act-to choose to live in a sustainable way” (Taylor, Littledyke & Eames, 2009, p. 128).

Constraints in the implementation of EE/EFS appear to exist. In their research, Cowie and Eames (2004), Cowie, Eames and Bolstad (2008) and the Parliamentary Commissioner for the Environment (2004) all discuss challenges and issues in the teaching of EE/EFS that arose in their studies. Challenges included: provision of teaching and learning resources, professional development,

time for planning and action, funding for equipment and projects, external support, in-school leadership and support, whole school involvement, and the non-mandatory status of EE/EFS. Although EE/EFS remains non-mandatory it has been recognised in the new curriculum, and is weaved throughout the document in its vision, values, principles.

Enviroschools is a relatively new initiative that has become increasingly popular throughout New Zealand and has grown to involve a quarter of New Zealand schools. In 2009, there were 79 Enviroschools in the Bay of Plenty (38% of schools in the region). (Enviroschools, 2009). It is a collaborative network made up of people from a range of organisations. It seeks to “engage young people in creating healthy, peaceful and sustainable schools and communities. Students learn by working on real projects that involve decision making, planning, budgeting, implementation and monitoring” (Enviroschools scrapbook, 2009).

This research project aims to investigate and gain a better insight into the EE/EFS learning experiences currently taking place in Bay of Plenty classrooms. It will explore the perceptions that are held by children and teachers participating in EE/EFS.

Procedure for recruiting participants and obtaining informed consent

My research will involve gaining access to five local schools in the Bay of Plenty. Five teachers and their year 4, 5 or 6 students will participate in the study. I intend on observing two approximately 45 minute blocks of EE/EFS learning and teaching in action in each of the five classrooms. Each teacher will be asked to fill out a brief questionnaire and will also participate in one approximately 20 minute interview with me. Five children from each classroom will also participate in brief individual interviews with me.

In order to recruit participants I will contact schools in the Bay of Plenty area via phone call, and firstly find out whether their school promotes environmental education and secondly which teachers in the schools teach environmental education. Schools will be chosen based on information I already have about particular schools in the Bay of Plenty and personal contacts. I have become aware, through practicum placements and word of mouth, of schools in the area that are involved in EE/EFS. I therefore intend on making contact with these schools. Because I am aware that there are not too many schools involved teaching EE/EFS regularly, I will take advantage of the information I have and contact the schools that I know are advocates of EE/EFS. There will be no particular reason for choosing any of the schools, other than the fact that they are teaching and learning EE/EFS. The first schools that give consent will be the schools that participate. Three of the schools that I am likely to make contact with are Te Ranga School, Ti Akau Ki Papamoa School and Te Puke Primary School. Schools will also be chosen based on relationships I have with two teachers who are responsible for teaching EE/EFS at Te Ranga and Te Puke. I believe that they would both be interested in participating in my research. I have friends teaching at other schools in the Bay of Plenty whom I will make contact with, as they may be

able to help me gain access to schools. I will also speak with Tauranga lecturers, Nigel Caulder and Marg Cosgriff, as they may be aware of suitable schools.

Teachers will be chosen based on schools that are chosen. When I have made contact with schools and found out which teachers are currently responsible for teaching environmental education within the schools, I would then make arrangements to phone or meet with each teacher and explain the purpose and procedure of my research, informally asking them if they would be willing to participate in the project. If a teacher is willing to participate I would ask him or her how they think is the best way of introducing the students to the project. The teacher may decide to introduce the research project to his or her students or may like me to be present. Once the more informal recruiting process is complete, I will then seek to obtain formal consent. Because the students will be Years 4, 5 and 6, Principals, teachers, parents and students will be presented with formal consent forms clearly outlining the research project and the participants' role within the research. If signed consent is not gained from both students and their parents/caregivers I will ensure that the students do not participate in any of the direct interviews or surveys, but, however they may be present during whole class observations.

Children will be asked by their teacher to volunteer to participate in interviews and five children will then be selected by the teacher. The teacher will be encouraged to select five children whose abilities across all measures vary. However, the children should have good communication skills, as this would allow the interviews to be most valuable and productive. The communication skills do not have to be outstanding; however, skill of a standard that would allow a quality conversation to take place would be beneficial.

Procedures in which research participants will be involved

Participants will be involved in observations, semi-structured interviews, and paper pencil surveys. During the two approximately 45 minute observations, teachers and students will be participating in normal EE/EFS teaching and learning. I will ensure that I am positioned in a suitable part of the classroom so that I will be causing the least possible distraction to the teacher and the children. During the observations I will be taking continuous narrative field notes of what occurs during the lessons. For example, in each observation I will make note of the content, focus and structure of the lesson, the teacher's approach to the implementation of the lesson, the activities in which the children are involved in, and any other relevant or interesting and unplanned for occurrences that will provide a good insight of the lesson. Some conversations that take place between the teacher and students, and students themselves, may be recorded. The field notes will then be transcribed and used throughout the research project. The semi-structured interviews will require 5 students from each of the three classrooms to participate in an approximately 15 minute discussion with me. Teachers will be required to complete a brief paper pencil survey, and will then participate in one

approximately 20 minute semi-structured interview. The interviews will be voice recorded and later transcribed.

Procedures for handling information and materials produced in the course of the research

All materials including observational notes, interview transcripts, recordings and other information will be stored safely in a locked filing cabinet, with only the researcher having access to any of the information. Once a grade is allocated for the research, the information will be safely discarded.

