

**DEVELOPING ECOLOGICAL IDENTITIES AND
ENVIRONMENTAL CONSCIOUSNESS:
A STUDY OF CHILDREN'S UNDERSTANDINGS AND ATTITUDES
ABOUT NATURE DURING A 10-MONTH
ENVIRONMENTAL EDUCATION PROGRAM**

by

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ABSTRACT

This thesis investigates children's perceptions of the natural world, and how their experience with one environmental education program has shaped their ecological identity and environmental consciousness. In order to examine children's understandings and attitudes about nature and the environment, I became a participant researcher in the Intergenerational Landed Learning Project (ILLP) at the UBC Farm during the 2005-2006 school year. The age of the children in this study was 9-10 years old. I employed a qualitative approach based on naturalistic inquiry and interpretation that aims to understand the context of lived experience. After the program finished, I chose to do an in-depth analysis of six children's experiences with *ILLP* at the UBC Farm based on semi-structured interviews collected. These interviews were complemented by recorded observations of particular activities at the farm, alongside my informal researcher journal. The value and significance of this study lies in the insights that the children's stories provide, and the many possibilities they reveal for educators interested in Education for Environmental Sustainability.

My findings suggest that the students' experiences with the *ILLP* deepened their understandings about nature, and informed their attitudes about environmental sustainability. The study provides evidence that engaging the child in a local, place-based educational setting enables him/her to develop a stronger sense of place and nourish a strong connection to nature. The children developed more complex understandings of the environment and an empathic and compassionate relationship to the land and the people with whom they worked. They came to understand the importance of farms and local, organic food production through their experiences working with soil and cultivation. Their concern for the environment and

their sense of responsibility toward taking care of it also grew stronger. The stories of these six children showed the importance of integrating emotions, understandings and practical skill development through experience with hands-on learning in the outdoors.

The thesis offers an argument for the re-conceptualization of the ways we teach and learn about the Earth, and highlights programs like the *ILLP*, and places like the UBC Farm, as educational environments in which we are able promote education for environmental sustainability. It also provides examples of effective educational tools (such as Earth Literacy) that can help educators, parents and community members to enhance the development of children's ecological identity and environmental consciousness.

TABLE OF CONTENTS

ABSTRACT.....	ii
TABLE OF CONTENTS	iv
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
ACKNOWLEDGMENTS.....	x
DEDICATION	xi
CHAPTER ONE: INTRODUCTION.....	1
Motivations and Research Question	1
Personal development and context for this thesis	3
The problem of environmental disconnect and “generational amnesia”: Human-Nature disconnection	5
Why do children need nature?	6
Teaching hope in a world of fear	9
Beyond fragmented, standardized education	10
Clarifying terminology: Integrating ‘Environmental, Outdoor, and Sustainability’ Education into ‘Education for Environmental Sustainability’	13
The Educational Challenge.....	15
CHAPTER TWO: THEORETICAL AND PRACTICAL FRAMEWORKS	17
Empowerment, Engagement and Connection through Education for Environmental Sustainability.....	17
Transformative Sustainability Learning (TSL)	19
<i>Why did I choose to discuss this framework?</i>	19
Place-Based Education (PBE)	21
<i>Why did I choose to discuss this framework?</i>	25
Earth Literacy (EL).....	26
<i>Why did I choose to discuss this framework?</i>	30
Education for Environmental Sustainability - Synthesizing TSL, PBE and EL	30
A Unique Exemplar of Education for Environmental Sustainability (EES):	32
Land-food-community integration - Intergenerational Landed Learning Project (ILLP) at the UBC Farm.....	32
Research Objectives, Learning Objectives and Key Concepts of the <i>ILLP</i>	34
<i>ILLP</i> Activities and Research	36
CHAPTER THREE: RESEARCH PROCESS AND THE FARM STORY.....	40
Research Process.....	40
Data Collection.....	43
Data Analysis.....	44

Analyzing the Interviews	45
Conceptual Understandings.....	46
<i>Earth Literacy components in children's understandings</i>	48
Attitudes about, and engagement with, nature, community and the Earth.....	49
<i>Earth Literacy components in children's attitudes and levels of engagement</i>	50
The Farm Story	51
The first day.....	51
The end of the growing season – A new beginning.....	53
Wintering spring – planting the first seeds and preparing seedlings.....	57
The signs of new life – Spring is here and we are busy, busy, busy.....	59
Full of life – It's summer, let's harvest!.....	62
My participation within the <i>ILLP</i>	65
 CHAPTER FOUR: SIX CHILDREN'S EXPERIENCES IN THE <i>ILLP</i> AT THE UBC FARM	68
 Reflection	69
Jason's Story	69
Jason's roots.....	70
A nostalgic sense of place – Jason's experiences and connections with planting and farms.....	70
Jason's transforming attitudes about sharing, learning and communication.....	71
Jason's level of engagement and his understanding about the links between learning in different settings.....	72
Starting to define an understanding of farming and the natural world.....	73
Importance of social relationships – special bonds in Jason's experience.....	74
Christa's Story	75
Getting to know Christa.....	76
The different influences in Christa's life.....	76
Conceptions about and attitudes towards farms and farming.....	77
Her sense of accomplishment.....	78
Connections between learning and experiencing.....	79
Connections, developing relationships and feelings about mentors and farmers.....	80
Christa's complexity of understandings and attitudes about nature and environment – establishing a sense of responsibility.....	81
Daniel's Story	84
A creative imagination.....	85
A magic sense of wonder, exploration and adventure.....	85
Daniel's gardening experience at home.....	86
The home sphere – shaping his understandings and attitudes.....	87
Building new relationships and relying on established ones.....	87
His unique view on farms – an international perspective.....	89
Daniel's complexity of thinking, his developing ecological identity and his environmental consciousness.....	90
Aaron's Story	92
Aaron's appreciation and desire to be in contact with nature.....	93

Aaron's previous experience with gardening	94
Understanding the importance of farms and the connection and interdependence between the natural and the human worlds	94
A nurturing sense of empathy	96
Aaron's environmental consciousness	97
Aaron's highlights	98
Ben's Story	99
Ben's specific conceptions and attitudes about farms and farming	100
Ben's change in specific conceptual understandings	101
Understandings and attitudes about environment, nature and environmental problems	102
Summary of Ben's experience at the farm and his priorities	103
Jackie's Story	104
Jackie's life at home and her gardening experience in this sphere	105
Returning to the experience – remembering relationships	106
Group work – a reflection	107
New knowledge – Jackie's changes in conceptions, understandings and attitudes about learning science during the second year	108
Farms and farming – their importance and value	109
A deep understanding of the intricate interconnection and interdependence between us and the natural world	111
A new found sense of place, sense of wonder and sense of connection	113
Summary of Jackie's highlights and unique insights	114
CHAPTER FIVE: CONCLUSION	116
Concluding Summary	116
Building an Ecological Identity	118
Social Relationships – Intergenerational Learning, community and cooperation	118
Sense of place and belonging	120
Connections to the Earth – complexity, interdependence and interrelationships	121
From separation towards interconnection	122
Complexity and interdependence – Understanding the interconnections between land, food and community	123
Transformation – engagement and attitudes through direct experience	125
Anthropomorphism	126
Developing an Environmental Consciousness	128
Stewardship, sense of respect and caring responsibility	128
Reflection	131
Limitations of the Study	132
Research Limitations	132
Researching and working with children	135
Implications for Education for Environmental Sustainability	137
Suggestions to Educators, Curriculum Planers and Community Members	138
Next Steps in Research	141
Concluding Thoughts	142

REFERENCES	144
APPENDIX A: Ethics Certificate of Approval.....	159
APPENDIX B: Interview Questions	160
First interview.....	160
Second interview	161
Third interview	162
APPENDIX C: Understandings and Attitudes Range Scales.....	164
APPENDIX D: Summary Tables of Children's Stories.....	166
Jason's summary.....	166
Christa's summary	168
Daniel's summary.....	170
Aaron's summary.....	172
Ben's summary	174
Jackie's summary.....	176

LIST OF TABLES

Table 2.1. Sobel's developmentally appropriate stages for environmental education.....	23
Table 2.2. This is a description and a comment on the usefulness of each of the nine components of Earth Literacy.....	28
Table 3.1. Specific themes and variables used as guidelines when analyzing children's understandings.	47
Table 3.2. Specific themes and variables used as guidelines when analyzing children's attitudes and levels of engagement	50
Table C.1. Range of understanding of interactions, interdependences and interconnections in the natural world.....	164
Table C.2. Range of children's attitudes and levels of engagement towards the natural world.....	165
Table D.1. Jason's summary.....	166
Table D.2. Christa's summary.....	168
Table D.3. Daniel's summary.....	170
Table D.4. Aaron's summary.....	172
Table D.5. Ben's summary.....	174
Table D.6. Jackie's summary.....	176

LIST OF FIGURES

Figure 1.1. A graphical representation of the suggested model of developing a sound ecological identity and environmental consciousness	12
Figure 2.1. Graphical representation of Transformative Sustainability Learning	20
Figure 2.2. A graphical representation of the nine components of Earth Literacy in the order in which they are envisioned to flow.....	27
Figure 3.1. Children and farm friend visiting the garden and exploring.	53
Figure 3.2. Children and farm friends preparing the bed for the winter.....	55
Figure 3.3. Children turning beds and learning about soil.....	56
Figure 3.4. Learning how to build trellises for growing beans.....	58
Figure 3.5. Me and my group learning how to water the seeds after planting.	58
Figure 3.6. The signs of new life.	60
Figure 3.7. Making sure to nourish the plants.	61
Figure 3.8. Observing, planning, nurturing.	62
Figure 3.9. The garden keeps growing and we are still busy.....	63
Figure 3.10. Enjoying the fruits of our labour.	65

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DEDICATION

I offer this thesis to my parents, who have, through their dedication and infinite support, given me the privilege to be where I am today. Mom, Dad, I am infinitely thankful for your unconditional love, your guidance, and your wisdom. Thank you for choosing to have this experience with me. I love you.

I also dedicate this work to all the children in the world who are deprived of the opportunity to develop a relationship with their land, and whose lives lack the magic and enchantment of a profound connection to the natural world.

CHAPTER ONE

INTRODUCTION

In the first portion of this chapter, I briefly introduce my personal experience and motivations for doing this work, and present the specific question guiding this research. Furthermore, I present Chapter One as a window to broad educational issues regarding the relationship of humans and nature, centrally focusing on the problem of children's disconnection from the environment. I provide a brief overview of how this problem affects children's development, education and healthy relationship with the natural world. I argue that the lack of direct experience and connection with nature seriously hinders children's ability to build a strong ecological identity and develop environmental consciousness. There is a pressing need for the re-conceptualization of the way we teach and learn about nature and the Earth. This re-conceptualization ought to be mindful of the cognitive abilities and emotional capabilities at different stages in a child's development. We need to address the significant challenges we face as environmental and sustainability educators by shifting away from views that separate us from the natural world, and turning towards those that embrace interdependence and interrelationships. In the last portion of this chapter I present my rationale for adopting the overarching term of 'Education for Environmental Sustainability', which serves as an integrative description of the work presented in this thesis.

Motivations and Research Question

This research was inspired by the empowering works of many visionary educators (like David Sobel and David Orr, among others) those who fight for educational change they believe is possible. It was also propelled by the need to find alternative approaches to the

way we currently teach and learn about the environment and sustainability, particularly at the elementary school level in North America. A re-conceptualization of environmental education that is based on a holistic and systems thinking approach is needed, so that it better represents the complexities and interconnections of the natural world. The way we currently teach and learn about the Earth does not provide our children with enough direct experiences in nature, nor does it help them comprehend the complexity of the issues at hand.

Over the past 3 years, I have become increasingly concerned about the profound detachment of humans from place and from the natural world. I have become particularly interested in learning about how this disconnection affects children's cognitive, emotional and practical skill development. I am also fascinated by the processes that lead to the development of our ecological identity and environmental consciousness. For this study, I concentrated on children's understandings, engagement, and attitudes about the Earth. I embedded my study within a 10-month environmental education program that allowed me to study the changes in children's understandings and attitudes over time. This program, the Intergenerational Landed Learning Project (ILLP) at the UBC Farm, provided the perfect practical context for studying these changes. Wanting to understand more about children's relationship to nature and its ramifications for the development of a sense of responsibility, I specifically aimed to answer the following question:

How did six children's engagement with, understandings of, and attitudes about nature and environmental issues change over their 10-month experience in the environmental education program of the ILLP?

My goal was to obtain insights into how children think and feel about the natural world, so that we can better understand how we might meaningfully implement a re-

conceptualization of education with respect to environmental sustainability. The insights gained by studying children's perspectives about the natural world can enable educators to help children develop their ecological identity and their environmental consciousness. Ideally, the formation of a strong ecological identity leads to a sense of responsibility that can empower children to reach new levels of transformative and informed action. The goal was to also highlight educational environments, like the *ILLP* that already promote the values of connection, empathy and compassion towards the natural world.

Personal development and context for this thesis

In my own journey of self-discovery, I have found that the most important part of the process of change is the integration of all dimensions of human nature including the physical self, the intellect, the emotional realm and spiritual awareness. My personal framework for this work comes from my interest in developing more conscious connection with self, with others, and with the place we inhabit. This interest has led me to investigate the way humans interact with nature and how this interaction shapes relationships with the natural world.

As a child, my experiences with the natural world were limited to a garden with lots of plants, various pets and occasional outings to the country side. In school, I was always very interested in the natural sciences, but it was not until I reached University that my passion for the Earth became prominent. After finishing my B.Sc. degree in Earth Sciences and Biology, I enrolled in a Master's program in the Department of Earth and Ocean Sciences. There, I began my journey under the tutelage of Dr. Kurt Grimm (Earth and Ocean Sciences, UBC) – an expert on sustainability and Earth systems science. Although I was aware of the term “sustainability”, I had never really explored its meaning. After my arrival

at UBC, I was exposed to a broader, more interdisciplinary realm of possibilities and my academic horizons expanded to the areas of sustainability, planning, science education, curriculum studies, and many more.

Although my expertise was in the natural sciences and my experiences as an educator were limited, I found myself developing a passion for educating our children to understand, love, and respect the Earth. This passion continues to be fuelled by new-found knowledge, by a growing sense of educational responsibility, and by children's innate sense of wonder and exploration. As my Master's program evolved, my interests in sustainability and environmental education intensified, and I made a decision to transfer from the Department of Earth and Ocean Sciences (EOS) to the Department of Curriculum Studies (CUST), Faculty of Education. I proceeded with my program with the supervision of Dr. Linda Farr Darling (CUST, UBC) and with Dr. Gaalen Erickson (CUST, UBC).

At the very beginning of my studies, Dr. Grimm informally introduced me to UBC Farm, and with it, the opportunities for sustainability teaching and learning. However, it was not until my transfer to CUST was under consideration, that my attention was brought to a particular program that goes on at the Farm. I quickly became interested and signed on as a volunteer "farm friend" in the Intergenerational Landed Learning Project (ILLP) at the UBC Farm. The *ILLP* is a recent initiative from the Faculty of Education, and it is an innovative environmental education program for elementary school children. It focuses on food-land-community connections, intergenerational, and place-based learning. As my involvement in the project progressed, it became clear the setting of the *ILLP* was very compatible with the purposes and frameworks of my research. I would now be able to apply educational theories that I had been exploring and acquire new skills, such as farming skills that included organic

practices and local food production. I would also be able to nurture relationships with children, teachers, farmers, researchers, and staff. Above all, work at the farm helped me develop a profound connection to place and an unprecedented sense of belonging that I had never experienced before.

In this and the following chapters, I present the findings from my study as a useful contribution to the fields of education and sustainability.

The problem of environmental disconnect and “generational amnesia”: Human-Nature disconnection

*“I like to play indoors better ’cause that’s where all the electrical outlets are.”
(4th grader, San Diego, CA) (in Louv, 2005)*

I believe that a powerful disconnection exists among humans, and between humans and nature¹, and that this disconnection is reflected in the way we currently live our lives (Kahn, 2002; Louv, 2005; Orr, 1994; Sobel, 2004). This disconnection, especially between humans and place, has led us to forget (or prevents us from remembering) that we are embedded within, and are importantly connected; to the world that sustains us (Capra, 2002; Macy, 1991; Macy, 1998; Roszak, Gomes and Kanner, 1995). This disconnection is, perhaps, one of the deepest (and largely unnoticed) causes of all the ecological and social adversities that we see in the world today.

A new generation of children is growing up in world² that is mostly unaware of the importance and beauty of the natural world (Chawla, 2002a; Chawla, 2002b; Gaster, 1991;

¹ Although I make the distinction here between “humans” and “nature”, it is merely to highlight the superficial and false dichotomy that has been created when thinking about our situationality in the world (Louv, 2005; Roszak, Gomes and Kanner, 1995; Sobel, 1996).

² It is worthy to note that the context of this thesis, and the criticisms and arguments made herein, are largely based on Western Culture and North American educational systems and lifestyles – in mainly urban settings and a society that has come to regard nature as a mere commodity to satisfy utilitarian tendencies (Louv, 2005; Rees, 2002; Wackernagel and Rees, 1996).

Nabhan and Trimble, 1994; Louv, 2005). And some have termed this disconnection between children and nature as a type of “generational amnesia” (Kahn, 2002). It is also argued that “we know...that many now consider children’s experiences of wildness a luxury rather than a basic human need.” (Nabhan and Trimble, 1994; p. xiii). We currently live in a highly urbanized society (and sadly, a vastly materialistic one) where access to wild spaces has been largely reduced due to the continuous loss of natural habitats (Drayton, 2003; Living Planet Report, 2006; Vitousek et al., 1997; Wackernagel and Rees, 1996), and to the intellectual and emotional detachment from the place we inhabit (Gruenewald, 2003; Pyle, 2001; Pyle, 2002; Sobel, 1996). The problem is exacerbated by the widespread emphasis we place on technology (in many cases an over-dependence on this resource) (Cordes and Miller, 2000; Kraut et al., 1998). Our children now spend most of their time caught up in rigidly structured activities within and beyond school walls, in shopping malls or in front of a computer or television screen (Beardsley, 2000; Brooks, 2001; Brooks, 2004; Healy, 1998; Healy, 1999; Louv, 2005). The consequences of this vast and increasing disconnection, loss of direct experience, and loss of enchantment with nature ought to be one of the primary concerns for educators, parents and community members.

Why do children need nature?

“... wilderness – even in its simplest forms – can nourish a lasting attachment to the Earth, and, in turn, nurture self-esteem.” (Nabhan and Trimble, 1994; p. xiii).

The lack of contact with nature greatly limits our children by preventing them from developing a holistic understanding of the intricate complexities of nature, from acquiring practical survival skills, and from creating a relationship with the natural world (Louv, 2005; Sipos-Randor, 2005; Zavestoski, 2003). Louv (2005), following from the ideas of John

Dewey (1902, 1938), rightfully states that “much of our learning comes from doing, from making, from feeling with our hands” (pg. 66). Research in developmental psychology, neurology, child development and education has confirmed that the lack of direct experience (particularly with nature) significantly inhibits the adequate development of a child’s senses, thereby limiting imagination and creativity (Louv, 2005; Moore, 1997; Reed, 1996). This ‘sensorial atrophy’ can result in the underdevelopment of the child’s senses, or in the over-stimulation of only one of them, most often the visual (Louv, 2005; Moore, 1997). This restriction prevents the child from discovering rich experiences of his/her world (Louv, 2005; Nahban and Trimble, 1994) that might enhance learning. While learning, the child has the opportunity to be engaged cognitively, emotionally and physically in his/her exploration; this opportunity is magnified when the child is in direct contact with nature. As Louv (2005) quotes Moore (1997), “children live through their senses. Sensory experiences link the child’s exterior world with their interior, hidden, affective world.” (Louv, 2005, pg. 65). Some research suggests^a that the child’s physical, mental, emotional and even spiritual health can be at risk when he/she is so far removed from contact with place, community and nature (Kaplan and Kaplan, 2002; Louv, 2005; Sobel, 2004). Furthermore, studies have shown that, if the child faces cognitive, physical or emotional challenges, contact with nature can provide an effective “restorational environment” where learning can be facilitated (Chard, 1994; Kaplan and Kaplan, 2002; Louv, 2005).

Nowadays, children seldom have any opportunity to search for those special places in which they can establish a sense of belonging and discover their identity through the magic of nature (Clayton and Otopow, 2003; Kahn and Kellert, 2002; Nahban and Trimble, 1994; Pyle, 2002; Sobel, 1993; Zavestoski, 2003). Children have an innate sense of wonder,

exploration and adventure (Carson, 1962; Dayton and Sala, 2001; Orr, 1994) that can be reawakened if only given the chance. They can (re)imagine, (re)create and (re)discover the wonders of the (natural) world in order to find a sense of self, a sense of communion and a sense of unity (Churchman, 1992; Clayton and Otopow, 2003; Nahban and Trimble, 1994). The alarming rate at which children are losing contact with nature, and losing the valuable knowledge it has to offer, possesses serious challenges to the their ability to become empowered citizens able to engage in sustainable practices (Gaster, 1991; Louv, 2005; Sipos-Randor 2005; Sobel, 2004). Enabling the child to fully embody the Earth that surrounds him/her can inspire a deep sense of awe, which in turn can promote a profound emotional connection and affinity to the natural world. What can follow is the development of an ecological identity³ (Kahn, 2003; Thomashow, 1995; Thomashow 2002; Zavestoski, 2003) aided by a strong sense of self (and self-esteem) (Kahn, 2002; Louv, 2005), and the development of a strong environmental consciousness (Kahn, 2003; Kals and Ittner, 2003; Louv, 2005).

We do not need to over romanticize nature in order to point out that direct contact with it strengthens the ability of the child to cognitively and emotionally deal with the expanding and increasingly multifaceted world (Louv, 2005; Sobel, 1996). Coupled with proper cognitive understanding, a sound emotional foundation empowers children to cope with an uncertain future that may otherwise overwhelm them and hinder their ability to act in transformative ways (Lange, 2004; Sipos-Randor, 2005; Sobel, 1996).

³ Ecological identity, as expressed by Thomashow (1995) "refers to all the different ways people construe themselves in relationship to the earth as manifested in personality, values, actions, and sense of self" (pg.3)

Teaching hope in a world of fear

Humanity faces the largest environmental and social crises ever seen on a global level (Daly, 1996; Diamond, 1999; Diamond, 2005; Goudie, 2000; Raskin et al., 2002; Rees, 2002; Vitousek et al., 1997). Studies and reports on the state of the planet inform us that the poverty, hunger and endless political and religious wars increase by the minute (Diamond, 2005; UN, 2007; UNFPA, 2007; UN-HABITAT, 2007), and that the planet's species and ecosystems are being continuously deteriorated at an alarming rate (World Conservation Unit, 2007; World Wildlife Fund, 2006). The negative impacts the human species can have on the Earth have been long discussed, and many are now turning to education in hopes that the next generations can aid in the transition to a better world (Earth Charter, 2000; Environmental Learning and Sustainability – Environment Canada, 1998; George C. Marshall Institute, 1997; Gough, 2002; Hungerford and Volk, 1990; Orr, 1999; Tbilisi Declaration, 1977). Though this is a commendable aim, teaching about these immensely complex issues can be difficult and emotional for both students and teachers, creating feelings of anxiety, uncertainty and confusion about the future (George C. Marshall Institute, 1997; Werner, 1995). As with other psychologically traumatic events, experience learning about global disasters can cause children to detach from reality or try to escape it (Roszak, Gomes and Kanner, 1995; Van der Kolk, MacFarlane and Weisæth, 1996; Wilson, 1994). Sobel (1996) worries that “if we fill our classrooms with examples of environmental abuse, we may be engendering a subtle form of dissociation” (pg. 2), and encouraging the emergence of “ecophobia” or the fear of (being in) nature and fear of abstract ecological problems. Thus, this ecophobia can lead to a sense of helplessness (George C. Marshall Institute, 1997; Roszak, Gomes and Kanner, 1995). There are significant risks in asking

children “to deal with problems beyond their understanding and control” (Sobel, 1996; pg. 5). However, trying to ‘protect’ them by withholding information can only lead to incomplete and inaccurate understandings of the issues at hand. Along with developmentally appropriate teachings, we should encourage children to envision the possibilities for joy, hope, and positive action (Sobel, 2004; Werner, 1995). We should help them develop a sense of connection, empathy, and respect for the natural world and their place in it (Louv, 2005; Sobel, 1996). We should also support “children’s biological tendency to bond with the natural world” (Sobel, 1996; pg. 6). Similar sentiments have been voiced by Kellert (1996), Kellert and Wilson, (1993), and Wilson (1986). E. O. Wilson’s concept of Biophilia is the hypothesis that aims to explain our affinity with/attraction to the natural world through an “inherited genetic tendency to respond to the natural environment in certain ways, particularly with certain emotional responses.” (Clayton, 2003, pg. 48). As Clayton (2003) argues, “if this hypothesis is valid, then a connection to nature is a fundamental part of who we are” (pg. 48). The cognitive aspect of teaching and learning about nature needs to be approached from a more holistic and ecologically sound framework so that students can come to appreciate the interrelatedness and interdependence of our world.

