# Education for Sustainability in transition of children from early childhood education to primary school

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# Abstract

This study examined the understandings gained by young children from education for sustainability experiences in their early childhood education and their actions and behaviours related to sustainability in their later years. Furthermore, the study investigated what environmental knowledge and behaviours were transferred across spaces and time, and what affordances make this possible and what constrains the process. The Aotearoa New Zealand early childhood curriculum, *Te Whāriki* (1996) and the *New Zealand Curriculum* (2007) were considered in terms of education for sustainability and their place in the transference of knowledge across spaces.

This was a qualitative, in-depth case study which examined the teaching and learning experiences for a group of students, (aged 5 -7 years) from one early childhood centre and their subsequent use of knowledge and behaviours at two primary schools in the Canterbury region of New Zealand. The data was collected from interviews and focus groups with student participants, teachers (both early childhood and primary) and written surveys by parents/whanau. In the student focus groups the student participants were shown a range of photographs of environmental activities or areas of interest from the early childhood centre they attended prior to enrolling at primary school, as a catalyst for recall and prompt for discussion.

A number of significant findings emerged from this study. For example; this study demonstrated that the student participants were identifying with tangible objects and resources around education for sustainability; therefore potentially these had a strong influence on their knowledge and practices. A number of affordances influenced this outcome, for example; pedagogical approaches and the interconnected relationships between the child, the family, the early childhood centre and the school. Finally the study has identified that an encompassing, holistic approach and the influence of home, the early childhood centre and primary school influences children's developing environmental competencies and ultimately the development of their identity. This study identified that with an

alignment of affordances young children were demonstrating thinking and actions from the dimension of education *for* the environment and were beginning to develop action competence.

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# Chapter 1 Introduction

## 1.1 Rationale

This study is concerned with education for sustainability, transition and identity. It examines the understandings gained by young children from education for sustainability experiences in their early childhood education, and their actions and behaviours related to sustainability in their later years.

From a personal and professional standpoint, I have taught in a kindergarten belonging to the Enviroschools Programme in Auckland, New Zealand. This kindergarten was one of the first in New Zealand to obtain the Enviroschools Green Gold Status, awarded to schools and early childhood centres that have reached a high level of sustainability practice. This experience gave me the opportunity to observe the powerful implications and outcomes for children and teachers working within a sustainable learning environment. Working alongside passionate, experienced and committed teachers whose environmental practices were at the core of their teaching and on-going learning, and whose philosophical beliefs viewed children as competent and capable individuals, has been a major catalyst for me to further investigate education for sustainability in early childhood education. One of these teachers, who had completed degree-level papers in environmental education, was an inspiration to the current study. Having peers whose practice was supported by current research in education for sustainability was exciting and enriching.

As a teaching team, our kindergarten staff presented several times on our learning environment and sustainable teaching practices to not only the early childhood community, but to primary teachers, city councils and early childhood groups in Australia. One outcome from participant evaluation and reflection from these presentations is that teachers are desperately searching to source more information, both practical and academic knowledge, particularly from the early childhood sector. This was another justification for the current study.

As a teaching team, each day we observed and reflected on the teaching and learning around our EfS programme which was entrenched in our daily rhythm

across the kindergarten. Each of the teachers focussed on their teaching style to support opportunities for child-directed inquiry, curiosity and wonder. Teachers were facilitators as children worked together to forge working theories to discover and find solutions. From observing these children, I would ponder as to what happens next? What do children do with this knowledge when they move from a rich, resourced and responsive early childhood environment? How can we ensure they take not only the experiences and knowledge with them, but the ways in which they gained knowledge? What is it that we do as teachers in an early childhood environment with an EfS focus that children are connecting with? These questions were raised at many team meetings. With more questions than answers, it was consequential that we needed to investigate further. This lead to the current study which focused on both EfS and the transition from early childhood education to school.

From a political standpoint, this study gives evidence to support teaching and learning (the pedagogy) of environmental and sustainability programmes within early childhood education and primary schools. To date, professional development within this area is underfunded and there is an increasing demand for more knowledge and guidance. It is a desired outcome of this study to highlight the need for leadership and development programmes from an education for sustainability perspective and to inform better education for sustainability teaching practices and learning across early childhood education and primary schools.

### 1.2 Background

Early childhood education in New Zealand is diverse, ranging from community based to private services, which cater for children from birth to 5 years. These services are licensed and partly funded by the Ministry of Education. "Early childhood education services in New Zealand have been established to meet the particular needs of children, parents and communities" (Ministry of Education, 1996, p. 7). In their fifth year, children enrol at primary school. Transition programmes that support the child from an early childhood centre to primary

school are not mandatory, and policy and procedures around this transition phase are specific to each context.

Early childhood education in Aotearoa New Zealand is guided by *Te Whāriki*, the early childhood curriculum. *Te Whāriki* (Ministry of Education, 1996*),* has the title translated from Māori as the analogy of 'the woven mat'. The underlying concept of this document "recognises the diversity of early childhood education within Aotearoa New Zealand. Different programmes, philosophies, structures, and environments will contribute to the distinctive patterns of the whāriki*"* (Ministry of Education, 1996, p. 11). *Te Whāriki* is based on a socio-cultural framework and has a holistic view of the child as an active, competent learner.

### 1.3 Research question

The research question that guided this study was:

How does education for sustainability in early childhood education influence young children's environmental knowledge and actions in later years?

With two further sub-questions:

- What environmental knowledge and behaviours are transferred into other spaces and time by young children?
- What affordances make this possible, and what are the constraints?

The study explored the multiple complexities of the ideas of sustainability and the interconnectedness of early childhood education, education for sustainability (EfS) and transition and identity. The study aimed to examine the durable impacts of an EfS programme on young children as they transitioned from early childhood to primary education. The study also explored the links between the early childhood curriculum, *Te Whāriki* and the *New Zealand Curriculum* for primary schools in terms of EfS. Throughout my teaching career, I have used the learning story format as an assessment tool. In this study, I have used the child's voice format for data collection. This narrative tool allowed me to identify the propagation of knowledge and the characteristics of the sustainability programme in the early childhood setting that are transferred into other realms. This may then

influence and inform practices within the early childhood community in the future.

### 1.4 Thesis outline

The thesis is composed of 5 chapters.

Chapter 1 is this introduction and sets the context for the thesis.

Chapter 2 is the literature review. The review explores the multiple complexities of education for sustainability (EfS) and its intersection with the realm of identity and transition from early childhood education into primary schooling.

Chapter 3 is the methodology section. The methodology chapter describes the methodology and methods undertaken for data collection for the research project. It explores the paradigm employed, the research sample and the interview design. Finally ethical issues, such as confidentiality and bias are discussed.

Chapter 4 is the findings section. This chapter presents the findings of the research project and highlights the themes that have emerged from the data, and uses quotations from participants to exemplify these themes. The themes relate to the research question as they identify what the student participants are connecting with over space and time, and therefore suggest what they are engaging with, and what knowledge is being transferred. The themes also connect to thinking around education for sustainability, and what affordances and constraints support or suppress these ideas and actions.

Chapter 5 is the discussion section which weaves the literature and the study findings together. The discussion section responds to any emergent themes and supports these with literature. Finally this section culminates with recommendations and implications that have transpired from this study.

# Chapter 2 Literature Review

## 2.1 Introduction

This review explores the multiple complexities of education for sustainability (EfS) and its intersection with the realm of identity and transition from early childhood education into primary schooling. Within this framework I outline a definition and brief historical perspective of EfS and examine the key ideas of EfS. I then identify current global trends in EfS and consider these from an early childhood education perspective. A number of theories and approaches are identified which have influenced early childhood education in Aotearoa New Zealand. Then I examine both the early childhood curriculum, *Te Whāriki* (Ministry of Education, 1996), and *The New Zealand Curriculum (*Ministry of Education, 2007*)* for schools, to identify links to EfS, and to highlight correlations and contrasts between these two documents. This is followed by a review of the transition and identity literature to explore the concept of children and change. Finally, I identify the key themes and contradictions that emerge from the examined literature, and discuss gaps within it and thus create a platform for the proposed study.

In a report published by the Intergovernmental Panel on Climate Change (IPCC) on Impacts, Adaptation and Climate Change (IPCC, 2007), a working group highlighted the risk to many social, biological and geographical systems risk due to climate change . Similarly, in an introduction to an edited primary schooling text by Littledyke, Taylor and Eames (2009), the authors stated:

> Our planet is sick. Our children will grow up with the legacy of mismanagement of previous generations, including ours, which has resulted in visible signs of large-scale environmental and social damage associated with climate change, eco-system destruction, resource depletion and pollution resulting from human activity (p. x).

These quotations illustrate a belief that sustainability issues, such as climate change, and world population growth are placing resources for survival under pressure. These issues are important for educators to consider in preparing children for the world that they will grow into. From an early childhood perspective, Sue Elliot, a leading early childhood environmental educator from

Australia, has claimed that, "it is becoming clearer that living sustainably is essential, not optional. There is no negotiation, education for sustainability is critical" (2010, p. 34).

Although this literature review is concerned with education for sustainability, it is my purpose to move beyond this. This study explores the different pedagogies within existing early childhood EfS programmes that can weave together a rich culture of sustainability and education for the environment. In doing this, it investigates how these programmes have affected young children's knowledge, attitudes and actions as they transitioned across spaces. This review then is concerned with the interconnectedness of sustainability, teaching and learning, identity and transference. To understand the current thinking around EfS, I firstly define EfS and then consider this from within a historical context.

**2.2 Defining Education for Sustainability**

It is clear from the literature that defining sustainability, and therefore what it means to educate for sustainability, is challenging. Davis (2010), a prominent Australian researcher on early education and sustainability, agrees, stating that, "Sustainability is a confused and contentious topic that has no universally accepted terminology or definition" (p.2). Furthermore, in Aotearoa New Zealand, the Parliamentary Commissioner for the Environment (2004) stated that "education for sustainability is still developing as a body of thinking. It draws on many theories and ideas from education and sustainability discussion" (p. 42).

More recently, Taylor, Littledyke and Eames (2009) suggested a possible definition when they stated that, "Education for sustainability addresses the complex set of factors that interplay between social, environmental and economic conditions that make up the world we live in" (p.4). Similarly, Davis (2010), stated "sustainability emphasises the linkages and interdependences of the social, political, environmental and economic dimensions of human capabilities" (p. 2). Elliot (2010) identified a more philosophical definition as, "education for sustainability is about questioning the way we live, the impacts we create as a

unique part of Earth's systems, and about creatively thinking of ways to live more lightly on the earth" (p. 1).

The consideration of the future focus or future dimension has also been identified within the EfS literature. Tilbury (1995) identified the need moving forward and explored the future dimensions of EfS. She described the future dimension as incorporating the "concept of 'empowerment' and 'action'" (p. 207). Like Davis (2010), Tilbury (1995) highlighted that "through EEFS (environmental education for sustainability) students consider the desirability and possibility of a greener economic, social and political society" (p. 207). This interconnectedness between the economic, social, political and environmental dimensions of sustainability is an important consideration in the current study.

It is evident that the literature is advocating that education for sustainability is not optional. While the review of literature has identified a number of definitions for EfS, the impetus for EfS to connect the environmental with the social, political and economic realms is clearly evident, as is thinking around a future focus dimension. These key ideas have arisen from a variety of sources in recent history.

### 2.3 History of Education for Sustainability

It could be argued that education for sustainability (EfS) has developed from the allied field of environmental education (EE). Tilbury (1995) suggested that during the 1970's there was growing concern globally over environmental issues and this gave rise to an environmental education approach. Tilbury examined the transition of 'environmental education' to 'environmental education for sustainability' (EEFS), and questions on how the two differ. Tilbury suggested that "the concept of 'sustainability' first emerged in the early 1980's" (p. 197) and went on to explain the term 'sustainability' was being used in environmental education in the 1990's. The Tilbury (1995) article does offer some insight into the history of environmental education which is useful for the current study, however, it lacks a global perspective as much of the data and ideas are drawn from Britain.

The key documents emerging from international events can be seen to have contributed to the development of education for sustainability. These included: the *Tbilisi Declaration*, the *Brundtland Report* and *Agenda 21*. These are viewed as key documents in the development of education for sustainability. The key ideas of these documents incorporate thinking around the interconnectedness of the social, environmental and economic dimensions, with an element of future focus for sustainability moving forward. The key ideas that are relevant to the current study and that may contribute to the current understanding of EfS were: the re-orientation of environmental education towards sustainability; to achieve environmental and development awareness in all sectors of society; the integration of environmental concepts into educational programmes; the development of innovative teaching methods for educational settings; international governmental support for tertiary networks for environmental education; and to provide every person with the opportunity to acquire knowledge and skills to protect the environment (Eames & Cowie, 2004; Parliamentary Commissioner for the Environment, 2004; Tilbury, 1995; UNCED, 1992). Henderson and Tilbury (2004), in a study which examined worldwide initiative approaches to sustainability, suggested that these documented commitments "have advocated for education reform or reorientation to reflect the new sustainability agenda" (p. 16). The literature here identified an international commitment to EfS and further emphasised the rationale for the current study.

Similarly, in Aotearoa New Zealand, in a text written by the New Zealand Parliamentary Commissioner for the Environment (2004), this shift and momentum of the notion of 'sustainability' over the 1990's is also identified. The Commissioner identified that education is, "essential for environmental sustainability and to sustain the social, cultural and economic well-being of people living now and in the future" (p. 37).

The response to this momentum has seen several initiatives for EfS within Aotearoa New Zealand. One of these was identified by Littledyke, Taylor and Eames (2009), where they stated that, "More recently, the [Education] Ministry's Statement of Intent 2007-2012 has identified sustainable development as a key

focus for education in [Aotearoa] New Zealand" (p. 2). This theme is developed further in the section on history of EfS in Aotearoa New Zealand.

### 2.3.1 History of EfS in Aotearoa New Zealand

Aotearoa New Zealand has seen more than 40 years of education for the environment. Bolstad (2003) identified that globally environmental education is imperative and that a number of schools were orientating towards sustainability. In 2003, Bolstad argued that within the Aotearoa New Zealand context environmental education had yet to become accepted as a part of teaching and learning and lacked integration within the school curriculum. From an early childhood perspective, Duhn, Bachmann and Harris (2010) align with Bolstad's (2003) stand point, when they claimed, "Internationally, education in general, and early childhood education in particular, has been slow to engage with global change" (p. 1). It is argued that the pace is slowly gathering momentum with several authors examining both EfS within Aotearoa New Zealand and Australia (Davis 2010, Eames & Cowie 2004). Eames and Cowie (2004) identified that, "since the early 1990's a number of developments have been made in environmental education policy, curriculum, and support, all of which have created opportunities for New Zealand [Aotearoa] schools to develop their own environmental teaching and learning programmes" (p. 180). Within Aotearoa New Zealand, one such initiative is the Enviroschools Programme which was developed in the Waikato in the 1990's.

In 2012, the Enviroschools Programme celebrated its 10 year anniversary. The initiative was first piloted in Waikato, Aotearoa New Zealand with 3 schools under the Hamilton City Council (Cowie & Eames, 2004). The Enviroschools programme is now a national movement and the growth of the initiative has seen its ethos woven into 828 schools, kura and early childhood centres throughout Aotearoa New Zealand to date. Currently approximately 120 early childhood services are enrolled, this being 2.5% of the total of early childhood centres in New Zealand are part of the Enviroschools network. The programme promotes a whole school approach to sustainability and places on the programme are increasingly in demand (Chapman & Eames, 2007). The programme is now

managed by the Enviroschools Foundation and implemented by regional and district councils. The Enviroschools programme has received both private and government grants (Henderson & Tilbury, 2004). The programmes run by the Enviroschools Foundation aim to "empower and enable individuals, families and schools to work together to create healthy, peaceful and sustainable communities. Building strong connections and trusting relationships is at the heart of this, as is fostering a culture of creativity and sharing" (Enviroschools, 2012).

### 2.4 Some key ideas of EfS

Many common conceptions within education for sustainability appear to correlate with the terms commonly used within the rhetoric of early childhood educators, such as: holistic, authentic, social, creative, critical thinking and inquiry. Likewise, Elliot (2010) identified that 'these pedagogical elements are fundamental to early childhood education. In other words, early childhood education has a pedagogical advantage for education for sustainability' (p. 35). Therefore, it appears sensible that young children are exposed to education for sustainability in the early years. Davis (2010) concurred, arguing that, "the value of starting early with education for sustainability is becoming much clearer, even if the practice and research is yet to fully emerge" (p. 228). This also emphasises the multiple complexities of EfS and identified the lack of current research in EfS in early childhood education.

To create a framework for education for sustainability, several authors (e.g. Barker & Rogers, 2004; Davis, 2010; Eames & Cowie, 2004; Gralton, Sinclair & Purnell, 2004; McLean, 2003; and Tilbury, 1995) categorised environmental education into a threefold approach commonly identified as education *in*, *about* and *for* the environment. The Ministry of Education (1999) suggested education *in* the environment allows for first hand experiences, education *about* the environment is knowledge that is taught about the environment, and education *for* the environment explores a more in-depth level of environmental education which culminates in thinking and action and / or change *for* the environment.

The authors listed above have argued that the dimensions of education *in* and *about* the environment, which have dominated our education system in Aotearoa New Zealand, are insufficient and can have little or no effect on children's attitudes and behaviours. As Davis (2010) suggests, "learning in and about the environment is not sufficient for laying the foundations of sustainable living" (p. 31). She identified that just learning *in* and *about* the environment lacks the human-environment interactions and the consequential problems. Alternatively, education *for* the environment is based on a more active role as this advocates work from an inquiry base, or as Davis (2010) described, "this form of EE [environmental education] adds the socio-political dimension" (p.31). Likewise, Tilbury (1995) stated that "education for the environment regards environmental improvement as an actual goal of education" (p. 207). Tilbury (1995) goes on to suggest that this dimension allows for a sense of responsibility and active pupil participation. It is from within this realm the term 'enactment' arises that allows for critical reflection and change. Unfortunately, examples of research from within the education *for* the environment dimension are scarce, particularly in early childhood education. This could possibly be as the dimension of education *for* the environment has been acknowledged as more challenging for teachers (Bolstad, 2003, Cowie & Eames, 2004, McLean 2003).

It is noted that all reviewed literature for the current study strongly supports the notion of education *for* the environment as the basis for future learning and the development of education for sustainability programmes. This is a key idea in EfS as education *for* the environment creates the opportunity for enactment. Although education programmes that employ the education *in* and *about* dimensions are valuable, they are not robust enough to sustain action and change.

One idea that has been suggested relatively recently to guide education *for* the environment is that of action competence. Danish academics Jensen and Schnack (1997) indicated that, "the concept of action competence includes the capacity to be able to act, now and in the future, and to be responsible for one's actions" (p. 175). The authors categorised action competence into four aspects, these being: knowledge/insight; commitment; visions; and action experiences. Eames, Barker,

Wilson-Hill and Law (2010) added connectedness and reflection to these previous aspects. In an attempt to analyse the term 'action competence', Jensen and Schnack (1997) suggested that, "competence is associated with being able and willing, to be a qualified participant" (p. 165). This article by Jensen and Schnack (1997) is useful for the current study as it reviews different aspects of action and the relationship between these and action competence. In particular, it highlights the value of learning through experience, clarifies what action taking is and leads to a consideration of how these ideas could be applied to early childhood education. In this area, Vaealiki and Mackey (2008) writing about a research project on strengthening environmental competencies in an early childhood centre, concluded that "it [the study] may encourage early childhood teachers to notice the many ways that young children can advocate for environmental issues" (p. 7). This study suggests that a focus on the aspects of action competence may be fruitful in an EfS early childhood environment.

Within the realm of early childhood education, the notion of participants being ready, willing and able has also been defined as learning dispositions, which are more readily known as habits of mind, or tendencies (Claxton, 2009). Along with Margaret Carr, a prominent early childhood researcher in Aotearoa New Zealand, Claxton argued that "education for the 21st century must aim at developing young people's ability to be skilful and confident when facing complex predicaments" (Carr & Claxton, 2004, p.87). The notion of being ready, willing and able is described by Carr and Claxton (2004) as learning inclinations, sensitivity to occasion and skills. There is therefore an identifiable link here between action competence and learning dispositions. This notion of dispositional learning is infused within *Te Whāriki (*1996), the early childhood curriculum in Aotearoa New Zealand, and is of interest in the current study as students' dispositions towards sustainability are explored. The examined literature has revealed a key connection between learning dispositions, EfS and early childhood education. It would appear that these connections are the ways in which students respond to opportunities, in the case of this study the opportunities being the complex issues around education for sustainability.

## 2.5 EfS and early childhood education in Aotearoa New Zealand

There are clear synergies between EfS and early childhood education (ECE) in Aotearoa New Zealand. Internationally, Aotearoa New Zealand is portrayed as a green nation with a cultural connection with the natural world. As a nation, we have easy accessibility to things natural, and many of our teachers are connected to the physical aspect of the natural world. Many teachers have developed quality learning environments and programmes that demonstrate links to education for sustainability within early childhood education across Aotearoa New Zealand (Duhn, Bachmann & Harris, 2010; Enviroschools Foundation, 2012; Vaealiki & Mackey, 2008). These programmes are guided by the early childhood curriculum, *Te Whāriki*, of which the underlying concept recognises different programmes and philosophies, (Ministry of Education, 1996). *Te Whāriki* is a holistic, bicultural document that interweaves the principles of well-being/Mana Atua, Holistic development/Kotahitanga, Empowerment/Whakamana, and Belonging/Mana Whenua, (Ministry of Education, 1996, p. 13). *Te Whāriki* defines the term 'curriculum' as, "the sum total of the experiences, activities, and events, whether direct or indirect, which occur within an environment designed to foster children's learning and development" (p.10). The holistic, authentic, organic nature of the curriculum gives permission for early childhood teachers to delve into the rich world of EfS.