ETHICAL ISSUES

Access to participants

I am not in normal contact with the participants. Therefore, I will need to gain permission from the principal, teachers, and parents before commencing the research. I have friends teaching at schools in the Bay of Plenty whom I will make contact with, as they may be able to help me gain access to schools. I will also speak with University of Waikato lecturers in Tauranga, Nigel Caulder and Marg Cosgriff, as they may be aware of suitable schools. The procedure that I adopt to gain access to participants will be carried out formally through firstly, less formal phone calls then formal letters, introductions and written consent forms. If a school chooses not to participate in the project I will respect their decision. Before commencing any research with the students I must ensure that parents have signed and agree to their children partaking in the project.

Informed consent

Informed consent will be gained through formal letters to principals, teachers, parents and children. Each letter will be suitably designed to suit its audience. For example the children's consent letter will be written in a much simpler form of language than that of the principals' letters. Each letter will clearly outline the purpose and procedure of the research project. No information will be kept secret.

Confidentiality

I will not discuss any matters concerning participants in the project with any person other than my supervisors. Pseudonyms will be used and children's and teachers' names will not be used in any discussions. All information gathered by the researcher will be kept confidential and will not be shared with any person. I will ensure that the participants know that the findings of the research will contain data from participants, however, their names will never be used.

Potential harm to participants

The students learning could potentially be disrupted by the research project. Every effort will be made to minimise classroom disruption and ensure that classroom life can continue as naturally as possible. I will always pre arrange suitable times with teachers to ensure that critical classroom activity or learning is not disrupted. I will be well organised and prepared, ensuring that observations and interviews are conducted efficiently with little learning time wasted.

Some questions regarding personal opinion will be asked and participants will be encouraged to express their personal views. However, I will not pressure participants to discuss something that they wish not to share. Participants can choose not to respond to particular questions. I will ensure that all participants know that this research project is not in any way a personal judgment of them, it is about learning about current practice, to inform and improve future practice. This research will not require participants to make comments or judgements on other people.

Participants' right to decline to participate and right to withdraw

All participants will have the right to decline and withdraw from the study before the study has endured for one month. If a participant decides to discontinue with their participation in the project they can approach either my two supervisors or I. No explanation or reason is needed. Participants will have mine and my supervisors contact details readily available to them. I will ensure that participants are aware that they have the right to withdraw before a certain date and that they know the procedure of withdrawing. The data that is collected from participants may also be withdrawn by the participant/s if he or she chooses to withdraw the information. However I will make participants aware through consent letters that they can withdraw the information up to one month after the data is collected.

- i) Indicate what activities you require participants to do in your study

The study will require participants to participate in observation and interviews. I will observe students and their teachers participating in EE on two separate approximately 45 minute observations. Teachers will participate in a brief pencil paper survey followed by an approximately 20 minute individual interview. Five students from each of the five classrooms will participate in an approximately 15 minute interview.

- ii) Indicate how much participants' time will be required

Each whole class observation will run for approximately 45 minutes. Interviews will run for up to approximately 20 minutes each.

Following interviews with teachers, I will ensure that I check if there was anything that was discussed that they prefer I delete, and not use in any of the project. I will also check with the children that they are happy for me to use the information they disclosed. This will be achieved by informing children

after the interviews that I will now be using some of the information they gave me in my report, and that if they wish for anything that was discussed to remain private and not be used, they can advise me of this and that I am happy to do so.

Arrangements for participants to receive information

I will keep the participants informed about the research and its results by discussing my progress with the teachers. If a participant requests to view data collected from them I will have it readily available for them to see. Interview transcripts will be returned to participants. I will also make it clear to the participants that the results can and will be discussed with them if they wish, and that they are easily able to access an electronic version of the thesis, as Masters theses are required to be lodged in the Australasian Digital Thesis (ADT) database. Once the thesis is complete I will also send the school a summary of the research findings.

Use of the information

I will ensure that participants are aware that I do not have the right to share the research information in any public arena other than in my research. However, there is a possibility of writing articles based on the thesis and sharing my research at a presentation seminar. Therefore I will need to gain all participants formal consent through signed letters of permission.

Conflicts of interest

There are no obvious conflicts of interest in my research project at this stage.

Procedure for resolution of disputes

In case of dispute, I will ensure that all participants are made aware in initial consent forms that the procedure for any dispute requires them to contact myself or supervisors. The supervisors contact details will be made readily available to all participants.

Other ethical concerns relevant to the research

At this stage, no other ethical concerns have been identified.

Cultural and Social considerations

Every effort will be made to ensure that participants of cultural backgrounds different from those of the researcher's are respected at all times. I am aware that my culture and background as a researcher will differ from the culture and backgrounds of the participants. I will ensure that I am culturally sensitive and responsive. For example I will make participants aware that they can choose not to discuss matters or topics that they wish not to.

LEGAL ISSUES

Copyright

Copyright gives the exclusive right to the creator of a work to reproduce it. Copyright includes a number of rights relating to a work - to perform, play or show the work in public, to broadcast the work, or to make an adaptation of the work, for example. And copyright ownership is quite separate from ownership of the work. Copyright for this research will rest with the University of Waikato.

Ownership of data or materials produced

The participants own the data. The researchers and the University own the research report and any writing that comes from the report.

Any other legal issue relevant to the research

No other issues are anticipated at this stage.

Place in which the research will be conducted

Research will be conducted in the classrooms within each of the selected schools, which are unknown at this stage.

Has this application in whole or part previously been declined or approved by another ethics committee?

No

For research to be undertaken at other facilities under the control of another ethics committee, has an application also been made to that committee?

N/A

Is any of this work being used in a thesis to be submitted for a degree at the University of Waikato?

Yes (information about participants access to electronic copies is detailed in the information letters).

Further conditions

None at this stage

RESEARCH TIMETABLE

Proposed date of commencement of data collection

April 15th 2010

Expected date of completion of data collection

June 15th 2010

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