Beyond fragmented, standardized education

Although science, technology, arts and other subject areas are essential parts of the curriculum, they can be taught in ways that are disconnected from each other and from the children’s experiences. Mainstream curriculum has been criticized for privileging normalized standards that reduce the autonomy of both teachers and students leading them to become passive givers and recipients of information (Gruenewald and Manteaw, 2007; Ross, 1997; Smith, 2007). Standardized curricula and assessment techniques have been criticized for

ignoring the whole child and the need to actively engage of the child in learning with “head, hands, and heart” (Sipos-Randor, 2005) (Hursh, 2005; Louv, 2005; Ross, 1997; Sipos-Randor, 2005).

In Western thought, reductionist approaches have dominated the way we think about the world since the time of Descartes and Newton (Kay and Schneider, 1994; Lambkin, 1998; Phelan, 2004). According to critics, education is steeped in a paradigm that inspires an incomplete understanding of how the world works (Birch, 1998; Orr, 1994; Phelan, 2004). This paradigm has also favoured the expansion of science and technology over other disciplines (Flinders and Thornton, 2004; Orr, 1994). With respect to the way we teach and learn about nature and environment, affection for and connection with the natural world is sometimes seen as mere romanticism. In the search for more scientific accuracy and objectivity we have allowed ourselves to become detached from the place we inhabit, and from passionate engagement with it (Damasio, 1995; Phelan, 2004; Pyle, 2001; Sipos, Battisti and Grimm, 2007). Robert Michael Pyle in his essay “The Rise and Fall of Natural History” depicts this perfectly when he points out that: *“Our environmental professionals are superbly trained in engineering, management, and theory, yet seldom have any intimate knowledge of the working parts of the systems they measure, monitor, and care for.”*

It is important that we reclaim enthusiasm, passion and emotion for learning so that the child has a more holistic understanding of the world that integrates not only the cognitive (intellectual), but also the complementary emotional and practical skills (Damasio, 2001; Orr, 1994; Sipos-Randor, 2005). In my view, great benefit comes from encouraging the young child to develop a strong connection to the natural world (Churchman, 1992; Sobel, 1996). Harmonizing this connection with a solid intellectual foundation and the opportunity for

direct experience the child can develop a sense of respect and responsibility. This process, can lead to actions that reflect a profound understanding of our intricate, interconnected world (Grimm, 2006; Sipos-Randor, 2005; Sobel, 1996). I argue that the child must first be brought to the awareness (recognize) of the interconnection with natural world. Once the child has started to understand these interrelationships, he/she can start to develop a sense of empathy, compassion and respect for the natural world. This connection, paired with proper cognitive understanding and practical skills, can foster to a sense of responsibility that can be potentially transformed into action. A graphical representation of this argument can be found in Figure 1.1.

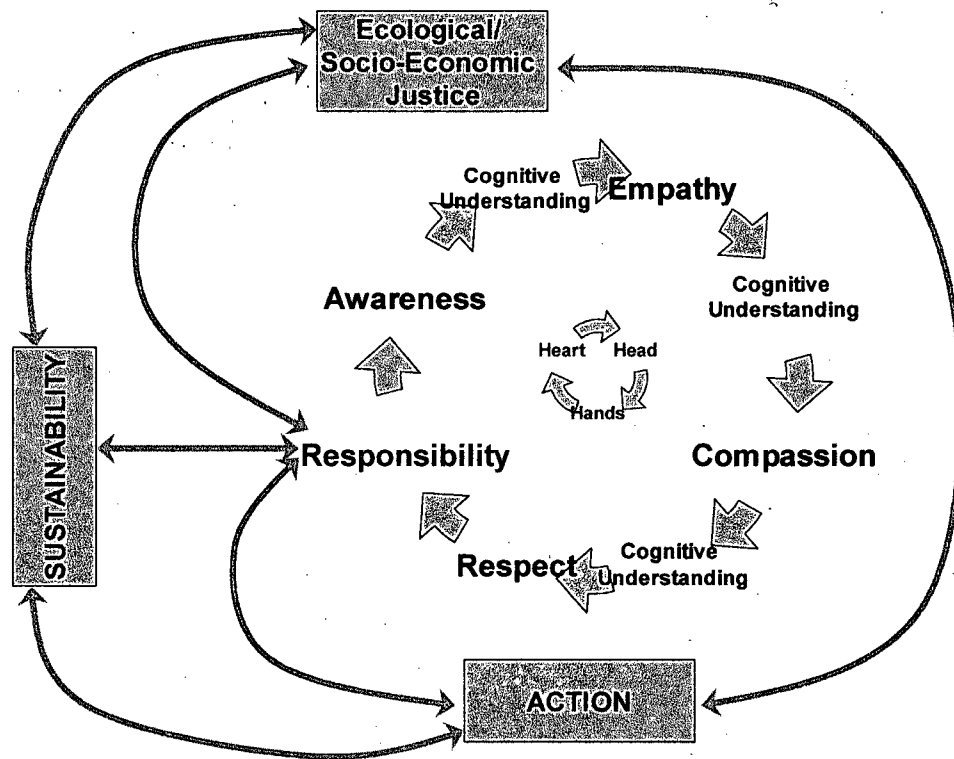


Figure 1.1. A graphical representation of the suggested model of developing a sound ecological identity and environmental consciousness. This particular work does not look at the implementation of a sense of responsibility, but rather only touches upon the potential for action. Parts of this model were inspired by Mary Gordon's *Roots of Empathy* (Gordon, 2003).

Clarifying terminology: Integrating 'Environmental, Outdoor, and Sustainability' Education into 'Education for Environmental Sustainability'

The terms 'Ecological' or 'Environmental Education' have been used widely in both academic and non-academic settings (AERA - EEE SIG, 2007), and these terms often focus our attention on teaching about the Earth and our relationship to it (Holsman and Ruskey, 1995; Lund, 2002). However, it is important to note that these terms, particularly 'Environmental Education', have recently been used to portray fields that deal with much narrower issues than the ones these terms are actually meant to represent (George C. Marshall Institute, 1997; Gough, 1993; Gruenewald, 2004; Marshall, 2006; Schmidt, 1996). In the following paragraphs, I highlight some of the limitations that have been imposed by the over-generalized use of these terms. I also point out that the same concern can be applied to the term 'Outdoor Education', since this field has been (and still is) an essential and complimentary component to Environmental Education (Ewert, Place and Sibthorp, 2005; Lund, 2002; Woodhouse and Knapp, 2000).

Some conceptions of Environmental Education have adopted an anthropocentric and utilitarian paradigm, and address limited environmental issues in unsatisfying and incomplete ways (Blumstein and Saylan, 2007; Gough, 1990; Gruenewald, 2004; Marshall, 2006; Ohman, 2006; Orr, 1994;). Perhaps, the oversimplification arises from the difficulty of grasping of the many dimensions of ongoing social and environmental issues. Popularized environmental education has often focused on just a few abstract problems (such as pollution, and more recently climate change), and suggests, what many have argued are, unhelpful and linear solutions (Blumstein and Saylan, 2007; Orr, 1991; Phelan, 2004). Teaching children to "be green" and offering them the oversimplified solution of "reducing, reusing, and recycling" quickly becomes meaningless if the child is not grounded in proper contextual

understandings and knowledge (Blumstein and Saylan, 2007; Grimm, 2006; Peterson, 2007; Sobel, 2004). Outdoor education in urban settings, for example, has recently become a tool for luxurious recreation. The comforts of civilization travel with students into natural settings, thereby reducing children's immediate contact with nature. (Louv, 2005; Sipos-Randor, 2005).

Sustainability Education offers a more holistic approach based on an eco-systemic, community-based perspective to the way we teach about nature and the Earth, (Cortese and McDonough, 2003; Moore, 2004; Rees, 2003; Sipos-Randor, 2005). However, sustainability education is not immune to the oversimplifications that both Environmental and Outdoor Education have been subjected to. In an ever expanding global world, the term *sustainability*⁴ itself is ambiguous and overused creating confusion about its purpose⁵ (Grimm, 2006; Sipos-Randor, 2005). Because of this confusion, the focus of education for sustainability can easily be reduced to the economic goals of 'sustainable development' (Costanza and Daly, 1992; Costanza and O'Neill, 1996; Rees, 2002). Education for Sustainable Development can be problematic if the relationship to the natural world is considered only in economic terms. In the field of sustainability, the term 'sustainable development' is often criticized for masking an intention to maintain the status quo (Rees, 2002; Rees, 2003).

⁴ The sustainability movement arose in response to the progressively more daunting task of alleviating ecological and socio-economic injustices so that we can create and enact more holistic and biocentric solutions for a better world. Sustainability is a process of synergistic complexity and interconnectedness/ interdependence within and among all holarchical levels of existence (Barlow, 1991; Holling, 2000; Koestler, 1967) or spheres of influence (Vaines, 1996) (both temporal and spatial components). Sustainability can be a way of life that integrates ancient wisdom with modern expertise being consistent with holistic values that truly bring the desired ecological and socio-economic justice.

⁵ However, it is also true that the term 'sustainability' has revolutionized the way we think about the world. As Sipos-Randor (2005) convincingly states, a "far greater benefit will result from clarifying and re/claiming the 'sustainability' concept rather than abandoning it, and particularly by advancing it as a well-defined movement for socioecological justice" (pg. 5). It is also important to be mindful of viewing sustainability as a process rather than a goal, as a way of life rather than a set of standards to be achieved.

I have made a distinction between the terms 'Environmental', 'Outdoor', and 'Sustainability' Education in hopes of highlighting some of the shortcomings of these seemingly separate fields. This separation, however, can become problematic when trying to unify and integrate their usefulness. This problem becomes particularly prominent when attempting to describe the re-conceptualization of education with respect to the way we teach and learn about nature and our relationship to it. I argue that much more can be gained by reclaiming the power of overlapping concepts within environmental, outdoor, and sustainability education. It is essential that we integrate them into meaningful pedagogies and curricula that reflect the values of a sustainable relationship between humans and the Earth (Capra, 1996; Capra, 2002; Orr, 1994).

In order to avoid confusion and discord of the sort I have pointed out, I use the term Education for Environmental Sustainability (EES) throughout this thesis. This overarching term will be used from now on to encompass aspects of Environmental Education, Outdoor Education and Sustainability Education because it fruitfully blends together the theoretical frameworks and pedagogical tools that are described in the chapters to come.

The Educational Challenge

"I cannot save what I do not love. I cannot love what I do not know" ~ Anonymous.

We are currently reinventing the meaning of stewardship, environmental consciousness and community, while trying to rekindle connections to the land, our own and our students'. The challenges that educators face are broad and complex, and therefore, we must find innovative paths for re-conceptualizing the way we teach about nature and our relationship to it. It is our duty as educators to empower, and engage our children by

providing the space for them to connect to the natural world, develop a relationship with it and find their passion for living, learning and sharing in a vision for the future.

In the following chapters, I present a more detailed account of what this work entailed, the practical context and theoretical frameworks in which it was carried out, as well as the ways in which it can potentially contribute to re-conceptualization of education.

CHAPTER TWO

THEORETICAL AND PRACTICAL FRAMEWORKS

There are many and varied solutions to address the problems identified in Chapter One that are considered to be helpful tools for the advancement of Education for Environmental Sustainability. In the first section of Chapter Two, I focus on three perspectives that I believe are among the most promising for this purpose. I argue that these particular theoretical frameworks can aid in the re-conceptualization of the way we teach and learn about nature, the Earth and our relationship to it. In the second portion of this chapter, I focus on an environmental education program that explores this re-conceptualization in practice. I present the Intergenerational Landed Learning Project (ILLP) at the UBC Farm as an excellent example of the initiatives that have been and are being developed for Education towards Environmental Sustainability. I give a description of the *ILLP*, its aims and objectives, and the process of instruction in this 10-month program.

Empowerment, Engagement and Connection through Education for Environmental Sustainability

The integration of education for environmental sustainability into the traditional education system, at least in North America, has often been difficult and slow (BC IRPs, 2007; Peterat et al. 2004). However, even with the challenges we face, there are many passionate, enthusiastic and dedicated educators that are making significant changes in the way we teach and learn about the Earth and our relationship to it (eg. Capra, 1996; Esteva and Prakash, 1998; Gruenewald, 2003; Intergenerational Landed Learning Project; Sea to Sky Outdoor School for Sustainability Education; Smith, 2002; Sobel, 1996; Sobel, 2004;

Voices for Sustainability, 2006). Furthermore, in 2002, the United Nations (UN) declared the Decade of Education for Sustainable Development (from 2005 to 2014) (December, 2002, to be led by UNESCO – United Nations Educational, Scientific and Cultural Organization). Even though the term *Sustainable Development* might be problematic for the field of sustainability and even for sustainability education, as educators, we would benefit most from viewing this Decade of Education for Sustainable Development as a stepping stone for the re-conceptualization of education for environmental sustainability. We should take advantage of the opening doors that are presented here, and look beyond the barriers of semantics. This (and other official documents⁶), as well as the support from grassroots initiatives, provides educators with opportunities to work together and create meaningful, collaborative tools for the incorporation and enactment of education for environmental sustainability in all levels of schooling and community (Voices for Sustainability, April 28-30, 2006).

Various models and pedagogies have been proposed as solutions to enhance educational practice that will effectively deal with the challenges presented in the previous chapter. I will focus on three dynamic pedagogical perspectives or frameworks that I believe have a great potential to positively contribute to Education for Environmental Sustainability. The three frameworks are Transformative Sustainability Learning pedagogy (Sipos, Battisti and Grimm, 2007; Sipos-Randor, 2005) (Figure 2.1), Place-Based Education (Gruenewald, 2003; Smith, 2002; Sobel, 2004), and Earth Literacy (Figure 2.2) (Grimm, 2006).

⁶ Like Agenda 21 (UN Rio Earth Summit, 1992), Earth Charter (UN, 2000), National Council for Science and the Environment (2003), Talloires Declaration of University Presidents for a Sustainable Future (1990).

Transformative Sustainability Learning (TSL)⁷

This is an innovative, simple and effective pedagogy that has very efficiently mapped a wide, but relevant selection of pedagogical and educational landscapes. Transformative Sustainability Learning (TSL) aims to bridge some of these seemingly discrete pedagogies by highlighting and combining their similarities. It was designed to contribute to the advancement of and facilitate sustainability education (particularly in higher education settings) by focusing on empowerment, engagement and connection of the learner through the integration of intellect (head), skills (hands), and emotion (heart). TSL serves as a useful tool to enable the learner to synergistically apply knowledge, practical skills, passion and values in hope that an emergent transformative learning process may lead to sustainable practices and choices (Lange, 2004; Sipos, Battisti and Grimm, 2007; Sipos-Randor, 2005). TSL was originally conceived with the purpose of exploring the following question: ***“How can educators and facilitators engage learners so as to encourage and enable personal, and thus societal, enactment of sustainability principles and goals?”*** (Sipos-Randor, 2005).

Why did I choose to discuss this framework?

Transformative Sustainability Learning (TSL) was chosen as a pillar for this work because its simple, yet profound organizing principle of “heads, hands and heart” (Sipos-Randor, 2005) is an exemplary way of addressing the critical need to acknowledge the role of emotions and direct experience in learning as much as the oftentimes overemphasized intellectual matters within the education system. It effectively brings together many of the

⁷ Although sustainability education “is inherently coupled with transformative education” (Sipos, Battisti and Grimm, 2007, pg. 7), this thesis focuses more on the factors that will eventually lead to the enactment of personal and societal action, and not on how transformation (if any) into action is manifested. It focuses, therefore, on how a child might develop an ecological identity/environmental consciousness steeped in values of sustainability as the basis for transformative action.

pedagogies and educational theories that are useful for the field of education for environmental sustainability.

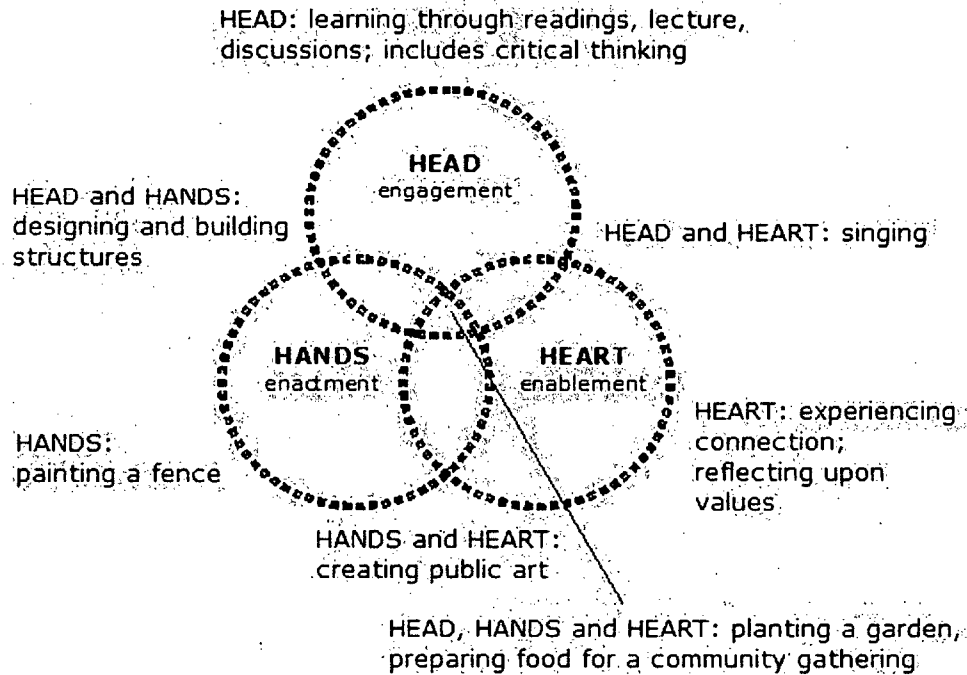


Figure 1: A Venn diagram depicting constituents and synergies of the TSL pedagogy wherein the principle of Head, Hands and Heart engages and enables participants to enact sustainability. There are seven (7) combinations that can emerge, an example of how each may be actualized is provided.

Sipos Randor, Y. and Grimm, K.A. Figure 1

Figure 2.1. Graphical representation of Transformative Sustainability Learning. Taken directly from Sipos-Randor and Grimm, 2006, Figure 1.

Place-Based Education (PBE)

Place-Based Education (PBE) is “a pedagogy of place” (Gruenewald, 2003; Sobel, 2004) that aims to provide children and educators alike with direct, hands-on and real-world experience, both in nature and in community. It encourages them to (re)connect to the land where they come from (community and bioregion), in order to develop and foster an embedded sense of place and belonging (Orr, 1994; Sobel, 2004). According to David Orr, the highest purpose of facilitating children’s learning is “to help open young minds to the awareness of the forgotten connections between people, places and nature.” (in Sobel, 1996). Some authors argue that one of the predominant concerns in the current education system is that “what happens in the classroom is qualitatively different from what happens elsewhere [in the real world]” (Smith, 2002; pg. 586). When we connect classrooms to communities by using ‘place’ as the curricular context, both teachers and learners can benefit from using the community and the natural world as their learning, living laboratories (Smith, 2002; Theobald and Curtiss, 2000; Woodhouse and Knapp, 2000). Out of this experiential and interdisciplinary approach, we can observe the emergence of a more holistic view of the world, where the learner explores the integration of traditionally fragmented subjects by actually experiencing the relevance and interrelationships among these. Being mindful not to fall into a romantic idealism of ‘going back to the land’, Place-Based Education also highlights the inherent need to honour traditional knowledge (Turner, Ignace and Ignace, 2000) and revive the vast richness of natural history (Pyle, 2001) of a particular place. PBE offers the natural incorporation of intergenerational learning within community, a critical but mainly unexplored element in formal educational theories (Peterat et al., 2004).

Place-Based Education serves as one of the stepping stones towards the development of an ecological identity. An ecological identity is (are) an aspect(s) of a child's sense of self that can include, but is (are) not limited to, "a positive emotional reaction to nature and moral reasoning about it." (Kals and Ittner, 2003; pg. 137). As Kals and Ittner (2003) argue, "the development of an environmental identity is a lifelong learning process" but it definitely "has its roots in an early age" (pg. 137). It is important that the young child begins to explore a sense of connection, empathy and respect for the natural world that will eventually empower him/her (through a better cognitive, intuitive and practical understanding of our complex world) to become a responsible steward of the Earth (Davis, 1998).

As discussed in Chapter One, when we are faced with the many often overwhelming ecological and social issues of the modern age, we tend to focus on the large, abstract problems that often seem unbearable to an adult, that alone to a child. It is because of this that the importance of developing a relationship with the immediate surroundings, and commencing education at the local levels, starts to become evident and critical. One of our guiding principles as educators ought to be the creation and/or implementation of pedagogies and curricula in the field of education for environmental sustainability that are developmentally appropriate to suit the cognitive abilities and emotional capabilities of the child (Hungerford, 2002; Sobel, 1996). We must strive to empower our children without engendering any fear of nature, and thereby inviting a lack of action to save it (Orr, 1994; Sobel, 1996). David Sobel (1996), one of the strongest proponents of PBE, argues that "what's important is that children have an opportunity to bond with the natural world, to learn to love it, before being asked to heal its wounds." (pg. 9). Based on his research with children, he presents a simple but effective age-framework with which we might better

approach the development of the child's relationship to nature, community and the world. A detailed description of Sobel's idea of "developmentally appropriate" (pg. 11) stages for education for environmental sustainability through the elementary and middle school years can be found in Table 2.1.

Table 2.1. Sobel's (1996) developmentally appropriate stages for environmental education. This is best viewed, not as a linear progression, but as a flexible, dynamic development throughout the child's relationship to nature.

Stage - Description	Age Range	Rationale
<i>Empathy</i> – this is the stage at which the child displays a natural affinity and tendency to bond with the natural world, especially towards animals that are within close contact. The geographical scope is limited to the immediacy of the home. The house and yard are their world.	4-7	Between the ages of four and seven, we must encourage and allow the child to experience that innate 'sense of wonder'. We must also foster the development an empathic relationship that derives from an inner sense of connectedness with the natural world, allowing this to become the emotional basis for the intellectual and practical understanding of interconnections and interdependence of all that is. This is a crucial step in developing a strong ecological identity and an environmental consciousness during a later stage (Davis, 1998). Since "early childhood is characterized by a lack of differentiation between self and the other" (Sobel, 1996; pg. 13), the natural state of the child at this stage allows for the experience of oneness with the world.
<i>Exploration</i> – this stage is characterized by the desire to explore the child's expanding world. The geographical locations at this stage expand to the surrounding landscapes that accompany the home, the school, community and even the region. Exploration tends to be in trails, nearby streams or ponds, and other parts of the (urban) landscape. The child fuels the imagination and exploratory force by building forts, hunting around, gathering treasures	8-11	It is at this stage that we must encourage and allow our children to explore and discover new places in their own way. The freedom that the child is given to explore his/her sense of self in relation to the rest of the world is an essential element to development of a sense of belonging. The feelings of connection are now emerging to the conscious awareness of the child through the first hand experience of their surroundings. Journeys of discovery become the

and caring for small animals and/or plants. The magic of finding and/or creating special places is very prominent at this stage.		basis for bonding with natural world, even if it is an urban area with limited access to wild places. This developing relationship with nature creates the bonds that are linked to a strong sense of place, and that is the basis for a more holistic cognitive understanding of how the world works.
<i>Social Action</i> – This stage usually begins around age twelve and extends beyond the age of 15. The geographical locations will expand, but they mainly change from isolated and magical places to more social places. This stage is characterized by developing social connections, and where the child or young adolescent feels a sense of place in society and finds a natural inclination towards stewardship and social action. The child now has both solid emotional foundations and holistic cognitive understanding of his/her expanding/surrounding world.	12-15	The child has developed more solid cognitive and emotional capabilities to deal with the abstract and expanding concepts of environmental problems. At this point it is wise to capitalize on their innate attraction to social connections and guide them towards a stronger sense of community. It is important to help them to be involved in activities that improve the neighbourhood or town; they are excellent ways to encourage them to be committed and contribute to their community. Though the central aim of this stage is to foster a social awareness and action, it is essential that the emphasis on a sense of empathy and a sense of exploration are not left unattended. They are still an innate part of the child or young adolescent and, in fact, this inner sense of connection never leaves, it is merely forgotten. It is in this profound sense of belonging that we are reminded of our oneness with the world we inhabit, and the sense that propels us to action.