*Te Whāriki* has several references to the natural world and links to environmental education. For example, strand 5, entitled 'Exploration – Mana Aoturoa' states that, "the child learns through active exploration of the environment. Children experience an environment where they develop working theories for making sense of the natural, social, physical, and material worlds" (Ministry of Education, 1996, p. 16). Similarly, Strand 2, 'Belonging – Mana Whenua', states that, "Children and their families experience an environment where they know that they have a place" (p. 58). The strand entitled 'Exploration' provides the closest explicit reference to EfS. The goal states that "children [are] developing working theories about planet earth, and developing geographical knowledge of places of local significance, and the development of a relationship with the natural

environment" (p. 82) . This notion of 'working theories' is explored further in Section 2.7.1 below.

With this environmental focus in curriculum, this may lead particular students to begin to think about their own environmental identity. Thomashow (1998) in a text on ecological identity stated that, "ecological identity refers to all the different ways people construe themselves in relationship to the earth as manifested in personality, values, actions and sense of self. Nature becomes an object of identification" (p. 3). Likewise, Clayton (2003) offers another insight into environmental identity, "Environmental identity – how we orient ourselves to the natural world – leads us to personalise abstract global issues and take action (or not) according to our sense of who we are" (p.2). This notion of environmental identity is useful for the current study as I explore the connections children are making to ideas, thinking and action around education for sustainability. The exploration in this study of children transferring environmental knowledge over space and time would also allow me to identify instances of young children beginning to develop environmental identity.

Vaealiki and Mackey, two Aotearoa New Zealand early childhood education academic researchers, are amongst the few who have studied and explored the relationship between early childhood education and education for sustainability. The pair weave the connection of EfS with *Te Whāriki* (Ministry of Education, 1996), and identified a key point from an early childhood conference in 2006 where delegates advocated that traditional thinking of environmental education could be examined to a more "transformative, collaborative approach" (Vaealiki & Mackey, 2008). Vaealiki and Mackey (2008) suggested that, "this approach [transformative] includes young children having a voice in how an environmental curriculum is enacted in the early childhood centre resonates with the philosophical underpinning of *Te Whāriki*" (Vaealiki & Mackey, 2008, p. 2). In search of an understanding of a transformative approach within EfS, Rathzel and Uzzell (2009) suggested that the 'transformative' approach "signifies what we need to think about how to fundamentally change the social conditions which have led to environmental degradation" (p. 265). Rathzel and Uzzell (2009) go on

to conclude that "transformative environmental education needs to inspire forms of action in which people can increase their collective control and influence over their living conditions" (p. 274). This reflects the dimension of education '*for*' the environment. Davis (2010) translated this conception into an early childhood education perspective when she stated that:

> While playing and learning in nature remains highly valued, this newer conceptualisation refers to a transformative early childhood education that values, encourages and supports children as problem-seekers, problem solvers and action–takers around sustainability issues and topics related to their own lives (p. 230).

The Vaealiki and Mackey (2008) article is based on a research project which looked at strengthening environmental competency in an early childhood centre, in which the authors used the metaphor of 'ripples' and the effect of environmental action and practices in one early childhood centre and its momentum to influence practices in other places with other people. Vaealiki and Mackey (2008) acknowledged and drew upon the sociocultural context of the early childhood setting and through this the children's thinking, questioning and contribution emerged as the central focus of the success of the environmental education focus. They identified that, "Children's thinking and questioning was a significant catalyst in encouraging teachers to increase the complexity of the environmental curriculum and extend specific subject knowledge and understanding about environmental actions" (Vaealiki & Mackey, 2008, p. 3). The authors summarised by identifying three 'environmental competencies' from this study. These being: an openness to consider alternative environmental practices; confidence to advocate for, and express, a desired outcome; and the third competency, persistence at sustaining environmental practice, flourishes in an early childhood centre that embeds environmental practices in the curriculum (2008, p. 7). These competencies appear to resonate with the view of Davis (2010) where children are viewed as problem solvers and action takers.

This view of the child as competent and capable is well known rhetoric in the realm of early childhood education and is a strong underpinning of *Te Whāriki* (Ministry of Education, 1996). The Vaealiki and Mackey (2008) article demonstrated an exemplar of practice that illustrated teachers having a rich,

respectful image of the child. This indicated the importance of having clear connections to current education theory and then having the knowledge and skills to enact theory into day to day practice. This work is useful for the current study as it not only identifies a place for EfS in early childhood education but it also links to teacher positioning, the view of the child and the notion of relationships.

Vaealiki and Mackey (2008) reinforce the fit between early childhood education and EfS. On the one hand, you have young children who are naturally connected and curious about the natural world and its endless learning opportunities. On the other hand, *Te Whāriki* (Ministry of Education, 1996) provides a bicultural curriculum that is flexible and responsive and has woven EfS throughout its principles and strands.

More recently, also within an Aotearoa New Zealand context, Ritchie, Duhn, Rau and Craw (2010) conducted a study focussed on the role of education for sustainability within the Aotearoa New Zealand context through examining global issues of ecological sustainability in early childhood contexts, and drew upon both western and kaupapa [philosophical] Māori initiatives. One major finding of the study was that, "place-based pedagogies radiate out from the centre. A sense of place starts with paying attention to the here and now, and has a ripple effect" (Ritchie, Duhn, Rau & Craw, 2010. p. 2). This is similar to the study by Vaealiki and Mackey (2008), with the analogy of the ripple effect, as discussed earlier. Ritchie, Duhn, Rau and Craw (2010) concluded that "teachers, tamariki [children] and whanau [families] are making effective use of complex knowledge and skills to address global issues in their local contexts" (p. 3). Although this article was useful for the current study as it was based from an Aotearoa New Zealand perspective and offers evidence of early childhood communities examining global issues in their local context, it lent more towards the sustainability issues of globalisation and citizenship, as opposed to 'education' for sustainability as a whole.

The search for literature for this review has identified a critical lack of current research which has explored EfS and early childhood education. The lack of

research in this area prompted Davis to write an article entitled, '*Revealing the research 'hole' of early childhood education for sustainability: a preliminary survey of the literature'* (2010). Davis' survey suggests that "these studies …show up the very tiny number of studies that recognise young children as agents of change around sustainability, what can be called, education for the environment" (p. 235). This article called for funding for research, exploratory research in educational settings, and proposed that research and researchers need support both conceptually and practically (p. 239). The Davis (2010) article concluded that:

> Early childhood is a high leverage area with investments in young children having the potential to reap big rewards into the future. Research in early childhood education for sustainability will add to these investments. This is a field whose time has come (p. 239).

This article clearly spells out the need for a study such as this one. A review of early childhood education (ECE) policy and how it connects to later schooling in Aotearoa New Zealand is now provided.

### 2.6 Early childhood education in Aotearoa New Zealand

Early Childhood Education in Aotearoa New Zealand is guided by *Te Whāriki* (Ministry of Education, 1996), the early childhood curriculum. This curriculum was founded on the following aspiration for young children:

> To grow up as competent and confident learners and communicators, healthy in mind, body, and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society (p. 9).

This early childhood curriculum is guided by four broad principles, these being: empowerment, holistic development, family and community, and relationships. Arising from these principles are the strands and goals which create the framework of the curriculum (Ministry of Education, 1996). It was envisaged that the curriculum would be distinctive from other curriculums, like primary school, and encompasses the uniqueness of the early childhood years. One of the key features of the curriculum is the reference to pathways of learning:

> This curriculum emphasises the critical role of socially and culturally mediated learning and of reciprocal and responsive relationships for children with people, places, and things. Children learn through collaboration with adults and peers, through guided participation and

> observation of others, as well as through individual exploration and reflection (Ministry of Education, 1996, p. 9).

There are clear links, however, between *The New Zealand Curriculum* (Ministry of Education, 2007) for primary schools and *Te Whāriki*, the early childhood curriculum. Some eleven years after the first publication of *Te Whāriki*, *The New Zealand Curriculum for English medium teaching and learning in years 1-13* (Ministry of Education, 2007) was published. The vision of this revised curriculum was to promote learning for the 21st century and to develop lifelong learning.

From my observation, the language within the revised 2007 *New Zealand Curriculum* is notably more focussed on education for sustainability than in the previous iteration of the *New Zealand Curriculum Framework* (Ministry of Education, 1993). This is reiterated in the Ministry of Education Te Kite Ipurangi (T.K.I) website which identifies connections to EfS in the *New Zealand Curriculum* and states that "sustainability is a significant theme throughout the national curriculum" (TKI, 2012). As an example, at the outset of the curriculum document in a section entitled 'Values', it states "students will be encouraged to value ecological sustainability, which includes care for the environment", (Ministry of Education, 2007, p. 10). This would suggest then that *The New Zealand Curriculum* (2007) is allowing education to identify aspects of EfS and begin to invest and determine interest, knowledge and capabilities of particular students. It may also allow for developing knowledge, assessing these capabilities, and identifying action and reflection of these particular students.

The vision of the revised *New Zealand Curriculum* (Ministry of Education, 2007) demonstrates a strong connection to pedagogy and key competencies. Like the principles and strands of *Te Whāriki* (Ministry of Education, 1996), the *New Zealand Curriculum* is structured by a set of values and key competencies. These values are: excellence; innovation; inquiry and curiosity; diversity; equity; community and participation; ecological sustainability; integrity and respect. The key competencies are: thinking, using language, symbols, and texts; managing self, relating to others; and participating and contributing. As Carr (2006) stated,

"key competencies, like learning dispositions, are about action and are closely attached to an environment that encourages their development" (2006, p. 23)

However, Peters (2005) emphasises that from an assessment of the conceptual frameworks of both the previous *New Zealand Curriculum Framework* (Ministry of Education, 1993) and early childhood curriculum documents, which can be viewed as very different and this has important implications for the way in which learning is viewed. As Peters (2005) suggested, "*Te Whāriki* (1996) acknowledges broad developmental progressions in its integrated approach as it draws more on sociocultural and ecological theories and avoids learning areas or fine grained curriculum progressions" (p. 11). On the other hand, the 1993 *New Zealand Curriculum Framework* did not emphasise these aspects. The two curriculums were therefore viewed as contrasting. Moving forward, it appears that it is an intention of the Ministry of Education's *New Zealand Curriculum* (Ministry of Education, 2007) to bring some cohesion to the education sector with the

The Curriculum highlights the need for the connections through the transitions of the learning strands from early childhood, primary, secondary and tertiary. This interconnectedness and relationship between the sectors has been absent from the previous *New Zealand Curriculum Framework* (Ministry of Education, 1993) document and in comparison this new alignment is viewed as a positive stance for education within Aotearoa New Zealand (Carr, 2008). Carr (2008) remarked on this alignment and the cohesive pathway of the two curriculums in saying, "this is an interesting development, and will enable, we hope, coherence of learning and learning opportunities across the early childhood, primary and secondary sectors in education" (p. 4).

The comparison of the two curriculums, *Te Whāriki* (Ministry of Education, 1996) and the *New Zealand Curriculum* (Ministry of Education, 2007), has shown the vision of flow from one curriculum to the other and ultimately the impact this can have on the student participants. Some theoretical ideas about early childhood education are now reviewed for the usefulness in guiding this study.

## 2.7 Theoretical frameworks for early childhood education

Early childhood education has been influenced by a number of models and theorists. There are several theorists that have particularly influenced early childhood pedagogy in Aotearoa New Zealand. The prominent theorists who have had a strong influence within current early childhood pedagogy are the co-constructivist theorists, Vygotsky and Brunner, whose ideas are discussed below. Ecological theory has also had an influence in current early childhood education theory. From within this theory, I identify with the work of Bronfenbrenner and this is also discussed.

### 2.7.1 Co-constructivist theory

Co-constructivist theory suggested that children develop best when in a social context. Problem solving, collaboration and co-operative learning experiences are integral in a co-constructivist approach. The teacher is viewed as a guide and facilitator of learning. Language and social interaction is encouraged. The Russian psychologist, Lev Semyonovich Vygostksy's (1869-1934) work is at the forefront of co-constructivist theory. Jenkins (2009) examined the co-constructive theorists' work and claimed the theorists believed that "learning implied an active, student-centred process in which teachers took an interest in their students' ideas" (p. 31). Professor Guy Claxton suggested Vygotsky's work provided two useful contributions in this area. He identified that, "First, minds consist largely of internalised habits, strategies and attitudes that are first developed in interaction with other people, and which therefore substantially reflect *their* habits and values" (Claxton, 2009, p. 180). Claxton (2009) analysed Vygotsky's second insight and described this as "whatever habits of mind you bring with you to learning, these are always selected, shaped and skewed by whatever unique predicament you happen to find yourself in" (Claxton, 2009, p. 180). The ideas around co-constructivism, child centred learning and the notion of learning dispositions and prior learning, have strong implications for education and for the current study. Each of these ideas reinforces the connections of EfS and early childhood education as it is from this point that the similarities in pedagogy are evident. The ways of knowing and the way knowledge is acquired within both of these realms are comparable.

Similarly, Dr Sally Peters, a researcher on transition and identity from the University of Waikato, Aotearoa New Zealand, discussed the work of Vygotsky and highlighted that the "cultural context was central to development" (2003, p.16). Peters identified that Vygotsky's theory focussed on the children's interactions with others. This is relevant to the current study as I focus on the working relationships and interactions between children, children and adults and children and the wider community. It is these socially constructed relationships, and subsequent learning within these relationships, that was of interest to the current study.

The ideas of the co-constructivists such as Vygotsky have also been allied to transformative education. Rathzel and Uzzel (2009) noted that, "Vygotsky's dialectical theory of development considers learning as requiring conflict – generated problem solving in which education provides opportunities for resolving dilemmas" (p. 271). EfS, in itself, addresses issues, problems and dilemmas which require reflection, dialogue, debate and action. Therefore, transformative education and EfS fit well together within education. In discussing EfS in primary school settings, Jenkins (2009) identified that "…to be effective, EfS needs to draw on co-constructivist theory and actively engage students in learning about sustainability issues" (p. 32). Similarly, in a book chapter by the New Zealand Parliamentary Commissioner for the Environment (2004) which focused on critical thinking and reflective teaching, it is suggested that, "people need to reflect on their own learning. Education for sustainability encourages people to ask lots of questions, to challenge underlying assumptions, and to think of themselves about sustainability issues, critical thinking is important" (p.44). There is a clear link here between the principles of co-constructivism and education for sustainability.

In the same vein, Davis (2010) proposed that with the challenges of the current environmental issues, humans will need to be creative in order to develop solutions. In order to develop this creativity, Davis (2010) argues that, "contemporary early childhood education places strong emphasis on children constructing their ideas about the world" (p.170). Davis (2010) identified the

connection of these children's 'working theories' within the Aotearoa New Zealand early childhood curriculum, *Te Whāriki* (Ministry of Education, 1996), which states that children should be encouraged to "develop working theories for making sense of the natural, social, physical and material worlds" (p. 82).

Therefore it can be seen that co-constructivist ideas sit well both within ECE and EfS. Co-constructivist theory sits parallel to ecological theory in that they are both socially constructed and recognise the child as a capable, social being that needs to be connected to others in society to develop.

### 2.7.2 Ecological Theory

The overarching belief of ecological theory is that of having social relationships and supportive links between environments that shape our learning (Bronfenbrenner, 1979). Within ecological theory, it is suggested that the environment affects what and how people learn. The theory is illustrated by a series of macro and micro interacting ecological and social systems with the learner engaged with the learning environment at its core. Bronfenbrenner (1979) described these systems as "the ecological environment is conceived as a set of nested structures…..like a set of Russian dolls" (p. 3). Peters (2003) observed that Bronfenbenner's ecological systems theory has been widely used in understanding issues around transition to school from the early childhood environment. Paquette and Ryan (2001), in an analysis of Bronfenbenner's ecological systems theory suggested that "changes or conflicts in any layer will ripple through other layers" (p. 1). If this is the case, the transition to school could have ripple effects in all areas of the child's being. It is the significant adults in the child's life who will help to calm these ripples, and it is these significant adults who need the knowledge and support and tools to do so. This is discussed further in the transition and identity section of this review below.

Bronfenbrenner's ecological theory is woven throughout the early childhood curriculum, *Te Whāriki* (Ministry of Education, 1996). In a reference to Bronfenbrenner's Ecology of Human Development, it is identified that, "another aspect of this exchange between children and their environment is the influence of

the communities to which children belong" (Ministry of Education, 1996, p. 19). Within the ecological theory, it is suggested that the environment affects what and how people learn. Within this study, the reciprocal notion of the influence of children and their communities would be important to consider.

These theoretical ideas of co-constructivism and ecological theory provide a background, theoretical framework in relation to the current study. These ideas link to EfS and early childhood education as they each view the child at the core of a social system, and their relationship and interactions with others and the environment is central.

### 2.8 Transition and Identity

This current study is concerned with not only education for sustainability; it also intersects with the psychology disciplines of identity and transition. It explores how exposure to quality programmes in early childhood education for sustainability have an effect on children's actions in future contexts and spaces. The study considers children as the agents of change and explores their ability to impart knowledge and create change in different contexts. What affordances and constraints enable this or suppress this enactment for the environment? Barab, and Roth (2005) explored the notion of affordance networks and suggest that "affordance networks include intentions, people, facts, tools, concepts, material and cultural objects, and practices that can be recruited to satisfy a particular goal or intention" (p. 3). Therefore, within the context of this study these would be the objects, practices or people that allow children the opportunity to impart and act on their knowledge.

A search for current literature relating to education for sustainability, early childhood education and transition and identity has proven problematic with very few examples found. This indicates a gap in the literature. So therefore, it was necessary to draw upon the general transition and identity literature to inform this study.

Firstly, it was necessary to review literature from the realm of transition in education. The transition to focus on for this study is the transition from an early childhood education setting to primary school. In this field, Peters (2005) has identified that differing policies relating to curriculum across these settings can be problematic. As noted above, Peters has pointed out that although the early childhood education (Ministry of Education, 1996) and school curriculum frameworks (Ministry of Education, 1993) in Aotearoa New Zealand were developed roughly at the same time, "the approaches that underpin these curricula are very different, as are aspects of the history and philosophy of the two sectors" (p. 9). The tension here suggested that children would be faced with a number of transitional challenges, as Peters (2005) identified, "when children start [primary] school, it is not just a transition to a new physical context but also an entry point to a new culture where aspects of teaching, learning and assessment are different" (p. 9). As identified in Figure 2.1, the *New Zealand Curriculum* (2007) has begun to mitigate some of these transition issues and has sought to align the early childhood curriculum and school curricula with a sense of flow between sectors.

The intention of the current research is to focus on children who have transitioned from an early childhood learning environment to the primary school environment. It is then crucial to view the transition to school, and the challenges this brings, from both the perspective of *Te Whāriki* (Ministry of Education, 1996), the Early Childhood Curriculum, and the *New Zealand Curriculum* (2007), as identified earlier in this review.

The ecological theorist, Bronfenbrenner (1979), as identified earlier, views the child as being central to a series of social systems. One of the crucial systems in the child's world is that of her/his family. *Te Whāriki* (Ministry of Education, 1996) is a sociocultural curriculum that makes several references to parents and family. The strand of 'contribution' stated that "children moving from early childhood settings to the early years of school are likely to need to perceive that their families are welcome and valued" (Ministry of Education, 1996, p. 65). Similarly, one of the overarching principles of *Te Whāriki* entitled *Family and Community*, stated that "the wider world of family and community is an integral

part of the early childhood curriculum" (Ministry of Education, 1996, p.14). This interconnectedness of relationships between families/whanau, and children and the learning environment is central to *Te Whāriki* and was important to consider in this study.

In comparison, the *New Zealand Curriculum* (2007) covering years 1 (new entrant) to year 13 (final year) has minimal direct reference to parents and family in terms of the transition to school. However, the principle of 'coherence' states that "The curriculum offers all students a broad education that makes links within and across learning areas, provides for coherent transitions, and opens up pathways to further learning" (Ministry of Education, 2007, p. 9). Although this is not specifically focused on transition to school, it is meaningful for the current study and indicates support and understanding for students in transition.

Professor Stuart McNaughton, an academic researcher in education, identified some key features in transitions, as he stated:

> the ideas that teachers have about the nature of teaching and learning, about transition processes and about domains of development such as literacy, about the flexibility of the curriculum, about relationships with and roles of families, are critical to supporting transitions (McNaughton, 1998, p. 37).

Indeed, the teachers' ideas and pedagogical approach to transition are critical. Teachers are a major stakeholder in the transition process and therefore influence whether the transition from early childhood education to school for students is effective or not.

This point brings to the fore the issue of power relationships and the teacher position within educational settings. Potter and Briggs (2003), in a study in which 100 parents and teachers were interviewed about attitudes towards their children starting school, identified one of the dominant responses of the child's voice was 'kind teachers'. Potter and Briggs (2003) concluded, "We advocate that the concerns of the children about their early experiences at school should be addressed by moving away from the discussion about children's readiness for school to focus on schools' readiness for children" (p. 49). Sfard and Prusak

(2005) in a study of identity as a tool for investigating learning consider the notion of power and individual voices when they stated that:

> The notion of identity proves helpful in dealing with issues of power and of personal and collective responsibilities for individual lives. In particular, identity features prominently whenever one addresses the question of how collective discourses shape personal worlds and how individual voices combine into the voice of a community.

Like McNaughton (1998), the work of Potter and Briggs, and Sfard and Prusak implied the notion of power relationships, and the teacher's position and the interconnection of this with identity. All of which are useful for the current study.

Within the current review, it is useful to draw upon the psychology of behaviour and transition. Gilbert (2005), a chief researcher for the New Zealand Council for Educational Research (NZCER), offers some useful insights into how we view ourselves and behave in different settings. Gilbert (2005) claimed that "we develop an ability to function, more or less successfully, in a range of different situations. We also develop the ability to move between situations, and to play different roles in those the situations" (p. 113). Gilbert (2005) goes on to say, "while we can emphasise different aspects of ourselves in different contexts, we are also constrained by how we see ourselves - and how others see us – in different contexts (p.114). This is useful for the current study as I examine what affordances support and what constrains children in transition to school and also explore children's behaviours and actions across spaces.