Being sensible to cognitive and emotional developmental stages of the child, together with a realization of the potential of a classroom or school as a ‘social movement’ (VanWynsberghe, 2007 Pers. Comm.) are both necessary for the emergence of an “authentic environmental commitment” that will “[emerge] out of first hand experiences with real places on a small, manageable scale” (Sobel, 1996; pg. 34).

Why did I choose to discuss this framework?

Placed-based education was chosen as one of the pillars of this work as a response to the critical need to reconnect to the immediacy of our surroundings, the place we inhabit, and one another (Gruenewald, 2003; Smith, 2002; Sobel, 2004; Woodhouse and Knapp, 2000). This (re)connection is essential to the very nature of who we are and to the more holistic understanding of our place within the larger world, and our responsibility towards it (Gruenewald, 2003). Place based education provides the opportunity to develop an empowering sense of self and a grounding sense of place that can shape and promote a sense of empathy, respect and stewardship (Gruenewald, 2003; Sobel, 2004). It also provides endless resources - as Louv (2005) acknowledges: "any natural place contains an infinite reservoir of information, and therefore the potential for inexhaustible new discoveries." (pg. 67). PBE focuses largely on community-based learning and community service, where the community (both as culture and physical place) is regarded as one of the classrooms. As a pedagogy of place, PBE has its roots in learning through direct experience and furthermore, connecting learning with every day experience with a specific context of place (Smith, 2002). Place based education is based on "approaches that are concerned with the context and the value of learning from and nurturing specific places, communities or regions... claiming place as a guiding construct" (Gruenewald, 2003; pg. 3).

The importance of allowing a (re)connection to our land, and the need to shift from current standards toward more holistic and sustainable beliefs, values and assumptions, is very eloquently expressed by Kahn (2003) as he quotes Aldo Leopold:

"Aldo Leopold (1970) argues that environmental education will continue to fail until we help people develop a "love, respect, and admiration for land, and a high regard for its value" (p. 261). "No important change in ethics," Leopold writes, "was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections, and convictions" (p. 246)." (pg. 114).

Earth Literacy (EL)

Earth Literacy (EL) (Grimm 2006) was intended to be a useful curricular as well as practical tool that in its flexibility would be adaptable to most, if not all educational settings (formal and informal). Earth Literacy is concept that was developed by Dr. K. Grimm, at the University of British Columbia. The Earth Literacy concept consists of nine interrelated and interdependent components that “identify and integrate diverse disciplinary and demographic perspectives into a clear statement of the reciprocal relationship amongst humanity and all of planet Earth outside and within ourselves.” (Grimm, 2006). As Grimm (2006) defines it, “Earth Literacy... is an explicit new discipline, stemming from a single question: *What do we need to understand, in order to comprehend, communicate effectively about, and enact the process of sustainability?*” (emphasis in text).

The concept of Earth Literacy is more adequate for teaching and learning in higher education settings since its intricate synergy and complexity are best understood, adapted and implemented at this stage. However, it may be used in elementary and secondary education settings as well. The challenge will be to adapt this concept to be cognitively and developmentally appropriate for children, as well as to highlight its usefulness as a pedagogical and curricular tool for the advancement of education for environmental sustainability and sustainability education.

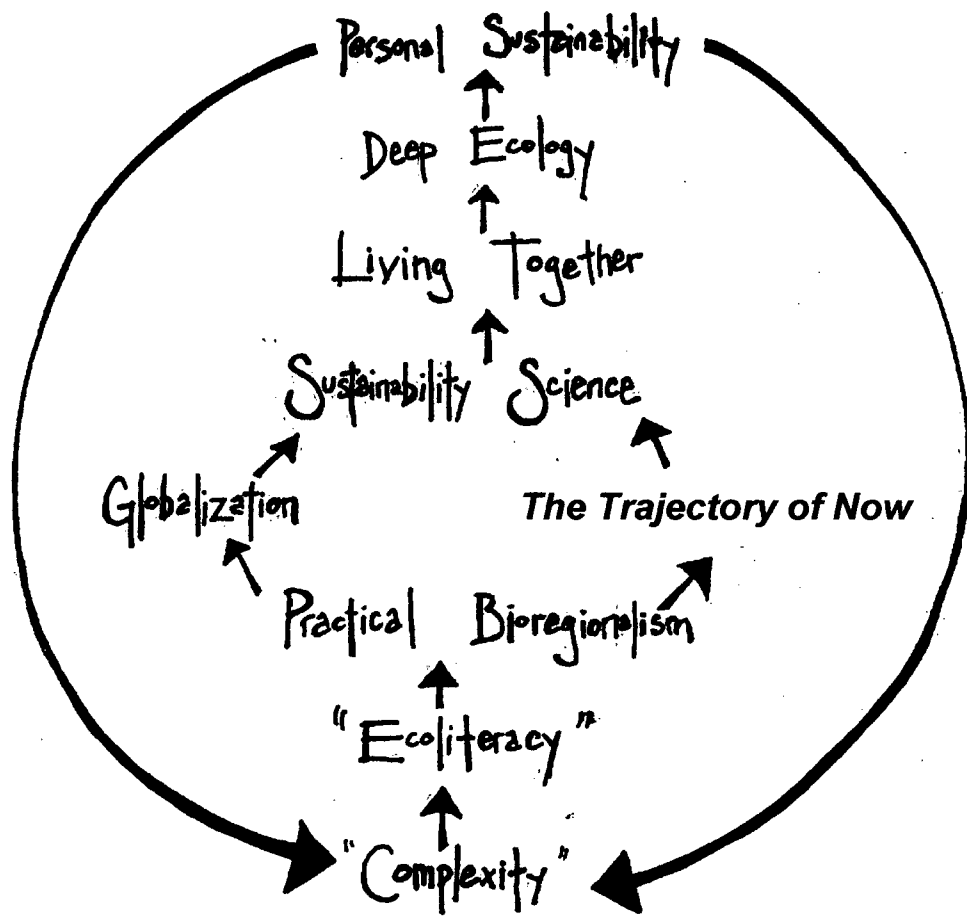


Figure 2.2. A graphical representation of the nine components of Earth Literacy in the order in which they are envisioned to flow. Taken directly from Grimm, 2006, Figure 11.

A description and usefulness of each of the nine components of Earth Literacy can be found in Table 2.2. The order in which they are described aims to represent the way the author views the reciprocal interactions and proposes it as the best working model of EL (Figure 2.2) (Grimm, 2006). Even though the elements of EL are being separately described, the reader is discouraged from viewing these as independent themes. As Grimm (2006) states, “the survey of each theme is not intended to narrowly define each subdiscipline, and thereby construct a set of rigid interdisciplinary silos. Nor is the survey intended to provide

the definitive statement about any of these themes” (pg. 7). The brief description presented in Table. 2.2 is aimed at giving the reader a more complete understanding of this heuristic tool, while also more clearly presenting the bases for many of the arguments made within this work about the intellectual, practical and affective learning concepts needed for a well rounded education for environmental sustainability.

Table 2.2. This is a description and a comment on the usefulness of each of the nine components of Earth Literacy for a more complete understanding of the concepts within this framework.

Component Name	Component Description and Usefulness
“Complexity”	This component is largely based on complexity science and is viewed from a systems thinking perspective. It is aimed at understanding (eco)systems as dynamic, self-organizing, self-perpetuating, emergent, unpredictable entities that span all holarchical levels of existence ⁸ - ranging from “submolecular to galaxial scales” (Capra, 2002; Grimm, 2006; Holling, 2000; Kay and Regier, 2000; Kay and Schneider, 1994). Complexity science transcends the linearity and need for certainty of the (still dominant) reductionist Newtonian and Cartesian science, and also focuses on relationships rather than parts (Capra, 2002; Kay and Regier, 2000; Kay and Schneider, 1994). Since there is a profound need to understand the simple, yet intricate inter- and intra-connections between and within everything that is in the world, this component is also aimed at understanding how these relationships reciprocally and dynamically shape each other.
“Ecoliteracy”	This concept is one that has been popularized and more clearly defined by David Orr (1991) and Capra (1996). It emphasizes and aims to aid us in better understanding that we are part of and are embedded within an ecological system that has biophysical limits. Grimm (2006) extends this understanding to the notions of “resilience (www.resalliance.org), the Panarchy metaphor (Gunderson and Holling, 2002), and a general theory of living systems (Capra, 1996; Grimm 2003a; Grimm, 2005c; Maturana and Varela, 1987) – a set of principles uniting and explicitly contrasting the biology of cells, organisms, ecosystems and the biosphere” in hopes to better represent the true complexity of our ecological world. (Grimm, 2006, p. 9).

⁸ Holarchical levels (Capra, 2002; Holling, 2000; Koestler, 1967; Vaines, 1996), as opposed to hierarchical levels of existence range across evolutionary aspects of space and time from a) micro levels to b) less complex life and spheres, c) self, d) community, e) bioregion, f) society, g) planet, h) cosmos, as well as the socio-economic (human) context that is shaped by geography and available resources (surrounding environment), history, culture, and personal experience.

<i>Practical Bioregionalism</i>	Practical Bioregionalism extends beyond the recognition of being embedded within an ecological system into acquiring, understanding and implementing a sense of place. It is the connection and integration of the relationship between a bioregion (fauna, flora, topography, etc.) with human culture and history (Great River Institute). Practical Bioregionalism is aimed at understanding where the resources come from and how the choices that are made impact the local community ecologically, socially and economically (Great River Institute; Grimm, 2006). Bioregionalism "is a holistic philosophy about living sustainably in a place over time." (Tiller, 1996)
<i>Globalization</i>	This component aims to include and understand the reality of our globalized world through acknowledging both biophysical processes and socio-cultural aspects at a planetary scale. The element of globalization is viewed and intended as a "necessary complement" to bioregionalism, where the contrasting local vs. global allows for the understanding of the (inter)connection and (inter)correlation of our situationality in an increasingly global world.
<i>Trajectory of Now</i>	This component, although an abstract title, intends to highlight the "historical trajectory" each of us occupies both at individual and collective temporal scales. It aims to acknowledge our historical (socio-cultural, as well as evolutionary) heritage, together with the contingent implications this context might have on, present and future possibilities (Raskin et al., 2002). It attempts to clarify the varied magnitudes and complexity of different (but sometimes simultaneous) processes happening at all spatial (holarchical) levels of existence (from individual to planetary evolution). It also particularly focuses on "an element of individual and/or collective self-reflection" that affects and shapes our attitude of where we come from, who we are, and where we are going.
<i>"Sustainability Science"</i>	This component serves as the quantifiable and demonstrable elements that help us define the (negative) impacts that our consumption of resources and production of waste has on the biophysical planet (Kates et al., 2001; Swart, Raskin and Robinson, 2002). It specifically includes practical tools such as the Ecological Footprint concept (Wackernagel and Rees, 1996) and sustainability indicators (Kates et al., 2001; Swart, Raskin and Robinson, 2002) that can help us begin to measure these impacts (to an extent). According to Grimm (2006), "this theme may [also] address the history, promise and possible concerns with technology". (pg. 10).
<i>Living Together</i>	This component serves as the integration of components 1-6 so as to apply to social systems through communication and practice them within community in a supportive (and hopefully) lasting environment. It is intended such that this practice reflects a deep understanding as well as a profound connection to the place we live in, at individual, local, regional and global scales.
<i>"Deep Ecology"</i>	This is a well established concept that moves away from an anthropocentric to a more eco-centric perspective. The deep understanding of systemic, complex processes of interdependence and interconnection allow for the development of a profound connection to the very systems that sustain us (Macy, 1998; Sessions, 1995). This understanding and intuition combined can propel a deep transformation and sense of stewardship at both the individual and societal levels. As

	Grimm (2006) states it, “the deep ecology unit is an introduction and opportunity to explore the ethical, moral and spiritual dimensions of sustainability.” (pg. 11).
<i>Personal Sustainability</i>	This final component of EL aims at integrating all the constituents of the concept at an individual level so that each of us can explore and reflect on what sustainability means and how we can apply the concept of Earth Literacy to advance our own personal sustainability. It is intended to allow for the empowerment, engagement and enactment of values and goals that reflect a deep, but personalized understanding of sustainability.

Why did I choose to discuss this framework?

Earth Literacy was chosen as one of the pillars of this work because its transdisciplinary approach comprehensively synthesizes the intellectual, practical and intuitive aspects of the basic knowledge and level of awareness we need have in order to better understand, communicate about, and enact sustainability. Rather than prescribing a fixed and static solution, EL (in its flexibility) offers the opportunity to dynamically (re)create a personal process of sustainability by critically and consciously exploring the reality of our relationship to the world. Earth Literacy is embedded within a systems thinking perspective acknowledging that all things “are interconnected at global, regional, local and individual scales” (Grimm, 2006; pg. 4). It efficiently covers the spatial as well as temporal scales of the complex interaction that we, as humans, have with the world – from our identities as individuals and as members of community, culture, society and a global world, to the historical trajectory(ies) of our multifaceted existence.

Education for Environmental Sustainability - Synthesizing TSL, PBE and EL

These integrative approaches (individually or combined) have the potential to provide a starting point from which we might contribute towards reshaping the way we teach and learn about the Earth and our relationship to it. Transformative Sustainability Learning,

Place-Based Education and Earth Literacy are all tools that can help us comprehend children's engagement with, attitudes towards and understandings about environment, nature and the Earth. With the understanding of how children see themselves with respect to nature and their surrounding environment, we can better equip ourselves (as educators, parents and community members) to facilitate the development of their ecological identities and environmental consciousness (Kahn, 2003; Orr, 1994; Zavestoski, 2003). As we journey through the process of re-conceptualization, and as our understanding of interconnectedness, interrelatedness and interdependence becomes more unified, a systems thinking approach and a more holistic view of education (which these theoretical frameworks provide) can greatly enhance the implementation of the needed changes to deliver Education for Environmental Sustainability (Capra, 2002; Davis, Sumara and Luce-Kapler, 2000; Orr, 1994; Skolimowsky, 1991; Sobel, 2004). Through an active, practical emphasis on direct experience, the developing child can begin to empathize, understand and care for his/her expanding and transforming world, thereby acquiring a solid connection to his/her local environment (Sobel, 1996; Sobel, 2004). As a supporting foundation, a clear sense of relatedness and belonging in the early stages of development is critical for allowing the child to more easily process the reality and abstraction of a global world at a later age (Davis, 1998; Sobel, 1996) (The implications of a lack of connection were discussed in Chapter One and the importance of starting at the local level was touched upon earlier in this chapter). By integrating Transformative Sustainability Learning, Place-Based Education and Earth Literacy, the combined process/product can provide the grounding practical, intellectual and emotional knowledge and skills necessary to create, enact and implement Education for Environmental Sustainability.

**A Unique Exemplar of Education for Environmental Sustainability (EES):
Land-food-community integration - Intergenerational Landed Learning Project (ILLP)
at the UBC Farm**

There are many unifying themes in the sustainability paradigm that serve as leverage or entry points able to propel and catalyze action (Grimm, 2006; Meadows, 1999). One of the most prominent themes is the land-food-community integration that is so necessary for the understanding of our relationship to and dependence on the land. This is not only a unifying theme in the sustainability movement, but also a recurring and overarching theme in the supporting theoretical frameworks of this thesis and an essential element for education for environmental sustainability (Grimm, 2006; Sipos-Randor, 2005; Smith, 2002; Sobel, 2004). Children can develop a powerful (re)connection to land, food and community with which they become intimately acquainted and can thoroughly relate to some of the essential elements of everyday life (Peterat et al. 2004).

In our ever expanding world and with the emergence of global markets, the production of food has been profoundly transformed (Goudie, 2000; Kimbrell, 2002; Pretty, 2002; Wackernagel and Rees, 1996). The increasing complexity and displacement of food production has created a large disconnect with regards to the understanding of food cycles, food security⁹ and the land (Feenstra, 2002; Hamm and Bellows, 2003; Kimbrell, 2002; Rosegrant and Ringler, 1999). Furthermore, there are vast environmental, socio-economic, and health consequences that arise from mass-scale food production and industrial agriculture (Gliessman, 1998; Goudie, 2000; Horrigan, Lawrence and Walker, 2002; Kimbrell, 2002; Rees, 2002). This disintegration from the land often means that our

⁹ The Food Security definition, as endorsed by the World Food Summit (2002), is that : "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle." (Australia's International Development Cooperation Food Security Strategies, 2004).

knowledge about where food comes from dissipates, creating a very limited understanding of our dependence on the land (Feenstra, 2002; Keeney, 1999; Pretty, 2002; Weiner and Levin, 1997). Wendell Berry describes this disconnection with grace:

“We are involved now in a profound failure of imagination. Most of us cannot imagine the wheat beyond the bread, or the farmer beyond the wheat, or the farm beyond the farmer, or the history beyond the farm. Most people cannot imagine the forest and the forest economy that produced their houses and furniture and paper; or the landscapes, the streams, and the weather that fill their pitchers and bathtubs and swimming pools with water. Most people appear to assume that when they have paid their money for these things they have entirely met their obligations.” (quoted in Sobel, 2004; pg. i)

It is because of this that we must strive to create (or reclaim) spaces (physical, intellectual and emotional) where our children can learn and care about food production and food security. It is essential that they understand the importance of linking food to a healthy human and ecological environment (Peterat et al., 2004).

There are many interesting and effective initiatives that are evolving and presenting educators with inspiration for the practical ways we can engage our children in meaningful and useful education from which a process of sustainability can emerge. In this section, I focus on one exemplary practical application that represents some of the educational theories and philosophies presented earlier in this chapter. The Intergenerational Landed Learning Project (ILLP) at the UBC Farm¹⁰ is an initiative from researchers in the Department of Curriculum Studies, Faculty of Education at the University of British Columbia.

¹⁰ The UBC Farm is now officially known as the Centre for Sustainable Food Systems at the UBC Farm. It is “a 24 hectare teaching, research, and community urban farm located on the University of British Columbia’s Campus in Vancouver, Canada. As the only working farmland within the city of Vancouver, the UBC Farm is an urban agrarian gem, featuring a landscape of unique beauty.” In 2000, students from the Faculty of Land and Food Systems (formerly known as Agricultural Sciences) were concerned about the disappearance of this valuable land. Integrating several areas of research, “the Farm is a student-driven initiative where students, faculty, staff, and the local community have been working together to create a place where anyone can come to learn, live and value the connection between land, food and community.” (Centre for Sustainable Food Systems at the UBC Farm, 2007; Quayle, Masselink and Brunetti, 2000; Sipos-Randor, 2005).

The *ILLP* is an environmental education program that focuses on “food as the link between a healthy environment and human well-being.” (ILLP, 2007). Even though it is stated as an ‘environmental education’ program, the *ILLP* encompasses most of the issues that are being argued for in an education for environmental sustainability. It aims to (re)connect children to the land, their food and their community by strongly emphasizing local knowledge, direct experience, and affective, place-based learning. The *ILLP* unites generations by bringing school children and their teachers together with community volunteers or ‘farm friends’ that have gardening and farming experience. Together, they share a 10-month process of planting, growing, caring and harvesting horticultural gardens in a local urban farm (Peterat et al., 2004; Sobel, 2004). This project was conceived and implemented as a response to growing and on-going global environmental issues, and particularly, as a response to the critical need to bridge the gap between educational theory and actual practice in both environmental and sustainability education. The researchers of this project argue that “although nurturing an emotional connection with nature is a prominent theme and goal for environmentalists, little is known about how to translate environmental philosophies into educational practices.” (ILLP, 2007).

Research Objectives, Learning Objectives and Key Concepts of the *ILLP*

The principal research goal of this project is to “[investigate] the ways young people develop a better understanding and appreciation for the land and learn how to care for the earth through working with the soil and growing plants in an apprentice type relationship with community farmers who model environmentally responsible practices.” (ILLP, 2007). As the project grows, the research objectives are refined, reconsidered and/or expanded to fit the changing, advancing knowledge. With a strong emphasis on direct, hands-on experience

and place-based, intergenerational learning this program provides the opportunity to explore and implement the pedagogical frameworks of education for environmental sustainability outside of the confined physicality of the classroom by connecting the school to the greater community. The *ILLP* reflects and “illustrates the values of lifelong learning, community mindedness, ecological and social citizenship, and civic responsibility.” (ILLP, 2007).

The major learning objectives of this project are:

- The development of a positive emotional connection to the natural world
- The development of a sense of place and belonging
- An appreciation of intergenerational relationships
- The development of a sense of responsibility and stewardship towards the environment
- The acquisition of collaborative and decision-making skills
- The acquisition of practical gardening skills
- The appreciation of the importance of food and our dependence on the land
- Understanding of the food growing cycle and the science of farming

The key topics for study in this project are:

- Farming and growing cycles
- Environment (outdoor) and scientific knowledge about the interconnected, interdependent natural world.
- Land, food and community relationships
- Intergenerational learning transfer

ILLP Activities and Research

The project began in 2002 with eighteen grade-seven students, their teacher and seven community farming elders ('farm friends')¹¹. The project has been growing every year since then. It started out with only six raised beds in 2002, and grew to own twenty four raised beds that became the living laboratories for more than eighty five children from two different schools, three different grades (grade 4 and 5 classes), their teachers and more than twenty five community volunteers during the 2005-2006 school period (Mayer-Smith, 2006 Pers. Comm.).

The Intergenerational Landed Learning Project is a 10-month process where teachers, students, 'farm friends' and project team members work together to share knowledge and learn about "various stages of the growing cycle to plan, plant and harvest food crops" as well as explore the issues of community farming and food security (ILLP, 2007). Children and 'farm friends' are assigned a group that will work together throughout these 10-months. Each group consists of three-five students and one-two volunteer 'farm friends'. During the span of the school year (September to June) the children, teachers and community volunteers visit the Farm approximately fourteen times, and are given the opportunity to get to know each other while exploring the landscape and learning about farming, nutrition and the ecology. Each visit is carefully and dynamically planned, tailored with themes that reflect the changes in season and follow how these changes affect the growing cycles. Teachers and *ILLP* researchers work together "to plan lessons that meld land and environmental topics with learning outcomes in all school subjects, while farmers share with the children their expertise and agriculture experiences." (ILLP, 2007).

¹¹ These dedicated volunteers are seen more as mentors and peers rather than teachers while sharing their expertise with the children and gently directing them through the process of farming.

At the start of the 10-month period, the entire team prepares for the growing season, and each group of children and 'farm friends' is assigned a raised bed that will be their responsibility for the rest of the program. This is where they will be doing the majority of their work with preparing the soil, cultivating and growing crops. The children learn about soil composition, wintering crops, companion planting, organisms that can be beneficial or harmful to the crops, as well as tool safety, gardening skills and, above all, responsibility. The joy of watching their own little piece of land transform into food they can harvest allows children to really make the connections between land, food and community, and understanding the importance of food security issues. Children are encouraged to take charge of their own learning and be actively involved in decision-making processes. This gives the child the opportunity to collaborate with their peers and 'farm friends' by taking responsibility and leadership when presented with tasks and learning problems to be solved. At the end of the program, in June, the students are able to see the product of their effort by sharing and enjoying the harvest of the collaborative process with their teachers, farm friends, parents, research team, and community members.

The program itself, and especially its delivery, is an excellent venue for the children to be empowered being a part of decision-making process and start taking responsibility for parts of their learning. The children do not have the opportunity to be involved and participate in the planning and development of the curriculum, but they do have the opportunity to make decisions about what would be planted, where and how much. This gives rise to a powerful engaging and synergistic interaction among educators, master gardeners, the children and place. This interaction helps build strong ties and relationships

not only among the children, 'farm friends' and teachers, but also to the plants (food) and the place in which they experience this process.

Every year, during the 10 months of the program, the permanent research team of the *ILLP* gathers data through recording observations in journals and informal conversations, using both audio-visual methods (video) and digital photography, and through semi-structured interviews with the children, teachers and community volunteers. The interview cycle aims to capture students' understandings, attitudes and conceptions at the beginning, middle and end of the project. The purpose is to collect information about the cognitive skills and affective understandings of children towards nature and also map the changes (if any) that they might go through in their understandings of and the "farming" experience. The volunteer farm friends and the teachers are also interviewed to gain a more detailed insight into their perspective, learning, and observation. To enhance the students' learning (and for research purposes as well) they are asked to keep garden journals where they record their observations, ideas and feelings throughout the entire process by drawing, writing and being creative. The teacher is in charge of facilitating the discussion of the students' work and understandings through classroom activities that relate the curriculum to the farm experience. It is critical that the child identifies the connections that exist between these two places and links what is being taught and learnt in the classroom with what is being experienced on the UBC Farm.

The Intergenerational Landed Learning Project at the UBC Farm served as the practical site or place where I explored the usefulness of the previously presented educational models to aid in the re-conceptualization of an education for environmental sustainability.

The detailed description of my involvement in the *ILLP* during the 2005-2006 school year, as well as my research objectives are discussed in Chapter Three.

CHAPTER THREE

RESEARCH PROCESS AND THE FARM STORY

In this chapter I reinstate the central question guiding this research and a description of the methodology that was employed to carry it out. I describe this qualitative research process, including the data collection methods and the methods of analysis. I also give a more detailed explanation of how I chose to analyze children's understandings of the complexity of our natural world, as well as their attitudes and level of engagement towards it. In the second portion of this chapter, I introduce the "Farm Story" – an account of how the program unfolds during the 11 or 12 visits that the children get to make to the farm. I present this to give the reader a more in-depth description of the communal and organic process of learning, farming, planting and growing that the children, farm mentors, teachers and researchers experience during this 10-month environmental education program. I wrote this portrayal of the diverse activities and interconnected themes that the children learn about with the aid of informal observations of each visit. I recorded these both as a farm friend and as a researcher in this journey. I conclude this chapter with a more detailed account of my personal involvement in the Intergenerational Landed Learning Project, and how my participation in this program enriched the research as well as my growth as an educator.

Research Process

After much deliberation, it became clear that the *Intergenerational Landed Learning Project* at the UBC Farm would be an excellent practical context for this thesis. The *ILLP* was suitable because it not only shares a lot of the values and goals of this project, but it also provides an exemplary setting in which the pedagogical models proposed as solutions to the

re-conceptualization of education for environmental sustainability can be put into practice. I immersed myself fully within this project as a volunteer 'farm friend' and later became part of the *ILLP* research team for the 2005-2006 school year (The Ethics Certificate of Approval can be found in Appendix A). Every year since it first started, the *ILLP* has been growing, and during the 2005-2006 period, two schools from the Greater Vancouver Area were involved with a total of three grade-4 and grade-5 classes. There were approximately eighty five students, and a total of one hundred and eleven interviews over the 10-month period during the 2005-2006 school year. One school from Vancouver West had two classes involved, with approximately thirty students each; and another class from East Vancouver with twenty six students. I was actively involved both as a participant and a researcher in the program, and as a 'farm friend' I was privileged to work with three grade-4 students from a school on the west side of Vancouver.

In my research, I used a holistic qualitative approach largely based on a constructivist paradigm, where naturalistic methods of inquiry and interpretation were employed (Hatch, 2002). This approach informed both the way in which the research design emerged, and the methods that were used to collect and analyze the data. The findings were presented in the form of in-depth case studies (Guba and Lincoln, 1994; Hatch, 2002; Merriam, 1988). The use of these methods aims to consider the child as a whole, and to portray more accurately the contexts of lived experience together with the complexity of dynamic patterns of learning (Hatch, 2002; Merriam, 1988).

My research was focused on the development, growth and change (if any) of students' relationship with nature and how the complexity of their thinking, their attitudes and their behaviour develop during their experience in an environmental program such as the

ILLP. It was specifically intended to investigate the way in which children understand, interact with, experience and feel about the natural world. I reinstate the guiding question of this research:

How did six children's engagement with, understandings of, and attitudes about nature and environmental issues change over their 10-month experience in the environmental education program of the ILLP?

Given that the guiding research question aimed to map the changes of children's engagement with, understandings of and attitudes about nature and environmental issues, it was therefore important that I investigated and analyzed:

1) children's conceptions and understandings about the natural world and environmental issues through the complexity of their thinking with respect to interconnections and interdependencies of the natural world;

2) the attitudes the child might have had, both before and after being immersed the *ILLP*, and how these attitudes might have changed during this time. It is important to look for the possible development of an empathic relationship with community, place, and the natural world, and the role of affective/emotive learning in the development of this relationship¹²;

3) children's level of engagement and how they relate to and situate themselves within nature - whether or not they see/understand nature and environment to be two separate things or if they equate them to mean the same thing. It is important to map the possible transformation of viewing and experiencing nature as separate and outside of self, to viewing and experiencing nature as whole and within self.

¹² This relationship might have the potential to provide the grounds for the emergence of a deep sense of social and environmental responsibility and action by informing and transforming their cognitive understanding about, the quality of their engagement with, and their attitudes towards the natural world.

Data Collection

There were two ways of collecting data for this particular research project within the Intergenerational Landed Learning Project (ILLP):

- 1) Two or three sets¹³ of semi-structured interviews with open-ended questions that were carried out towards the beginning (January), middle (March) and end (June) of the program, in order to gather some insights about children's feelings, conceptions and attitudes towards nature and this experience. I was only actively involved in gathering data during the third (3rd) set of interviews (June) with other members of the *ILLP* research team. I was able to have some input into the questions that were asked during this particular set of interviews. The first (1st) and second (2nd) interview sets were gathered by other research members of the Intergenerational Landed Learning Project. The sample interview questions for each set can be found in Appendix B.
- 2) Researcher narrative of experience and recorded observations of changes and patterns of children's feelings, conceptions and attitudes within this experience. The children visited the UBC Farm eleven times, over a 10-month period during the 2005-2006 school year. I kept an informal journal where I recorded my observations, feelings and experiences, not only as a participating 'farm friend' and as a researcher, but also as an educator.

The combination of field observation and interviews allows for patterns of interactions, thinking and behaviour to be recorded within the natural setting in order to gain more accurate insights into children's experiences, as well as to go through a process of

¹³ In some instances, due to time constraints the first set of interviews was not carried out until March, and therefore only 2 sets were gathered from some participants.

reflection (through the interviews) about the experience while the program is going on and shortly after it is finished (Eder and Fingerson, 2003; pg. 40). Part of the recorded observation was also informed by informal interviews that were carried out as a typical part of conversations with the children involved, at the time that the events were taking place.

Data Analysis

This analysis involved fifteen interviews with six children from two different schools that took part in the program during the 2005-2006 school year. I chose three children from a grade-4 class from GB School (East Vancouver) with a total of three interviews each. The first interview round was in November 2005, the second towards the middle (in March 2006), and the last one just after the end of the program (in June 2006). The other three children I chose were from QE School (Vancouver west side), and were from two different classes (grade 4 and grade 5). They only had two sets of interviews; the first one was on January/February 2006 and the second was just after the end of the program (in June 2006). One particular student in this set of interviews was a returning participant of the program. She had also been involved in the *ILLP* during the 2004-2005 school year. The fifteen interviews were chosen as a convenience sample to represent the voices of the students involved in the *ILLP* from September 2005 to June 2006. The ages of the children that were involved in the program were nine and ten years old at the time of their experience. The children were not interviewed at the farm but at their respective schools, and during school time¹⁴. The three particular students I worked as a farm friend with during the 10-month

¹⁴ Even though the researchers attempted to mitigate the effect of power dynamics between “teacher” and “student”, it was noticed that for the duration of the interviews and transcription of the dialogs, the children were still responding in a way that they have been schooled to – as if they were responding right or wrong in a test, or to a teacher/ authority figure. There seemed to be a remnant fear that the questions being asked were

program of the *ILLP* are not part of the six that are analyzed here because parental consent to carry out the interviews with them was not received. It is also because of this that the data recorded in the journal as observation of my group's engagement, attitudes and understandings was not used in the detailed analysis of this six stories, but rather in the more general and conclusive findings of this research.

My own experience with these children in the project, nonetheless, had a strong influence on the way I looked at these interviews. Children's voices are central to these findings and therefore I attempt to provide as much information about their perspectives as I can, honouring the ways in which they express themselves, perceive and interpret the world¹⁵. By being mindful of this, we can better guide them in their process of construction of meaning without disempowering them from their own development and learning as individuals (Peterat et al., 2004; Vaines, 1997). Pseudo-names have been assigned to these children to protect their identity.

Analyzing the Interviews

The analysis involved a process of mapping the patterns of children's engagement with, understandings of, and attitudes about the natural world and the environment. The interpretation of children's conceptions, feelings and behaviours was done through the lenses of the theoretical frameworks presented in Chapter Two. The (eco)systemic perspective of these frameworks attempt to consider the reciprocal influences that shape the development of

intended to test them, although it was made clear at the beginning of each interview that this was not the purpose. The implicit power dynamic was still felt in the child-interviewer exchange (Hill, 2005).

¹⁵ It is important to note that some of the answers the children gave during the interview process were perhaps not due to hostility or unwillingness on their part, but rather to aspects of the child's personality such as shyness, fear of authority, etc. Some of the problems with communication that arose might have been due to some language barriers since a lot of kids (particularly in GB School) have varied international backgrounds, and English might be a second language. These limitations are discussed further in Chapter Five.

the child in both spatial (macro, meso, micro) and temporal (mainly historical) scales (Bronfenbrenner, 1995; Raskin et al., 2002; Tudge and Hogan, 2005). The following paragraphs explain the specific themes and variables I considered when analyzing the data.

Conceptual Understandings

These are the considerations I took when analyzing children's thinking and conceptual understandings about the natural world through a lens of complexity and a systems thinking approach. Mapping children's thinking is essential for our understanding of how children perceive the world and make sense of it. I focused on how their thinking and cognitive understandings about nature changed during the 10 months of the *ILLP* and used guiding variables I considered useful to specifically to analyse the growth, development and change (if any) in children's understandings and practical (applicable) knowledge/skills. While analyzing children's understandings, I also began to explore how their conceptual understandings might have influenced their engagement and attitudes towards the natural world. In Table 3.1, I give the specific variables I used as guidelines when analyzing children's understandings. The major themes I considered were the complexity of children's thinking and use of terminology, as well as their practical knowledge/skills.

- a) Complexity of thinking – I refer to the level of understanding that children possess and develop with respect to the interactions, interdependences and interconnections of the (natural) world. It is also important to look at how (and if) children are able to recognize these interactions, interdependences

and interconnections in the different spatial and temporal scales of different processes¹⁶.

- b) Knowledge of concepts and terms – This category is aimed at gaining a better understanding of how children express and construct their knowledge about nature. I also try to look at the sophistication of the language children use - words and terminology used to describe the different conceptions about nature, environment and environmental issues.
- c) Applicable knowledge/skills – I aim to highlight the skills the children have acquired through this experience as a hands-on learning process. Engaging not only their “heads”, but also their “hands” (Sipos-Randor, 2005).

Table 3.1. Specific themes and variables used as guidelines when analyzing children’s understandings.

Complexity of thinking and Terminology	Applicable (physical) knowledge/skills
<ul style="list-style-type: none"> - Importance of farms and farming - Conceptions of farms and farmers - Knowledge of plants, planting, soil, nutrients, spacing, placement, companion planting - Conception of environment, nature, environmental problems *(Observe weather they see themselves as outside of nature or as part of it) - Understanding of complexity of ecological 	<ul style="list-style-type: none"> - Planting - Growing food - Using (designated) tools properly - Watering - Spacing - Testing

¹⁶ By spatial and temporal scales I mean the recognition of the different size scale of parts and process and the time it takes for those processes (cycles) and products to occur. For example, I am looking for how well the child is able to link the process of how a seed turns into fruit, or how mountains can turn into soil. In this particular example I would also look at how (and if) the child is able to link the importance of the mountain in the process of farming and so on. This is specifically related to the holarchical levels of existence (Barlow 1991; Holling, 2000) referred to in Chapter One and Chapter Two.

<p>processes</p> <ul style="list-style-type: none"> - Understanding of interconnection, interdependence and interrelation - Incorporation of historical, cultural (heritage) accounts - Local food production - Connections between land, food and community 	
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In order to characterize children's thinking (conceptions and complexity) I conceived a range that spans from simple to complex thinking based on the level and quality of recognition of interactions, interdependences and interconnections of the (natural) world. This range can be found in Table C.1, Appendix C, and is only meant to be a guiding tool for better understanding the variability of conceptual understandings children have with respect to nature and the Earth.

Earth Literacy components in children's understandings

While thinking and analyzing about children's understandings about nature and their experience during the *ILLP*, I identified some components of Earth Literacy (EL) that were reflected in children's expressions of their understandings about the natural world. I mainly identified the EL elements of *Complexity*, *Ecoliteracy*, *The Trajectory of Now*, and *Globalization* in this overarching theme of children's understandings, since these elements deal with complexity of ecological systems, systems thinking approaches, culture, heritage and global perspectives, among many. Even though I have placed these components on the

side of intellectual engagement, they do not exclusively belong to this category since they also surface in the portion of emotional engagement (attitudes).

Attitudes about, and engagement with, nature, community and the Earth

In this section I present the considerations I took when exploring and analyzing children's attitudes towards and levels of engagement with the natural world and community within their experience in the *ILLP*. I concentrated on the growth, development and change (if any) in children's relationship with the natural world. I attempted to map children's feelings of empathy, compassion and connection towards the Earth, as well as their sense of wonder and exploration that can spark interest and willingness to actively participate in what is being taught and learnt. Incorporating the role emotions play in shaping children's attitudes and level of engagement is important so that we can understand how children relate to, interact with and feel about their surroundings, and in particular, the natural world. Furthermore, exploring the link amongst direct experience, level of engagement and how children relate to their surroundings is also important for gaining insight into how children create meaning in their lives (Hungerford, 2002; Jickling, 2003b; Payne, 2005; Sobel, 2004). While mapping children's emotions and attitudes towards nature, I considered the multiple factors that influence these attitudes. Furthermore, I tried to explore the influences these attitudes might have on both their cognitive understandings and practical engagement with learning and their surroundings. I also looked into possible clues that might indicate the potential emergence of a sense of respect and responsibility through the transformation of values and behaviours with respect to nature. Table 3.2 gives the specific themes and variables I used as guidelines to analyzed children's attitudes and levels of engagement.

Table 3.2. Specific themes and variables used as guidelines when analyzing children's attitudes and levels of engagement.

General Attitudes/Engagement	Acquiring/developing a Sense of Place	Social Relationships
<ul style="list-style-type: none"> - Awareness - Empathy → Affinity - Compassion/Sensitivity - Responsibility - Action/Advocacy - Interaction with the natural world - Excitement/Willingness - Hostilities, insecurities, fears, reservations 	<ul style="list-style-type: none"> - Belonging - Attachment - Wonder - Discovery, adventure, exploration - Community - Connection 	<ul style="list-style-type: none"> - Friends - Family - Farm mentor - Teacher

This analysis of attitudes about connections and relationships to nature and levels of engagement can prove to be difficult using only the interview data. The observation of children's interaction at the farm is essential for a complete picture of what the growth, development and change (if any) look like during the 10-month period. I tried, to the best of my ability, to combine the recount of my personal experience within the *ILLP* with this interview data to present more complete insights into how attitudes and levels of engagement might change (if they do). As with the previous section, I conceived a simple range to help characterize children's attitudes and levels of engagement towards the natural world, and this description can be found in Table C.2, Appendix C.

Earth Literacy components in children's attitudes and levels of engagement

While thinking and analyzing about children's attitudes and levels of engagement with nature and their experience during the *ILLP*, I identified some components of Earth

Literacy that were reflected in children's attitudes and engagement with the natural world. I mainly identified the EL elements of *Bioregionalism*, *Living Together* and *Deep Ecology* in this overarching theme of children's attitudes, since these elements deal with local heritage, culture and land, as well as community interaction and a deep connection to the natural world. Even though these three require a stronger focus on emotions and attitudes, they are not exclusively about the emotional engagement since they also require an intellectual engagement.

The Farm Story

I have written this description with the purpose of taking the reader through the journey that the children, farm friends, teachers, researchers, parents and community members embarked on from October 2005 to June 2006 at the UBC Farm. This experience took us through the beautiful seasonal changes of the year, allowing us to deeply understand the cycle of the life through plants, and to experience (in real-time) how this cycle is intimately related with and interdependent on all other environmental factors, including us. It was a fascinating and rewarding new experience that touched each of us in different ways. Every step of the way, I marvelled at the potential for growth and was honoured to be able to witness such empowering transformations in the children, educators, myself and the natural world within us and around us.

The first day

As farm friends, facilitators and researchers, we excitedly awaited the arrival of approximately sixty students and their teachers from QE Elementary from two grade-5

classes. Having just met, most of us were getting to know each other while preparing to welcome the children. Just before gathering in the greenhouse, we were taken on a mini-orientation and were able to explore and get to know the *ILLP* children's garden – the wonderful space that now, in the fourth year of the program, contained twenty four raised beds flourishing and radiant with the last remaining harvest from the previous season; the space that, together with the children, we would be nurturing and looking after for the next nine or ten months. Before the children arrived, we went through a brief run-down of the day's activities and overall objectives of the day while sipping on a cup of tea and enjoying fresh home-made cookies. That first day at the farm, each group of students would be getting to know their farm friend, getting familiar with the farm space, the specific bed that would be looked after, and getting a general idea of what the farm experience is all about.

The excitement began to grow as we heard the children arriving with their teachers at around 9:30am on that beautiful October Thursday. As the children gathered by the eastern entrance of the greenhouse, we could see a large and vibrant group of impatient, hesitant, shy and playful students, with some curious heads poking through the mass to get a better view of who (or what) was awaiting inside. After the initial excitement of this new experience the teachers asked the children to settle down so that we could begin the activities of the day. The children got to share some of their previous farming/gardening experience (or lack thereof) when the program coordinator and facilitator at that time asked questions like: "Has anyone been to a farm before?", "Have you ever tried to grow any plants before?", "What types of food plants do you think we will be able to grow at the farm this year?". Some children excitedly voiced things like "Tomatoes! Onions! Broccoli!" After the general introduction to the farm, the children got to learn about the different garden tools and the

importance of handling those tools properly for safety. Finally after about thirty minutes of listening to the introductory talk and the activities of the day, the children and farm friends were introduced and the building of this reciprocal relationship began as each group discovered their assigned raised bed. All visits involved a similar process where volunteer farm friends would arrive before the children to do a quick review of the day and be informed about the objectives. When the kids arrived, they gathered in the greenhouse to start the day by outlining the tasks reviewing some of the relevant concepts. Teachers and coordinators worked together to make sure that the children were able to make connections between learning and experience. Teachers reinforced the farm experience with curriculum-related activities in the classroom.



Figure 3.1. Children and farm friend visiting the garden and exploring. Taken from ILLP, 2006; <http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

The end of the growing season – A new beginning

The children could hardly wait to get out into the planting area to explore, wonder and marvel at the garden beds full of plants and vegetables, some of which they had never seen or tasted before. They got to know more about their farm friends by asking questions while sampling herbs, edible flowers and other edible plants around their garden bed. After

getting familiarized with the new surroundings, the children and their farm friends got busy and down to work – they were weeding, cleaning up their beds and of course, harvesting the last of the healthy products from the previous season. There were herbs, broccoli, onions, some greens, and to the children's amazement, pumpkins. Eagerly, guided by teachers and farm friends, the children gathered the fresh ingredients from the garden beds to make salads and enjoy a light meal together. This was one of our first introductions to direct experience with organic farming, and the children enthusiastically listened as some of their mentors talked about the non-use of pesticides in this process. As the day progressed, and after cleaning up some dishes, the groups returned to their beds to continue with the clearing out process. In that process of cleaning the beds, the children got introduced to composting and seed collection – anything that could be used as a seed for the next growing season would be collected and stored, and any other organic waste would be composted. The growing season in Vancouver was coming to an end, and preparations for the new one needed to be made. The children learned that winters are generally too cold for some plants to grow outside, and that the soil needed to regenerate nutrients while in a low stage of productivity. Since we were in autumn, many of the leaves from deciduous trees were already on the ground and the children learned about the process of “mulching”, where these leaves and other “brown” organic matter are used to cover the soil in order to provide insulation and nutrients while suppressing weed growth. The children were starting to learn about nutrient recycling and got a glimpse into how the different natural cycles are interconnected and interdependent. After all that work, the end of that first day came and the children left still talking about their own beds, discussing what they might like to plant next year and eager to come back to the farm very soon.

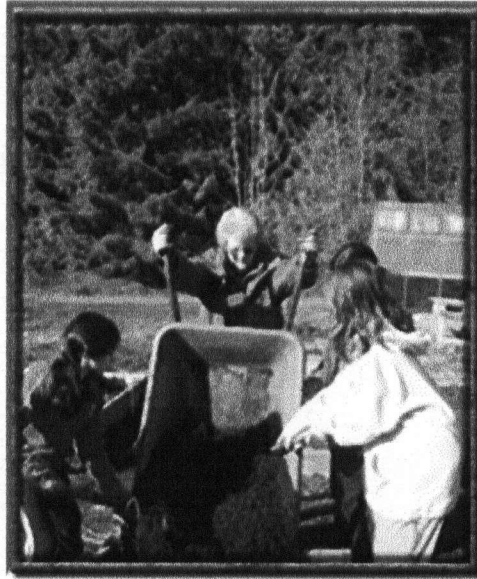


Figure 3.2. Children and farm friends preparing the bed for the winter. Taken from ILLP, 2006; <http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

Approximately four weeks went by before the children returned to the farm at the end of November, and the landscape had changed even more. We were on the onset of winter and all of the leaves from the deciduous trees had fallen off. The children came back to their beds with a challenge of learning about the living soil and how to keep it healthy. They were getting acquainted with “good” bugs and “bad” bugs in the soil. They had to find earthworms, wireworms, cutworms and other bugs, identify them and draw them. We learned about how these creatures interact with the roots of plants and how they might be harmful or beneficial to the crops. We also learned about the food chain when we learned that wireworms, even though harmful to the plants, were a delicacy for the chickens. Most children were extremely excited about being able to interact and feed the chickens, since they could probably relate to an animated, moving creature a little bit easier than plants.



Figure 3.3. Children turning beds and learning about soil. Taken from ILLP, 2006; <http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

Since the children would not be at the farm again until February, the groups needed to prepare the garden for the winter. While continuing to enrich and nurture relationships between students and farm friends, and also discussing possible names for their groups, the children and their mentors planted hairy vetch and fall rye as cover crops (that would help protect the soil from erosion and add organic matter), continued to mulch, and to learn about the concepts of organic farming and composting. Having put the beds to rest, the children would have a long time before coming back.

It was about two months before the children and their farm mentors came together at the farm again at the beginning of February. This time we got to learn about soil formation and the composition of healthy, fertile soil and connecting to what we had been learning about the living creatures in the soil and composting organic matter. After gathering tools and getting ready, the children worked on their beds with their groups – they removed the mulch, added new, healthy compost to top off the beds, and turned their beds to dig in the cover crops they had planted. They made sure to check for nutrient levels and pH (soil tests) and also recorded the temperature of the soil. After doing that, the groups planted wireworm

traps (potato halves on a stick) in order to control the pest. The final preparations for the new planting cycle also involved the design of their garden plan. While making preliminary decisions about what they wanted to plant, the children and their farm friends also confirmed the group names. Once the flexible garden plan was drawn, and decisions were made about the timing, spacing and positions of each plant on their bed, the children and their mentors were ready to leave and return three weeks later to start planting.

Wintering spring – planting the first seeds and preparing seedlings

The children came back with vibrant energy, ready for the next step. Finally, we would be able to plant seeds both directly in the ground and prepare seedlings in the greenhouse for later transplanting. Checking the wireworm traps, removing the worms and replanting the traps in the beds were the next step. The children collected the worms and would go feed to the chickens once the garden work was done. Following the flexible garden plans and making the necessary changes to them, the children were guided by their farm friends and learned how to sow the seeds that were to be planted. We learned that even before spring arrived, in this particular climate, the soil was ready and warm enough for things like peas, beans and radishes to be planted directly on the ground. Before planting the peas and beans, we had to make sure to build structures that would support their growth once they began to sprout. We learned how to build the trellises for the beans and peas using strong wood sticks and some rope.