Beach (2003), who examined consequential transition in education and considers a developmental view of knowledge through social organisations, identified the challenges of knowledge propagation and the continuity across time and context. Beach (2003) described a transition as consequential, "When it is consciously reflected on, struggled with, and shifts the individual's sense of self or social position. Thus, consequential transitions link identity with knowledge propagation" (p. 42). Beach (2003) explained that:

> Transitions involve the propagation of knowledge across social space and time through the construction of associations embodied in artefacts… Knowledge is constructed and reconstructed during transition… Each of these experiences involve propagation; the construction of new

> knowledge, identities, ways of knowing, and new positioning of oneself in the world (p.42).

This notion of the propagation and transference of knowledge is central to the current study. The work of both Gilbert and Beach are of interest when the current study examines how, and in what way, and indeed if all, individuals share their existing knowledge from past experiences in a different setting. The ability to impart prior knowledge within different contexts over time and space is of interest within the current study.

### 2.8.1 Transition in a Theoretical and Educational Context

To understand the transition from early childhood to school, it is necessary to place this transition in a theoretical context. Peters (2003) discussed a number of dominant theoretical approaches to transition. However, the one I believe is the best fit to support this review, is the notion of 'scaffolding the process'. Again, I draw on the work of Vygotsky, who claimed that the child needs to be in a social, cultural context with interaction and support from both peers and adults in order to develop. An example of viewing the child in a cultural context is presented by Peters (2003):

> This highlights the importance of not viewing the child in isolation (as a focus on readiness tends to do), but instead looking at opportunities for parents/caregivers to become familiar with the classroom and activities at school, so that they have the necessary information to scaffold the process for their children (p. 172).

Therefore, from a sociocultural perspective of transition, the child needs the support of parents and or caregivers to prepare and guide them through the transition to school. Hence, parents and or caregivers need to be informed on what the process entails and how they can best support their child. From this perspective, this idea of scaffolding is useful for the current study.

### 2.8.2 Multiple Voices in Transition

Several of the reviewed studies on the transition to school incorporated the 'child's voice' as a data collection tool. These were identified in research by Dockett and Perry (1999), Dockett and Simpson, (2003), Elliott (1998), and Potter and Briggs (2003). Potter and Briggs (2003) stated that "some of the literature

relevant to starting school and the emerging international research trend to giving children a voice in matters that concern them" (p. 44). Although many authors identified the use of 'child's voice' as a new phenomenon, I suggest that more recently this is common practice when critiquing an educational issue from multiple perspectives or lenses. The use of 'child's voice' demonstrated respect, and values the view of the child as a competent, social being. Similarly, Marshall (2001) claimed that the voice of the child needs to be considered within a framework for transition. Marshall (2001) proposed that, "collective involvement in the transition process by all concerned will show the staff's appreciation of the interests and abilities of the children and their families" (p. 21). Likewise, Dockett and Perry (2004), in a report of a pilot study of 300 parents, educators, and children, stated that:

> Children and adults experience the transition to school in different ways and that different concerns and issues are raised by different participants. Failure to include any one of these groups in conversation about transition to school results in an incomplete picture of what happens and why it is important (p. 186).

This idea of children being competent participants in research was explored by two Australian researchers in sociology, Danby and Farrell (2004), who sought to examine issues around the competence of child participants involved in research in early childhood. The authors suggested that, "This notion that children are competent practitioners of their social worlds rather than merely developing towards adulthood flows into a very different research programme" (p. 36). This supports the current study as the use of the child's voice as a research tool will be critical to the outcomes of this study as I identify what it is that children are connecting with in terms of EfS. One concluding idea of the Danby and Farrell (2004) paper that is pertinent to the current study is the notion of competent interaction, as they identified, "the conceptualisation outlined in this paper is one that sees children as interacting competently with adults, including their parents, and teachers, and researchers, in the research agenda" (p. 44).

The reviewed literature relating to transition and identity within this study suggests the use of the 'child voice', as a tool for data collection as I work to

identify the key aspects of education for sustainability that are transferred from one space to another.

### 2.8.3 Relationships and Communication

This review indicates the importance of building positive, reciprocal relationships between all stakeholders during the transition process. An Aotearoa New Zealand study, entitled the Competent Children Study Project, which is tracking 500 children from age 5 to adulthood, has identified the importance for a child's growth for there to be a positive relationship between the two main groups of adults who share responsibility for the child, the parents and the teachers (Wylie, 2001). Likewise, Marshall (2001) stated, "Teachers can support the parents by developing a partnership with them that shows appreciation and understanding" (p. 21).

Dockett and Perry (2001) also support the notion of establishing positive relationships between the children, parents, and educators and emphasised that all stakeholders need to, "take into account contextual aspects of community and of individual families and children within that community" (p. 6). For this to occur, a positive relationship and open communication practices need to be in place. Wagemaker (1998) suggested that "critical to bridging the school to home transition is becoming aware of the expectations that the school has of its new entrants and what steps parents can take to maximise a child's chance of success" (p. 5).

This notion of the development of a relationship between families and teachers is of interest to the current study as it is through these relationships that communication and connections are formed. From this standpoint, information and knowledge is shared. Jones (2006), in a study that examined the funds of knowledge families have about their child, and the importance for teachers, families and the child of sharing this knowledge, concluded that knowledge can be shared by all stakeholders by contributing to portfolios and teachers listening carefully to families. Jones (2006) identified "the deeper the understanding the teacher has of the child's experiences elsewhere, the more the teacher can actively

create links for the child and support learning, and in turn deepen the conversation" (p. 30). In a New Zealand study, Peters, Hartley, Rogers, Smith and Carr (2009) focused on portfolios and how they enhance learning in the transition to school. One of the conclusions that they drew was "we feel that portfolios as transition artefacts, in all their multitude of forms, are highly dependent on the relationships between the kindergarten teachers and the new entrant teachers within the school" (p.14).

The use of artefacts as transition tools is a key feature of the current study as I investigate what supports and constrains the ability of children to transfer knowledge from one place to another. The review of the literature around transition and building relationships has identified the importance of the role of reciprocal relationship between home and school in the transition process. The key ideas that have been identified are; the development of positive reciprocal relationships; an awareness of the expectations of primary school teachers; the ways in which knowledge is transferred; and ways of which primary teachers are informed of students prior knowledge. The interconnectedness of the early childhood centre, the primary school and the family is a key affordance in the transition process. All of these key ideas informed the current study.

### 2.9 Summary

This review has highlighted a number of themes from the literature. From an education for sustainability perspective, the key themes that emerged from the reviewed literature were: action competence, links between current early childhood programmes internationally and identifying common threads, links between the *New Zealand Curriculum* (Ministry of Education, 2007*)* and the early childhood curriculum, *Te Whāriki* (Ministry of Education, 1996), in terms of thinking around education for sustainability.

The themes that have emerged from the reviewed transition and identity literature are: the use of the 'child's voice', the notion of power and teacher positioning, affordances and constraints, different pedagogical approaches, the propagation of knowledge, and identity and transference. Each of these themes impacts on

learning and teaching and are important to the current study as they either afford or constrain learning. There is a notable abundance of literature relating to transition and identity, particularly around the area of transition to school.

Another key theme from the transition and identity literature is the importance of relationships and communication between all stakeholders, all stakeholders need to be informed and an open, reciprocal relationship between all parties is vital for an effective transition to school. It is from this standpoint, that children will begin to make connections and relationships. The stage is set for them to then begin to impart knowledge and build upon past experiences that can lead to effective EfS.

The small amount of current literature relating to early childhood education and education for sustainability was highlighted. This gap in the literature has proved problematic, therefore the review needed to examine these entities individually, making links where possible and drawing upon literature from other education sectors.

A small number of recent research articles relating to early childhood education and education for sustainability within the Aotearoa New Zealand and Australian context have shown some positive examples of EfS pedagogy and practice in early childhood education. The key ideas from these are the suggestions of a movement away from traditional thinking of environmental education to a more transformative approach to education for sustainability that would in turn create opportunities to link to education *for* the environment. Another idea is the notion of the view of the child as a competent, capable problem solver. And finally the metaphor of the ripple effect of change in one context and its impact across other contexts. For example, the idea of the child imparting prior knowledge propagated from the early childhood centre and sharing this at home. It is worthy to note that a number of these reviewed articles identified the issue of the lack of current literature in this realm of early childhood education and EfS.

This literature review has examined literature for the purpose of the current study which aims to explore the multiple complexities of education for sustainability

(EfS) and its intersection with the realm of identity and transition from early childhood education into primary schooling. The notable lack of literature which explored education for sustainability and transition and identity gives justification for the proposed current research study. The next chapter describes how this study was conducted.

# Chapter 3 Methodology

## 3.1 Introduction

The methodology chapter describes the methodology and methods undertaken for data collection for the research project. It explores the paradigm employed, the research sample and the interview design. Finally ethical issues, such as confidentiality and bias are discussed.

The research question that guided this study was:
How does Education for Sustainability in Early Childhood Education, influence young children's environmental knowledge and actions in later years?

Two further sub-questions were:

- What environmental knowledge and behaviours are transferred into other spaces by young children?
- What affordances make this possible, and what are the constraints?

This study then sought to understand the effect the education for sustainability (EfS) experiences in an early childhood centre had on a sample of students, and how this effect could be explored in the first years of the students' primary schooling.

This was a qualitative, in-depth study which gathered data from teachers, parents and children from one early childhood centre and two primary schools in the Canterbury region of New Zealand.

## 3.2 Methodology

The methodology needs to fit the purpose of the research project and is therefore a crucial part of the research design. Smith (1998) asserts that "research methodology is based on the skill of matching the problem with an appropriate set of investigative strategies" (p. 173). For this to occur, the concept of paradigms needs to be considered.

Kuhn, an early non-positivistic philosopher, has been reported as defining a paradigm as "a way of thinking that was constrained by rules relating to what questions could be asked, what methods could be employed and what answers could be accepted" (Kervin, Vialle, Herrington, & Okely, 2006, p.38). It is the responsibility of the educational researcher to be able to articulate which research paradigm they relate to. I view a paradigm as a systematic way of thinking about the world, about knowledge and about doing research.

Within an educational context, three major paradigms can be identified, these being, normative, interpretive and critical. The normative paradigm is concerned with human behaviour, is essentially rule-governed, and should be investigated by the methods of natural science (Cohen, Manion & Morrison, 2007, p. 21). In contrast, the interpretive paradigm is characterised by a concern for the individual. Cohen, Manion and Morrison, (2007) suggest that the interpretive paradigm "seeks to describe, analyse, and interpret features of a specific situation, preserving its complexity and communicating the perspective to participants" (p. 21). This link to context is also highlighted by Borko, Liston and Whitcomb (2007), who note that "interpretive researchers attempt to capture local variation through fine-grained descriptions of seeing and actions and through interpretation of how actors make sense of their socio-cultural contexts and activities" (p. 4). The critical paradigm looks to critique the current situation and examine possibilities for change, often seeking that within higher forums, for example, lobby groups, and at policy development level. This is explained further by Cohen, Manion and Morrison (2007) as "this [the critical paradigm] regards the two previous paradigms [normative and interpretive] as presenting incomplete accounts of social behaviour by their neglect of the political and ideological contexts of educational research" (p. 26). Similarly, Hughes (2003) stated that "research for social justice is commonly understood as encompassed within a critical research paradigm" (p. 35). The critical paradigm may be viewed as a driving force for social change and justice. For this study, although it is hoped the findings have a political impression, it is not its primary purpose.

Therefore the best fit for this study is the interpretive paradigm. This paradigm was also chosen for the purpose of this project as it reflects individual stories, feelings and actions in social context and natural settings. It also allows for flexibility and is responsive to the participant. As Neuman (1994, cited in Mutch, 2005) suggested, the interpretive approach is "the systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds" (p. 68) This perspective makes the interpretive paradigm fitting for the purpose of this study as it involves analysis through observation of people in a natural setting.

In recent times, much educational research has moved away from the earlier dominant normative, scientific approach, to a more interpretive approach that employs qualitative approaches to data gathering. Maykut and Morehouse (1994) state that:

> Qualitative researchers value context sensitivity that understands phenomena in all its complexity and within a particular situation and environment. The quantitative researchers work to eliminate all of the unique aspects of the environment in order to apply the results to the largest possible number of subjects (p. 13).

This quote highlights the relationship between qualitative research and the interpretive paradigm. As discussed earlier, the interpretive paradigm reflects individual stories, feelings and actions. Similarly, qualitative research is context sensitive and aims to make meaning of individual stories. Therefore the two may be viewed as a good fit. This study used an interpretive model with a qualitative approach to data collection. The data collection methods are described in the following section.

### 3.3 Data Collection Methods

A qualitative approach was employed for this study. Qualitative research is more likely to be conducted within a natural setting, which in the case of this project was a learning environment. Qualitative research also allows us to gather data from participants' stories, and to then make sense of their views. Johnson and Onwuegbuzie (2004) suggest that qualitative research is useful for studying a

limited number of cases in depth and for describing complex phenomena that are embedded in local contexts. This was certainly true for this research project as it focused on one early childhood centre. The study takes this one case and attempts to describe the complex phenomenon of learning for sustainability, which can be viewed as a complex issue within that context.

There are several methods that fit with a qualitative approach. The characteristics of a qualitative approach are identified by Cohen, Manion and Morrison (2007) as being concerned with "words, responsive, open-ended, individuality, informality, subjective facts interpreting and unstructured" (p. 355). As opposed to a quantitative approach, which Cohen, Manion & Morrison (2007) described as being concerned with numbers, measuring, and formality, seeking objective facts, and being structured and statistical. For this particular study, the methods selected were: focus groups, individual interviews and questionnaires, and observations. These methods fit a qualitative approach as they all allow for examination of subjective information, can easily be open-ended and individual, being responsive to the participant.

Multiple voices were used to acquire data in this project and this triangulation was chosen to provide rich, reliable, contextual data. The process of triangulation included semi-structured interviews with teachers and children, and survey questionnaires with parents/whanau. This is known as a multi-method approach of triangulation (Cohen, Manion & Morrison, 2007, p. 141). A multi–source approach of triangulation was also employed as data was collected from a number of different groups of people. This approach also allowed for the testing of the data's trustworthiness.

Delamont (1992) suggested that, "triangulation involves systematically attempting to get several types of data on something" (p. 133). Similarly, Kervin, Vialle, Herrington, and Okely (2006) define triangulation as "the comparison of multiple data sources to build a coherent analysis of data" (p. 87). Likewise, Cohen, Manion and Morrison (2007) explained triangulation from a social science perspective by stating, "triangulation techniques in social sciences attempt to map

out or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint" (p. 141). Rich, robust data is evident when the data is collated from different sources. In this study, the data was gathered from a number of different sources, these being; student participants, the teachers and parents/whanau. This allowed for a more in-depth story to emerge from a wider lens.

Triangulation in this study will allow for multiple connections and stories to emerge over time and space, using different methods. The methods of data collection are discussed in the following section.

### 3.3.1 Interviews

Interview is a method commonly used within sociocultural settings, in situations where the researcher needs to gain information of a more humanistic nature. Interviews allow the researcher to gain useful insights into human behaviour, feelings and opinions. The recorded data is likely to be rich, reflective and embedded in the natural context (Bishop 1997; Cohen, Manion and Morrison 2007; Smith 1998).

Cohen, Manion and Morrison (2007) stated that, "literally the word 'inter-view' is a view between people" (p. 151). They asserted that, "we need to recognise that the interview is a shared, negotiated and dynamic social moment" (p. 151). This suggests that the interview needs to develop from a relationship. Therefore for the purpose of this study, I needed to begin to form a relationship with the participants. Prior to the interviews, I visited the early childhood and primary school teachers, and the corresponding centre supervisor and school principals. This allowed an introduction and the opportunity for us to connect and build a relationship. With the student participants, I met them on the day of the focus groups and spent time introducing myself and informing the student participants of my purpose. We had an informal discussion prior to commencing the focus groups.

A semi-structured interview approach is conversational and flexible and was one method employed to gather data for this project. I posed open-ended questions and constructed the interview with what emerged from the participants. The student participant interviews were conducted in small focus groups. This allowed children to respond to one another and encouraged reflection and the recall of events. Cohen, Manion and Morrison (2007) suggest focus groups are characterised when, "Participants interact with each other rather than with the interviewer, such that the views of the participants can emerge – the participants' rather than the researchers' agenda can predominate. It is from the interaction of the group that the data emerge" (p. 376). This was evident in the focus groups in this particular study as the student participants began to share their own experiences and connections to some of the photographs, the early childhood centre and each other. Once the conversation began to flow, the students prompted each other and they were eager to share their stories.

### 3.3.2 Questionnaires

Parents/whanau were sent a written two page questionnaire. This was done in consideration of the time constraints of families allowing them to choose a time to respond that would be convenient to them. These were completed anonymously so parents were not identified. Parents/whanau were informed that they were able to communicate with the researcher by email.

The questionnaire for this study was designed to allow for the flexibility of the participants' responses, and this type of questionnaire is known as the open-ended questionnaire. Cohen, Manion and Morrison (2007) suggested that the open-ended question format is useful for small scale research. They went on to identify, "it is the open-ended responses that might contain the 'gems' of information that otherwise might not be caught in the questionnaire. Further, it puts the responsibility for and ownership of the data much more firmly into respondents' hands" (p. 330). This was certainly the case for this study where a number of 'gems' emerged from the parental comments on children's behaviours and actions around sustainability at home.

A weakness of the questionnaire method of data collection was evident with only 2/6 surveys returned. Parents were encouraged to return surveys via an email message I distributed. Another weakness of this method is the assumption that the participant will have an interest in the topic in question. Cohen, Manion and Morrison (2007) concurred, "Simply because the researcher is interested in, and has a background in, a particular topic is no guarantee that the respondents will be like minded." (p. 322). This may be the explanation for the lack of parental responses in this study. It may be possible that the parent participants had little interest in the topic of education for sustainability, or more simply they could not find time to complete the questionnaire.

### 3.3.3 Observations

Observations were used as a data collection tool within this particular study as it allowed me to gain a sense of the interconnectedness of the students, the teacher, the context and their relationship with the environment. The day I visited the early childhood centre to take photographs of the environmental activities, objects and spaces identified by the teachers, I also observed the environment to gather evidence of an environmental nature. I observed parent information boards, art displays, heard stories from teachers and listened to conversations between teachers and children and conversations between children. I also observed the rich, inviting outdoor areas for cues of EfS practices. The objects, spaces and activities which I observed, and that which were identified by the teachers were photographed and used as evidence and used as prompts for the student focus groups.

Immediately after the student focus groups, the student participants were given the option to take me on a tour of their schools. The student participants were given a camera to take photographs of what they thought was important to them with regards to education for sustainability. I was a passive observer throughout the tours. In a study by Gerber and Kwan (2001) at the University of Hong Kong, photographic observations were used to identify adolescent conceptions of different environments. Gerber and Kwan (2001) stated that, "amongst these graphic forms of information, photographs are used widely to present data about

the environment. Personal experiences involving the direct observation of their natural and cultural environments also play an important role in people's understanding of the world" (p. 9). This is useful as it allowed me to gain observations of the personal key experiences through photographs taken by the student participants.

In a discussion on observation as a data tool, Cohen, Manion and Morrison (2007), stated that

> Qualitative research… draws the researcher into phenomenological complexity of participants' worlds; here situations unfold, and connections, causes and correlations can be observed as they occur over time. The qualitative researcher aims to catch the dynamic nature of events, to see intentionality, to seek trends and patterns over time (p. 397).

Within the current study the photographs taken by the student participants were useful as I was then able to observe what EfS meant to them as individuals and to identify what it was that the students were making connections with at school in terms of EfS.

### 3.4 Sample

The recruitment of participants was guided by people who have in-depth knowledge of early childhood centres in the Canterbury region who work within the principles of sustainability. Two early childhood centres were identified and were approached to gauge their potential interest. One centre was willing to participate.

Initially the early childhood centres were contacted by email off their website. Once a response was obtained with an expression of interest, I telephoned to arrange a visitation. I had no prior connection to any of the possible early childhood centre sites.

The centre supervisor at the selected early childhood centre introduced me to the two team members who lead the education for sustainability programme within the centre. From this point the teachers identified possible student participants who matched the criteria for participation. Their respective schools, principals,

teachers and parents/whanau were then contacted regarding their participation in the project.

Prior to the interviews, I addressed the early childhood teaching team at a meeting and information about the research project was shared. Similarly, prior to consenting, meetings were held with both primary school principals to inform them of the research process.

The sample for this study included six student participants, (5-6 years of age), who had all attended the early childhood centre and transitioned from it within the last two years, their respective parents/whanau, (with all being invited but only 2 returning the survey) one early childhood centre and two early childhood educators, two local primary schools at which the students were now attending and a total of 3 primary school teachers at these schools. All participants were referred to with pseudonyms in this thesis.

### 3.5 Research Design

Cohen, Manion and Morrison (2007) indicate that research design is governed by the notion of 'fitness for purpose'. The purpose of the study should determine the research methodology and orientation. For the purpose of this study, photographs were taken at the early childhood centre to illustrate sustainability activities that I had been told the student participants had been involved with over the past two-three years. These photographs were enlarged and laminated then used as prompts with small focus groups. This was used as a method to collect data.

The focus group questions for the student participants were piloted with a pupil of similar age of the student participants who also attended one of the primary schools engaged in the study. This was to ensure the children would understand the language used and the responses she shared indicated that this was so. From the pilot, I was able to revise the questions and formulate possible probes to these questions. The focus group questions are in Appendix 1.

The interview process required the student participants to view photographs of an education for sustainability nature from their early childhood centre. These would allow them to recall spaces and events from the early childhood centre. The photographs were of spaces only and did not include photographs of teachers or children. A digital Dictaphone was used to record the interviews. The semi-structured questions initiated dialogue, with occasional probes, however, on several occasions in the group interviews, participants conversed with their peers and the interviewer observed.