Figure 3.4. Learning how to build trellises for growing beans. Taken from ILLP, 2006; <http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

The children then proceeded to plant the seeds making sure to give each seed enough space to grow, and planting them at the proper depth according to size. After planting, we carefully watered the seeds, being careful not to drown them or uncover them.



Figure 3.5. Me and my group learning how to water the seeds after planting. Taken from ILLP, 2006; <http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

Once we had named and dated the seeds we had just planted, the groups gathered in the greenhouse to prepare some seedlings that were to stay there until the temperature increased and they were strong enough for transplant. We filled individual paper pots with healthy soil and seeded fennel and onions, that were to be kept in the greenhouse flats.

Finishing that day, putting our tools away and cleaning up, we knew that the next time we met at the farm, there would be much excitement and new growth – we could not wait!

The signs of new life – Spring is here and we are busy, busy, busy

Our next visit was planned around the arrival of spring. Impatient to see what had come up from the ground, and after listening to the day's plan and activities, the children ran out into the garden space to discover the first sprouting plants on their beds. Baby bean and radish plants filled a section of the beds. The children were asked to observe and record seasonal changes, including (but not limited to) budding leaves, temperature changes and the songs of birds. Each group had to choose a tree or plant that they would observe over the next few visits, and record how it changed. After checking the wireworm traps, soil temperature, and checking the garden plan, the children and their farm friends got to the planting work almost immediately. We gathered the tools and watering cans, and learned about which seeds were suitable to be planted at this time. Adding a thin layer of new compost to help our plants grow, we learned that we could start directly planting things like kale and other oriental and salad greens, besides being able to plant more peas, beans and radishes if we wanted. Indoors, we were able to check on the seedlings we had started the previous visit and start preparing some more. The children and mentors started many seedlings for broccoli, cauliflower, head lettuce, beets, herbs and flowers.



Figure 3.6. The signs of new life. Taken from ILLP, 2006;
<http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

After this, the visits would become more frequent since this was a busy time of the year and there was much work to be done. Just two weeks later, at the beginning of April, the children came back. After hearing the preparation for the day and the instructions, the groups went straight to work. Team work and collaboration were essential. While some gathered tools and the necessary materials, others in the group had already started weeding in and around the garden bed. We learned to identify which plants were considered weeds and which ones were our own growing plants. At times it was difficult to discern between the weeds and our crop, because they were all growing and were roughly the same size. We also started to thin some of the plants that were happily growing on our beds, in order to give them more room. The soil was also ready to house even more seeds and the groups were now able to plant things like carrots and spinach if they wanted to. It was still too cold for other plants, so we started some more seedlings for tomatillos, ground cherries and summer squash in the greenhouse. After doing some hard work in the garden and in the greenhouse, the children and farm friends headed into the forest to learn about the dynamics of this adjacent ecosystem, and about the local indigenous plants and creatures that live in that

forest. We learned about the different types of trees that grow here on the West Coast temperate forest – tall Douglas firs, beautiful red and yellow cedars, and western hemlocks.



Figure 3.7. Making sure to nourish the plants. Taken from ILLP, 2006;
<http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

The children came back only two weeks later and this was an exciting time, not only because we got to see our beds growing and to plant more, but also because some of our seedlings that had been developing in the greenhouse were ready to be transplanted. By mid-April, our garden beds were almost full, so we weeded, thinned and made sure all the plants had all they needed. Our bean and pea plants were tall and growing taller, salad greens and carrots, kale, radishes were sprouting...the gardens were full of life! Some gardens grew better and faster than others, but these were lessons in themselves that the children could learn. When deciding on which plants to transplant, we made sure to choose the strongest seedlings and tucked them in, watering them carefully. They needed to be placed strategically so that they would have the space they needed, and not be overshadowed by the taller plants. After we transplanted and watered, we added a few spoonfuls of organic

fertilizer to our beds, to give our plants some nourishment. On that same visit, we also got to learn about hydroponics and the importance of water in farming. It was now the beginning of May, and we came back to the farm once again to transplant, water, weed, fertilize and thin. The maintenance of the garden bed was hard work! After making sure that our plants were healthy, we were able to concentrate on other creatures around the farm. We learned about honeybees and their special role in pollination of flowering plants, and were also able to observe, identify and characterize (as friends or foes) some of the different insects around the garden. Some of our plants were flowering and we could even see some of the fruits that were being produce. The next time we came to the farm, it would certainly be exciting!



Figure 3.8. Observing, planning, nurturing. Taken from ILLP, 2006; <http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

Full of life – It's summer, let's harvest!

It was the middle of May and summer was just around the corner. The children were as excited as always, and by this time they were so familiar with the general duties of maintaining a garden that the children were more independent, self-directed, and some took leadership roles. Still observing how things were growing and recording the observed changes, the children and their farm friends were still caringly attending to their beds and

helping the plants grow. This particular visit was reserved for a very special guest that, unfortunately, was unable to make it that day. The children had been learning about the peoples that first inhabited this land and the cultural heritage that represented. Our guest was an elder First Nations community leader that would come and share the story of the land and the history of his peoples. In spite of this, our coordinator and facilitators were able to take the children on a tour of the farm, and try to explain this heritage, history, and transformation of the land, so that they could more easily relate to what they had been learning at school. Even without the visit of our special guest, it was still a productive day full of running around making sure that the garden beds were kept in optimum condition.



Figure 3.9. The garden keeps growing and we are still busy. Taken from ILLP, 2006; <http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

The end of May rolled around, and the children came back to a fuller and even more flourishing garden than ever before. The children were very excited because this was the first time they got to harvest some of the fruits of their own work. We learned about nutrition and the benefits of organic food for our healthy, and after doing some of the regular maintenance work of weeding, thinning, fertilizing and observing, we were able to prepare some of our delicious harvest. The children and their farm friends got to prepare a light salad

with the ingredients taken from our very own garden, and some lemon balm tea with fresh leaves. After cleaning up and putting our tools and materials away, the children left with a bittersweet feeling. The next visit would be our celebration, but it would also be our last time together.

This last visit was a very memorable one. It was merely one week before the summer solstice and it was the day of a grand celebration in community where children, farm friends, teachers, parents, guardians and other community members were able to share and enjoy the fruits of their hard work. There was a closing ceremony in which children received a certification for having completed the program, and farm friends and staff members were thanked for their invaluable contributions and time. The children and farm mentors got to share their knowledge and experience their garden beds one last time as they helped harvest some of the ingredients for the wonderful meal we were about to have. The groups did not harvest everything that was in their beds because many things were still growing to reach their full potential. These plants would serve as the learning grounds and snack bars for summer programs, as well as the last remaining harvest that the new group of students would get to enjoy and admire, as a new growing cycle was due to begin.

This was the end of their journey together, but also the beginning of a new opportunity for children to continue applying the knowledge they gained from their experience at the farm, and take it into the school, their home, and their own communities.



Figure 3.10. Enjoying the fruits of our labour. Taken from ILLP, 2006;
<http://www.cust.educ.ubc.ca/landedlearningproject/gallery-4.htm>

My participation within the ILLP

As a ‘farm friend’ during the 2005-2006 school year, I had the honour of sharing this wonderful experience with a group of three grade-5 boys that eventually gave the name “Worm World” to our group. Worm World was in charge of a raised bed on the second row, and third line of the garden plan. We embarked on this journey together and encountered many wonderful challenges that enriched our experience. During this process, I kept an informal journal that allowed me to record my feelings, questions and observations about the process of being a participant in the *ILLP* that I could later use in my reflection of the experience as a researcher.

At the beginning of the project, my contribution to the gardening and farming process was restricted because my knowledge and skills about farming or gardening were basically non-existent. My intellectual involvement was limited to my knowledge about rocks, soil and nutrients, and how these relate and interact with the growing cycle of a plant and soil system. In spite of my lack of confidence and my hesitation about the value of my contribution, I was able to share my knowledge with the children and other farm friends

when it was time to talk about soil formation and composition. With the support, encouragement and trust of many of experienced farmers and gardeners, I was able to learn about the process of farming, caring for plants and growing one's own food alongside the children. The master gardeners shared their invaluable knowledge with us, and the group of students, teachers, farm friends and staff were able to build a sense of community and create an amazing experience.

During my involvement in the project, I encountered many challenges both as an untrained educator and as a person. While working and learning with the children, I marvelled at the undying enthusiasm of some, but I also discovered how hard it can sometimes be to engage a child in certain activities. I learned that not all children would have the same level of willingness or even positive attitudes about this experience, which made it even more difficult to get them interested in learning about this in the first place. One of the most striking (and humbling) personal discoveries was my unconscious need to be in control of the learning situation, as an adult and as a mentor. Little by little, I learned to let go of this and was able to allow the children in my group to take responsibility of their own learning, find themselves in leadership roles, and discover the many wonders of the natural world through the plants they were caring for.

During this process, I was able to experience and witness how children learn, how they think and how they act/react to different circumstances and how they think about nature and the environment; a perspective that no textbook or journal article could ever provide. In my specific group, one of the children had a significant change in attitude about the whole experience. He went from being indifferent, to finding excitement in observing the smallest change in the garden. He even wondered around to find different rocks and became very

inquisitive about their origin and formation. I was more than glad to share this knowledge with him, and was also excited that I was able to inspire a sense of discovery and exploration in him, at least with respect to that particular area.

I really enjoyed watching and interacting with children in this amazing informal, outdoor learning setting. I was able to observe, over the span of nearly 10 months, the growth and learning children experience in a program like the *ILLP*. I became part of the research team later on in the project, so I was able to be actively involved in the research. I had the opportunity to be involved and provide input to the last round of interviews in this process and join the team to help gather data, transcribe it and analyze it. This was also my first time gathering data for a qualitative study, which was both intimidating and fascinating.

By the end of the program, I sensed an immense growth in my development as an individual and an educator. I had found more confidence and gained valuable knowledge and skills about farming, plants and growing cycles. My involvement at the farm fuelled my passion about education for environmental sustainability even more, and provided me with the knowledge and skills to begin to understand what it takes to be a sustainability and environmental educator. It gave me invaluable perspectives into a world that was foreign and unknown before – a world of educational theories and practices, a world of teaching and learning that my previous academic training did not and could not provide. It gave me the opportunity to experience first-hand what it really means to teach and learn.

CHAPTER FOUR

SIX CHILDREN'S EXPERIENCES IN THE *ILLP* AT THE UBC FARM

In this chapter, I present the findings of the research I carried out within the *Intergenerational Landed Learning Project* in the form of a narrative. I offer the stories of six children's growth, development and change (if any) with respect to their understandings of, attitudes about and engagement with the natural world during the 10-month environmental education program of the *ILLP*. I analyzed and wrote each profile through the lenses of the frameworks presented in previous chapters, and I attempted to capture the different components of Earth Literacy that each child represented, as well as "spheres of influence" (Peterat et al., 2004; Vaines, 1994) that might affect the way children understand, feel about and behave towards the natural world. Through these portraits I aim to highlight the unique experiences, interpretations, expressions and emotions of each child, and to emphasize how important these findings are for our understanding, as educators, about the ways we can empower children to develop their ecological identities and environmental consciousness. I also try emphasize how an environmental education program like the *ILLP* can help form, develop and/or transform (if any change does happen) children's ecological identity and environmental consciousness within community and place (Kahn, 2003; Peterat et al, 2004; Vaines, 1994). I stress the significance of intergenerational learning in education for environmental sustainability, and how this process of reciprocal learning can meaningfully shape children's and adult's views about nature and our relationship to it. A table summary of my analysis of each of the six children can be found in Appendix D.

Reflection

My first attempt at writing this chapter proved more challenging than I had previously expected. The process I went through brought me to the realization that it is more difficult to step out and let go of previous constructions and disciplines than one would imagine, when trying to implement new ways of thinking. My own unconscious assumptions, background and frame of mind lead me in a path of constructing this chapter with a more rigid, reductionist structure. I found that I had a tendency to want to categorize neatly defined parameters that fragmented the data that consequently hindered my attempts to present a coherent analysis for this type of research. Although I deeply resonate with a more holistic re-conceptualization of education and the application of ecological and systems thinking approaches, I was humbled by my own inability to escape my tendency towards a more rigid approach. After much consultation, I found inspiration in writings of reflective practice analysis that led to more useful ways of presenting the findings of my research.

Jason's Story

In this profile, I present Jason – a relatively shy student at GB Elementary in Vancouver, BC. At the time of his participation in the Intergenerational Landed Learning Project at the UBC Farm, Jason was in grade 4. The most striking aspects about Jason's story were his grounded sense of place, his relationship with his farm friend, and the budding transformations of attitudes related to his engagement with the natural world through this experience.

Jason's roots

Jason moved to an apartment in Vancouver from Ottawa with his mom and step dad in 2005. He is an only child and he thinks it is good to be an only child "because you do not have to share with anybody" (GF¹⁷, 1st interview). In conversations with Jason I found that he cares about his family and pets (he does not have any at the moment, but wants a dog), and that he fears ghosts. Within what Jason shared in our conversations, I found that he considers Ottawa his special place, "because that was where I was born...My family is in Ottawa and I like to visit them...my grandma and my grandpa and my uncle and cousin" (GF, 3rd interview). He feels a sincere sense of belonging to the place where he spent his first seven years.

A nostalgic sense of place – Jason's experiences and connections with planting and farms

Although it was not until the end of the program, I found out that Jason likes planting not only because of his experience at the UBC Farm, but also because it is linked with the special bonds he shared at home with his grandmother: "When I lived in Ottawa, me and my nan went to go planting... we planted some carrots and flowers" (GF, 3rd interview). Jason's reflections on sharing a gardening experience with his "nan" gave me the impression that he felt nostalgic and missed that sense of belonging. As I show later on, Jason was able to relate this experience of intergenerational learning to the one at the UBC farm, allowing him to better appreciate his relationship with his farm friend.

Once the program was on its way, Jason's enthusiasm and affinity for plants and planting became more prominent. He now likes planting because "you get to plant and plants

¹⁷ Each child was given a pseudo name, but the initials were kept for reference to each child that was interviewed (as well as the number of the interview). I use the initials of each of the six children presented in these stories within their respective profiles.

are good” (GF, 2nd interview). It is interesting that although Jason likes planting and in fact had tried to grow plants before, like “an apple tree”, in his first interview he shared that he did not think farms were that important. He usually thought of farms only as animal farms – mainly, he said, “because I’ve been to lots of... animal farms.” Jason’s thoughts and feelings about farms at the particular time of my last conversation with him were triggered by his sense of smell – he thought farms were “stinky a little, it smells weird” because of the “soil and compost.”, but his views on the importance of farms was still not clear and probably did not change much.

Jason’s transforming attitudes about sharing, learning and communication

This was one of the most prominent transformations in Jason’s experience. From the interviews, I could see that there was an obvious change in Jason’s opinion about sharing. As the program progressed, Jason felt that working in a group was best because members could help each other out: “I like planting. We get to work together. If we have trouble, one of our friends can help us... it’s fun to work with friends.” Jason was excited about working with his group, and with his farm friend. In their time together, they talked about “planting... school, movies” (GF, 2nd interview) – Jason and his group seemed to have good communication: “[we] talk about planting to each other,” he said, “we think about what we are going to do the next time we go to the farm.” They would decide together what was to be planted next. Not only did Jason find a way to relate this new experience to his special relationship with his grandmother, but he also found a sense of community where his attitude towards sharing chores, responsibility and decision-making were transformed through learning, interacting and developing special bonds with mentors and friends. Jason, along with Jackie and Christa, showed me how powerful intergenerational learning can be. He

showed me how important it is for children to learn in community and direct experience with nature, where reciprocal interactions allow the children to actively participate in the teaching and learning, as well as be able to develop their leadership skills.

Jason's level of engagement and his understanding about the links between learning in different settings

Jason seemed to be really enjoying his time at the farm. By the middle of the program, I found that one of his favourite activities at the farm was to "fetch the tools." His favourite tool is the spade and he really likes digging in the dirt because: "you find worms to feed to the chickens." Jason knew that he was learning "how to use tools properly", and started to feel that he could use and apply some of the skills he was learning at the farm "to plant at home" (GF, 2nd interview). Even though he felt he could use some of the skills learnt at home, Jason was still unsure about the connection between what he was doing at the farm and what he does at school. He reasoned: "we don't plant here (in school)." At the end of the program, Jason still saw a difference between the farm and school as contexts for learning; he said: "in here (school), we don't go outside to learn, and you don't plant." However, he now thought that the farm might be a good place to learn science "cause there's lots of bugs and plants" (GF, 3rd interview), and he felt that it was good to learn outside. Although Jason did not express it directly (like Aaron did), his attitudes showed me that he had started to see the value in learning through direct experience in nature, and the meaningful engagement with others. As many children are telling us through their attitudes and behaviours, learning within the walls of the classroom is not always as effective as we would hope. It is necessary that we listen to our children, and to their need to make their learning meaningful by relating it to what the experience in their everyday life. Direct

experience beyond the walls of the school can be one of the more effective ways to achieve this connection between learning and experience. Furthermore, as I show through Jason's profile, and through most of the other ones too, emotion and cognition are strongly related. The level of engagement and positive attitudes increase as the child meaningfully embodies learning and experience and vice versa; learning becomes easier as the level of engagement and positive attitudes increase.

Starting to define an understanding of farming and the natural world

At the beginning of the program I was unclear about Jason's understandings and concepts about planting and farming probably because of his own uncertainty. But by the end of the program, I was able to see that understandings about farming and sustainable farming practices were starting to develop. For example, he was now incorporating concepts into his learning such as organic farming in which "they don't use chemicals or pesticides" (GF 3rd, interview). The complexity of Jason's understandings about nature through farming also increased over the year; he had learned a lot more about planting, and he was also less shy about conveying his understandings. He learned "to... not plant big things in the middle, to put it to the side, cause it will block the sun from the other plants."

Jason's understandings about abstract, large-scale concepts like nature and environment were not very well defined, but his cognitive understandings about good farming practices were definitely transformed by the weekly experiences with his farm friend. When talking about nature, for example, Jason sees nature as including "animals... insects... trees... and vegetables" (GF, 3rd interview). Even though Jason views both nature and environment as the same thing, his understanding of specific instances of interdependence and interconnections in nature are not too clear, he says "they (nature and

environment) are both part of the environment... and the farm (barely audible)” (GF, 3rd interview). Jason’s complexity of understanding might not be as developed as some of the other children that I present here, but this program allowed Jason to develop in other aspects particularly with respect to his attitudes about nature and his appreciation of collegial relationships.

Importance of social relationships – special bonds in Jason’s experience

Throughout the program Jason expressed the view that farm friends are really important and he was grateful that the farm friends were there to help them because it “was fun...cause they spend all their free time with us...they wanna spend time with us” (GF, 3rd interview). His affinity to plants and growing things became more prominent and his positive attitude towards his farm friend was obvious. There was a sense of security in his relationship with his farm friend, perhaps because he related this experience with his memories of his grandmother. Although Jason’s experiences at the farm were rich and meaningful, where he got to try new foods like “radish” and learned that farmers are “hard working”, he could not see himself becoming a farmer. His career interests lie elsewhere: “I wanna be a hockey player”, he says (GF, 3rd interview).

It was through Jason’s profile that I was able to understand and highlight the importance of having special social bonds, guidance and a sense of place during the development of an empathic relationship towards the natural world. Creating a strong emotional foundation as the child develops his/her relationship with nature is necessary for a grounded sense of place/belonging and safety with which the child can explore his surroundings in a powerful way. Jason’s experience gives us a window into how powerful intergenerational learning can be in aiding the transformation of attitudes, engagement and

understandings about the natural world, and potentially the eventual formation of a strong ecological identity and environmental consciousness. Even though Jason wants to be a hockey player, he can still appreciate the developing a sense of connection and the importance of gaining knowledge about the interdependent relationships among land, food and community.

In the concluding chapter to follow, I will attempt to weave Jason's profile within the overall re-conceptualization of how we teach and learn about nature and the environment. I will also try to convey the importance of portraying children's voices and experiences and the usefulness of mapping the changes in children's understandings, engagements and attitudes about the natural world.

Christa's Story

Christa is a chatty and energetic girl that attends GB Elementary. She was in Mr. P's grade-4 class when she was involved in the *ILLP*. In my conversations with Christa, I was able to see that, from the beginning, she had a good sense of interconnection and interdependence, as well as interesting views and understandings about environment, environmental problems and nature. Her sense of respect for farmers and farming, and her sense of responsibility were uplifting, even though some of her understandings were unclear. It was through Christa's profile that I was best able to map the different spheres of influence in a child's life, and understand how conceptions and attitudes about nature are shaped by these different spheres (Peterat et al. 2004; Vaines, 1997). The influences in Christa's life were clearly defined, more so than in any of the other children in this set of interviews. The spheres of influence that were highlighted through the interviews form this particular

experience were her family, her home life, her surrounding places, her friends, school, and of course, the farm. Clearly understanding these influences becomes useful when aiming to holistically comprehend the intricate complexity of an integrated human existence (Peterat et al., 2004; Vaines, 1997).

Getting to know Christa

Christa has a big family, and of course, she likes talking about it: "I live with 8 people. I live in the basement with my grandpa, grandma and my uncle. And my older brothers live upstairs. I sleep with my brother and my dad sleep upstairs... I have 2 brothers and one grandpa, one grandma, and I have like over 500 relatives." She went on to say that she has met a lot of them, but still has "not met those who live in Australia, New Zealand, or Fiji." Christa has two older brothers "one is in grade 11, one in grade 6", but she does not think it is such a great thing to have two older brothers because "they bully you" (HI, 1st interview). As will become more evident later on, Christa sometimes feels that she has to prove her self strong. Her farm experience allowed her to develop some confidence and feel a sense of pride in her accomplishments.

The different influences in Christa's life

Christa cares about her "family, friends, and... school", and she appears to quite like school: "I like my friends, I like the subjects. I like art, I like socials, I like science" and going to school is very important for her "because we need a good education to get a good job." She even has some specific jobs in mind, and she says it is because she likes to talk a lot: "I wanted to be a teacher... and then I wanted to be... you know people they have this office and people come to them, lay down and talk and stuff" (HI, 1st interview).

During her free time, Christa says she does not have a special place that she likes to be in or go to, it is “usually at home.” In our first interview, she shared what she does on her free time: “I usually do like... search the Internet... I go on the computer, I watch TV... sometimes I read.” However, in my conversations with her, I found that she sometimes spends time at her cousin’s farm in Langley, “it’s mostly vegetable farm...like we have lots of chickens, cows and stuff” and she likes to go there and see the animals. Although it seems that Christa spends a lot of time passively in front of the TV or computer, her understandings and attitudes towards farms and farming are particularly holistic and well developed. Christa had planted things before going to the UBC Farm, and she has a flower garden at home; she says: “at home I plant plants but not vegetables... roses, sunflowers... mostly roses though”, but her mom does the planting and she helps by watering. Her experiences with nature have not been limited, and this is reflected in Christa’s attitudes and sense of responsibility.

Conceptions about and attitudes towards farms and farming

As early as the first interview, I was able to see that Christa’s conceptions and attitudes about farms, nature and environmental problems were an amalgamation of her experiences at her cousin’s farm, at school and what she reads in books and watches on TV. At the beginning of the ILLP, what she had to say about the importance of farms already showed a clear understanding of where food comes from, and a well developed understanding of interconnectedness and interdependence within nature. She said: “if we don’t have farms, we would not have food... they produce milk, vegetables, fruits... bread... candies... because they have sugar canes” (HI, 1st interview). Christa’s understanding and knowledge about organic farming was also evident from the beginning:

“the organic soil...also organic farmer, they don’t use pesticides to keep the bugs away.” (HI, 1st interview). As she was constructing and adding to her understanding about organic farming throughout the program, her conceptions about the differences between “growing organic food and normal” were becoming quite interesting. Although a bit confused, she thought that one of the main differences between them was size. “That means standard is bigger and...the organic are small.” She was also surprised that organic farms are not as common as she thought: “I actually thought there were more organic farms but I guess I am wrong...cause most farms are standard” (HI, 2nd interview). Her views on organic food and farming, however, did not change dramatically after her experience in the program; she said: “standard farms they’re not really healthy for you, because they put pesticide and stuff in their fruits and vegetables...it’s to keep the pests away and organic farms, like ours, they don’t really care cause they want it to be healthy...like if you do use chemicals like the fruits and vegetables will look more appealing, but it won’t like be healthy as much...and organic farms they are small, not as bright, but they are healthier.” (HI, 3rd interview). Maybe the introduction to organic farming that was done at the farm was not enough for Christa to break away from her original conception about organic food and farming. This might tell us something about the way we approach specific processes, such as organic farming.