At the conclusion of the student focus group interviews, the student participants were given the option to take me on a tour of their school with a view to them taking photographs of environmental activities around their school. The use of cameras and other digital technologies is increasingly prevalent in educational settings. In a study conducted by Einarsdottir (2005), which focussed on children's photographs as a research method in a playschool in Iceland, Einarsdottir (2005) stated, "Using cameras was one of the methods used in the present study, and combined with other methods it proved to give valuable information on children's views on their life in an early childhood setting" (p. 539). In this study, there were no restrictions on the use of the camera or limit to the number of photographs taken. There was a brief discussion on care of the camera and its operation. My role throughout the tour was passive, responding to technical support as appropriate. I engaged in light conversation but remained aware not to influence the student photographer and the other student participants who accompanied the tour. The tour was optional. However, all participants choose to accompany me on the school tour. Without direction, the student participant photographers quickly identified areas in their school that had an environmental connection for them and these were photographed accordingly.

Unfortunately, due to the time restrictions during the school visits, I was unable to upload and discuss the photographs with the students to ascertain their thinking behind taking the photographs that they did. This could be perceived as a weakness of the study, as a follow up discussion would have provided me with

further insights into the students' thinking about sustainability and therefore giving a more robust nature to the data.

Semi-structured, individual interviews were employed as data collection tools with the early childhood and primary school teachers. Both early childhood teachers at the centre, Kyla and Cara, were interviewed together and were also shown the photographs of the areas that they had identified as areas of environmental interest. Several of their responses linked to environmental activities and objects or resources which enabled these activities within the early childhood context. Prompts and probes were used in all interviews where appropriate to gain further information, clarification or meaning from participants. Interview questions were peer reviewed before use. The interview guideline questions for both the early childhood and primary teachers are in Appendix 3. The semi-structured interviews were scaffolded by a question guide. Questions were thoughtfully designed with the research question and purpose in mind. Some of the question guides included prompts. However, often the prompts and probes used during the interviews were impromptu and emerged from the participant's responses. The ability of allowing the interviewer to deviate reflects the flexible nature of the semi-structured interview method. The question guides were emailed to the early childhood teachers and the primary school teachers prior to the interviews. This allowed time for the participants to reflect and consider their possible responses.

Finally, written questionnaires were used as a method to collect data from parents/whanau. All six sets of parents/whanau were sent a written two page questionnaire. Parents/whanau were able to communicate with the researcher by email with any questions they had. The parents/whanau questionnaire was designed to be A4 double sided. These questionnaires were delivered by post and a self-address envelope was provided for the return of the completed questionnaire. Only 2/6 of the surveys were returned. The questionnaire is in Appendix 2.

The early childhood teachers identified possible student participants. The criteria considered attendance at the centre, an interest in the environmental programme and consequent enrolment at the local schools. The centre teachers distributed the consent forms and information to the parents/whanau as many have siblings at the centre. Eight consents were received and the schools were approached to participate. One school did not respond, leaving six participants. The research commenced with these six student participants from two local, rural schools in Canterbury.

All teacher interviews were transcribed, and the transcriptions were emailed to each participant to verify accuracy. The teachers responded either verbally or by email that checking was complete. All teachers responded that the transcripts were accurate accounts and they were happy for the research to proceed.

### 3.6 Analysis

The interview transcriptions were coded using a colour coding system. The coding was directly related to the themes that had emerged from both the literature review and the collated data. These themes are shown in Table 1.

TABLE 3.1. Coding for analysis

| Theme | Sub-themes | Origin of code |
|---|---|---|
| **Theme 1 : EfS and action competence** | Examples of in / for / about | Literature review and emerged from data |
| | Examples of action competence | Emerged from data |
| | Recall of environmental activities | Emerged from data |
| **Theme 2: Pedagogical approaches** | Teacher positioning | Literature review and emerged from data |
| | Affordance and agency | Literature review |
| | Making learning visible | Emerged from data |
| | Links between school and early childhood education | Emerged from data |
| | Opportunities and possibilities | Emerged from data |
| **Theme 3: Transition and Identity** | Propagation and transference of knowledge | Literature Review |
| | Considering the child's environmental identity – what are they connecting with | Emerged from data |
| | Identifying experts | Emerged from both data and literature review |
| | Linking actions, (or not) of EfS between ECE, home and school | Emerged from data |
| **Theme 4: Hopes and Dreams** | Need for more support | Emerged from Data |
| | Needing more knowledge and finance | Emerged from Data |
| | Learning from children | Emerged from Data |

Due to the flexible nature of the semi-structured interview method, data was recorded which deviated from the central themes of the research. Personal judgement was used to sift the data and then silo this into the related themes. This process then captured the rich, robust data that would then begin to scaffold a story. Verbatim quotes were identified that exemplified particular points and supported certain outcomes. The themes of the research began to emerge. These were then woven into the findings and discussion section of this report.

The focus group interviews with the students and the semi-structured teacher interviews were transcribed and analysed using a colour coding method. A similar process was implemented with the parental questionnaires. Points of interest were identified and the different themes emerged. These were coloured coded and grouped together as data for evidence in the thesis.

### 3.7 Reliability, Validity and Trustworthiness

Reliability in this study was enhanced in a number of ways. The same question guide and prompts were used with all student participants. All student participants viewed the same photographs taken from their early childhood centre. Similarly, all primary teachers were presented with the same question guide, as were the early childhood teachers. It is the nature of the semi-structured interview that the participant co-constructs the path of the interview. This was the case in this study with participants with each interview having a different direction. At times there was a need to prompt to guide the interview and other times a need to probe for more information. On occasion I needed to reiterate what was said to ensure I understood the participant responses.

Another way that reliability was enhanced was by asking adult participants to check their transcripts for accuracy. Similarly, the use of the multiple method triangulation as identified earlier, also enhanced reliability.

A number of measures were undertaken to enhance validity. Peer feedback was given by the research supervisor on instrument design. Piloting is also a strategy to ensure validity. Piloting involves the interview questions being posed to either

individuals or focus groups to ensure understandings. The researcher is then able to analyse findings and amend the interview questions as required. Piloting was undertaken in this study for the student focus groups to ensure the questions were valid and the student could understand what was being asked. The student participant questions were piloted with one child who had not attended the early childhood centre but had attended a similar centre with a strong environmental education programme. The child viewed some of the photographs and the questions where checked and possible probes were noted. In addition, I am an early childhood educator with a background in EfS and I believe this experience may also contribute to the validity of this study.

It is the responsibility of the educational researcher to examine themselves in terms of personal stance and biases, and power dynamics and imbalances. Kervin, Vialle, Herrington and Okely (2006) suggest "it is important that researchers identify and acknowledge any biases, assumptions, beliefs and values that may impact upon data gathering process" (p.86). Not only do good ethical practices give validity to the research project, they protect the participants and the researcher.

The researcher needs to carefully examine themselves in terms of bias, past experiences, relationships, and their beliefs in terms of research paradigms. It is vital that the researcher examines the purpose of the research and why they arrived at the question of focus. Is it due to interest? Or is it from past experience and a will to create change? Both of these scenarios give different rationales and will therefore come with differing biases. It is also the responsibility of the researcher to ensure these biases are counteracted. Borko, Liston and Whitcomb (2007) state "the researcher articulates and examines his or her biases and how they may affect data collection and analysis" (p. 6). Likewise, Smith (1998) asserts that "researchers must go further than simply recognising personal beliefs and assumptions, and the effect they have when interacting with people" (p. 173). Smith (1998) asserts that the researcher needs to ask questions to examine their position. For example, who defined the research problem? For whom is this study

worthy and relevant? To whom is the researcher accountable? (p. 173). Similarly Walford (2001) in a discussion analysing 'researching yourself' stated that:

> It needs to be acknowledged that all research has a subjective element. This is especially so in qualitative research, where the researcher is the main research instrument…All research involves the researcher in making decisions about the choice of topic and how the research is to proceed. These decisions always involve individual choices, and often evolve from previous personal experiences and commitments (p. 98).

Cohen, Manion and Morrison (2007) add that, "they [the researcher] must, therefore, give no hint of judgment, support or condemnation. They must avoid counter-transference projecting the researchers' own views, values, attitude biases, background onto the situation" (p.130).

This is meaningful for me within this study as I was reflecting on my personal experience as a parent and an early childhood educator committed to education for sustainability within my teaching practice. This could have become an issue in this study. Consideration was given to my standpoint and strategies employed to counteract any bias. For the research to be successful I needed to remove myself from the identity of teacher and parent and focus solely on that of researcher. I can identify here with what Lather (1992) describes as the change-enhancing, advocacy approach to research. Lather's discussion on the advocacy approach certainly identifies my motivation for the study, and therefore requires me to closely examine the intended purpose of the study and my personal related biases. Strategies to counteract biases, stance, attitudes and power dynamics were explored in order to not influence outcomes. These are discussed in the ethics section.

### 3.8 Ethics

These were the ethical considerations that required close consideration for this particular study: written informed consent and confidentiality, voluntary participation, biases, research purpose and intention, and power imbalances. One key factor of informed consent is the notion of voluntarism, that is, voluntary participation. Cohen, Manion and Morrison (2007) stated that "voluntarism entails applying the principle of informed consent and thus ensuring that participants freely choose to take part (or not) in the research and guarantees that exposure to

risks is undertaken knowingly and voluntarily" (p. 52). For this particular study, adult participants were given consent and research information and allowed several days to consider their participation. I ensured that participants understood that participation in the research study was voluntary. Any queries were welcomed. Student participants were informed about the study from parents and/or teachers prior to any engagement from me. Parents/whanau were asked for their consent to involve their child as children as young as 5-6 years old are deemed not to be capable of providing consent themselves as they were not able to understand the full implications of involvement in the study.

This study was conducted from a socio-cultural perspective. Cowie and Carr (2004) described learning and development in a socio-cultural context as the consideration of people, places and things. Therefore the notion of power dynamics was a factor that required close consideration. There were two main areas of power dynamics and imbalances. Firstly, the power and control of the information and knowledge disclosed by participants. Secondly, power dynamics in terms of the researcher-participant relationship. Bishop (1997) stated that:

> Researchers in the past have taken the stories of research participants and have submerged them within their own stories, and re-told these reconstituted stories in a language and culture determined by the researcher. As a result, power and control over research issues such as initiation, benefits, representation, legitimation, and accountability have been traditionally decided by the imposition of the researcher's agenda, interests and concerns about the research process (p. 29).

Similarly, Smith (1998) stated that:

> It is critical that researchers recognise the power dynamic which is embedded in the relationship with their subject…they [the researchers] have the power to distort, to make visible, to overlook, to exaggerate and to draw conclusions, based not on factual data, but on assumptions, hidden value judgements, and often downright misunderstandings (p.176).

These examples illustrate that the researcher needs to not only be aware of issues surrounding power dynamics but ensure strategies to counteract imbalances are in place. The researcher has a responsibility to ensure issues surrounding power dynamics are addressed to protect the integrity of the researcher, the participants, and the research project itself. Not only do good ethical practices give validity to

the research project, they protect all involved. I consider this to be important for the current study as it involves an adult, child dynamic.

In the current study a number of strategies were employed to offset any issues of power. Firstly, I had not met the early childhood team prior to the study commencing and therefore they had little knowledge of my history in teaching and interest in EfS. Secondly, I was very aware of my position from a child's perspective and was conscious to counteract any possible issues relating to power dynamics. I closely considered the questions that were presented to the student participants and the way I presented them, ensuring a relaxed, light-hearted disposition. I also considered the environment. I set up the interview room to be welcoming and had the photographs of the early childhood centre presented on the table as to allow the student participants to connect with them as they entered the room. I wore a badge and introduced myself. I then described what my purpose was and ensured all participants were happy to work with me. It was clear at this time that the student participants had been informed of my visit and wanted to engage.

Ethical considerations were thoroughly examined throughout this study. Informed consent was received from teachers and parents/whanau. The identity of all participants, the early childhood centre and the schools remained anonymous. The teachers, principals and parents/whanau were sent information with the consent forms which outlined the research process. This also explained the right of withdrawal. The consent forms and information are in Appendix 4. The data transcripts from all the teacher interviews were returned to each teacher participant concerned to check for accuracy. Any comments and/or amendments were welcomed.

One of the ethical considerations which is an important responsibility of the researcher is the gaining of informed consent and promise of confidentiality. Cohen, Manion and Morrison (2007) stated that:

> Informed consent is an important principle. It is this principle that will form the basis of an implicit contractual relationship between the

> researcher and the researched and will serve as a foundation on which subsequent ethical considerations can be structured (p. 53).

For this study I presented an outline of the research to the early childhood teaching team prior to their engagement in the study. Although not all of the early childhood teaching team were involved in the study, they were informed and consequently contributed by supporting those who did participate. I arranged and attended meetings with school principals and primary school teachers. Information and consent forms were distributed to teachers, parents and principals. The ethics approval was sighted by all parties. Signed consents were collated and the research was initiated.

In considering confidentiality, Cohen, Manion and Morrison (2007) stated, "this means that although researchers know who has provided the information or are able to identify participants from the information given, they will in no way make the connection known publicly"(p. 65) Similarly, Aubrey, David, Godfrey and Thompson (2000) stated that, "the major responsibilities researchers have in relation to participants are that they will do no harm, that they will treat those who agree to participate with respect, that they will be trustworthy and that they will maintain confidentiality and anonymity" (p. 152). In this particular study confidentiality was ensured particularly by two measures. Firstly, all participants were given pseudonyms, the early childhood centre and schools were unidentifiable and any photographs used did not show any identifiable features, i.e. flags or signs. Secondly, all documentation pertaining to this study will be handled and stored in accordance of the ethics committee requirements.

### 3.9 Summary

An interpretive, qualitative approach was employed in this particular study. Semi-structured interviews, focus groups, photographic recall and parental surveys were used as data collection tools. The interviews were transcribed and returned to the teacher participants for checking to ensure reliability. A strong ethical stance was maintained at all stages of the research process to protect both the researcher and participants. The data was analysed and coded against several

central themes which emerged from the literature review and from the data. These are presented in the next chapter on findings.

# Chapter 4 Findings

## 4.1 Introduction

This chapter presents the findings of the research project. It presents the themes that have emerged from the data and uses quotations from participants to exemplify these themes. The themes relate to the research question as they identify what the student participants are connecting with over space and time and therefore suggest what they are engaging with and what knowledge is being transferred. The themes also connect to thinking around education for sustainability and what affordances and constraints support or suppress these ideas and actions.

The data represents several participants: 6 children, 2 early childhood teachers, 3 primary school teachers and 2 parents. This triangulation of the data provided multiple voices allowing an enriched story to unfold. In accordance with the ethical requirements of this study, all participants are identified by pseudonyms.

As identified in chapter 3, the methodology section, data was collected from interviews and focus groups with student participants, teachers (both early childhood and primary) and through written surveys by parents/whanau. In the student focus groups, the student participants were shown a range of photographs of environmental activities or areas of interest from the early childhood centre they attended prior to enrolling at primary school. The intention of the photographs was to provide a catalyst for recall and prompt discussion.

The findings are presented in sections. Firstly, evidence of the recall of environmental activities is presented. Secondly, there is an examination of student experiences in education *about, in* and *for* the environment. Thirdly, the data that related to objects, symbols and actions of environmental significance that the student participants connected with is presented, these being; the wormery, the bird house, the Bokashi and the garden. Then these ideas and actions are placed in the context of EfS. Finally, the findings relating to pedagogical approaches are

explored and all of these are linked to transition and identity. I believe by presenting the findings in this order the reader is able to understand the relationship and interconnectedness of early childhood education, education for sustainability (EfS) and transition and identity. At the beginning of each section I have given a brief description to explain the context of each of these sections.

### 4.2 Recall of environmental activities

Photographic recall was employed as one method to gather data for this study. The photographs were taken of spaces or activities in the early childhood centre which were identified by the early childhood teachers as having both connections to the education for sustainability (EfS) programme, and that the past student participants had engaged with at the time of their enrolment in the early childhood centre. The photographs were enlarged and laminated to present to the student participants in group interviews. The photographs were presented on the table of the interview room for the student participants to view and handle as they arrived. From the photographs, all six student participants were able to recognise and recall events, activities, and spaces from the photographs at the early childhood centre.

In a group interview with four of the student participants from one school, the photographs were placed on the table and the children began to connect with them. One participant, Indy, exclaimed, "I remember this, my preschool teacher…". Oliver, another child in the group quickly responded, "Yeah, it's in my book!" [Described as the learning journal by the early childhood teachers]. Indy replied, "Yes I remember this, it is in my book". Oliver picked up one of the photographs of the paper bricks, "we made this altogether", he explained. Indy took a moment to reflect as the others talked amongst themselves, and as the realisation becomes apparent, she makes the connection, "Hey, did all of you go to preschool [the early childhood centre]?" Once this is identified the group begin to relate and share stories. The purpose of the photographs here then, was not only to promote discussion and recall around the EfS programme, but to allow the group time to identify that they had all been to the early childhood centre and had these same experiences. Once this was established they began to identify as a

group and to piece together their stories and experiences of their early childhood centre to share with me.

The capacity of the children to reflect, connect to and recall events and activities of an environmental nature was clearly evident. For some children, the events had taken place two years prior, for others a few months earlier. The most memorable experiences recalled by the students were those that provided more than a one-off experience. For example, the wormery, the Bokashi, the bird house project and the planting. These children were exposed to these experiences on a daily basis in the early childhood centre and this allowed opportunities for sustained learning over time. The capacity of all the student participants to make connections between these experiences and their learning at the early childhood centre and their subsequent school was also of interest.

The photographs provided a catalyst for discussion around the recall of events and activities related to EfS, but they also allowed children to connect with symbols of the early childhood centre. One example was when the photograph was presented of the mandarin tree with a statue alongside it. Maddy squealed, "That's …" Ben smiled and pointed to the photograph, "I definitely know that…..that's outside by the deck and that's ….a statue. It is an adult with a baby". Maddy agreed, "Beside it. That's beside the sandpit", she confirmed. In another group interview, the student participants examined the same photograph, and Indy exclaimed, "I remember that too". Josh quickly responded, "It's a girl and a boy". Angus shared his perspective, "It's Jesus", he informed the group. In this situation the recall from children is a connection with a symbol of place (See Figure 4.1).

Figure 4.1 Statue as a symbol of place in the early childhood centre

The statue provided a platform for children to express their mutual relationship and share their personal perspective on its identity. In some way it had a reflective, spiritual meaning to the participants. This evidence demonstrated the importance of symbols and icons in children's lives. Littledyke, Taylor and Eames (2009) suggested that EfS makes a connection with spiritual health and suggested that this "connectedness is part of supporting empathy for and a sense of responsibility to other people and to other living thing" (p. 209). From observing the reactions of the children to the photograph of the statue, it seems useful to highlight the importance of icons and symbols in an educational environment and to understand their relevance for children and their well-being.

In summary, the recall of environmental activities was stimulated by a series of photographic images selected by the early childhood teachers. The photographs also allowed the group to reconnect with the early childhood centre and consequently one another. They then began to share stories which demonstrated several incidences of education *about, in* and *for* the environment.

### 4.3 Education *about, in* and *for* the environment

This section of the findings chapter considers the connections the data makes to the notion of education *in, about* and *for* the environment. This allows a contextual framework for the findings and relates to the research question as it

explores the ideas of education for sustainability and then allows the reader to think about how this influences children's thinking and actions.

Essentially education *in* the environment depicts education for sustainability (EfS) in a particular context or setting. The Ministry of Education (1999) suggested education *in* the environment allows students to gain first hand experiences. Education *about* the environment is knowledge that is passed on about the environment which can be removed from the context, for example a lesson in a classroom. Lastly, education *for* the environment explores education *for* sustainability at a more in-depth level and thus creates thinking and action and or change for the environment. The Ministry of Education (1999) suggested that education *for* the environment is based on students' knowledge and understanding about the environment.

A rich EfS programme would reflect activities and actions that are composed of each of the education *in*, *about* and *for* dimensions, with a vision of moving towards education *for* the environment, which sees student-led inquiry and action resulting in changing attitudes and behaviours for positive outcomes for the environment.

The data for this study is highly represented in the education '*in* and *about*' dimensions, with all participants describing evidence of EfS practices that link to education *in* and *about* the environment. Incidences of education '*for*' the environment were less prevalent, however the data would suggest there was some evidence of the dimension of education '*for*' was present in this study. This data is now presented around these themes, culminating in a discussion around education '*for'* the environment.

The following findings provide evidence of experiences and knowledge gained from objects, symbols and actions of EfS significance across time and place. These are illustrated through the following sections on the wormery, the bird house, the Bokashi and the gardens.

### 4.3.1 Wormery

During the interview with the early childhood teachers, one of the teachers, Kyla reported that a wormery had been in the early childhood centre for over 5 years. With this history, the wormery and its care appeared to now be entrenched in the centre culture. The early childhood centre teachers noted that the children were exposed to the wormery on a daily basis and gained knowledge and skill of its operation over time. Kyla provided an example, saying "they [the children] know they have to have wet hands to handle the worms so they don't destroy them". When the students in the focus groups were shown a photograph of the wormery at the centre, 4/6 student participants were able to make connections to the wormery. One student participant, Ben, exclaimed, "This is our worm farm". He then shared that he had a wormery at his primary school and at home. Ben then described the types of food the worms like, and the cycle of composting and selling the worm liquid to reinvest into the gardens at the centre and at the school he was currently attending. In the same interview, another child, Maddy, shared her knowledge of the type of worms found in the wormery, "there is tiger worms", she exclaimed. It is evident from working with the wormery the students had gained and retained knowledge of worms and their role in the care of the wormery.

One of the schools that the student participants were now attending had an "enviro group" with 80 members from a school with a roll of 250 pupils. Primary school teacher Alys explained the existence of a wormery when discussing the distribution of the composting rubbish within her school, as she says "I've got one container for worms, as Mrs X and I are officially doing the worm farm, so we've got the worm farm rubbish, and the rest of the school are doing the rest of the compost". During the student focus group interview at this school, the students were asked if they wished to show me what environmental activities they knew of at the school. The wormery was chosen, with student participant, Angus, photographing the outside and inside of the wormery (See Figure 4.2). This is evidence that the knowledge gained with the wormery at the early childhood centre may have provided a rich learning tool that the student participants were connecting with over time and across settings.