Her sense of accomplishment

Christa thinks farming is fun, and she especially feels useful and proud about what she can do at the farm because she can prove to everyone that she is capable of doing things by her self. She felt that she needed to do this, she shared, because “at home everyone thinks I’m weak because I’m just a little girl but if they were there they could see that I can carry a wheelbarrow, shovel, and stuff.” (HI, 2nd interview). She feels that through some of the

responsibilities and chores at the farm, she was able to prove to her self that she can do these things on her own, and this seemed to increase her confidence and sense of ownership of what she was doing.

Connections between learning and experiencing

Christa saw a lot of similarities between what she learns in school and what she learns at the farm, she said: "You learn a lot of stuff at school and at the farm. You learn science at school and you learn science at the farm... you learn socials because that's part of the environment. You learn all of the stuff. We do reading at the farm. We do PE because we are working. I guess everything you do at school is everything you do at the farm." The same applies for math "you have to learn the depth, how you plant a seed like a centimetre or an inch." (HI, 2nd interview). By the end of the program, Christa had no problem confirming this connection with ease, she said: "we actually kind of learn everything, like most of the subjects in school at the farm... mathematics... science, science is all about the Earth, so you can learn it at the farm or at school" (HI, 3rd interview). Christa was the only child in this set of interviews that could really see a very close connection between what is done at the farm and what is done at school. Not only does she see a parallel, but she also thinks they are kind of the same. She has no problem connecting what she experiences to the curriculum, which is the ultimate goal we want as educators (in light of the present situation). We wish that children could feel that what they learn is meaningful, useful and relevant so as to bridge the disconnect that exists between what is taught and learned, and what is experienced. Christa shows us that it is possible, and that we just need a better approach so that children can, in fact, feel that way.

Connections, developing relationships and feelings about mentors and farmers

Christa seemed to thrive in learning through unstructured play and having the opportunity to explore. Playing with friends, being able to interact with people, and building social relationships is very important for Christa. She said the farm was “like recess kind of and you get to plant and stuff and you get to play with your friends... You see everyone all the time if you want to see someone” (HI, 2nd interview). I could see that by the end of March, Christa was already developing a close relationship with her farm friend, Jude, who became her permanent farm friend after a few switches. “I like the friends because they are nice and they teach us a lot... I had Alice before and now I have Jude... We had help from Jude. She helped us. She told us what we could plant this time and the one we can’t plant because it’s not summer yet” Christa feels like she learnt “lots of things like... about bugs, plants... the irrigation system... how to plant stuff!” By the end of the program, Christa had come up with a wide array of adjectives to express how highly she thought of her farm friend: “Jude, she’s humorous, intelligent, sweet, sensational, great, terrific” (HI, 3rd interview). Christa’s feelings of attachment and belonging with respect to the experience at the farm and the relationships she formed were heartfelt; she expressed: “when I think about the farm I really miss it... and sometimes I can’t wait to go back... I’m gonna miss Jude’s humour... I’m gonna miss every one at the farm” (HI, 3rd interview). Christa feels that farmers “are hard workers” and has a lot of respect for them. She says that, “they are lucky because they get to grow their own food... they can read the packages for the seeds, they know what’s in it, and they don’t really have to spend that much money... and they are healthier” (HI, 3rd interview). Although she understands what it takes to be a farmer, and she knows the importance of growing one’s own food, she is still undecided about whether she

wants to be a farmer in the future or not. Perhaps it is because Christa cannot see farming as being a 'good job'.

For Christa, it seems that building social relationships is essential for the way she learns. Just like Daniel, Christa thrives when learning by doing in a setting where she can be an active and contributing member of a group. What was most inspiring about Christa's experience was her contagious enthusiasm and seeing how her growing sense of attachment enhanced not only her social learning, but her cognitive one as well.

Christa's complexity of understandings and attitudes about nature and environment – establishing a sense of responsibility

At the beginning of the program, Christa's conception of the word environment was "about animals and plants", and when she heard the word nature she thought of "trees, wind, soil, grass, flowers, animals" – she basically equated them to be the same thing (HI, 1st interview). When it comes to environmental problems, Christa's understanding was a little bit fragmented and disconnected, despite her more holistic understanding of complexity and interconnections of the natural world. When Christa thinks of environmental problems, she thinks of things "like littering" due to influences from a presentation from a grade-7 class. She said: "we have grade 7th come to talk to us and they drew the world without garbage and they drew the world with garbage...and it was all mossy and stuff" (HI, 1st interview). Although this knowledge of 'environmental problems' is narrow and sometimes limiting, she feels a certain degree of responsibility, she says: "we have to clean up and stuff... That's why we have the garbage day. We go like to Central park and stuff and pick up garbage" (HI, 1st interview). I could see that this limited understanding made it more difficult for her to connect all of the factors contributing to the degradation of the environment. She struggled

to make the connections to the larger world, she said: "I don't know, sometimes the weather ruins the plants. It might die or yeah" (HI, 1st interview). Christa reminded me of the importance of being sensitive to the cognitive and emotional capabilities of the child when teaching and learning about large-scale abstract environmental problems. Many children, like Christa, can sometimes be confused and overwhelmed when attempting to connect everything together. It is not to say that we should not talk to children of Christa's age about environmental problems, but perhaps we should focus more on locally based information which they can directly relate to and therefore feel part of the process of finding possible solutions.

After the *ILLP*, Christa's conceptions of nature and environment became a little bit more encompassing of interrelationships, and what was even more interesting was that she now not only viewed both environment and nature as the same thing, but also related them both to environmental problems. Here is what she had to say when talking about environment and nature the last time around: "if you don't help the environment, your Earth, the Earth will turn all (unclear) bogs and rats will be everywhere... to keep the Earth healthy you don't litter, [you] recycle, compost... you could like use manure too like make the Earth healthier too" (HI, 3rd interview). I could see that she was trying to put together the impression the grade-7 class presentation had on her, and combine it with her new knowledge about farming in order to reason what is good for the Earth from this particular perspective. Christa's understanding of interconnection and interdependence was evident from the beginning, and she was actually one of the only children in this sample who not only viewed nature and environment as the same thing, but also included the human sphere in both. Her sense of responsibility and interdependence also grew stronger by the end of the

program, she said: “you have to help the environment to keep your self healthy because like, if you don’t keep your plants or everything else on Earth, you won’t be healthy cause trees give you oxygen and... also if your plants aren’t healthy, the animals aren’t healthy and if you are a meat eater, you eat like the animals, you’ll get sick, you’ll die, then the plants will die, then the animals will die” (HI, 3rd interview).

It was Christa’s enthusiasm and positive attitudes towards the farm experience, and her caring attitude towards people that I admired most. For Christa, seeing this experience as play and an opportunity to build and strengthen her social relationships was very important, which highlighted, again, the importance of having a supportive and caring role models while learning. Her sense of respect for farmers and farming was developed, but grew even stronger through her experience in the program. Christa’s understandings of interconnection and interdependence along with her sense of responsibility were unfailingly shown and became more prominent after the program. However, what was most puzzling about Christa’s understandings was her fragmented conceptions of environmental problems and the difficulty she had when trying to put it all together. This was a little bit surprising, since Christa was really able to understand how intricately dependent we are on the systems that sustain us and the importance of keeping them healthy, and in turn, keeping ourselves safe. Christa was the only child in this sample who was able to intimately relate her experience and learning at the farm to what she can learn at school without seeing a disconnect (or detachment) between the two learning settings (school and the farm) that we see so often.

I hope to present Christa’s profile, and the unique characteristics of her experience at the farm, within the larger picture that I am trying to convey in the following chapter. The particular highlights that Christa provided will be insightful additions to further our

understandings about the ways in which we can re-conceptualize how we teach and learn about the Earth. Hopefully, the way in which we will choose to implement this re-conceptualization reflects and honours children's voices and feelings about learning by doing, and creating those emotional attachments to place and community.

Daniel's Story

Here, I present Daniel – an open and genuine boy with a great imagination and sense of wonder and adventure. He attends GB Elementary and was in Mr. P's grade 4 class when he was involved in the *ILLP*. In this profile, I try to convey and highlight the most unique and important aspects of Daniel's experience at the farm with respect to his understandings and attitudes about the natural world. He was in the same farm group as Christa, and had the same farm friends, Alice, Linda and Jude.

As I got to know Daniel through the interviews, I saw that, in contrast with Christa's, Daniel's understandings of farming, gardening and environmental issues are influenced largely by what he learns at home through his parents and siblings. Daniel is the youngest child in his family and has "one brother, three sisters" (KL, 1st interview). I found that his attitudes and levels of engagement are usually enhanced when he meets new people and learns new things. One of the things that were most unique about Daniel's story was that he is able to make more global connections beyond those spheres of the home, school and community. I learned that he cares about his family, his house and his garden, but Daniel also cares about the world and would like to see "peace, never anymore wars, having good people, never bad" (KL, 1st interview). His awareness of global issues and his sense of social responsibility were inspiring. Daniel also cares about his house: "I never want to get it

burned down because I love the house. There's a lot of stuff I like in there" (KL, 1st interview).

A creative imagination

In my conversations with Daniel, I found that he spends a lot of time watching movies and TV, he even said: "I watch seven hours of TV every day" (KL, 1st interview). The amount he says he spends in front of the TV is probably exaggerated, but it nonetheless has an influence in his creative imagination. When he was asked about his likes and dislikes, he shared that he likes using garden tools, getting dirty and watching movies. He also shared the things that he fears, which are "robbers, sharks, and kidnappers." Daniel has never seen a live shark, but he fears sharks "because they eat your flesh, the blood comes out and then you die." As is often shown throughout this profile, Daniel's imagination is very rich and seems to be fuelled by the streaming influences of movies, TV and other entertainment media.

A magic sense of wonder, exploration and adventure

Daniel likes playing outside in the school playground, but does not seem to have a special place in the outdoors. He also seems to play by himself most of the time and sometimes he feels lonely; he says: "I never get to see my friends much" (KL, 1st interview). In spite of this lonesome play, Daniel's sense of wonder is refreshing. When talking about special places, for example, he thinks that "a special place would be like a wonderland – a nickelodeon place, Aquarium... and Alaska" (KL, 1st interview). He said he would like to go to Alaska because "It's cold. You can have a snowball fight. You can go ice skating, see polar bears, you can ride a snowmobile. You can go outside and go ice-fishing too... I like snow... you can see a lot of sights there – seals, walrus, bear, fishes" (KL, 1st interview).

Daniel is expanding his imagination and sense of adventure by combining what he has already experienced – he has seen “a seal and polar bear” at the Aquarium – with what he would like to experience in the wild. As I present later on, it is Daniel’s sense of wonder, exploration and adventure along with his creative imagination (and with his learning at home and influences from mentors) that fuels his relationship to the natural world. It was through Daniel’s profile that I learned the power of having a magic sense of wonder that, even in the midst of being bombarded by electronic entertainment media, can help to establish a sense of connection to the bigger world.

Daniel’s gardening experience at home

Daniel knows a lot about gardening from his experiences at home. He helps his mom around the house but also with gardening, and seems to be excited about this particular experience: “I pick up garbage and do some stuff in the garden like getting stuff like dirt, flowers, and tools. And I get to water plants” (KL, 1st interview). Daniel knows a lot of the names for tools because he uses them at home often, he knows “Shovels, rakes, garden rakes, we don’t have a dibbles. We have a giant fork.” Because he is in constant contact with these tools, he has not forgotten the names and he is also very proud of his knowledge “yeah. I knew them before. I knew them when I was five” (KL, 1st interview). During conversations, Daniel showed me a sense of attachment to a previous garden he had. Daniel had “planted lots of things already” well before his experience at the UBC Farm. In his old house he “planted watermelons, bean trees, carrots, cabbage... It was a really nice garden there. Trees too... it was good. It’s fun to get dirty” (KL, 1st interview). In spite of his active engagement in the previous garden, he did not seem as involved in his current garden, he says: “our mom does that.” However, he shows willingness to engage and likes it helping out. Later on, I

will show why this experience and expertise are so important in this story and how these have influenced Daniel's understandings and attitudes about nature and the world. Unlike Christa, Daniel's experience is mainly centered around his home environment, but in the garden and other aspects relating to environmental issues.

The home sphere – shaping his understandings and attitudes

Even though Daniel learned a lot, he did not find his experience at the farm a new one, because he gets a lot of his learning about gardening and planting at home; he says: “my dad teaches me lots of stuff... plant, water... yeah... I can do a lot of stuff, because I've got experience at home. I plant beans, and I get to mix the soil. But I don't put in the manure. I put in the fertilizer but never the manure. My dad does the manure” (KL, 3rd interview).

Although he is very confident in this knowledge, Daniel acknowledged that there some new things he learned at the farm, for example, he said: “I learned how to plant like stuff... how to space them out because they actually will compete for... nutrients” (KL, 3rd interview).

Throughout the interviews, I was also able to see that his use of language and terminology was frequently more eloquent than the other children. There were also other changes that I was able to see in his understandings. At the beginning of the program, Daniel had heard of the word organic but did not really know its meaning. As he experienced the program, he started to grasp the concept – “Some people use chemicals to grow but in organic you don't use anything. You just do the old fashioned way” (KL, 2nd interview).

Building new relationships and relying on established ones

As the program progressed, I found that Daniel's enthusiasm and level of engagement at the farm was increasing. He is an extroverted boy who loves learning new things (which

he seems to easily incorporate in his learning) and is very keen to meet people: "meeting new people... it's fun... like our farm mentors and the people who teach us how to farm and make stuff like the wireworm traps and like make a trellis and what are good pests and what are bad pests" (KL, 2nd interview). Daniel values the knowledge he gained and the relationship he built with his farm friend, as he expressed: "I will always remember my farm mentor... Jude... she was cool. She was really nice. She liked to joke around and she encouraged me to do stuff." Even though Jude was not the only farm friend he had, Daniel did not mind having more than one farm mentor either, he said, because "I like having different people... I get to know how they work" (KL, 3rd interview). Daniel learned more about plants, planting and tools, but he found the way compost is turned at the farm rather unfamiliar: "I don't like stirring the compost with that thing... because I'm usually shovelling. Like my mum and my dad and my uncle are gardeners and I work with them so I'm used to shovelling compost and putting it on the bed but not shaking it and doing that" (KL, 2nd interview). Here, Daniel allowed me to see how his own developing identity as a gardener is being strongly shaped by the role models he has at home. Just like Jason, Daniel showed me how important these mentor-student relationships are, whether learning at home or at the farm. Although Daniel is usually very keen to meet new people and learn from them, at times he did not like to engage in his group because he found it hard to be the only boy: "I'm the only boy in my group. I've got two girls." When asked if this was ok, he said: "No. I don't like hanging around with girls that much." And even sometimes this meant that he did not feel like interacting that much with his farm friends, "they're nice. But sometimes I don't really get along... I'm not sure. When I'm not in the mood, I don't get along" (KL, 2nd interview). This was the only instance in which I found that Daniel's enthusiasm for learning

and meeting new people was tamed. However, Daniel (along with Christa, Jason and Jackie, and each in their own way) showed me that having mentors, role models and a communal process of decision-making has powerful benefits in the development of the whole child, including his/her understandings and attitudes about the natural world.

His unique view on farms – an international perspective

Daniel's international perspective is one of the most interesting things I found about his story. He has been to many farms and his descriptions were very specific and articulate while explaining one of his drawings during the interview: "this is the place for horses. So you would not need cars. Here's the pond, the farmer, the dog, dandelions, the house, East, west, north, south, the barn, the silo...there's the pumpkin patch. There's the scarecrow, the place where you go pump the water, blueberries, raspberries, blackberries and strawberries" (KL, 1st interview). Even though Daniel has had many opportunities to experience farms and the process of growing food, his views on the importance of farms was rather vague. All he had to say about the importance of farms was that "we need them to grow stuff" (KL, 1st interview). Since Daniel has travelled and has been to many farms in different places, like "in Seattle, Los Angeles, San Jose, Vietnam", he has interesting perspectives. Daniel has intriguingly constructed a dichotomy between what farms are like in Canada (and probably North America) and what farms are like in Vietnam; he reasons: "It's kind of different... they don't have the really neat stuff we have here. They have like tools but not like these things. They are not like us. That's why we send money to our grandparents... they don't have farms but they have gardens" (KL, 1st interview). Here, Daniel showed me not only how his direct experiences have shaped his conceptions, but also how his familial relationships influence his understandings and attitudes about farms. The dichotomy he has created is very interesting

and is certainly worth exploring. Daniel seems to emphasize the aspects which he thinks put farmers in Vietnam at a disadvantage, and therefore make them different. It was through this particular conception and emotion that I was again able to see Daniel's sensitivity to the well-being of a more global scale community.

Daniel's complexity of thinking, his developing ecological identity and his environmental consciousness

Daniel's understandings and attitudes towards the environment were intricate and complex. When he thinks about the word environment, he expressed: "I always think of houses, like in the city; birds, cars, schools, no pollution for the world – that is just bad to have pollution. In this world we have a lot of pollution. When I think of our environment, the other thing is like balloons when you have them you should never let go of them because they will go up in the sky and they will pop and they might land in the water and sea turtles will eat them and they will die" (KL, 3rd interview). Daniel, like Jackie, has a more encompassing view and showed concern for non-human species. Daniel knows some of the sources of this pollution; he says it comes from "cars, garbage, gas, oil" (KL, 3rd interview). His knowledge about environmental problems and his understandings and attitudes about this particular subject have been shaped by what he learns through his sisters. It was very exciting to find out that his learning at home seems to be thorough and that he is able to make profound connections between actions and consequences. I found, however, that by the end of the program at the farm Daniel's understandings of the environment and environmental problems had not changed much, perhaps because of the strong influence he has at home; he said: "the environment is like stuff... like we can pollute the world with oil, gas. Like people who use gas when they drive, black smoke comes and then they are polluting the world, the

air... and you can't breath that well. And when you have oil spills, the water becomes contaminated and it will be really weird and animals will be become sick and die... you should not kill plant and trees... we would not live and breath air if we kill them" (KL 3rd, interview). He did add some notions that related his understanding of these problems to plants. Maybe Daniel's understandings and attitudes towards environmental problems did not change much because at the farm, although the children did talk about some environmental problems, this topic was certainly not extensive and was rather general. Only Daniel and Jackie were the ones in this sample who were able to make such large scale, abstract connections about the impacts of pollution. Christa was able to relate these events more to our health as humans and the impacts it has on us.

It was Daniel's zest for learning from and with new people, his openness to new experiences, his magic sense of wonder and creative imagination that captivated me. Through Daniel's profile, I was best able to show the importance and power of developing and cultivating a sense of wonder, exploration and adventure that fuels a creative imagination. In Daniel's case, this sense of wonder along with his experience gardening and learning at home have created a well established sense of respect and responsibility for the natural world. Daniel's unique insights presented a more global/international perspective not only on farms, but also on other aspects such as world peace and environmental problems. In contrast with Christa, Daniel did not find it difficult to embody such large-scale, abstract concepts. Although Daniel's sense of interconnection and interdependence were not explicit, these were weaved through his understandings and attitudes. Daniel reminded me of the importance of having a strong familial support system that provides a comforting and secure space allowing the child to build a sense of confidence; something that Christa was not able

to find that at home, but at the farm. In Daniel's case, the farm seems to have been a complementary venue to learning at home for the development of his ecological identity and environmental consciousness.

In my conclusion, I will incorporate Daniel's unique global/international perspective and further inform the different ways in which we can encourage and help our children to make connections between local and global, abstract spheres. I also hope that I can convey the importance of fostering a strong sense of wonder and imagination that encourages the development of a magical relationship between the child and the natural world, and that this in turn, can positively influence the way children understand and feel about nature and the environment.

Aaron's Story

Aaron is a contemplative and quiet boy. Through my conversations with him, I was able to see that Aaron has a deep appreciation for and longing to connect to nature. Aaron's profile directed me to focus more on the affective realm and its importance not only for the development of an empathic connection with the natural world, but also the role of emotions in learning. It was Aaron's nurturing sense of empathy and deep connection to nature that was most striking. He was able to appreciate and see the value of the natural world beyond ecosystem services and also had a more holistic view of the connections between the natural and social worlds. His sense of connection and care are inspiring. Aaron attends QE School and was in Miss D's grade-4 class when he attended the *ILLP* at the UBC Farm. Aaron shared a little bit about what he likes and about his family, he said: "I have 2 brothers, a mother and dad, two cats and two turtles... I like basketball. And I like playing outside and I

like computers and watching TV” (LI, 1st interview). Aaron’s parents are quite busy “they are both doctors”, so he and his brothers have a nanny, “she takes care of us most of the time.” He says he does not have a lot of chores and the nanny, “sometimes she cleans the house” (LI, 1st interview). Aaron is not that fond of school but “sometimes it is fun when we can play with friends but don’t have to do work.” However, he does like “math and science” and especially social studies because he can “learn things about people and places... and animals” (LI, 1st interview).

Aaron’s appreciation and desire to be in contact with nature

Aaron says that when he is outside he likes to “go for a walk and play basketball.” His walks are “in the forest with my mom and dad... it’s quiet... it’s nice... because there are lots of trees and it’s quiet. There is not like pollution in the forest” (LI, 1st interviews). Aaron talks about a special place where he usually goes to, and that he can relate to. Its proximity and calmness seem to provide comfort. “I like to go to this place not far from our house. I like it there and quiet It’s close to my school and it’s close to my house” (LI, 1st interview). I was able to see Aaron’s longing to be in the peacefulness and calmness of nature, connecting to the heart of nature. It was through Aaron’s profile that was best able to show the importance of encouraging our children’s biophilia, or affinity to nature, and allowing them to feel that true sense of connection to something bigger than ourselves. I was also able to see how these caring sense of connection allowed (and influenced) Aaron’s understandings to be more holistic with a sense of interconnection and interdependence.

Aaron's previous experience with gardening

Like Jason and Daniel, Aaron had some experience at home with planting and gardening before coming to the *ILLP* because his dad likes to garden and “has lots of gardening magazines” (LI, 1st interview). Aaron is a very observant boy, and was excited about sharing some of his gardening experience and observations of how things grew in his garden: “we have two gardens one in your back yard and one in our front yard. And once I planted. I was trying to plant a (not clear), and I put some compost... and then it did not grow. But then in the compost there were tomatoes seeds and they grew. So there was a tomato plant instead of a ** plant... my dad helped me a little bit” (LI, 1st interview). He also described what is in his garden and what is planted there; he said “we have a birch tree, and we have lots of bushes, and flowers, snowdrops, green onions. We have lots of things but I don't remember all the names” (LI, 2nd interview). Even though Aaron had had some previous experience with gardening, he still learned a lot at the farm. He learned “how to grow plants and... what plants do... and... what's in the soil, and... how plants help us... and which plants to eat” (LI, 2nd interview). Aaron's cognitive understandings and the change in his learning was best shown through his attitudes towards plants, farms and the whole gardening experience.

Understanding the importance of farms and the connection and interdependence between the natural and the human worlds

When Aaron thinks about farms, he thinks about “plants, vegetables, fruits... house, chickens” because he has read about farms in his dad's magazines, has planted at home, and has visited a few farms. Interestingly enough, Aaron did not think that the UBC Farm looked like a real farm because “it has a lot of different things, like not one thing but there is a lot...”

(LI, 1st interview). It was not clear why Aaron saw a difference between the farms he had visited before and the UBC Farm, but he “saw farms that were like fields. Big farms... they were grape farms. And we saw houses... and farmers” (LI, 1st interview). Even though Aaron found it difficult to explain why he thought these farms were different, he does have a pretty good understanding regarding the importance of farms, including the economic and nutritional values that farms (and food for that matter) have for humans. He said that we need farms “so we could get vegetables and fruits. So people could eat them... and we can sell them... and so people can make money from selling them and not to buy stuff... and yeah... and they help fight diseases... because vegetables and fruits have vitamins in them.” Like Christa, Aaron was able to see the importance of farms to provide healthy food for us humans. Aaron’s consciousness about the importance of farms and his understanding of the effort it takes to grow food was only stronger after the farm experience. He thinks that farms “are good” because they “give us the food that we eat... and they help us live... it is not that easy to just grow things.” He also thinks that knowing how to grow food is important “because without the plants we couldn’t live... cause then there’d be no food... just the things that eat the plants couldn’t live cause there’d be none... and then the world would just fall apart” (LI, 2nd interview). Aaron showed me sensitivity towards and a more holistic understanding of the fragility and intricate interconnections of the natural world, as well as our interdependent relationship to it. Here, Aaron’s view tends to be more holistic, inclusive of non-human species, and less anthropocentric. As I will show later on, the importance of understanding how children make connections between the natural and human spheres, and how they think about the interaction between the two is essential for educators’

understanding, development and implementation of better ways to teach and learn about the environment.

A nurturing sense of empathy

In the interviews, I found that Aaron started to develop a stronger empathic relationship with his surroundings. He showed this by being concerned about plants, nurturing them, and making sure they were well taken care of: "we planted rye and hairy vetch to make the soil like moist and easy for the plants to grow. And we also mulched it to make the plants happier... so the plants will be healthy and they will be warmer" (LI, 1st interview). His concern for the well being of the plants showed Aaron's heart-felt sense of compassion. All throughout the program Aaron always wondered how long things would take to grow, and liked watching them grow. At the beginning he said that going to the UBC Farm was fun and wondered how things would turn out: "I would like to see how things will grow... It's fun to see plants grow and it's fun to do all that stuff to help the plants. Like when we mulched it when we planted the hairy vetch... it will be interesting to see how plants will look like" (LI, 1st interview). At the end of the program Aaron still enjoyed watching plants grow, he thought "seeing what they turn out like in the spring was fun" (LI, 2nd interview). It was interesting to see, though, that while Aaron always showed excitement and concern about "helping" the plants grow, his nurturing side was challenged by impatience when it came to waiting for things to grow. He mentioned that his least favourite activity at the farm was "to choose... waiting for the plants to grow... cause it was slow" (LI, 2nd interview). This impatience perhaps grew out of the same excitement to see things grow. Aaron definitely had a well developed ecological identity, and as I show next, a strong environmental awareness and sense of responsibility.

Aaron's environmental consciousness

From the conversations we had, I could see that Aaron's environmental consciousness and sense of responsibility were budding and were partly shaped by what he learned in the classroom, and partly shaped by what he learned at the farm. In the classroom, they talked about "pollution, sewage... smoke from factories" that comes from "cars... smoke... boats", and that there was a problem because there was "too much of it... [so] we need to find some other way... we need have less of it... to find a different source of... a different way for car... different fuel... different cars" (LI, 1st interview). As most children, Aaron had some trouble making sense of large scale environmental problems, but he is at least aware that there are possibilities and solutions to alleviate these problems. Though he knows it is not easy, he intrinsically understands how important it is to keep the Earth healthy. From the experience at the farm, Aaron learned different things about the environment – for example, he learned "that it's hard to keep good (the Earth)... but we should try... to not pollute it a lot... and help it grow" (LI, 2nd interview). Even though Aaron was not able to fully articulate his understandings and feelings about environmental problems, he does have a deep understanding for the interdependence of everything in nature, and he also appreciates their aesthetic value. He says that nature and environment are important "because if there was no nature or anything, there'd be no trees or plants and there'd be nothing to eat... and then just there'd be no... nice places anymore... it'd all be... like, factories and cities and roads" (LI, 2nd interview). This reminded me of the importance of not only emphasizing a rational understanding of what nature is, but also of encouraging our children to see the beauty of the natural world. By encouraging our children to appreciate nature's aesthetic value along with the developing emotional attachment, cognitive understanding, and

applicable skills, we can better empower our children to care about the preservation of the environment. Furthermore, Aaron's longing to be in contact with nature also reminded me of the important role nature plays in keeping our emotional, physical and mental health well balanced. The decreasing access to wild places is not only restrictive, but can also be potentially detrimental (Kaplan and Kaplan, 2002; Louv, 2005).

Aaron's highlights

It was through Aaron's profile that I was best able to demonstrate the importance of developing a nurturing sense of connection with nature as an emotional foundation for the wholesome development of a strong ecological identity and environmental consciousness (responsibility). Though Aaron was not as articulate as other children in conveying his understandings, he still had a thorough holistic understanding of the natural world. Furthermore, it was through him that I was able to show how, in combination with a strong empathic relationship with the natural world, a child can better understand nature. Aaron is a nurturing and observant boy, but he can also be actively engaged and have a positive attitude about interacting with nature. He thinks going to the farm is fun because he is "outside...doing more hands on stuff" (LI, 2nd interview) and thrives by having direct contact with nature. Just like Jason and most of the other kids, Aaron loves learning by doing. In my interaction with Aaron I was able to see how much fun he actually had at the farm. He was also very enthusiastic about the possibility of having the same experience again, and what is more, unlike any of the other children, he could actually see himself working in a farm in the future. He said he would like to do farming in the future "cause it was really fun when we did it at the UBC Farm... and I'd like to do it again" (LI, 2nd interview). Aaron's level of

engagement and enthusiasm were transformed by the program, and his view of nature and growing awareness of its importance was strengthened.

I will aim to weave Aaron's unique theme of emotional connection and nurturing empathy into the larger picture of my argument for the re-conceptualization of Education for Environmental Sustainability. I hope to show that developing a caring sense of empathy is just as essential as understanding the complexity of the natural world, and even the first step towards a holistic ecological identity and environmental consciousness. As I show in Ben's case, a good understanding of complexity is not enough to propel a sense of responsibility that will eventually lead to action.

Ben's Story

Ben is a very active boy who attends QE school in Vancouver. At the time of his involvement in the farm project he was in Miss G's grade-5 class. Ben has two older siblings – a brother and a sister and both of his parents are lawyers. Ben only enjoys school when he can play with his friends, and when there is PE class and math because “it just comes easy.” He does not like reading and writing as much, and cannot really see the value of going to school (IH, 1st and 2nd interview). Ben's experience reminded me that not every child is moved or significantly transformed by experiences like the *ILLP*. In his case, the experience at the farm had little impact on his attitudes about, and engagement with the natural world. Ben is very clear and focused on what he likes – he likes soccer, he plays it during his free time and also “[plays] soccer 5 days a week.” Although it was easy to see that Ben found little value in his farm experience, he was not completely unchanged. Some of his understandings changed throughout the program, but oftentimes, Ben would be somewhat

reluctant to share his views and understandings. Ben did not entirely resist his farm experience but his indifference towards it showed me that he could not relate to it, especially because he could not see a connection to his passion, which is soccer.

Interestingly enough, Ben had had some experience with gardening and plants, even before the program started. His dad has a garden and does the planting, and Ben helps to plant “sometimes... just help him plant them and water them” (IH, 1st interview). Ben does not dislike planting, but is indifferent towards it; he says: “it’s ok... it’s not too bad... I would rather play soccer, though” (IH, 1st interview). He does not like being passive during his free time, and he likes being outside and active, but Ben says he would rather be playing sports: “If it’s a good day, I’d rather be outside than sitting and watching TV” (IH, 1st interview).

Ben’s specific conceptions and attitudes about farms and farming

Ben does not consider farming or gardening extremely important and he cannot see himself as farmer. In spite of this, he does have very interesting conceptions with respect to farms and their importance. Near the beginning of the program, Ben thought that the UBC Farm was “a bit different” than other farms and was surprised to find out that it was an urban farm that could produce substantial amounts of food: “most of the time when I say ‘farm’, I think about something like in the middle of nowhere, and then I go to the farm, and it’s like really small plants and you can see everywhere but you still manage to grow as much and you still have chickens laying eggs” (IH, 1st interview). Although he cannot relate to farms and the process of farming much, Ben does have some understanding about the importance of farms with relation to our subsistence, he says: “this is where we get our food from... yeah, we need food, if we do not farm... we won’t have... half the food we do have” (IH, 1st interview).

Ben also discovered that he liked working in groups and he was able to see the value in doing so. It was through this reflection on teamwork that I was able to notice a faint sense of ownership and pride when he talked about planting and having their own bed “cause you get like your own bit of area to work on, and when you grow it’s yours and not anyone else’s so you know you did this” (IH, 2nd interview).

Ben’s change in specific conceptual understandings

In spite his low level of engagement and attitude of indifference towards learning about farms, it was his concept of organic food that I found most clear within his understandings about farming. Here is what he understands about organic food: “I think it grows much better if it grows without pesticides. Well, you can find a worm in your apple but it’s better than having chemicals in the garden” (IH, 1st interview). By the end of the program, Ben was able to say a little bit more about organic food and farming: “it’s better for you, and it costs more... because it’s harder to grow... because... you can’t put any pesticides and stuff in it to keep the worms and stuff away... you have to figure another way to keep them away... there’s more work to do it... it’s a lot better for you, and pesticides can poison you” (IH, 2nd interview).

There were also some new things in Ben’s learning experience at the farm. Something that he will remember about the farm project will be the raised bed and how fast the plants grew, “cause it grew a lot in like two weeks” (IH, 2nd interview). Ben was surprised to learn that plants could grow fast in a short period of time, if they had the right conditions. He knew that plants need “rain and water... and sunshine” (IH, 2nd interview) in order to grow, and was able to appreciate that “it takes a long time... all that effort is put into it” (IH, 2nd interview). Ben’s understandings and concepts are quite clear and he started to

show a better sense of complexity in his thinking by the end of the program. He was also aware of the amount of work that is required in food production, but again his attitudes seem to be indifferent.

Understandings and attitudes about environment, nature and environmental problems

Ben thought about things “like trees, planting trees, growing stuff” as well as “cars, and people smoking and polluting” (IH, 1st interview) when he thought about the environment. It seemed that he intended to make it inclusive of both the natural and human worlds, but interestingly, he thought nature is “good” but “it’s only for the animals” (IH, 1st interview) excluding himself (and therefore humans) from it. Ben saw some clear differences between environment and nature: “I think they are different” because “environment is about trees and nature is about animals” (IH, 1st interview). Ben also thought however, that “they do relate in certain way” (IH, 1st interview) and saw some similarities between the two: “they are both alive” (IH, 2nd interview). But what was even more interesting in this story, was that Ben saw similarities between the environment and nature best when it came to the “problems.” He said, “I guess killing some animals and cutting down some trees are really connected” (IH, 1st interview). It was from this statement that I found Ben’s first signs of understanding interdependence, although he did not elaborate on why he thought these two ‘problems’ were connected. In contrast with Daniel, Ben says that he talks about environmental problems at school but not that much at home. At school, they talk about “pollution and how it affects the environment, and how the trees give us oxygen and stuff like that... and we talk about trees and about people cutting them down... and wasting paper” (IH, 1st interview). Again, I could see a budding sense of interconnection and interdependence, as well as responsibility. However, I am still not sure

how much of this knowledge Ben actually embodied in his identity. Ben's view of nature and environment did not seem to change much throughout his experience at the farm, and he was not sure whether or not he saw himself as part of the environment. As seen throughout this process, Ben did not seem too engaged with the learning experience, but he did see a little bit of a connection between what he learned at the farm and what he does at school with respect to science and environment. In the last interview, I got another glimpse of Ben's environmental consciousness. He said that perhaps the reason why there were abundant news about environmental problems was because we had to "tell people about it, make sure they don't use it too much." He thinks about these problems "sometimes", he says "when I like pull of a leaf off a tree, when I'm using paper" (IH, 2nd interview). Although Ben does understand the value of resources and how we use them, he still could not see himself as being particularly worried about the environment. When asked if he was concerned about the state of the environment, his answer was a simple "no" (IH, 2nd interview). Ben's profile was a little bit perplexing because even though he has sufficient understanding about the natural world and its intricate complexities, and sometimes has shown a budding sense of responsibility, he is not able to relate to the environmental problems or show any emotional concern about these issues.

Summary of Ben's experience at the farm and his priorities

As I showed in this profile, the greatest transformation seen was in Ben's conceptual understandings about farms, planting and growing food. His level of engagement and attitudes, however, minimally changed throughout the program. Ben showed me a sufficiently developed cognitive understanding about nature and environment, but I was able to discern that he has not yet fully embodied and integrated this knowledge into a meaningful

sense of connection and responsibility. Ben has a good bank of information but might not really know what to do with it or how to apply this information. Contrary to Aaron's experience, it seems that what is missing in Ben's experience is a meaningful emotional connection to his surroundings and the natural world. Through this connection, he might transform the information he already has into effective and applicable knowledge to which he can actually relate. The outdoors and creatures in nature did not seem to be a problem for him, and 'nature' as such did not seem an uncomfortable place for Ben. However, he reminded me that not every child might develop a passion for nature and a holistic ecological identity and environmental consciousness due to other priorities, spheres of influence, or passions. For now, Ben still thinks that playing soccer is his priority and, in fact, he is very confident that he is a good player and that he will "play soccer, for Manchester United, in England" when he grows up (IH, 2nd interview).

I hope to be able to use Ben's unique farm experience to demonstrate how essential an emotional connection and affective relationship to the natural world is for a solid environmental consciousness. Through Ben's profile I hope to present the argument that cognitive understanding of how nature works is not sufficient on its own for the development of a holistic ecological identity that will lead to action and concern for the environment.

Jackie's Story

Jackie is a very articulate and expressive girl that was involved in the *ILLP* for two years in a row. Her first year was the 2004-2005 school year and she was in grade 4. The second year she was in Miss G's grade-5 class (2005-2006). By analyzing the 2005-2006 interviews I was able to get to know Jackie and understand her concerns, conceptions and

attitudes about environment and nature. Jackie shared a sensitivity to wildlife and its preservation in natural habitats that I found touching. She said she wanted to have a bird as a pet, but she knew that she did not want to do any harm to it. She did not “want anything too exotic because then like... sometimes people they take those from the wild places... it’s not very nice... I like them where they live and where they are” (RL, 1st interview). I was very lucky to be able to write about Jackie’s experiences at the farm, as they represent not one, but two years of being actively involved in this program. The insights and holistic views that I was able to gather from Jackie’s story are an invaluable contribution to this work. Not only did I get to map changes in Jackie’s understandings and attitudes from her 2005-2006 year experience, but I also got a glimpse into what her experience was like the previous year. Furthermore, I was able to gather some information about what lasting influences a program like the *ILLP* can have on a child, and how this in turn, shapes his/her understandings and attitudes about the world. Jackie’s experiences and conceptions are beautifully complex and full of contrasts, and I hope that this profile represents that intricacy.

Jackie’s life at home and her gardening experience in this sphere

Jackie has a younger sister, her dad is a pharmacist and her mom stays at home. She likes playing outside with her friends when it is sunny, and I found in the conversations with Jackie, that she has different activities she can do during her free time, for example, she says: “sometimes I draw and sometimes I play with my sister. And sometimes I play videogames. Sometimes I play games with my mom, and maybe TV or something but I don’t watch a lot of TV” (RL, 1st interview). Jackie has had some experience with gardening at home and she has shared this experience with her mom. She says: “in the summer sometimes my mom grows things and she buys little seed packages with vegetables and tomatoes or cucumbers or

something and then... we plant them.” Jackie thinks that “it’s fun... because you dig the hole and... like you just do stuff... and in summer time it’s so sunny outside... And... planting is a good thing to do outside” (RL, 1st interview).

Returning to the experience – remembering relationships

Jackie was very happy to be back at the farm, and to have the opportunity to go through this experience again. She particularly likes it because she gets to share experiences with other people and build relationships: “I like being at the farm. I like helping other people, I like being with my friends... and... also... we have nice people there” (RL, 1st interview). Jackie has had two different farm friends – Reetha was her farm friend the first year and Rachel was her farm friend in her second year at the UBC Farm. Having had some experience from the previous year, Jackie felt empowered to teach some things about planting to her new farm friend, and felt a sense of pride when the student-teacher relationship was reversed; she said: “well, I liked teaching the farm friend new things because she did not know a lot of things... like we talked about insects and I said the little wireworms are bad I think... maybe I said what kind of plants they were (in their bed) because Rachel kind of guessed about them” (RL, 2nd interview). Even though Jackie felt that she could teach something about farming, she still thought she could learn a lot from Rachel and that farm friends are important “because... we need to ask them what kind of things we need to pull out and if it’s ready yet” Jackie was happy to be actively involved in her own learning and being able to take responsibility for it. She reminded me of the importance of allowing children to teach us, as we teach them, in a reciprocal learning exchange.

Group work – a reflection

At the beginning of this year's program Jackie reflected fondly on the experience of her first year at the UBC Farm and she said that she liked "doing garden work... because then you get to use different kinds of tools" (RL, 1st interview). Jackie also remembered the experience she shared with her group the first year: "we grew beans and we used these poles that were so long that they went up really high and they were taller than everyone else's, and I also remember that I was really good at getting wireworms... because I got several wireworms out every time at the farm" (RL, 1st interview). Jackie was a girl who did not show any reservations or fears about being in contact with nature. She was, in contrast with Christa, completely comfortable with handling worms. Not surprisingly, what Jackie remembers most about the second year's experiences has a lot to do with the planting process and the success of her group: "this year we grew too many things and so we gave them away because other people did not have a lot of plants... we grew radishes, and peas and beans and also salad greens, and I think we grew kale too" (RL, 2nd interview). The learning experience of the *ILLP* (2005-2006) seems to have been rich, encompassing and meaningful for Jackie; she recalls: "I learned about planting. I learned about insects. And I think I learned about soil, compost, we learned about.... what plants are good with each other and what plants are not very good and special thing about some plants" (RL, 1st interview). The importance of this knowledge and Jackie's attitudes and understanding of complexity will become apparent in a later section.

New knowledge – Jackie's changes in conceptions, understandings and attitudes about learning science during the second year

Jackie learned more (new) things about plants, what they look like and what they taste like during her second year. Some of the things that she learned and observed seemed to surprise her. Jackie's memories of her experiences at the farm were very lucid and detailed; she recalls: "when I was picking the peas, I did not know they grew from those flowers... and also... radishes... we had this radish that grew so big that it was kind of sticking out the ground... so we saw how big it was and that's how it looks like... radishes are spicy because I thought they would be just... like broccoli or just chewy but I did not how they taste like. And they sweet and spicy." Jackie continued sharing what she had learned about the different things she grew: "I learn that there was parsnips and they are white carrots and they smell like carrots but they were not carrots" (RL, 2nd interview). Seeing how Jackie reconstructed her conceptions about different things is fascinating. There were other new things that Jackie also learned and even though, at first, she was undecided about whether or not she learned science at the farm, the hypotheses she formulated with her new knowledge were quite interesting. This was, perhaps, partly due to the fact that her farm friend largely emphasized science learning while at the farm, and conducted more science experiments with her group because they had had the previous year's experience. This year (2005-2006), she learned about hydroponics at the farm (although she did not remember the exact term): "I learned that about hyrdo... thing... like not hydro... well I don't know what's called... those people from a long time ago they grew things in the water that were just floating there" (RL, 2nd interview). Her attempt at applying this new knowledge is commendable (though not scientifically accurate), especially because she is providing some suggestion for ways in which farming could be done. She "thought those [hydroponics] are kinda

interesting... because there is like oceans and the water is just there, so you can probably put some floating rocks and put dirt around it and the roots would just be hanging underneath so then that way they would not take up too much space or anything... and they won't tangle up with other roots or anything." Jackie also learned and practiced other science at the farm. She recalls: "we did a soil test... we mixed the tables with the water and we put soil in there and it changes color" (RL, 2nd interview). Unlike Christa, Jackie could not see the connection between what she learned at the farm and what she learns at school, even after two years in the program. Jackie made a distinction in the style of learning within the two places by explaining the quality and quantity of direct experience she gets in both. Jackie shared her thoughts on why she thought the farm and school were different: "I think they are different because at the farm you get to do more things and it's cool because at school you just do a lot of math problems on paper and you don't really experiment on things... because you just go outside... I like going outside once in a while, because sometimes we go outside for gym on a good day and then at the farm we go outside everyday" (RL, 2nd interview). Jackie, along with all of the other children in this sample, loved to be outside learning by doing.

Farms and farming – their importance and value

Even before her experience at the UBC Farm, Jackie had had the opportunity to experience other farms and had interesting ideas about why these farms were different than the UBC Farm: "they look different because that farm (cow farm) does not have as much trees, and this one (UBC Farm) has trees all around it and so... it's impossible not to look at trees" (RL, 1st interview). The first year of the *ILLP* seemed to help clarify some of these differences, she said: "when I came there for the first time, I learned that there are different farms too. Like... there are no cows... mostly people plant stuff, and they have some animals

like chickens. But then it's mostly planting" (RL, 1st interview). I could easily see that Jackie's conception of farms was a hybrid between her previous conception (what a farm was and what it had in it), and the new things she discovered at the UBC Farm. When Jackie thought of the word farm, she thought of "a place where there are farmers and there are chickens and cows and horses and stuff like that, and there is lots of plants" (RL, 1st interview). I found that at the end of this year's program (2005-2006), Jackie's conceptions about farms had not changed much, but after being in the program for two consecutive years, Jackie has really come to value the work that farmers do. She knows that farming "can be a hard work to keep like watering the plant every day and stuff... because you have to work for a long time and then... waiting can be can difficult because there are so many hours in a day and you have to be waiting and waiting" (RL, 2nd interview). Jackie knows what it takes to be a farmer, but she also feels a sense of pride and knows that her hard work can pay off, "then at the end you get a reward which is great" (RL, 2nd interview). Through Jackie's story, as well as Christa's, I could see how powerful the experience at the *ILLP* can be for a child's confidence, sense of accomplishment and sense of belonging.

At the end of the 2005-2006 year, Jackie could really see the value of the *ILLP*, and she knew that every one can contribute by cultivating in their own little piece of land. Jackie easily identified herself as a potential farmer or just even as a contributor. She inherently understood the importance of growing food locally and the benefits (economic and social) of doing so. She thought that the program is a good idea because "a lot of kids and boys always say 'oh, I don't wanna be a farmer because it takes too much work' and things like that but I think it's also a good idea because actually... even if you are not a farmer and you just have a small garden or a house plant or like.... you know a little box with some seedlings in it, it's

still fun... because you can just water them and thin them and they grow and you can eat” (RL, 2nd interview). Jackie also had pretty clear ideas about the importance of farms – not only for food, but also for economic reasons – she said that farms are important, “because not many people grow vegetables in their gardens and things, and the farmers grow things and sell them. If there weren’t any farms, then...there would be less jobs and also... people would not eat vegetables unless someone next door has vegetables and give them to them...or someone have vegetable stand, so they could buy them” (RL, 1st interview).

It was through Jackie’s profile that I was able to show best the connection between growing food, land and community. She was able to really embody a more local (bioregional) sense of community and food production. One of the aims of this program was to better prepare the children to understand and get acquainted with their local surroundings, community, heritage and natural ecosystems, so that they can understand the processes of the natural world at scales that cognitively and emotionally manageable. Jackie showed a potential for community leadership and her ecological identity and environmental consciousness were well established. In a way, her understandings of local farming complemented Daniel’s understandings of (global) larger-scale farms and farming.

A deep understanding of the intricate interconnection and interdependence between us and the natural world

I could see that Jackie’s conceptions, understandings and attitudes about nature and environment were well developed after the first year at the farm. Her description of nature and environment was very eloquent and detailed, and she was able to intricately weave her knowledge about environment, environmental problems, heritage, culture and history. Jackie shared what she thinks about when she hears the word environment: “I think of the animals

and plants and air and land and soil. Also I think about forest and mountain and creation of the earth, ocean and sky.” Her ecological identity and environmental consciousness shone through the narrative of her learning: “Sometimes I think about how people pollute the environment and that’s, it’s not very good, like dump their garbage on the ground or driving cars...and the air gets really foggy... and smog and it’s hard to breathe and stuff like that. So sometimes I think about things that we can do to help the environment. First Nations people use things from the environment but they don’t use a lot like, they may kill one whale but people with a ship can kill a hundred whales” (RL, 1st interview). I was very impressed with the way she was able to weave the historical aspect of the land with her understanding of the modern environment.