Figure 4.2 ‘Student on Tour’ Photograph of the wormery

### 4.3.2 Bird House

Another object of interest in the early childhood centre was the bird house. The bird house is a key feature in the early childhood centre garden, which was a group project that was designed and planned by the children. One photograph showed the bird house that the students had designed. One of the six student participants, Angus, identified with the photograph of the bird house. When the student participants were asked if there was anything like these photographs at school, Angus exclaimed, “Yes, we have a bird house at school”. Although Angus made this comment, he didn’t photograph a bird house on his tour of the school. He went on to explain that he also had a bird house at his home. Kyla, the early childhood teacher, described how the bird house was established:

> Well the bird house, that was about 2 years ago now, probably most of the 4 year olds were involved in the planning for, and what the birds would get out of it, what would happen in the environment, where it would go, they had to decide where it would be positioned, and most of the 4 year olds at the time were involved in that activity. And since, there are children involved who have been making bird feeders to go on it.

This is evidence that the bird house provided a catalyst for the children to initiate activities which engage in education *in* the environment. Within the context of the early childhood centre, the bird feeder was an activity which seemed to create an opportunity for the collective knowledge and ideas of the children to be drawn together.

### 4.3.3 Bokashi

Another environmental activity that participants related to was the establishment of the Bokashi, an enclosed bucket which provides a composting system. One early childhood teacher, Kyla, described how the early childhood centre had recruited expert assistance from the local council to explain the Bokashi system to both early childhood centre staff and children. Kyla goes on to state that this visit along with several other activities engaging children and the Bokashi was intensely documented in the children's learning journals. Kyla shared:

> So in their learning journals they have lots and lots of stories with [the facilitator] from the council, from the environment, he came in and we organised what kind of food can go in the Bokashi and what can go in the worm farm and all the ingredients for in the Bokashi too.

This is evidence that the teachers indicated that the learning around the Bokashi was intensely documented in the children's learning journals.

Both parental responses described the centre learning journals as a way of sharing information about their child's interests at the centre. Kyla explained:

> The Bokashi was brand new for all of us, and to have something that smelt like it did, it was such a tactile experiment, the children loved it, and the boys loved it. I'd loved to have someone come in and make it with us again. Buying it is well and good, but seeing the enzyme go in and you have to mix it. You need a certain quantity of the elements, it was just wonderful. It was baking on a massive scale!

The Bokashi was another tool for composting employed by the early childhood centre on a daily basis. Kyla explained that the impact of the Bokashi in the early childhood centre inspired families and staff alike to use them in their homes. "[We] hope they [the Centre families] would want to continue it at home, to reduce their waste at home as well. Some of the staff have got into it too when they didn't have before".

Like the bird house, the children's experiences with the Bokashi were robust and on-going, as early childhood teacher Cara explained:

> They are still enjoying it because they were digging in the garden, and someone said to me, 'I think we might dig up the Bokashi', and then I

explained to them that it was gone. Because they dug and dug and couldn't find any food.

One group of the student participants now have Bokashi buckets in their classrooms at school. These children instantly recognised the photograph of the Bokashi. One student participant, Ben, identified with the photograph prompt and was able to articulate the functionality of the Bokashi system to me. While taking me 'on tour' at his school, Ben photographed the Bokashi in the classrooms and insisted he photograph the enzyme packaging which detailed the instructions. The enzyme is critical to the function of the Bokashi. The connection that Ben made to the Bokashi demonstrated the importance for him of this as an object to promote education *in* and *about* the environment. See Figure 4.3 of the Bokashi in the classroom photographed by Ben.

Figure 4.3 'Student on Tour' Bokashi in class

### 4.3.4 Gardens

The gardens are an established focal point of the EfS programme at the early childhood centre. As one of the early childhood teachers, Kyla, said, "...the veggie garden was up and running and there was always an intention of planting trees". All the student participants shared some knowledge of gardening during the group interviews. The key data that emerged from the vegetable garden photograph prompt was around garden systems: weeding, watering, harvesting, burying the Bokashi compost, and the consumption of food. Some children (2/6) mentioned

the vegetable gardens at their respective primary schools. From discussions with teachers, it seems that both school gardens are 'works in progress', however, the student participants at each school appeared to have been informed about their imminent development. Comparably, both parents who returned the survey responded that they have engaged their child in environmental experiences which centre around a garden, for example, growing seeds, growing and harvesting vegetables, and water conservation.

Similarly, from the photograph prompt of a garden area at the early childhood centre the children were asked what they could see, and Angus proudly responded, "plants, native plants, flax… flax is native, that's where we went for our treasure hunt". When the student participants were asked to connect with what was at the early childhood centre and now at school, Angus exclaimed, "Yes, we've got heaps of flax" [meaning at school]. Angus's primary school teacher, Alys, identified the native planting as a connection to EfS. Her colleague, Pia, concurred, "We have the native garden over there. We had drainage [problems] – we used to have a lake in the winter. Then they planted the natives out there, and then they did outside the library". As discussed earlier, Angus identified flaxes as being represented at both the early childhood centre and at school. He highlighted this in the group interview and also photographed a number of flaxes whilst on tour of the school.

Half of the children identified fruit bearing trees and plants and mentioned the consumption of this food at the early childhood centre. Student participant, Ben reflected, "We used the fruit for eating, for shared lunch and stuff, at meetings the adults had it." Maddy added, "and if we run out of lunch, we might be…", "you can have some apple", Ben concluded. This concept of food consumption and sustaining self was evident in the discussions around the photographs from the early childhood centre; however, it was not evident in any of the discussions about the school environment.

During the tour of one school, we entered Maddy's classroom. Ben is quick to entice Maddy, "do you want to take photos of those plants?" Maddy took

photographs of the in-class growing experiments. All primary teachers in the study reported that 'growing' was an activity that was done at school either in inquiry or buddy time.

With all student participants sharing prior knowledge of their experiences with vegetable gardens and the growing of fruit and vegetables, this activity is a key finding that has emerged from the data which links to education *in* and *about* the environment. In terms of the research question, this identified that students are transferring their knowledge across spaces and over time and therefore this has an impact on their actions. However, the findings illustrated less, although some, incidences of the dimension of education *for* the environment.

### 4.3.5 Education *for* the Environment

Education *for* the environment requires more in-depth inquiry resulting in change or action *for* the environment. There were notably fewer responses from all participants relating to education *for* the environment. However, when I posed the question, 'what were they hoping to achieve from the environmental activities'?, responses from the early childhood teachers, Kyla and Cara, began to emerge that reflected the notion of education *for* the environment. Cara stated that she would like to set the children up with skills and make them able to be responsible for the environment themselves. When Kyla viewed the photographic prompt of the nappy recycling bin at the centre, she described how the early childhood centre took action on this issue:

> Particularly this [photograph of nappy recycling bin], that stopped for a while and we did an audit of how many nappies we had a week. And we had to help to lobby local government to set that up again. The lady who does that, so she could set it up, because the funding had stopped. Yet that is a massive environmental issue.

The nappy composting is a local initiative that converts disposable nappies to garden compost. The closure of the operation was documented in the local media and created a strong community response. This resulted in the nappy service being reinstated. Although the nappy composting initiative is not an activity that is evident in all settings, there was evidence to suggest it provided the staff and children at the early childhood centre exposure to an action that typifies education

*for* the environment. This was evident in the children when during stimulated photographic recall they recognised and identified the purpose of the nappy recycling bin.

Although there appeared to be fewer incidences of practice that related to the dimension of education *for* the environment, the study identified that there were some examples that were meaningful, and that teachers and children were thinking about education *for* the environment.

### 4.3.6 Section Summary

From the data, a range of activities and objects that link to education *in, about* and *for* the environment has been identified. Several links are evident between the early childhood centre and the schools, many of which identify with objects of environmental interest. Data from the group interviews with the student participants at two primary schools exemplifies the notion of education *in* and *about* the environment. From the photographic prompts and consequent discussions, all of the children (6/6) made informed connections with experiences in the environment and were able to demonstrate knowledge *about* the environment. The data here demonstrated what the children were connecting and engaging with in terms of education for sustainability at the early childhood centre and then at primary schools. This is a key point which links to the research question as these appear to be the tools which the students are using to transfer and then impart prior knowledge. In this case, they are identifying with tangible objects and resources, for example: the Bokashi, the wormery, vegetable gardens, flaxes, and the bird house. Some of these entities were reported in a number of areas of the children's lives, including the early childhood centre, primary school and home, therefore potentially having a strong influence on their knowledge and practices. This is further discussed in the next section on action competence.

The purpose here is to identify what activities, objects and symbols the student participants were engaged in at the early childhood centre, to then link these to the student participants' actions and engagement at school and at home. This will

support the research question as it considers what environmental knowledge and behaviours are transferred into other spaces.

It is evident from the results and data that all participants identified strong connections to activities and actions which link to education *in* and *about* the environment. These activities provide a basis for the foundations of environmental knowledge. However, there was less evidence of activities, practices, actions, thinking and knowledge which connected children with the dimension of education *for* the environment, although there was some evidence that this was developing.

### 4.4 Action Competence

Within the context of this study, the data allowed me to view the children's behaviours, knowledge and actions over a period of time and from different perspectives. Therefore I was able to discern aspects of action competence that appeared to emerge over time. Jensen and Schnack (1997), in an attempt to define action competence, suggested that:

> Competence is associated with being able, and willing, to be a qualified participant. Action needs to be interpreted in relation to the whole range of distinctions concerning behaviour, activities, movements, habits, and, then, actions (p. 165).

All primary school teachers described evidence of children displaying aspects of developing action competence. Although they have not used this term directly, as the researcher, I have identified these aspects and characteristics from the teacher's stories.

Half of the student participants, 3/6, demonstrated through their own data that they had developed some aspects of action competence and were able to articulate in some depth the functionality of the Bokashi, the wormery, the paper brick-maker or/and the care and the purpose of the garden. Some evidence for this is described above Section 4.3. This evidence suggested that three of the student participants have developed competence over time and have transferred this competence from the early childhood centre and home environments and are

beginning to demonstrate this competence at school. One primary teacher, Alys, highlighted the passion of one of the student participants, Angus, in saying:

> Just the enthusiasm. Because Angus was really enthusiastic, anything to do with growth, because he was part of the growth with the buddy thing as well. And if I said we had buddy time, he would say, "Will we be doing some more planting?" You know he was always really keyed into that type of thing. Because he has quite an analytical mind.

This is an example of the type of development of action competence that was evident amongst these students. There was also evidence of knowledge development, reflective capacity and empowerment. Overall, this evidence potentially demonstrated a willingness to take action *for* the environment, although this conclusion is tentative due to a lack of detailed evidence around the intentions of the students, which is a key feature of action competence. Jensen and Schnack (1997) have suggested that the components of action competence are: knowledge/insight, commitment, visions and action experiences (p. 173). To further analyse this development, I have used an example of the data drawn from one participant, Ben, and his knowledge of the Bokashi. The following section provides this as a case study as an example of developing action competence.

### 4.4.1 Ben and the Bokashi – a case study

I have chosen one student participant, Ben, and his journey and connection with the Bokashi composting system as a case study to highlight evidence of one child's emerging action competence. The journey begins with the reflection of Kyla, Ben's early childhood teacher, when she recalled Ben's intense interest in the Bokashi and the composting process when he attended the early childhood centre.

> The Bokashi, Ben, he is very involved in that, and a group of his friends were really involved, as they learnt to make Bokashi as well, so in their learning journals they have lots and lots of stories with [the man] from the council, he came in and we organised what kind of food can go in the Bokashi and what can go in the worm farm and all the ingredients for in the Bokashi too.

In the early childhood centre, the Bokashi became a tool for teaching and learning around EfS with teachers and children learning new skills alongside one another.

Primary school teacher, Kim, didn't refer directly to the Bokashi, but she offered an insight into Ben in saying,

> Ben is very environmentally aware and he is a thoughtful wee man. They [Ben's family] are very interested in gardening and growing their own gardens and eating what they grow...In our inquiry topics, he was always very interested in whatever was coming. He has an inquiring approach to stuff, and he is very good at asking questions to find the information he needs.

Through this evidence, primary teacher Kim explained an insight into Ben's history and allowed me to begin to understand how his intense interest and knowledge was developed over time.

During the focus group interview for this particular study, Ben demonstrated his in-depth knowledge of the operation of the Bokashi to me. He listed food waste that can be composted, and those that can't. Ben then explained how you "squash it down". When we went on the photograph tour of the school, both Ben and Maddy went immediately to the Bokashi buckets in their respective classrooms to photograph. Ben also insisted that he took photographs of the instructions on the packet of the Bokashi enzyme (See Figure 4.4).


Figure 4.4 'Student on Tour' Bokashi instructions

I then questioned Ben further to see if he would make any further links between the early childhood centre, school and home. He responded:

> We have Bokashi buckets in our house. And once the Bokashi is filled, we take it to the garden and make a big line and put it in there. And then bury it back up, so all the worms can have a nibble.

This  demonstrated not only Ben's understanding of the cycle of the Bokashi composting, but of its purpose, to act sustainably about food waste, to then feed the worms and nurture the garden.

Ben's Bokashi story was collated from different perspectives and is articulated by himself as narrator of the cycle of the Bokashi.  This is evidence of emerging action competence where one child has developed an intense interest and gained expert knowledge over time and space and is now able to act and articulate his knowledge and expertise to others.  His engagement with inquiry learning was highlighted by his teacher and is evident in his actions. From Kim's description and Ben's reflection, it is evident that Ben's family are engaged in gardening and composting and have involved Ben in this process.  This encompassing approach has allowed Ben the opportunity to develop a rich, intense knowledge of the Bokashi.

In exploring another activity, gardening, Ben was able to articulate the economics of the garden.  Ben explained to me the cycle of the garden and the connection with the wormery by selling worm fertiliser and plants to re-invest into a fund to raise money to build more gardens. Ben had been exposed to this process at the early childhood centre where worm juice (produced from the wormery) had been sold to raise funds for garden projects, and then again at school where plants had been sold to the community outside the school office and funds reinvested into the EfS programme (See Figure 4.5).


Figure 4.5 'Student on Tour' Plants for sale at school

Ben had taken a keen interest in the rudiments of economics. The following dialogue between Ben and I illustrated his understanding of the school project of reinvesting funds from products sold at school:

> Researcher: So what did you do with the worm wee?
> Ben: We've got it to sell.
> Researcher: And what would you do with the money?
> Ben: We use it for the school garden.
> Researcher: Fantastic, is that at school or preschool?
> Ben: Pre-school and school.

Ben goes on to give another example of his expert knowledge that demonstrated his intense interest in the economics of the garden when I ask him about the plants for sale at school:

> Ben: These [plants] get sold. People just usually buy them.
> Researcher: And where do they put the money?
> Ben: In the office.
> Researcher: And what happens to the money? Does Mr Principal put it in his piggy bank?
> Ben: (Laughs) No ahh, we use it for the school garden.
> Researcher: For the school garden?
> Ben: Yep.
> Researcher: Have we seen the school garden?
> Ben: No, the school garden is not made yet.

Primary school teacher, Kim, also affirmed Ben's interest in economics when she shared that, "he was very involved in our market day and our enterprise. Nothing to do with growing anything but very involved in that. Just whatever is happening, he takes an interest". Kim also confirmed that the garden was a work in progress.

This section has provided key evidence of one participant's story of developing action competence. Ben's ability to demonstrate his knowledge development, display his reflective capacity and empowerment are all aspects of developing action competence. A key connection in this case study is the opportunity of the student participant to impart prior knowledge that he had developed over time and then apply this knowledge to his current setting, in this case Ben's knowledge of the Bokashi in his classroom. This development in Ben is linked to teacher pedagogy in the early childhood and primary school settings. Many factors have

influenced this and these are examined in the following section on pedagogical approaches.

### 4.5 Pedagogical Approaches

This section identified a number of pedagogical approaches that emerged from this study which were key factors in supporting the development of the EfS programme and the opportunities for children to share and develop thinking and ideas around the environment. These were: constraints and affordances, teacher positioning, making learning visible, and opportunities and possibilities.

#### 4.5.1 Constraints and Affordances

Within this section the identified constraints and affordances that were evident for the provision of EfS that could lead to transfer of environmental knowledge and behaviours between educational settings are presented. A number of constraints were identified by both the early childhood teachers and the primary school teachers. All of these teachers involved in the study identified the need for more support, particularly in terms of finance and knowledge. Both early childhood teachers described energy, time (and time to reflect), resources and support from the local community, schools, parents, whanau and the wider community, as factors to ensure the EfS programme is maintained. Primary teacher Kim concurred, saying "We are under time constraints to get through our particular inquiry". This suggests that time was a constraint for all teachers.

Similarly, the teachers identified knowledge and attitudes as constraints of the EfS programme. Primary teacher Alys reflected, "You know, you don't know what we don't know! There may be wonderful things out there, some things we don't know". The primary school teachers identified attitude, funding, and the busyness of family life as limitations of the EfS programme. Primary teacher Kim shared:

> Yeah, some of it just falls on dead ground, and that is life. You know once it is dealt with in the classroom it would be lost. And I think that is a commentary on life, it is very busy and people don't smell the roses as often as they should.

This attitudinal constraint was identified by another primary teacher, Pia, who identified parental attitude as a constraint. She suggested for some families,

sustainability was not their motivation and this then influenced the children's thinking. For Pia, this was clearly evident with the rubbish-free lunch days where some children did not participate.

On the other hand, this study provided evidence of an abundance of opportunities where the early childhood teachers and the school teachers were nurturing children's ideas and thinking around action competence and the environment and therefore supported the notion of affordance. The affordance in this case would be the teacher approach or the teacher positioning, which can influence the affordance for the learner.

All of the teachers in the study, both early childhood and primary, suggested they had support from outside experts and facilitators. The early childhood teachers identified that they had the support of each other. Two of the primary teachers from one school had the guidance of the in-house 'enviro' leader. For example, Pia identified a teacher within the school who was the 'enviro' leader. Her colleague, Kim agreed, saying "She lives it, it is a lifestyle she lives". Pia concurred, "And everyone knows that and you feed off that, or you will see something and you will say "hey Lia, I saw such and such, I saw a programme the other night on building such and such. Because she does love it, she is the shining light. It reflects". Although this support is present, all teachers believed they could have more support to further enhance their EfS programmes.

An interesting outcome of this study was the use the internet as support tool for EfS teaching. The early childhood teachers identified that in the future they would like to set up a blog site to share knowledge to connect with like-minded early childhood centres and schools with rich EfS practices. When questioned about further support for the EfS programme, primary teacher, Kim, stated, "With the access to the internet and resources like that, we tend to link into that I guess".

One primary teacher, Pia, explored plans for the future and shared information about the development of the school over the coming years. "We had the architect the other night, on planning the school for the next 5 – 10 years, there were

questions on sustainability, how best we could build. There is an actual awareness". This is evidence of the school developing a school wide approach to EfS which supports the notion of affordance for student's future learning.

### 4.5.2 Teacher Positioning – a Platform for Inquiry

All of the primary school teachers identified the inquiry learning approach as an opportunity for EfS. Inquiry learning is a model "to support teacher inquiry into the teaching-learning relationship" (TKI, 2012). Both of the early childhood teachers described events that demonstrated issues around teacher positioning and the teacher-learner relationship. This was evident where teachers explained scenarios where they were learning alongside children. Kyla described how community experts came into the early childhood centre to teach new skills around sustainability to the teaching team and children, as she stated, "They come and teach us [children and teachers] about it. We are learning as well". Here Kyla seemed to be viewing herself as a learner alongside the children, not an expert of EfS.

Similarly, Cara's story around the paper brick-maker highlighted power dynamics and teacher positioning in the early childhood centre and she reflected on her personal teaching philosophy. A family whose child attends the early childhood centre lent their paper brick-maker for an EfS activity. Cara explained to me that the paper brick-maker is a device that processes waste paper into a compressed paper brick. Cara stated, "I didn't know how to use the brick maker either, so they [the children] have discovered how to use it themselves, which has been cool". Like Kyla, Cara identified that she lacked the knowledge to operate the brick-maker and worked alongside the children to learn the process of paper brick-making. This is an example of a teacher reflecting and making a conscious decision to not lead the group, but to work in parallel with children. This co-constructed learning is a common approach in education for sustainability, where students and teachers alike engage in inquiry learning. Similarly, during the interview with primary school teacher Kim, I asked what she believed were the strengths of EfS activities for children. Kim responded that:

> I think it is initially raising awareness and then engaging the kids at a personal level, and asking how they could get involved and what little

> changes they could make, and how they could take their education home to talk about it at home, to then make a bigger change in the community. That is what I would say is the link.

Here Kim highlighted her approach of children self-managing and taking responsibility for their learning. This links to the current *New Zealand Curriculum* Key Competency of managing self (Ministry of Education, 2007, p. 12). This is evidence that Kim has consciously created a platform for inquiry where children were thinking about EfS and ideas where being developed around sustainability.

Similarly, another primary teacher, Pia, when asked about the strengths of the EfS activities at school responded that it was, "Buy in, catering to their interests, just a general enthusiasm that they can get from...because it is across the school". The primary school teachers were questioned about student participants' attitudes, knowledge and behaviours with regards to EfS. All of the primary school teachers responses related to activities '*in* and *about*' the environment, which in some cases seemed to lead to the possibility of action *for* the environment. For example, when questioned how they believe the student participant interests in these environmental opportunities compare to other children in the class, teacher Alys responded, "Knowledge they gain. It is all part of our inquiry unit. This sets them up really nicely for inquiry. They sort of analyse something and then move through in the process, until they synthesise and come out with the end product". Her colleague, Pia, agreed,

> Yes, and what are we going to do now? That is the big question at the end. OK, we've got all this knowledge, what are we going to do with it. It is no use just having knowledge, we need to do something with it. That is when they [the children] come up with some really good ideas.

Here Alys and Pia described metacognition, where they are wanting students to think about their knowledge and how they can then put this into action, thereby creating a platform for thinking around education *for* the environment.

All of the primary school teachers in this study identified opportunities for children to impart prior knowledge, thereby allowing the transference of knowledge from home and preschool. The issue of teacher positioning as an

affordance for student learning is highlighted in this evidence. The teacher-learner relationship in a context of inquiry learning were two factors which supported the student participants by giving opportunities to impart prior knowledge and to provide a platform for new learning. A key aspect of inquiry and indeed, early childhood education, is transparency and making the learning visible to others. This is discussed in the following section.

### 4.5.3 Making Learning Visible

A key feature of the early childhood centre's environmental programme was the ability of the teaching team to make the connection with children's learning and the EfS visible to all stakeholders. Both of the early childhood teachers identified the use of learning journals, informal conversations, communications board, website, media exposure, and children's conversations with parents as a means to translate the students learning around EfS. This is evident in the early childhood teachers' responses about communicating children's learning during the interview, in which they describe learning journals, displays, vision maps, informal discussions, newspaper articles, their website and links to 'enviro' schools, children's interests and conversations, committee discussions, exposure through media and fundraising. The documenting of this learning was a key to making the learning visible across spaces by linking to the home environment. Kyla stated:

> We have been in the paper as well, and we had the veggie garden when we first decided we were quite a sustainable community – we were in the paper so that was a few years ago now. We probably need to be in the newspaper a little bit more, 'cause some of the things that we do.

The survey data from the parents supported this visibility with the returned surveys suggesting that the parents were aware of their child's involvement in the environmental programme in the early childhood centre from their child's learning journal and discussions with teachers. This indicates that the EfS programme in the early childhood centre was clearly and regularly communicated by the teaching team to ensure that the learning in this area was visible to families. This is evidence that from a pedagogical standpoint the transparency of learning is an important key for children's thinking, learning and development in EfS.

The early childhood teachers had also informed their chairperson and committee of the governance board about the EfS programme, as Cara explained, "Through the committee, [the committee chair], is talking about the new 'enviro' area we want to develop, and she will talk to the committee…so they are all parents, so they know what we are doing". This is evidence of the open, reciprocal positive communication between the teaching team and the committee in the early childhood centre. It also highlighted the importance of the ability of the teaching team to articulate the virtues of the EfS programme to the wider community as a key factor for the success of the programme. It is through this communication and dialogue that further opportunities and possibilities were identified.

### 4.5.4 Opportunities and Possibilities

The interview process provided the opportunity for teachers to come together to dialogue around the ideas of transition, education and sustainable practices. The two early childhood teachers who work at the same centre were interviewed together. Likewise, two of the primary teachers from the same school were interviewed together. The only primary teacher from another school was interviewed alone. Where the teachers were interviewed in pairs, the interview became a forum for unprompted discussion where the teachers began to explore ideas together around EfS and transition. The nature of the teacher responses demonstrated that the interview had been an opportunity for the teachers to reflect on their own teaching.

The early childhood teachers Kyla and Cara had a discussion during the interview where they explored ideas around communication and networking with comparative early childhood centres. Cara stated:

> We know there is stuff going on. The likes of City Preschool, but like if you or I had a contact there. They do have cluster meetings but they are really hard to get to, even just thinking now…. like a blog on the internet.

Her colleague, Kyla, agreed and Cara responded, "I just thought of that just right now!" Kyla is excited about the concept, she added:

> Yes you did, well done! Even skyping would be good. You could Skype to the preschool, 'we are planting this now, what are you guys doing'?

> We could have it outside, if the internet would work out here, sometimes it doesn't!

Another example of this unprompted dialogue was between the primary teachers, Pia and Alys, when they reflected on the transition process. Alys pondered:

> I feel because of the physical nature of this [rural] school, like you were given time, I feel that is something that could be done a little better. I am not quite sure how. But I don't really know, I haven't physically been to any of the preschools here.

From a later conversation, the teachers suggested that the discussions around the future possibilities of EfS and transition wasn't something they had time to think about prior to engaging in the research. The interview had become a catalyst for further exploration and reflection around the concept of transition and change.

These examples were evidence of the teachers having time and space in the study interview to begin to reflect and explore possibilities and opportunities around transition and EfS. I had not anticipated this prior to collecting the data and although it does not relate directly to the research question, it was inspiring to witness and is worthy of further exploration. There are possibilities here with the development of teacher action competence from reflection on experiences and future visions of actions, for example, the development of a blog site.

### 4.5.5 Section Summary

This section has provided evidence of environmental teaching and learning which points to several pedagogical considerations being employed in both the early childhood centre and the schools to foster the EfS programme. These key points were highlighted from the data which indicated the need for careful attention to pedagogical considerations and the relationship this had on the effectiveness of the EfS programme in both the early childhood centre and the schools. The teacher participants highlighted a number of possibilities to further enhance their EfS programme, for example, using the internet to connect with early childhood centres with similar interests in EfS in the community.

### 4.6 Links to Community

For an education for sustainability programme to be successful it needs the support of the wider community. Wenger (1998), in a paper on communities of practice, suggested that these are groups of people who share concern for something they do and learn how to do it better (Wenger, 2012).

Each of the data sites in this study, both the schools and the early childhood centre, had employed the expertise of external EfS facilitators from the local community that had visited all three sites at various times. The facilitators worked alongside both adults and children. Early childhood teacher, Kyla reflected:

> Having visitors in and making [the children] realise that it is not just us, that there are people out in the community that actually do this for a living, that this is their job, and they come and teach us about it. We [the teachers] are learning as well.

One external facilitator, Leone, a community educator who is currently employed by a local waste management company to educate teachers and students on the principles of EfS, had visited the early childhood centre several times and now visits the schools that the student participants are attending. Through this exposure over time and place, it was my impression that the children had become familiar with the facilitator, building on their relationship with her and their level of knowledge and skill in the EfS principles. It was evident from my observations that because Leone operated in the two spaces, it was possible for her to make connections between what the children were learning in the early childhood centre and the primary schools. Leone was therefore providing a conduit between the two spaces and was able to then support the transference of knowledge over time and space. Her role was crucial in terms of EfS and transition as it reinforced students' learning and prior knowledge.

All of the teacher participants, both primary and early childhood, identified the need for working with a community expert as a means of further support for the success of the EfS programme. Primary teacher, Alys, provided evidence of this when she stated:

> Leone is amazing…. She comes in quite strongly and we see her on occasions with all sorts of things. And I have known her a very long time and she is very approachable and very hands on. And she has talked to my children in the past about growing things and gardening and stuff like that. And she has been in with my Bokashi bucket…That kind of person is very resourceful.

From the other primary school in the study, teacher Alys agreed with the need for external facilitators, "it's the initiation, isn't it, to know where to start from, it seems such a big thing doesn't it, and what little things can we do to start off in a small way and then build on and get better at".

In hindsight, if I had been aware that the EfS facilitator, Leone, was working across the three data sites, she would have been an ideal participant to include in the data set of the current study.

This engagement with external community facilitators highlights the importance of professional development for teachers. This evidence from teachers is an indication that teachers feel that professional development and learning opportunities would be highly beneficial in the area of EfS.

Seeing the school as part of its community, one teacher, Kim, was asked during the interview about the strengths of the EfS activities for children's learning, and she replied:

> Just being able to relate it outside of school. And carry it out in the community and relate it to the world. And how we live and how we need to live, and the caution we need to take and the care we need to take.

Similarly, primary school teacher Alys responded:

> It is a community thing almost, because our parents have bought into it as well... It's a whole home/school environment where we each support each other. I found that particularly here, after being in a large city school you kind of notice that. Just being part of a whole family, a school and a community that is all growing and working towards the same thing is really good.

The notion of community is evident here and demonstrated a special characteristic of these two rural schools and their local community. It is interesting to note that

the teachers who had previously worked in urban primary schools highlighted the difference between rural and urban schools and suggested the assumption that the families of the school had made a lifestyle choice to live out of town and had an interest in nature and wanted this connection for their children. There is evidence from this study to support this teacher statement where families identified EfS as being second nature to them. One parent response supports this:

> I think he [the child] has been exposed to this his whole life so it is just a moral part of his thinking and he wouldn't know there was any other way to think. He is a generation where caring for the environment is discussed so widely in many places and that it is not really questioned and we try to reinforce this at home.

The parent went on to suggest that she feels most of the child's exposure to environmental practices and thinking are based at home but believes it is reinforced from many other places in the child's life.

The early childhood teachers identified how important community support was to their EfS programme when they were questioned about where they seek support from, or where would they like to have support from. Kyla responded, "All of the environments, like the preschool [the early childhood centre] environment, the community environment, maybe the school, parents, and whanau, and the wider environment like the government. And other preschools". This evidence suggested that the connection here with community is pivotal to the success of the EfS programme in the early childhood centre.

It is of interest to comment that the early childhood centre and one of the schools were involved in the Enviroschools programme. However, from the interview data and from my observations both the early childhood centre and the school had 'flown the nest' of the Enviroschools umbrella. Teachers from both the early childhood centre and one of the school teachers suggested that the extensive documentation of the current Enviroschool pathway was challenging in an already overloaded teaching programme, and had deterred their motivation somewhat. From what I ascertained, it seems their early involvement in Enviroschools was a catalyst to the current EfS programmes that they currently run independently.

In summary, this section has highlighted the importance of community for the implementation and on-going support of an EfS programme. The evidence has indicated the involvement of external facilitators and the commitment of families have contributed to the development of the EfS programmes in both the early childhood centre and the schools. The evidence from teachers is an indication that teachers feel that professional development and learning opportunities would be highly beneficial in the area of EfS. Viewing the early childhood centres and schools as part of their communities then leads me to examine the link between EfS, transition and identity.

### 4.7 Transition and Identity

One of the themes that has been explored in this study was the notion of transition and identity and its place in education for sustainability. What are some of the key ideas that children were connecting with in the early childhood setting and transferring to other places? This is explored in the following section as the links between school and the early childhood early childhood centre are discussed.

The data were collected from two rural schools in Canterbury. One school is 10 kilometres from the nearest early childhood facility, the other is adjacent to the early childhood centre where the participants attended prior to moving to primary school. Some of the teacher participants (2/3) identified the physical separation from the early childhood centres as a constraint of a rural school. Understandably, these teachers were from the primary school 10 kilometres from the early childhood centre. Both teachers indicated they would like to review the current transition process within their school to connect with the local early childhood centres. One of the primary school teachers, Pia, suggested:

> Perhaps we should look at that a bit more, because I think that would be a valuable thing to do [visit local early childhood centres]. And perhaps there could be some time to allow you [Alys] and the other new entrant teacher to go and do some visits.

Both of these teachers, Pia and Alys, had previously worked in city schools and had highlighted that they had well established reciprocal connections with the local early childhood community at that time.

In contrast, one of the primary school teachers, Kim, who works at a school which is adjacent to the early childhood centre, described a close connection with the early childhood centre. Kim stated:

> We have a rather nice close relationship with our school [and the early childhood centre], there is a lot of integration and preschool visits, the children from here [school] still run down to the fence at lunch time and call out to siblings, and wave out to old friends and things like that. I do think that we have quite a nice two-way interaction. There is plenty of communication going on. Our principal wanders down time to time to see them and have a chat.

Kim then reflected on past practices which supported the transition for children and families from early childhood to primary school. She stated:

> In the past, when I was a new entrant teacher here, I've run a morning where they would come over, the kids who are going to start here, and it is a really nice integrative thing and it seems to help the transition. That smoother transition, not so much the fear of the unknown it seems to me.

In summary, it is evident that the physical nature of the positioning of the school and early childhood centre has a direct impact on the transition process and the relationship between the school and the early childhood centre. This study has highlighted that the relationship with the home, school and early childhood centre environments is a key factor in creating opportunities for the transference of knowledge.

### 4.7.1 Propagation and transference of knowledge

Both of the early childhood teachers identified that they would like children to have knowledge that they can pass on when they left the early childhood centre. These teachers were asked what they hoped children would take with them when they leave the early childhood centre in terms of thinking about environmental behaviours. Kyla responded, "Respect for the environment", and Cara added, "And a relationship with the environment". Kyla concluded, "And they have some knowledge that they can pass on". This notion of the transference of knowledge is one of the intentions of this study. What is it that children are connecting with? What allows or constraints them from imparting this knowledge in other places?

The evidence suggested that the early childhood teachers wanted the children to have agency and wanted the children to think they can contribute and therefore have their knowledge around EfS valued by others.

One of the early childhood teachers, Kyla reflected on the idea of prior knowledge, as she stated:

> In some of them, it was that they [the children] have an interest as they live on lifestyle blocks anyway, a lot of our children do. Their interest was prior knowledge, so they could share that knowledge with us. And very, very proud that they knew what the EfS facilitator was saying, and what we were saying. So they were helping us too.

Kyla then used the paper brick-maker as an example,

> I think with the paper bricks that came from Grace. That was Grace's paper brick-maker. So that was really nice that she knew how to use it before we did and helped us with that. So she was very keen on that.

This evidence from Kyla suggested that in this case the knowledge around EfS was initially coming from the home environment, and being both complemented and extended upon in the early childhood centre. It was my impression that the early childhood teachers demonstrated a co-constructive approach which allowed the opportunity for the children to impart prior knowledge and were flexible and open to the child's lead.

When the primary teachers were questioned about how they became aware of the student participants' attitudes and knowledge, one primary teacher, Kim responded:

> Just the demonstration and the involvement and the wanting to participate and share knowledge and share information, like what he bought with him, like prior knowledge, that he bought with him to the class and into our discussions. He was always quite prepared to give information.

I went on to probe further and asked how Kim thought these activities connect with interests, knowledge and attitudes that they may have brought with them from the early childhood centre. She responded, "Just affirming that prior knowledge and the interest and enthusiasm I would think".

Similarly, I queried the other primary teachers about the connection of interests and knowledge, and Pia responded, "I think it just builds on their experiences, the more experiences they have in these lines, a lot of children, the more experiences they have, the more……", Alys continued, "Knowledge they gain. It is all part of our inquiry unit. This sets them up really nicely for inquiry. They sort of analyse something and then move through in the process, until they synthesise and come out with the end product".

All of the primary teachers indicated that the six student participants selected by the early childhood team for this study displayed an interest and awareness of the environmental programme offered at school. The teachers had given the children time and space to impart prior knowledge they had gained from other environments in their life. Evidence of this triangulation between the early childhood centre, home and school is discussed in the following section.

### 4.7.3 Linking Actions of EfS between Early Childhood Education, Home and School

Both the early childhood teachers identified strong links between home and the early childhood centre and highlighted several examples of this, ranging from children imparting knowledge from home, school or the early childhood centre, or taking home seeds to plant, and having children bring resources from home to assist in the EfS programme, for example, the paper brick-maker.

Likewise, all the primary school teachers identified links between home and primary school in relation to EfS. These teachers also identified opportunities for the children to impart prior knowledge and therefore provide an opportunity for the transference of the student participant's knowledge from home, the early childhood centre and school.

The evidence suggested that students had the opportunity to share prior knowledge during an inquiry unit at school. Primary teacher, Alys shared evidence of this as she discussed one of the student participants, Ben. She stated, "In our inquiry topics, he was always very interested in whatever was coming. He has an inquiring approach to stuff, and he is very good at asking questions to find

the information he needs". The inquiry unit topics that children were engaged with at the time this study was undertaken were growing, planting and enterprise.

Half of the student participants made connections to home, the early childhood centre and school from the photographic prompts during the group interviews. As identified earlier, these student participants made these connections with the photographs of the wormery, the Bokashi, the bird house and the native flax. This is supported by the parental responses, where both of the parents suggested their child talked at home about the garden at the early childhood centre. These children would compare gardens and make suggestions of what to plant at home. One parent highlighted evidence of knowledge sharing, "[my child] would come home and compare the preschool garden to Mummy's garden! And would tell me what to plant in my garden". Another parent shared that their child bought home a pumpkin plant from the early childhood centre to plant at home.

Further evidence of the linking between spaces was demonstrated when two of the student participants connected with the Bokashi photograph from the early childhood centre. Ben shared, "We have Bokashi buckets in our house". Likewise, Angus made the connection with the Bokashi, "we've got a Bokashi. I then inquired as to where it is at home, he promptly replied, "beside the garage and one by the front door. And one inside. We have got 2 of them inside in the same drawer". This is further evidence of the importance of environmental objects and the connections and links the student participants made with these over different spaces.

Both of the parents responded that the exposure to different environments influenced their child. One parent highlighted this and shared:

> I think most of his exposure will be based at home but I think this has been built on by exposure at preschool [the early childhood centre] and school which helps him consolidate that information. And when he hears it from many sources I think that reinforces the notion that it is a normal thing to think and discuss.

One of the primary teachers alluded to the environmental awareness of student participant Ben and stated, "that [the awareness] may come from home or

preschool… probably both actually, knowing the families and the background. The family activities, they are all interested in gardening". This evidence indicated the importance of relationships and having background knowledge of families.

The data in this section provides evidence of the value and importance of relationships between the child, the family and the educational setting. It also indicated the significance of the encompassing influence of home, the early childhood centre and school on children's developing environmental competencies and ultimately, the development of their identity.

### 4.7.4 Development of Identity

With exposure to environmental experiences over time and place, it appears the student participants were beginning to develop an environmental identity. Both of the parental responses stated that environmental experiences influenced their child. One parent suggested this was due to the experiences being practiced at both the early childhood centre and at home. Another parent stated "I think [the child] has been exposed to this his whole life, so it is just a normal part of his thinking".

As identified earlier, over half of the children, (4/6) made connections to home, the early childhood centre and school from the photographic prompts. These student participants were able to weave their stories from different experiences over time and place and then articulate this to me in the group interviews. This evidence demonstrates the development of the child's environmental identity and what had influenced this development.

A surprising finding of this study was the development of the environmental identity of the early childhood centre teaching team. Kyla explained this following a query about the EfS activities for children and what she hoped to achieve, and what type of outcomes was she thinking of for the children, as she responded, "I hope they [the children] would want to continue it at home, to reduce their waste at home as well. Some of the staff have got into it to, when they didn't have before". I anticipate that an outcome of the early childhood

centre team increasing their knowledge of EfS could then have a strong impact on the teaching experiences they will offer children in the future.

In terms of identity, students' thinking will not always be affected by what they engage with at school. For instance, one of the parental responses stated there was 'no change' in their child's environmental thinking since they started school, and identified that "it is part and parcel of our lives". This particular child had obviously been immersed in sustainable thinking and practices in their home environment, therefore their school life had not added to that but merely complemented it. It would seem then that school life did not at least contradict what was happening at home, and therefore this would highlight the importance of the school EfS programme supporting what is happening at home.

Another indication of this was when early childhood teacher, Kyla, was asked of any examples of feedback from home or school on children sharing knowledge, she responded, "probably with the planting, I think a lot of them have little veggie gardens going at home". Kyla went on to share a story of a parent whose child is currently enrolled in the early childhood centre. The parent had said to her, "we just had to have a veggie garden because he just digs everywhere, he has to have his own now, he wants his own veggie garden." Kyla recalled another example of the impact of the EfS programme in the early childhood centre, "one of the children wanted to take worms home to start their own worm farm". This request came to fruition.

Although the latter story does not pertain to the student participants in this study, it does however demonstrate evidence of the influence of the early childhood centre and its impact on children's environmental thinking and learning. It also highlights the importance of the integration of home, the early childhood centre and consequently the school and the importance of the relationship between the three spaces. It is an impression that this particular student views the thinking and practice around EfS as 'normal'. This is a critical point where the home life is supporting the learning of the early childhood centre, and later the school, and

vice versa. This reciprocal support between these spaces appears to be important within the context of this study.

### 4.8 Summary

Throughout Chapter 4, I have presented the findings of the study. Verbatim from the data have been used to exemplify key findings. The findings of this study are both complex and interconnected and a number of factors have emerged. It is evident from the findings that all student participants and both the primary teachers and the early childhood teachers identified strongly with education *in* and *about* the environment. There was less evidence of all participants, students and teachers, connecting with the dimension of education *for* the environment, although there was evidence that this was developing, for example, in the case study of Ben and the Bokashi.

The findings demonstrated that the student participants were identifying with tangible objects and resources around EfS, for example: the Bokashi, the wormery, vegetable gardens, flaxes, and the bird house. These activities provided a basis for the foundations of environmental knowledge. Some of these entities were reported in all areas of the child's life, the early childhood centre, primary school and home, therefore potentially having a strong influence on their knowledge and practices.

Another key finding that emerged from the data was the consideration of pedagogical approaches and the influence this has on children's thinking and learning around EfS. The pedagogical approaches that were identified were: affordance and agency, teacher positioning, making learning visible, and opportunities and possibilities. Numerous opportunities were identified across all data sites that enhanced the student participants' thinking and learning around EfS. The primary teachers identified inquiry learning as a time and place for teaching and learning around EfS. The data provided several positive examples of issues around teacher positioning and the teacher-learner relationship where children were learning alongside teachers. The documentation and stories in the

student participants' learning journals around EfS were identified as one of the key tools in making the learning visible and sharing knowledge with families.

All teachers identified a number of factors that constrained their teaching in EfS. These were: lack of funding, lack of knowledge, the need for more support, energy levels, time, and time for reflection and attitudinal constraints. The evidence from all teachers indicated that they felt that professional development and further learning opportunities would be highly beneficial in the area of EfS.

Other key finding is the recall of activities and prior knowledge. The recall of environmental activities was stimulated by a series of photographic images. These images were identified by the early childhood teachers as areas of EfS interest at the early childhood centre. The photographs allowed the student participants to reconnect with the early childhood centre and consequently one another. Once the group identified as a group, they then began to share stories which demonstrated several incidences of developing action competence. The student participants connected with all of the photographs, and of particular interest was their response to a statue from the early childhood centre garden. It appeared that the statue provided the children with a sense of place and belonging with many of them sharing their individual stories about the statue.

Another key finding was the transference of knowledge and the incidences of developing action competence. These factors are woven together in the case study of one student participant, Ben. The data illustrated that Ben was able to articulate and impart his knowledge on a number of EfS dimensions. His stories around the Bokashi and the economic cycle around the selling of plants and the re-investing of funds into the schools EfS projects was a key example of developing action competence. There was also evidence of knowledge development, reflective capacity and empowerment amongst all students. Overall, this evidence demonstrates a development in the willingness to take action *for* the environment.

The study also identified that the link between the wider community, external facilitators, home and the commitment of families, school and the early childhood

centre were important to the success of the EfS programmes. The evidence also suggested that 'in house' leaders contributed to the development and success of the EfS programmes. This highlights the importance of home and community working together and the notion of 'communities of practice'.

In terms of transition, it is evident that the physical nature of the positioning of the school and early childhood centre had a direct impact on the transition process and the relationship between the school and the early childhood centre. The study provided evidence of the value and importance of relationships between the child, the family and the school. It also identified this encompassing, holistic approach and the influence of home, the early childhood centre and school on children's developing environmental competencies and ultimately the development of their environmental identity.

These key findings are now explored and discussed in Chapter 5, the final chapter of this thesis.

# Chapter 5 Discussion

## 5.1 Introduction

This study explored the multiple complexities of education for sustainability, identity and transition. It has examined the understandings gained by young children from education for sustainability experiences in their early childhood education and their actions and behaviours related to sustainability in their later years. Furthermore, the study investigated what environmental knowledge and behaviours were transferred across spaces and time, and what affordances make this possible and what constrained the process.

I begin by discussing findings in this study that responded to the first research sub-question, what environmental knowledge and behaviours are transferred into other spaces by young children? This is followed by findings that addressed the second sub-question, what affordances make this possible, and what are the constraints? Discussion around these two sub-questions leads to conclusions drawn about the overall research question in Section 5.4 in which I then examine children's development and the transference of knowledge over space and time, and the consequential development of environmental knowledge and identity. Finally, implications and recommendations for future education for sustainability programmes for young children that have emerged from the current study are highlighted.

## 5.2 Transfer of environmental knowledge and behaviours

Firstly, I set the scene with regards to education for sustainability, with a discussion on the three fold approach to education for sustainability, this being, *in*, *about* and *for* the environment. From here the notion of developing action competence will be examined and what this might look like in young children. Ideas around the connections of co-constructivism and ecological theory are also considered as is the significance of the transformative approach to education. The outcomes relating to EfS and the transference of knowledge and identity development from this study are also discussed here.

### 5.2.1 Experiences of education *about, in* and *for* the environment

A threefold approach to EfS identified in Section 2.4, which includes the three dimensions of education *in, about* and *for* the environment has long been argued to be an effective approach in EfS. Davis (2010) suggested that "learning in and about the environment is not sufficient for laying the foundations of sustainable living" (p. 31). She identified that education *in* and *about* the environment, whilst reasonably easy to achieve, lacks a prime focus on human-environment interactions and the consequential problems. In contrast, education *for* the environment is based on a more active role and advocates working from an inquiry base to solve problems, but it is also acknowledged that this dimension is more challenging for teachers (Bolstad, 2003; Cowie & Eames, 2004; McLean, 2003).

The findings in this study suggested that all student participants, and both the primary teachers and the early childhood teachers, provided evidence of education *in* and *about* the environment from their experiences, with evidence of education *for* the environment being less apparent. Education *for* the environment may be seen as more intensive and more challenging as it is based on student-led inquiry and action, which aim to create change in attitudes and behaviours for positive outcomes for the environment. Although the commitment and enthusiasm from all teachers for EfS in this study was evident, a lack of knowledge and understanding of effective EfS pedagogy could be a reason why education *for* the environment was less apparent across all settings.

Nevertheless, I would argue here that the findings of this study that showed, for example, the development of knowledge and the provision of experiences around EfS through wormery care, Bokashi composting, and gardening, have shown that environmental activities from the dimensions of *in* and *about* the environment create an initial framework to attract interest and invite engagement from students. This was evident in this study with the teachers from both early childhood and primary schools engaging children in environmental activities, for example; the wormery, Bokashi composting and planting, all of which sit within the *in* and *about* dimensions.

Within this study, the student uptake to these types of activities was high, with early childhood teachers reporting high levels of engagement in each of these activities in the early childhood centre. This was also evident during the group interviews with all student participants able to recall and share stories from the photographic prompts of the EfS activities, objects and spaces at the early childhood centre, keeping in mind that for some students these experiences at the early childhood centre were 18 months prior. This level of engagement and exposure demonstrated both the teacher and student enthusiasm towards environmental activities. This is supported by Chapman and Eames (2007) who stated, "An emphasis on 'action' should not distract attention from the still important work of understanding *about* environmental and sustainability issues and the values, and forces that support them" (p.17). As this study has highlighted, it has been this exposure to environmental activities and the creation of interest and engagement from within the dimensions of *in* and *about* across both the early childhood centre and then the primary schools, from which evidence of education *for* the environment has begun to emerge in later years. The case study of Ben and the Bokashi, see Section 4.4.1, is an example of where the study has identified evidence of developing action competence through the students' early experience of EfS in their early childhood centre and early primary schooling.

### 5.2.2 Developing Action Competence

Action competence is supported by 6 aspects (Eames, Barker, Wilson-Hill & Law, 2010) and is aligned with the dimension of education *for* the environment. These aspects are identified in Section 2.4. Action competence promotes advocacy and action on environmental issues and supports enactment. Within the current study, a case story emerged that highlights one particular child and his intense knowledge and engagement with the Bokashi composting system, as described in Section 4.4.1 Ben and the Bokashi. This case story is one example of developing action competence in young children and illustrates that action competence can be evident in young children. This study showed that Ben had been exposed to experiences around EfS throughout his early childhood years, with both early

childhood teachers and his school teacher reporting on his active involvement and strong sense of inquiry. His ability to articulate the knowledge he had acquired was evident. An example of this knowledge was Ben's in-depth knowledge of the operation of the wormery, which he had gained at school, at the early childhood centre and at home. He described the types of food the worms like, and the cycle of composting and selling the worm liquid to reinvest into the gardens. The other example is when Ben was presented with the photograph prompt of the Bokashi. He was able to articulate the functionality of the Bokashi system to me. While taking me 'on tour' at his school, Ben photographed the Bokashi in the classrooms and insisted he photograph the enzyme packaging which detailed the instructions. Ben's prior learning and his ability to articulate his knowledge and understanding of systems, like the cycle based around the wormery and the Bokashi, along with his apparent disposition of curiosity and inquiry reported by his teachers, may have led him to begin to develop aspects of action competence. These were: knowledge development, reflective capacity and empowerment. This is evidence that young children are able to develop aspects of action competence.

Jensen and Schnack (1997) identified that action competence demonstrated that the participant was ready, willing and able to act. The correlation of the notion of being ready, willing and able was also identified in the literature review whereby co-constructivist theory linked to learning dispositions (see Section 2.4). Within the realm of early childhood education in Aotearoa New Zealand, learning dispositions, also referred to as habits of mind or tendencies (Claxton, 2009), are used as an assessment tool using the learning story format. Carr and Claxton (2004) align the notion of being ready, willing and able with learning inclinations, sensitivity to occasion and skills. The literature review for this study identified a relationship between action competence and these learning dispositions. To emphasise this relationship between learning dispositions and action competence, I again draw on the case story of Ben. Ben's early childhood teacher indicated that Ben had an intense interest in the Bokashi and the composting process when he attended the early childhood centre. Likewise, Ben's primary school teacher reported that Ben was very thoughtful and had an inquiry approach to his learning. These tendencies may be connected to the learning dispositions of curiosity,

persistence, confidence and responsibility. Likewise, these examples also demonstrate some of the aspects of action competence, these being: knowledge development; reflective capacity and empowerment. Ben also displayed the characteristics of what Carr and Claxton (2004) described as being ready, willing and able. This illustrates some commonalities between learning dispositions and action competence.

As discussed in Section 2.4, this is evidence of the relationship between early childhood education and education for sustainability. Elliot (2010) also compared early childhood pedagogy with environmental pedagogy and identified that the "educational features indicate a pedagogical advantage in early childhood education with respect to the implementation of education for sustainability" (p. 35). This demonstrates the relationship between these entities. Early childhood education is also aligned with co-constructivist theory and ecology theory as they both view the child as central to a series of social systems. This is developed further in the following section.

### 5.2.3 Co-constructivism, ecological theory and transformative education

The relationship between co-constructivist theory and ecology theory is highlighted in this study (see Sections 2.7.1 and 2.7.2). Co-constructivist theory has similarities to ecological theory in that they both see learning as socially constructed and recognise the child as a capable, social being that needs to be connected to others in society to develop (Bronfenbrenner, 1979; Jenkins, 2009). The Aotearoa New Zealand early childhood curriculum, *Te Whāriki* (Ministry of Education, 1996), connects with both theories, and views the child as central to a series of social systems. It is within these social systems that the child has the opportunity to engage in problem solving, collaboration, reflection and co-operative learning experiences. Likewise, education for sustainability raises and addresses issues and dilemmas which require reflection, dialogue, debate and action. Within this study the early childhood teachers made links between their EfS programme and the strands and principles of *Te Whāriki* with one early childhood teacher highlighting that EfS connects to all parts of the early childhood curriculum due to the curriculum's broad nature. There was also evidence of all

teachers providing opportunities for students to problem solve, reflect and engage in co-operative and co-constructed learning. For example, the construction of the bird house required problem-solving, joint fundraising efforts involved cooperative learning, and student reflection through learning journals helped them to consider their experiences more deeply. It was apparent that the learning journals were also taken home and therefore the learning was transparent and transferred to another social system in the child's world.

Vaealiki and Mackey (2008) identified that the transformative approach included young children having a voice in how an environmental curriculum was enacted in an early childhood centre. Similarly, Davis (2010) advocated the notion of transformative education and stated that, "While playing and learning in nature remains highly valued, this newer conceptualisation refers to a transformative early childhood education that values, encourages and supports children as problem-seekers, problem solvers and action–takers around sustainability issues and topics related to their own lives" (p. 230). Perhaps unaware of the theory itself, the early childhood teachers were demonstrating instances of transformative education in their practice when they acknowledged that the students come to the early childhood centre with prior knowledge and have opportunities to share knowledge with the teachers as they engaged in solving problems. An example from this study of transformative education was the problem of what to do with waste paper? One four year old child brought in a paper brick maker from home and educated her peers and teachers on how to use it. This was an example of the development of transformative education within the early childhood centre that linked well to co-constructive and ecological theories of learning.

This section has identified examples of co-constructive learning from this study. These examples are the types of co-constructive pathways that these students were exposed to in early childhood education and they were therefore being empowered to move forward towards transformative learning. I suggest here that a future focus for EfS and early childhood education with its roots firmly entrenched in co-constructivist and ecological theory could give rise to what Elliot (2010) described as the transformative journey.

### 5.2.4 Outcomes for EfS and the transference of knowledge

Firstly, I consider the ideas around the transference of knowledge. The question which guided this section was what environmental knowledge and behaviours are transferred into other spaces by young children? Beach (2003) stated that transition "is the concept we use to understand how knowledge is generalised, or propagated, across social space and time" (p. 31). Beach (2003) goes on to identify that "each consequential transition consists of changing relationships between persons and social activities represented in signs, symbols, texts, and technologies…in systems of artefacts" (p. 36). This changing of relationships and social structures during the process of transition can be challenging as students propagate knowledge and forge identities. Beach (2003) is mindful of education and economic policy that attempts to smooth and create what he terms "seamless" transitions and advocated that society needs to "take advantage of their [the transitions] productive developmental nature" (p. 46). The challenge, as Beach (2003) suggested and I agree, is how to encourage students to embrace the challenge of change and transition, as it is through this tension during the transition process that new knowledge is formed and identities develop further.

Within this study, there was evidence that students were connecting with various representations, as described by Beach (2003), that demonstrated their knowledge propagation and transference of this knowledge over space and time. This evidence is presented in Section 4.2 where students recalled activities that they had been engaged in at the early childhood centre around the bird house construction, the wormery, the Bokashi and the garden.

The data illustrated examples of the recollection of student's experiences and then the transference of knowledge across space and time. In this case, transference from the early childhood centre to school. A first example is of student participant, Angus. From the photographic prompts, Angus viewed the photograph of the outside area of the early childhood centre. He recalled and identified the "native flaxes" as he called them. He then shared that this is where they had treasure hunts at the early childhood centre. It would appear that the flaxes were a symbol or place of significance for Angus. Then 'on-tour', Angus

photographed several of the flaxes at his school, making up a third of his 'on-tour' photographic collection demonstrating the significance of the flaxes to him. The second story is of Ben and his understanding of the wormery and the relationship between the wormery and the economics of the garden. From the photographic prompt of the wormery at the early childhood centre, Ben revealed how he had been exposed to this process at the early childhood centre where worm juice had been sold to raise funds for garden projects, and then again at school where plants had been sold to the community outside the school office and funds reinvested into the EfS programme. The connections that Angus and Ben are making are examples of the transference of knowledge over space and time using the objects and spaces of EfS significance as a vehicle to transfer this knowledge.

It seems possible that the student learning journal or portfolio from the early childhood centre could be viewed as an artefact that supports the transference of knowledge over social settings, in this case from the early childhood centre, to home and to primary school. Beach (2003) suggested that "consequential transitions make us consider that identity craftwork drives knowledge propagation" (p. 45). In the case of this study, the data from teachers and parents indicated that two of the students had been exposed to an encompassing approach of education for sustainability that may have enabled them to transfer knowledge and behaviour across the social settings of home, early childhood and school.

This shows the mutually reinforcing nature of environmental learning at the early childhood centre and the home environment might have assisted the student participant to gain a holistic sense of learning that they readily transferred to primary school with confidence. This was also a desire of one of the early childhood teachers when she shared her hopes about when students transition to school, "They [the students] have some knowledge that they can pass on, like if they do some planting in the classroom situation, that they can pass on knowledge, even like using the terminology of the different parts of plants and what they require". This may be where we can begin to identify the craftwork where students are developing their own environmental identity.

### 5.3 Affordances and Constraints

To analyse the EfS programmes in this study, it was necessary to explore the affordances and constraints that were identified that either supported or hindered the EfS programme. The affordances in this study being pedagogical approaches, in-house experts, external facilitators, and relationships and communication; and the constraints being lack of funding, lack of knowledge, and time, programme, and attitudinal constraints.

#### 5.3.1 Affordances

Firstly, I consider the affordances that support the EfS programmes. The pedagogical approaches used were: teacher positioning, use of external facilitators, presence of 'in-house' leaders, and relationships and communication all appeared to have a notable impact on the EfS programmes within this study. The study identified a number of opportunities where the early childhood teachers and the school teachers were nurturing children's ideas and thinking around EfS.

The primary school teachers reported that they actively chose co-constructed learning paths during inquiry sessions, in order to create a sense of wonderment and shared learning. Both of the early childhood teachers described events that demonstrated issues around teacher positioning and the teacher-learner relationship. Possibly due to the nature of *Te Whāriki* (Ministry of Education, 1996), the early childhood teachers reported creating and reflecting on environments for joint discovery and new learning opportunities around EfS. This was evident where the teachers explained scenarios where they were learning alongside children, for example the use of the paper brick-maker, see Section 4.5.2. A primary school teacher also shared her experience and stated, "O.K, we've got all this knowledge, what are we going to do with it. It is no use just having knowledge; we need to do something with it. That is when they [the children] come up with some really good ideas".

In a recently published article, Mackey (2012), reporting on research in an early childhood centre with an environmental curriculum that aimed to focus on children's confidence and competence that lead to purposeful action, suggested

that, “Teachers also have a professional responsibility to the children and families in their communities to their own learning of issues that impact on children” (p. 482). The examples of teachers in the current study re-positioning themselves as co-constructors of learning where outcomes are unknown and yet to be explored demonstrates pedagogical reflection and intentional changes to their teaching practice. Wells (2002), in a study on inquiry as an orientation for learning, suggests that “we can hardly expect teachers to create the conditions in their classrooms for students to develop these dispositions if the teachers themselves do not have similar formative experiences” (p. 204). This further supports the outcome of this study that appropriate teacher positioning is a key affordance of a successful EfS programme. One early childhood teacher described how external facilitators came into the early childhood centre to teach new skills around sustainability to the teaching team and children. The teacher suggested that this was an example of teachers and children learning alongside one another in the early childhood centre.

Both of the participating schools and the early childhood centre in this study had enlisted the expertise of external facilitators to support their EfS programmes. One community facilitator in particular, Leone, was seen as an affordance who supported each setting’s EfS programme. Leone operated across the early childhood centre and both schools involved in the study and from my observation provided a conduit between the two spaces who was able to then support the transference of knowledge over time and space. Although Leone was possibly unaware of the potential effect she had, I believe her role was crucial as not only was she aware of the EfS knowledge she was imparting, and projects each setting was engaged with, she had relationships with the teachers and the data suggested that the students who had attended the early childhood centre and the schools had become familiar with her over time. Her role could also have been important in terms of EfS and transition as she may have reinforced students’ learning and prior knowledge, this role is worth exploring further to enhance a sense of flow of knowledge between the transition for early childhood to primary school. It is from within this standpoint of a relationship, prior knowledge and teacher positioning that student action competence begins to develop. Therefore, the

recruitment of an external facilitator who operated across educational settings may potentially be an affordance to an EfS programme.

Another affordance that supported the EfS programmes in both the early childhood centre and schools in this study was the assertion that having an 'in house' expert in EfS provided support for teachers and provided positive outcomes for the EfS programme and children's learning. In this case an 'in-house' expert is a teacher with an interest in EfS. Cowie and Eames (2004), in examining the challenges for EfS, suggested that many EfS programmes "rely on in-school leadership and support and/or the efforts of enthusiastic individuals" (p. 22). Within the Cowie and Eames study, one respondent identified that the school's environmental education programme was "reliant on an already busy teacher doing extra work to lead the programme in our school" (p. 22). In the case of the current study, one primary teacher at one of the data sites who was not a participant in the study, was identified by a primary teacher participant as an 'in-school' leader of the EfS programme. In contrast to the response from the participant in the Cowie and Eames (2004) study, the primary teacher participant in this study saw the 'in-house' leader role in her school as a point of contact. The relationship here is viewed as collaborative. Therefore in this study having a school 'in-house' leader was viewed as a fortunate position for the school and may have been a catalyst for this particular school's growing EfS programme and student development through EfS.

The development of a relationship between families and teachers was a key consideration in the current study. Once relationships are formed, communication and connections are forged and information and knowledge was shared. As an affordance, I investigated what supports and constrains the ability of children to transfer knowledge from one place to another. The reviewed literature around transition and building relationships identified the importance of the role of a reciprocal relationship between home and school in the transition process (Dockett & Perry, 2001; Jones, 2006; Marshall, 2001; Peters, 2003; Wagemaker, 1998; Wylie, 2001). Jones (2006), in a research project that explored learning dispositions through identity and through settings, and examined if a child developed a learning identity, concluded that "the sharing of stories between

family and teachers, or between early childhood teachers and teachers of new entrants [in primary school], not only enhances knowledge about the child – it can also contribute to the development of strong, reciprocal, and respectful relationships" (p. 31). The findings in this study provided evidence of the value and importance of relationships between the child, the family and the school. It also indicated the significance of the encompassing influence of home, the early childhood centre and the school on children's developing environmental competencies and, ultimately, the development of their environmental identity.

The study identified that having links between family, the early childhood centre and school allowed for more open communication and the development of relationships. Dockett and Perry (2001) support the notion of establishing positive relationships between the children, parents, and educators and emphasised that all stakeholders need to "take into account contextual aspects of community and of individual families and children within that community" (p. 6). One example from this study is where one of the primary school teachers lives in the school community and knows the family of one of the participants. Her prior knowledge of this child's family situation may have informed her knowledge about the student participant. The primary school teacher was able to share knowledge with me of the family's environmental activities at home.

Some of the student participants who were beginning to develop action competence were identified by their teachers as being 'switched on' or 'keyed into' inquiry learning, particularly inquiry around an environmental focus. The primary school teacher also made connections with these particular students' families and identified them as coming from strong environmental backgrounds. All of the parents who provided data responded that they felt that the exposure to different environments had influenced their child. It would appear then from this study that students with exposure to environmental learning from home, the early childhood centre and school were then predisposed to the opportunity to develop action competence in later years.

### 5.3.2 Constraints

Within this study, a number of constraints were identified that may have hindered the potential of the EfS programme. Both the early childhood and the primary school teachers acknowledged a number of factors that constrained their teaching around EfS. These were: lack of funding, lack of knowledge, the need for more support, energy levels, time, and attitudinal constraints. The lack of knowledge and ways to access knowledge, and the need for support, were identified by all of the early childhood teachers and all primary school teachers as a constraint, with one primary school teacher reporting, "You know, you don't know what we don't know! There may be wonderful things out there, some things we don't know".

All of the teachers in this study indicated that they felt that professional development and further learning opportunities would be beneficial in the area of EfS. Many of the constraining factors identified in the current study echo the recommendations of many previous studies on environmental education programmes. For example, Cowie and Eames (2004) and McLean (2003) have advocated the need for in-depth teacher education in EfS. Chapman and Eames (2007) identified that:

> Whilst the new slim line version of the [New Zealand] curriculum may be appropriate for the mandated learning areas, EEFS has not been strongly emphasised in the past or enjoyed the levels of resourcing, professional development and pre-service teacher education emphasis that these mandated areas have commanded. (p. 19).

An investment into professional development and leadership of EfS programmes would go some way to negating some of these constraints identified by teachers in this study.

### 5.3.3 The role of curriculum in transition

The curriculum flow from early childhood education to the primary sector may be seen as both an affordance and a constraint from an education for sustainability perspective from the reviewed literature for the current study. It is apparent that one of the intentions of the *New Zealand Curriculum* (Ministry of Education, 2007) is to create a sense of flow across all education sectors. The *New Zealand Curriculum* (Ministry of Education, 2007) is rich in the language of sustainability,

and has exciting intentions for EfS, however without pre-service and in-service professional development and leadership in EfS, I believe these intentions may be misunderstood and therefore may be viewed as a constraint. With foresight, Chapman and Eames (2007) proposed that any new curriculum guidelines for EfS "will require resource materials that illustrate more of the 'how to' and professional development to support its implementation" (p. 16). From within the current study, it would appear that the primary teachers' environmental education programmes sat within existing inquiry modules, or were the product of ideas driven by enthusiastic students and teachers. All primary teachers identified they would benefit from further professional development of EfS in how to better integrate EfS into their teaching and learning programme.

On the other hand, the curriculum flow is also seen as an affordance for student learning. This interconnectedness and relationship between the early childhood and primary sectors has been absent from the previous national curriculum documents and is viewed as a positive stance moving forward for education within Aotearoa New Zealand (Carr, 2006; Cubitt, 2006; Peters 2005).

Within this study, there was some evidence of the possibility of curriculum flow between the early childhood centre and the primary school. One of the primary school teachers where the school was positioned adjacent to the early childhood centre indicated that the school and the early childhood centre have a close relationship and are well integrated. The two-way communication between the early childhood centre and the school as identified by one teacher was evident in this study. This teacher suggested this allowed for a smoother transition for students. It would be my impression that this communication between the two settings also allowed the opportunity for the sharing of children's prior knowledge and interests.

Another example of possible curriculum flow was the support of children in transition and the nurturing of their prior knowledge. However, as one primary teacher identified, she feels that primary teachers need to do more in terms of the entry to school transition and she intended to reflect further on the current

practice. The study findings suggest there are still further opportunities to explore in terms of linking curriculums. Not only the opportunities to support students in this transition period, but to also support and nurture the knowledge they bring, and, in particular, knowledge around environmental thinking and behaviours. One obvious and immediate recommendation is the sharing of the early childhood learning journals as a transition tool. In this study, it appeared that the learning journals were a rich, well documented journey of the students' learning, and a system of ensuring that primary teachers allow children to have these in classrooms would have multiple advantages. The documentation would support the transition process and inform the primary teacher of prior learning, open dialogue between peers, reinforce the students' learning journey, and support the realignment of their identity. As Jones (2006) concluded, "information gleaned from conversations, and reified through documentation, can help to bridge the discontinuities in a child's journey from one learning community to another when used by the teacher to assist in scaffolding the child's entry into a new community" (p. 30). Some of the student participants in this study made connections to their individual learning journals from the early childhood centre, particularly to the connections they made with photographs. As Peters et al (2009) identified, "Portfolios have become literacy artefacts, tools of engagement, empowerment, interaction and communication; connecting the child and family in the border crossings between home and kindergarten, and later home, kindergarten and school" (2009, p. 6). This was certainly the case for some of the participants in this study where the learning journals seemed to be a tool for reflection and possibly allowed the opportunity for the student participants to see their learning over time and space.

### 5.3.4 Development of children's environmental identity

Thomashow (1998) identified that, "ecological identity refers to all the different ways people construe themselves in relationship to the earth as manifested in personality, values, actions and sense of self. Nature becomes an object of identification" (p.3). Likewise, Clayton (2003) offered an insight into environmental identity, noting that "Environmental identity – how we orient ourselves to the natural world – leads us to personalise abstract global issues and

take action (or not) according to our sense of who we are" (page not numbered). Within this study, I consider there were student participants who were demonstrating that they were developing action competence and reflecting on their environmental identity. These particular children were transferring environmental knowledge over space and time. This knowledge, thinking and action were articulated to peers, teachers and to myself as researcher. Thomashow (1995) discusses the notion of an ecological worldview where students have an "emerging philosophy, built on an intuitive and cognitive understanding of ecology, a way of interpreting the world" (Thomashow, 1995, p.5). These students who were displaying aspects of action competence were surrounded by an encompassing environmental focus. Mackey (2012) has identified that:

> when our youngest citizens participate in bringing about positive change, they contribute their ideas and understandings of the world around them; are involved in conversations where their voices are heard; work within democratic processes alongside others to find solutions and to take action (2012, p. 476).

A number of students within this study were exposed to an encompassing approach in a number of facets of their lives, their home life, their early childhood centre and now their school that potentially empowered them to possibly take action in the future. I argue here that these students were developing an environmental identity.

The use of photographs enabled me to observe students' emerging environmental identities. The photographic recall as a means of data collection allowed students to make connects and articulate examples of their environmental knowledge. These photographs prompted students to make links over different times and spaces and gave them the ability of communicate their stories. The excitement when the students viewed the photographic recall prompts verified their enthusiasm about the objects, activities and spaces from the early childhood centre and left me with no doubt that these experiences were extremely positive and have left long-lasting, powerful impressions. The student participants were also invited to photograph anything of environmental interest to them whilst I accompanied them on a tour of their schools. The types of photographs they took demonstrated to me that these students had quickly 'tuned in' to my intention. The photographs

the students had captured featured; classroom Bokashi systems, wormery, recycling, flaxes and art. It was also of interest that the students who 'took charge' of the camera were also the students who demonstrated behaviours that displayed developing action competence.

### 5.4 Conclusions

The multiple complexities of EfS, identity and transition have been examined in this study in a search to identify the understandings gained by young children from EfS experiences in their early childhood education and their actions and behaviours related to sustainability in their later years. While this study was concerned with EfS in the early years, it also focussed on transition and identity and investigated what environmental knowledge and behaviours were transferred across spaces and time and what affordances make this possible and what constrained the process.

Education *in*, *about* and *for* the environment has long been argued to be an effective approach to education for sustainability. Education *for* the environment, although more challenging to achieve for both teachers and students, is the dimension from where students can create change in attitudes and make positive outcomes for the environment. However, from an early childhood perspective this study demonstrated that young children are connecting with objects, resources and spaces with an environmental focus and the teaching and learning around these creates rich, authentic learning opportunities. This study has identified that EfS activities that are on-going and are a part of the daily rhythm of the early childhood centre, for example the Bokashi and wormery operation, are the ones the student participants were connecting with, and were able to impart knowledge about, once they moved to primary school. Some students who articulated their connections and in-depth knowledge with the objects, resources and spaces presented to them from the photographic prompts, and who engaged in these experiences from the dimensions of *in* and *about* the environment in early childhood appeared to be more likely to then begin to develop aspects of action competence in later years in primary school. This resonates with the study of Mackey (2012) where she identified, "quality early childhood experiences that

respect the child's right to know, to decide and to act will spread the young child's influence across the boundaries of age, time and place" (p.483). This was certainly the case for some students in this study.

Given encompassing, holistic environments, in this case, home, the early childhood centre and school, young children seem to be able to begin to develop aspects of action competence. The synergy of messages between home, the early childhood centre and primary school and the co-constructive learning opportunities that empower students to take ownership of their learning may have contributed to transformation and the development of action competence. A future focus therefore, would be for EfS and early childhood education, with its roots firmly entrenched in co-constructivist and ecological theory, to explore EfS through a transformative approach. The knowledge and ideas that the early childhood and primary teachers were apparently using, based on constructivism and ecology theory, were leading to some positive outcomes for students. It would appear that all teachers were scaffolding learning for students. This synergy of early childhood and primary school would suggest that schools should prepare themselves for students, just as students prepare themselves for school.

The students' learning journals could also further the development of student action competence. The documentation in the learning journals may be viewed as one of the vehicles for the transference of knowledge from the early childhood centre to primary school. The learning journals may then be viewed as a conduit between the two spaces as they can integrate the thinking, feeling and actions of past experiences, as is required for the development of action competence.

This study has identified the close relationship between the pedagogies of education for sustainability and early childhood education. The relationship is identified in a number of ways. Both view the child as an active participant in a social system where the child has the opportunity to engage in problem solving, collaboration, reflection and co-operative learning experiences. Likewise, EfS raises and addresses issues and dilemmas which require reflection, dialogue, debate and action. Elliot (2010) comments on this relationship and advocated that

early childhood education is in an advantageous position. One comparison which this study has identified is the manifestation of learning dispositions across the disciplines of science and early childhood education. Learning dispositions are discussed by Carr and Claxton (2004) from an early childhood education perspective, and Jensen and Schnack (1997) from an EfS perspective. This further indicates the relationship between early childhood education and EfS and here I argue also places early childhood at an advantage. Under the *New Zealand Curriculum* (2007) it is intended that student knowledge that is propagated in early childhood education is now supported through learning pathways into primary school.

One of the *New Zealand Curriculum* (2007) key intentions is to create a sense of flow from early childhood education to the primary sector. The *New Zealand Curriculum* is rich in the language of sustainability, and is well intentioned in terms of EfS. However, to sustain the pathways of the EfS knowledge of some children moving from early childhood to primary school, the challenge is for primary teachers to interpret these curriculum intentions and support children's learning pathways. For this to occur and for EfS programmes to be robust and sustainable, EfS leadership and professional development is imperative.

Within this study, there was some evidence of curriculum flow between the early childhood centre and the primary school. It would be my impression that this communication between the two settings also allowed the opportunity for the sharing of children's prior knowledge and interests. Findings suggest there are still further opportunities to explore in terms of linking curriculums. Not only the opportunities to support students in this transition period, but to also support and nurture the knowledge they bring, and, in particular, knowledge around environmental thinking and behaviours.

To address the question of what students were connecting with across settings, this study identified that students were connecting with various representations, as described by Beach (2003), that demonstrated their knowledge propagation and transference of this knowledge over space and time. Students' knowledge was

connected with objects or artefacts of environmental significance, these being: the wormery, Bokashi composting, gardening, and the bird house.

### 5.5 Implications

This study identified that there are good synergies between early childhood education and education for sustainability. Both realms present a holistic approach, consider learning dispositions, focus on working theories and problem solving and view the child as an active, capable participant. With the roots of the New Zealand early childhood curriculum, *Te Whāriki*, grounded in ecological and co-constructivist theory, the implication therefore is there should be no problem with the integration of EfS programmes into early childhood education.

The provision of good, simple EfS activities that are entrenched into the culture of the early childhood centre provide effective and powerful learning *in* and *about* the environment. Hands on, experiential learning from an inquiry base is the key aspect here. This was clear when students shared their experiences from the early childhood centre. The implications here are for early childhood centres to provide for constant, on-going, experiential learning experiences around EfS. This exposure over time creates a platform from which students may then develop ideas around education *for* the environment.

Another implication from this study is the consideration of teacher positioning. Early childhood and primary school teachers need to reflect on their teaching philosophy and practice to ensure they allow for the co-construction of learning pathways that create a sense of wonder and inquiry for students around education for sustainability. It requires careful consideration of the balance of providing activities and exposure from the dimensions of education *in* and *about* the environment to then create learning environments that allow for students to develop their ideas, thinking and action from within the dimension of education *for* the environment. From this study, the engagement of students in the dimensions of *in* and *about* the environment could be viewed as a pre-requisite to education *for* the environment. The dimension of education *for* the environment

also requires teachers to make a deliberate re-positioning to allow child-led initiatives to emerge from within the dimension of education *for* the environment. All of the students in this study were comfortable engaging with the natural environment. This also brings with it an element of risk taking. This interaction with the natural environment and its opportunities for risk taking has lifelong impacts for students.

This study concludes that the school and the early childhood centre that were adjacent to one another had a good relationship and close communication. The EfS activities, objects and resources between the two were complementary. This study indicates that good EfS practices that are evident in both settings enabled students the pathway of learning in EfS. The implication here is the geographical location and the physical nature of the settings has an impact on the communication between the early childhood centre and the school. Another implication here is that good communication and relationships between settings is an affordance for learning.

Another implication is that there is knowledge and experience from families and the practices and ideas of education for sustainability out in the wider community beyond the early childhood centre and the primary school which could possibly be invited into the early childhood centre and the primary school. The early childhood teachers 'knew' their children and had knowledge about their particular interests and skills and were able to then draw upon children's experiences from home and integrate this into the early childhood centre programme. It is therefore important that both early childhood teachers and primary school teachers take time to get to know their students and be informed of their wider interests, skills and abilities.

A further implication of this study is that the students who are exposed to rich, intensive learning experiences around EfS at home and in the early childhood centre need opportunities to maintain their learning pathway when they transition to school. The implications here are important as failure to maintain and co-construct pathways around EfS in their future learning may disempower the

students. Therefore ways and means of creating cohesive pathways for these students from early childhood education to school is imperative. These students need to feel connected, they need opportunities to reflect and impart prior knowledge and develop on-going thinking and learning around EfS. It is essential that this learning is valued. Therefore the primary school has an obligation to the students, and their families to support further learning pathways.

### 5.6 Recommendations

A number of recommendations have emerged from this study. Here I attempt to echo the voices of teachers and students in this study and draw some recommendations for the future. The most apparent recommendation is the desperate need for new knowledge across both the early childhood and the primary sector. The need for professional development, both in-service and pre-service is critical. This would also enable the enactment of the *New Zealand Curriculum* (Ministry of Education, 2007) mandate on the commitment to sustainability where aspects of EfS are identified and now need professional development and leadership to ultimately have an impact on EfS and student learning.

In addition, a number of pathways to accessing new knowledge around education for sustainability can be identified from this study, these being: the creation of networks through blog sites, cluster groups, the use of local external facilitators, and the development of specialised teachers who create ways to weave EfS into all curriculum areas. The latter of these, weaving of EfS into the curriculum, is evident in *Te Whāriki* due to its holistic nature; however, early childhood teachers yearn for new knowledge and ways of knowing around EfS.

The teaching of EfS pedagogy at all levels, pre-service and in-service across all sectors, so teachers are able to go beyond activity based programmes that address the education *in* and *about* dimensions, and transition to a commitment and understanding of education *for* the environment, is crucial. The identification of exemplar early childhood centres and schools of innovation with strong EfS practices could also be useful. Likewise the accessibility of all educational

facilities to programmes similar to Enviroschools would be advantageous. However, it would be a recommendation due to the feedback on the past challenges to fulfil documentation requirements, that a pathway is created for accessing information on EfS that doesn't require an intensive time commitment. This could be a new initiative or come under the Enviroschools umbrella.

If early childhood centres or schools are in the fortunate position to have a passionate, committed teacher who is willing to 'take on' the role of the 'in-house' EfS leader, this person must be supported in terms of release to plan and co-ordinate programmes, and be allocated budget to attend professional development workshops, have opportunities to network with likeminded people, and run workshops to share knowledge with others.

It would also be a recommendation for early childhood centres and primary schools to identify families who engage in environmental practices at home and 'tap in' to their skills and knowledge by creating potentiating, powerful environments where families feel they have a place.

All of the students in this study were comfortable engaging with the natural environment. This also brings with it an element of risk taking. There is a link between education for sustainability, the interaction with the natural environment and risk taking. Therefore it is useful for teachers to consider and reflect on risk taking as a learning disposition for some students and ways this can be accommodated within the learning environment. This interaction with the natural environment and its opportunities for risk taking has lifelong impacts for students.

In terms of transition, I advocate that the student learning journal or portfolio from the early childhood centre be viewed as an artefact that supports the transference of knowledge over social settings, in this case from the early childhood centre, to home and to primary school. As identified by the teachers in this study, the idea of reciprocal visits between the children and teachers of both the early childhood centre and the schools is imperative to the transition and allows the child to make connects across spaces.

Perhaps the key feature of transition from this study, as with several others, is the crucial importance of the open reciprocal communication between the three main entities of the child's world, the early childhood centre, the primary school and their home and family. This connection across spaces with visitations reinforced with the learning journal is the beginning of the new pathway that the student and the primary school will construct together. In terms of EfS, this study indicates that EfS itself is a good vehicle for transition as it promotes memorable learning experiences that activate recall and experiences around co-construction. However, there are barriers to these pathways. The construction of pathways is feasible if the physical, geographical location of the early childhood centre and the school allow them to enjoy the benefits of being in close proximity to one another, however this is not always possible. One possible solution is the idea raised earlier by one early childhood teacher in this study and that is the use of I.C.T (information, communication and technology) to Skype and Blog to network between schools and the early childhood centre. Or, as one primary school teacher suggested, she used to visit all the early childhood centres and on reflection she would like to revisit this practice. These types of ideas illustrate how the flow between curriculums allows for memorable learning experiences between early childhood education and new entrants in primary school to be shared and the pathway is continued.

Although this study makes some attempt to respond to the current call to address the gap in the research of education for sustainability and early childhood education, the need for further investigation remains urgent if we are to deliver meaningful, authentic EfS programmes that impact both the environment and children's lifelong learning pathways. Investigation into how these pathways are developed and how are they sustained? Are questions which would be a continuation of the current study.

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# Appendices

**Appendix 1: Guide for Semi-structured Interview Questions for Children:**

Exploring the influence of Education for Sustainability, how does it impact on children's actions in later years? What possibilities are transferred into other spaces by children? What affordances make this possible, and what are the constraints?

Using photographic prompts for recall.

(Introduction using non-threatening prompts to begin to connect)

I wonder …….(pause).

I've seen one of those at ……..

Tell me what you see in this photograph.

What was this about?

What is happening here? / What happened here?

Did you join in with this? Why did you join in?

What do you remember?

What was important about what you were doing?

Why did you do this?

Tell me more about that?

This looks interesting….. how does this work/what does this do/

The photos show us some of the things you did at preschool (their words), tell me some of the kinds of things you still do. Where? Why?

WIDE TO THEN PROBE TO TOPIC QUESTIONS

Tell me about things at home like this? Do you do this at home? What kinds of things do you do at home?

Is there anything that is the same as pre-school? In what way are they the same?

**'On tour':**

I am interested in things to do with the environment that we have been talking about, could you show me these things at school, (photograph option – environment only).

Can you take me on a tour?

Children photograph areas of interest. Return to room where we discussed photographs of pre-school. Immediately upload photos. Discussion begins.

Questions around photos at school:

This is interesting, why did you (child's name) take this photo? What is important about this photo? Did you help with this? Why / why not?

Tell me some more about that?

What is happening here? Is this like what you did at preschool? Why? In what ways do you think it is the same?

Does anyone else have a comment on this photo?

**Appendix 2: Questionnaire for Parents/Whanau**

Exploring the influence of education for sustainability in early childhood education, how does it impact on children's actions in the later years'?

Thinking about your child when he/she attended X Preschool, please comment on the areas of the environmental programme that you know they were involved in, and how did you know about their involvement?

Did you notice anything that you could attribute your child's involvement in the environmental programme at preschool to their behaviour at home? (i.e.: conversation, actions, role play, art, knowledge sharing, action)

School:

Do you know of anything environmental that your child has been involved in at their primary school?

Do you believe there has been any change in your child's environmental thinking and behaviour since leaving X Preschool and being at primary school? Please give any examples that come to mind.

Home and Family

As a family, have you engaged your child in environmental experiences, e.g. : recycling, gardening, visits to places of nature etc.? Please explain.

Do you feel that your child's environmental thinking and behaviour may have been influenced by these experiences? If so, how?

In your view, would you rate your child's environmental experiences at X Preschool, their primary school or as a family as more influential on their environmental thinking and behaviour? Please explain your response.

Do you have any further comments:

Many thanks for your time. Please return this survey in the envelope provided, or post to Tracey Biss, P O Box, Rangiora.

**Appendix 3: <u>Table of Questions in Relation to Research Themes</u>**

| Research Question |
| --- |
| Early Childhood Teacher Question Guide:<br>• How long have you taught at the centre?<br>• Can you tell me about you EfS programme and the history around its development?<br>• Can you describe the environmental activities that the children you have identified for this study were involved in?<br>• (Visual cue of photographic prompts) What were you hoping to achieve with these activities? What types of outcomes where you thinking of for children?<br>• Why do you that achieving some of these things were important? (reiterate generated responses)<br>• Why do you think achieving these things was important? (Possible probe to philosophy)<br>• What do you feel were some of the strengths of these activities for children are learning?<br>• Thinking back to what we have here (photographs of environment spaces/activities), what were some of the constraints do you think?<br>• What do you feel were some of the strengths of these activities for children's learning?<br>• (Possible probe) What do you think were the learning outcomes for the children in being involved in these activities?<br>• Thinking about yourselves as teachers now, what kinds of support do you think you need?<br>• What kind of support have you had as a teacher offering these kinds of experiences?<br>• As a big picture, what ideally would you like to see in terms of support?<br>• Thinking about the children in the study, can you tell me about their interest and what they did in these activities? What was their level of involvement?<br>• What do you hope children take with them when they leave the centre in terms of environmental thinking and behaviour?<br>• (Possible probe) Is there any examples that have fed back to you form parents, teachers, form home or school, where one of the participants have done just what you have hoped for?<br>• (Impromptu probe) How do you translate this learning that is happening here to your community and to your families? How do they know what is going on?<br>• Any further comments? |
| |

Question Guide for Primary Teachers:

- How long have you taught at this school?
- How long have you taught in the junior school?
- From looking at the children in your class who have been identified by the teachers at the centre, can you comment on any evidence of their environmental learning when they first came to school. Please give examples?
- How did you become aware of this knowledge, attitudes and/ or behaviours? (Prompt)
- How did these children's interest in environmental learning compare to other children in the class?
- What environmental activities and opportunities have these particular children been exposed to since they started school? Please comment on their reaction to these activities.
- How do you think these activities connected with interested and knowledge, attitudes that they may have bought with them, perhaps from the centre, perhaps from home? (prompt – summarise identified activities)
- What do you feel were some of the strengths of these activities for children's learning?
- What were some of the constraints?
- Thinking about early childhood education in your community and the connection to the school, early childhood facilities like play groups, kindergartens, what kinds of connections do you think there are? And/or what would you like to see?
- What kinds of things would support you as a teacher in offering experiences around EfS?
- What else might assist you?

**Appendix 4: Research Consent Form**

I have read the attached letter of information.

I understand that:

1. My participation in the project is voluntary.
2. I have the right to withdraw [specify withdrawal conditions].
3. Data may be collected from me in the ways specified in the accompanying letter. This data will be kept confidential and securely stored.
4. Data obtained from me during the research project may be used in the writing of reports or published papers and making presentations about the project. This data will be reported without use of my name.

I give my consent to the following for the study to proceed.

I can direct any questions to Tracey Biss (03) 3126xxx or ourpace@clear.net.nz

For any unresolved issues I can contact my Project Supervisor, Dr Chris Eames at the University of Waikato on (07 8384357) or at c.eames@waikato.ac.nz

I give consent to be involved in the project under the conditions set out above.

Name:_____

Signed:_____

Date:_____

Please return this form to the researcher in the stamped addressed envelope provided. Thank you.