Jackie’s understanding about the environment at the end of the second year became intriguingly more detailed and tailored towards her experience at the farm. Her understanding was particularly geared towards the forest with which she seemed to have found a special connection, as is shown later on. She said: “I learned that they grew a bunch of trees at the farm because they wanted to study them, and also I learned that in the forest...there are many plants there and you can see them, and there is really big ferns and things like that. And also...it’s kinda scary because we went up there to go get some leaves for the cover crop and the maple leaves in there, they are so big!” (RL, 2nd interview). Though this time Jackie struggled to eloquently express her understanding, I could still see how, in her thinking, she tried to work out how pollution might affect the growth of trees, she reasoned: “They are probably big as a plate, like a diner plate because I think maybe since some maple trees they have to take off the carbon dioxide that come through the air, they don’t grow much, but then once they are there, they don’t have to filter a lot of dirty air, so they grow really big.” Jackie

still thinks about things like trees and green things when she thinks about the word environment, things like “forests and plants and all the little plants that grow in the forests and birds and animals and things like that and the Earth” (RL, 2nd interview). She also has no problem seeing nature and environment as the same thing, but it was intriguing that she did not include humans in her definition of nature, just like Jason and Ben. When Jackie thinks of nature, she thinks of “animals and trees and stuff like that... and the forest, and there is not really people there” (RL, 1st interview). Again, I saw some of the contrasting (sometimes opposing) conceptual understandings that Jackie presented. It was interesting to see that, even though she was able to fully incorporate the historical aspects of the land into her conceptions of environment, she still saw nature as untouched wilderness; a sphere outside of our own. As I hope to convey in the conclusion, encouraging our children to view and feel part of nature is essential to shaping their understandings and attitudes about conservation and value of the natural world.

A new found sense of place, sense of wonder and sense of connection

Jackie, once again at the end of this year’s program, emphasized her desire to be outside learning and experiencing nature. In her account of her second year’s experience, I found that she developed an empathic connection and a strong sense of belonging in a special place in the forest. Jackie’s reflection on how she felt about this place was refreshing, and she conveyed through her expression that sense of wonder and mystery that we are able to feel when in touch with nature. Jackie said: “I liked to go to the forest and walk around because I like to walk for a long time because it makes me tired and like I feel good when I am tired. And also... it’s fun and you can... in the forest things are like closed up and it’s really secret because there is a lot of trees and a little of sun is shining through... and then there is fresh

air, and there is birds, and it's kinda cold sometimes but after it's good too." Jackie also saw it as an escape from the fears of society, "it feels like a nice place... because there are no cars and there not any... you know... poor people because sometimes poor people are kinda scary. And also... you know there is like nobody who would come and rob you or anything because they probably don't live a in a forest." Even though Jackie feels a sense of attachment to this natural place, and was able to develop a connection to it, she still did not see this special place as a completely safe refuge. She commented: "once in a while there might be like a person who comes with a dog or something because there are always people who walking their dogs." Jackie showed me the perfect example, in this set of interviews, of how societal fears can affect children's thinking and how these fears are rationalized by them. Sometimes with reason, these fears are reflected in children's willingness to be outdoors and in the natural world.

Summary of Jackie's highlights and unique insights

Jackie's profile was probably the most intriguing for me, since her experience at the farm for two years gave me a wider view of her understandings and attitudes about the natural world and her interaction with it. One of the most interesting aspects I found in Jackie's story was they way she thrived while being involved in empowering reciprocal relationships with her farm mentors that not only enhanced her confidence, but also her leadership skills. Christa, Daniel and Jason also showed me the importance of Intergenerational learning, but each in their own way.

As with all children in this sample, Jackie longs for direct experience in nature and loves being outside. Unlike Christa, Jackie had no problem interacting with creatures at the farm and did not display any type of fear towards them, showing me that she was very

comfortable with being in contact with the natural world. On the other hand, Jackie displayed some fear towards human (or man-made) perceived dangers.

I was very impressed with Jackie's ability to provide a holistic ecological view, embodying an intricate complexity that no other child in this sample was able to convey, partly because she also had a strong emphasis on science from her most recent farm friend. Jackie was also the best example of how children can come to have a comprehensive understanding and positive attitudes about the importance and value of farms and food production.

Unlike Jason and Aaron – who had an established sense of place and belonging – I had the opportunity, through Jackie's story, to trace the development of her sense of belonging and attachment to a special place in the forest at the farm. She found a rekindled sense of wonder, adventure and connection. Her ecological identity, as well as her environmental consciousness and social responsibility were highly developed.

I hope to be able to show and incorporate the many insightful characteristics of Jackie's experience, along with all of the other 5 profiles, into a valuable depiction of the importance of carefully understanding how children think and feel about the natural world, our interaction with it. It is my hope to present this evidence as inspiring ways in which we can re-conceptualize and implement new ways of teaching and learning about the Earth.

CHAPTER FIVE

CONCLUSION

I present Chapter five as the concluding chapter of this thesis, where I bring together the findings of this research. In the first portion of this chapter, I use the most prominent themes found through the analysis with respect to the development of children's ecological identities and fostering of their environmental consciousness. In the second portion of this concluding chapter, I present the limitations of the study, as well as the implications of the findings with respect to education for environmental sustainability and the re-conceptualization of the way we teach and learn about the Earth. I also briefly offer suggestions and discuss the next steps and opportunities in this kind of research.

Concluding Summary

In earlier chapters, I conveyed the importance of allowing children to experience nature and the potential risks of having minimal or no direct contact with it (Louv, 2005; Sobel, 2004). I argued that, through meaningful direct experience, and a holistic understanding of complexity, children can develop a deep connection with the natural world that fosters a sense of empathy, care, and informed responsibility (Hungerford and Volk, 1990; Payne, 2005; Sobel, 2004). Children's levels of interest and engagement can increase when they are able to make meaningful connections between their learning and their experiences. This active engagement, in turn, encourages and nurtures the development of a holistic understanding about interconnection and interdependence of the world we live in (Hungerford, 2002; Hungerford and Volk, 1990; Jickling, 2003b; Sobel, 2004). Through the

stories of the six different children presented in this work, I was able to show the change in children's engagement with, and attitudes about nature. I was also able to show that children's cognitive understandings about nature can change and, in fact, grow in complexity throughout the involvement in programs like the *ILLP* at the UBC farm. For the 10-month program, the changes in their understandings and attitudes about the natural world show that having direct experiences in nature, coupled with direct teaching about nature and the environment, does provide children with the opportunity to develop a profound connection to nature. Furthermore, these findings confirm that connection and awareness can, in fact, foster empathic and caring relationships together with understandings that can facilitate positive transformations including the development of a sense of responsibility.

Within the particular focus of the farm, one major theme weaved throughout the program was the link between land, food, and community. As one of the most prominent, unifying themes in the sustainability movement, it is also an essential component of educational programs that focus on environmental sustainability. It is very important that children understand these connections. During their experiences in the *ILLP*, children started to develop and nourish an emotional connection to the natural world through growing plants, and they developed a special relationship to place. They also learned about the planting cycle, what the plants need to be "healthy" and "happy", and they intimately experienced the intricate complexity of the natural world. Digging through the soil, and working with their hands, the children acquired valuable practical skills while using the tools to plant, transplant and nurture their growing flowers and vegetables. They learned about the optimal spacing, depth and location of planting, together with concepts like companion planting as used in organic practices. They also learned about team work and community spirit. This rich, multi-

sensorial and multi-disciplinary learning brought about a deeper sense of interconnection and interdependence between and within the different holarchical levels of nature (see Chapter 2), and the importance of the links between land, food and community.

In the process of analyzing the interviews, I was able to bring the themes I previously identified (presented in Chapter Three) together with themes that emerged through this process. In this concluding chapter, I synthesize what I considered to be the most salient themes of the analysis. I also identified the components of Earth Literacy that I found within the children's understandings and attitudes while looking at their experience through this framework. The components of Earth Literacy are highlighted throughout the themes and the usefulness of the concept is discussed more detail in a later section on implications.

Building an Ecological Identity

Social Relationships – Intergenerational Learning, community and cooperation

Through the six different stories I was able to show the significance of providing our children from an early age with nurturing guidance through intergenerational learning, resulting in a sense of community and cooperation. In the case of the farm, the development of an empathic relationship with the Earth is nurtured through reciprocal interactions where children and mentors learn to love and know the Earth through their hands (McNamee, 1997; Peterat et al., 2004; Sobel, 2004). Most children were able to build meaningful relationships with their farm friends, and showed that intergenerational learning is a powerful experience of community and contributes to a sense of belonging. The children deeply appreciated having the farm mentors with whom they shared this experience. Christa cares about her

farm friends “because they are nice and they teach us a lot,” and Jason values the fact that “they wanna spend time with us.”

The children were able to see the value of group efforts and some, like Jason, were able to change their minds about sharing. At the beginning, Jason thought that being an only child was good “because you don’t have to share with anybody”, but after sharing chores, responsibilities and decision-making at the farm, he thought working in a group was good because, “if we have trouble, one of our friends can help us.” Even Ben, a child who found little reward in the farm experience, found working in groups “fun”, and saw the value in team-work. Out of this community experience, there were other emergent changes that I was able to see in the children’s understandings and attitudes. For example, Christa was able to find a new sense of confidence in herself and to feel a sense of accomplishment from the tasks she was able to complete at the farm. From this, I was also able to show that increasing confidence can engender a sense of leadership and responsibility, and inspired these children to be more independent in their learning. Jackie, for example, felt empowered to share her knowledge and to teach others what she knows about planting. Ben, like many others, felt a sense of ownership as he and his group had the opportunity to create something when taking care of their bed and the plants they grew; and they felt a great sense of accomplishment at the end, because “you know you did this.” Jackie added that “at the end you get a reward which is great.”

This particular theme of community and cooperation reflects some of the aspects of the Earth Literacy component of *Living Together*, since there are strong elements of communicative practice within a supportive community that allow for cooperative engagement in building and creating solutions together.

Sense of place and belonging

I was interested in finding out how children develop a sense of place and belonging, and how this in turn fosters a more compassionate view towards the natural world around them. I wanted to know how their sense of wonder, exploration and discovery would be shaped by an experience like the one at the UBC Farm, and how attitudes would shape levels of engagement and willingness to learn about the natural world.

Through the experiences of the six children, I was able to show how important a sense of place and belonging is to a child's development, as well as to his/her understanding about, and affection for the natural world. It provides the child with a special connection to a specific physical place in which he/she can feel safe. The child can nourish emotional ties to this physical space, as well as to the people related to it. Jason and Aaron already had an established sense of place from the beginning of the program, but I was still able to show how important this sense of place is in nurturing a strong connection not only to the natural world, but to other people as well. Jason's sense of place and belonging was in a different geographical location, but his relationship to this different place and his grandmother were strong and were very important parts of his ecological identity. It was through Jackie, however, that I was best able to show how an experience like the *ILLP* can aid in the development of a child's sense of place. I was able to show how this sense of place can allow the child to experience a true connection to a space in the natural world where a sense of wonder and belonging can flourish. While in the program, she found a connection to a place in which she felt safe and was able to rediscover the many wonders of nature. Jackie's experience allowed me to see the process of developing of a sense of place and the rebirth of a sense of exploration. A sense of wonder and adventure are necessary for the child to be

motivated to explore, discover, and experience the natural world around him/her. Daniel, for example, had a wonderful imagination that fuelled his already established sense of wonder and adventure. Daniel's sense of wonder allowed me to show how important it is for a child to be able to let his/her imagination run free and to be able to feel part of something bigger.

In this theme I found that *Practical Bioregionalism* and "*Deep Ecology*" are the two components of Earth Literacy that are most prominent since some of the factors include a profound emotional connection to a physical space, and an awareness of where we come from. *Practical Bioregionalism* highlights the local community in which the child can explore and become familiar with the fauna and flora of his/her special place, while "*Deep Ecology*" highlights the emotional connection of self within place.

Connections to the Earth – complexity, interdependence and interrelationships

Throughout this work I emphasized the importance of developing an empathic connection to the natural world and a sense of compassion towards it. I demonstrated that a profound connection to the Earth empowers and fuels a sense of respect and responsibility when coupled with awareness and deep understanding of the complexity of the natural world. It is this connection to nature and seeing ourselves as interdependent parts that helps us understand and care about the well being of the Earth, and in turn, the well-being of human societies. I argue that a child's ecological identity and environmental consciousness cannot be developed without this powerful connection. The profound emotional connection reflects aspects of the component of *Deep Ecology*, while the cognitive understandings reflect what the components of *Complexity* and *Ecoliteracy* are trying to convey.

From separation towards interconnection

One of the goals of this analysis was to understand how children conceptualized nature, environment, and environmental issues, and how they situate themselves within the natural world (whether or not they view themselves as part of or separate from it). Some studies have found that children most often think of nature as “out there” instead of seeing themselves within it (Haluza-Delay, 2001; Shepardson, 2005). In my findings, I observed a similar trend. At the beginning of the program, I found that most children viewed themselves as separate and disconnected from the natural world. I also found, however, that after developing more meaningful connections and understandings about the complexity of nature, some children were starting to recognize how interconnected and interdependent we are with the natural world. Even though the majority still sensed separation, they were beginning to incorporate the human sphere as part of the natural world, and their views on nature and environment became slightly more integrative and holistic. Their conceptions of nature and environment tended to be defined by a range of comparative notions where some children saw just a few similarities between environment and nature (eg. Aaron), and some thought they were the same thing (eg. Christa). For many of the children, environment was mostly related to environmental problems and, during conversations and interviews, the children quickly turned to this notion. I highlight these distinctions to point out that when we teach children about these concepts (environment and nature), we need to be aware of how these two words are portrayed, and how their interpretations might shape the way in which children think and learn about the natural world and our relationship to it. For the purposes of this thesis, I usually equate the word nature to environment, since I see it as a helpful

integration that brings us a step closer to viewing ourselves as interdependent parts of a larger ecological system.

Complexity and interdependence – Understanding the interconnections between land, food and community

Some of the specific changes that I found were the children's understandings about farms, farmers and the production of sustainable and organic food, and how these concepts are used to build the connections between land, food and community. Aaron and Jackie in particular, understood the importance of farms as one essential link in our interaction with nature, and recognized the significance farms represent for our subsistence and social structures. Farms, said Aaron, "give us the food that we eat... and they help us live," and Jackie also added that, "if there weren't any farms, then... there would be less jobs." Jackie was also able to recognize the importance of having farms within the community, and the impacts local food production can have on individual lives. She said farms and growing our own food is important because "even if you are not a farmer and you just have a small garden or a house plant or like... you know a little box with some seedlings in it, it's still fun," and people could share their vegetables, "or someone have vegetable stand, so they could buy them." In contrast, Aaron and Daniel were able to talk about farms and farming at a more global and international level.

Children came to understand the benefits of employing sustainable farming practices and particularly, growing organic food. Jason knows that in organic food, "they don't use chemicals or pesticides," and Ben thinks that organic food is "a lot better for you, and pesticides can poison you." Aaron was also very aware (as was Christa) of the importance of a nutritious food supply in terms of our health. He said that we need farms, "so we could get

vegetables and fruits... and they help fight diseases... because vegetables and fruits have vitamins in them.” All of the children understood and appreciated the farmer’s work, along with his/her expertise, although each expressed this differently. Farmers, Christa said, “are hard workers,” and Jackie thought farming “can be a hard work.”

The children learned about the complexity of the natural world through different life cycles of plants and insects, while learning how these cycles relate and are interdependent with the processes of soil formation, nutrient recycling and factors like temperature, sunshine and water. They learned about the intricate interactions of the atmosphere, biosphere, lithosphere, hydrosphere, and the human sphere (without using this terminology). There were varying levels of understanding of complexity, but it was Aaron’s perspective that I found most developed. He had a deep understanding of the interdependence between ourselves and other species of the planet, such as plants. He said that without plants “the things that eat the plants couldn’t live.” Understanding complexity demands a wider focus than just scientific knowledge and requires a more holistic approach that integrates different disciplines in which a systems thinking perspective is adopted (Capra, 1996; Capra, 2002; Orr, 1994).

This section highlighted the concepts of *Complexity* and *Ecoliteracy* because the children’s understanding of interconnection, interdependence and interrelationships developed or were enhanced by their experience at the farm. In this section I also identified the Earth Literacy concepts of *Practical Bioregionalism* and *Globalization*, because within their understanding of complexity, there were connections that highlighted different holarchical levels ranging from the local/regional to global associations.

Transformation – engagement and attitudes through direct experience

Experiences like the one at the UBC Farm can provide the grounds for powerful personal transformations. Through Jason's and Aaron's experiences, I was best able to show how active engagement and hands-on learning allow children the opportunity to become more positively involved toward nature, and toward other aspects of learning and life. Children like Christa, Jackie and Daniel already had a positive attitude towards such an experience, but their enthusiasm and levels of engagement also increased. Even though Aaron and Jason were both quiet, I was able to clearly see their excitement about this experience. Aaron also told me that if he had the opportunity to go through an experience like the *ILLP* again, he would definitely do it, "cause it was really fun when we did it at the UBC Farm...I'd like to do it again." Looking at the different ways in which children respond to experiences like the *ILLP* reminded me, however, that not every child will be deeply and positively transformed by the experience. Ben was the most prominent example of a child who could not relate to this experience and could not make it relevant and meaningful for his learning. In spite of the minimal change in Ben's attitudes and levels of engagement, he (as did the other 5 children) liked being outside doing hands-on learning. Interestingly, even though children were very excited about interacting with the natural world, there was still some hesitation and fear toward being in full contact with the natural world. Christa, for example, showed a few reservations when it came to holding and touching the worms, and feeding them to the chickens. Her least favourite activity at the farm was to, "feed the chickens" because "they poke at you...and then I have to hold worms...I can touch them, but I don't like holding them." Jackie on the other hand, was quite comfortable with this activity, and showed that she felt comfortable in nature (the forest)

away from other perceived social dangers because, “there is like nobody who would come and rob you or anything because they probably don’t live in a forest”.

In this section, I have identified the components of *Deep Ecology* because it emphasized the importance of understanding and developing a powerful sense of connection to place and nature. I also identified potential fears and hostilities a child might have when interacting with the natural world.

Anthropomorphism

In the case of most children, the empathic relationship that was formed while they learned and cared about the plants also displayed a certain degree of anthropomorphism and concern about “helping” the plants grow and making sure they have everything they need. It was through Aaron that I was best able to show the importance of having an empathic relationship with the natural world and becoming one with it. Even though Aaron’s connection to nature was already evident from the beginning, his affinity and compassion towards nature was enhanced during the experience at the UBC Farm. Aaron often expressed his concerns for the well-being of the plants he looked after, and made sure they were “warm”, “happy” and “healthy.”

The use of anthropomorphism in the process of forming a connection to the natural world has been pointed out by many, and in fact, has been encouraged as it is considered to be an effective way in which children learn about the natural world (Cornell, 1998; Gebhard, Nevers and Billmann-Mahecha, 2003; Sobel, 2004). Evidence suggests that children, more often than not, identify with elements of the natural world through this intrinsic process of anthropomorphosis. Scott (2007) found that children can develop strong relationships to the animals they study and care for in a 5-day environmental education program (focusing on the

aquatic environment), and that through this process of anthropomorphosis, the children were able to develop a sense of responsibility for these animals. Scott's study also found that children were able to extend this sense of stewardship beyond concern for single species, to the conservation of their habitats and (marine) ecosystems. Sobel (1996, 2004) talks about the benefits of anthropomorphising elements of nature, and argues that it allows us, in a sense, to become one with the natural world through adopting non-human characteristics, as well as bestowing human characteristics onto the non-human world. Gebhard, Nevers and Billmann-Mahecha (2003) have studied the benefits of allowing children to develop a sense of respect and responsibility for the natural world through anthropomorphising trees, while Joseph Cornell has created exercises through his benchmark works of "Sharing Nature with Children". For the past 30 years or so, Cornell has taught children to care about the Earth through games and activities that include "Role Playing" and the "Animal Games" where children have a chance to become the animals they are learning about (Cornell, 1998). Children, and even adults, tend towards anthropomorphising the natural world (consciously or unconsciously), since the development of an emotional relationship means adopting a caring attitude towards nature in which we invariably attribute human qualities to the non-human world, and vice versa (Sobel, 1996; Sobel, 2004). However, we must also be aware of the potential risks of anthropomorphising the natural world since it can potentially lead to the adoption of an attitude where humans are considered masters (controllers), rather than care-takers and stewards of the Earth. It is therefore of utmost importance that we ensure that, while the child envisions the human characteristics in a non-human world, a sense of respect and a caring attitude are fostered so that he/she does not see nature merely as utilitarian play (Cornell, 1998; Louv, 2005; Sobel, 1996). As we saw with Ben (and in some

cases with Christa), children tend to look for the “fun,” and can view nature only as entertainment or a distraction. Ben, for example, shared that feeding the chickens was “more fun than planting,” but that planting was “better than school,” and Christa mentioned in the beginning that the farm was like “recess.” It is important to know that children can move beyond viewing nature only as play without the developed consciousness and awareness needed to create this “play” into a pleasant and meaningful experience that is accompanied by a compassionate sense of respect and responsibility for nature. Direct experience without conscious awareness and a caring relationship does not allow the child to appreciate the importance of nature at deeper levels of interconnection and interdependence.

Developing an Environmental Consciousness

Stewardship, sense of respect and caring responsibility

Through the experiences of these six children at the farm, I was able to see slight growth in their concern about environmental problems by the end of the program, some were still unsure about situating themselves fully within nature. However, most children’s environmental consciousness and sense of responsibility began to grow stronger. With respect to environmental issues, children’s concerns were centered mostly on pollution, recycling and energy consumption. This is, perhaps, because these are some of the most prominent topics amongst the general public, and are therefore most easily understood.

Jackie, for example, said that, “sometimes I think about how people pollute the environment and that’s it’s not very good, like dump their garbage on the ground or driving cars,” while Aaron thought about things like “pollution, sewage... smoke from factories,” that comes from

“cars... smoke... boats,” when he thought about environmental issues. Even though I did not notice a huge change in their understandings of environmental problems, there was some growth. For instance, several mentioned forests and plants, and how these help/relate to the environmental problems in terms of paper products, clean air and providing oxygen. Daniel, for example, added that “you should not kill plant and trees... we would not live and breathe air if we kill them.” Aaron said that the Earth, “it’s hard to keep good... but we should try... to not pollute it a lot... and help it grow.” Children’s various responses were largely focused on their concern for plants. These responses were likely related to their experiences at the farm, and its focus on cultivation and food production. From the interviews in this study, I was able to see that the major influences and spheres where children learn and hear about environmental issues come from home, school and the media. Daniel, for example, knew a good deal about environmental issues, and even something about species at risk from what he learns at home from his siblings and parents. Jackie, like Daniel, expressed concern for other species and had a wider perspective on the impacts of habitat destruction. Ben, Aaron and Christa identified school and media as the major source of their knowledge about environmental problems.

Some of the children’s interpretations about environmental issues also suggested that sometimes, like in Christa’s case, children can become overwhelmed with the information about large-scale environmental problems, and this is likely to create confusion. This simply points to the need to remain aware of and sensitive about the emotional and cognitive capabilities of the child. It also points to the value of Place-based Education – starting on a smaller, local scale to which the child can more easily relate, especially in the younger years (Sobel, 2004). It was through the contrast between Aaron’s (and Jackie’s) attitudes and

understandings, and Ben's experience that I was able to show the importance of having an emotional connection to nature and to point out the limitations of only focusing on cognitive aspects, as it was in Ben's case. Although he had a fairly solid understanding of the complexity of the natural world, and environmental issues, Ben was not able to see himself as a steward of the Earth because he had not developed an emotional connection to the natural world. He was not able to develop this empathic relationship, perhaps because he could not relate the experience of planting to his one passion which was soccer. Aaron and Jackie on the other hand, each had a good understanding of the complexity of the natural world as well as a strong emotional connection to it. Through Aaron's and Jackie's attitudes and conversations, I was able to show that both students had a meaningful connection and a holistic understanding of the interconnection, interdependence and interrelationship of the natural world (including us). These are necessary for children in order to develop a sense of responsibility and environmental consciousness that will lead to action. Some, like Jackie and Aaron, were able to provide solutions for environmental issues, drawing from their knowledge of interconnection and complexity as well as understandings taken from Traditional Ecological Knowledge and Wisdom (TEKW). Jackie, for example, said, "sometimes I think about things that we can do to help the environment. First Nations people use things from the environment but they don't use a lot like, they may kill one whale but people with a ship can kill a hundred whales". Aaron provided some solutions for reducing pollution because there is "too much of it... [so] we need to find some other way... we need have less of it... to find a different source of... a different way for car... different fuel... different cars."

With respect to the levels of children's environmental consciousness, I found that most of the elements of Earth Literacy were present. Each child, in his/her own way, incorporated varying levels of *Complexity* and *Ecoliteracy*. Their sense of place, community and cooperation highlighted *Practical Bioregionalism* and *Living Together*, while their emotional connection, and sense of belonging and connection displayed the element of *Deep Ecology*. Their levels of understandings sometimes took them beyond the local space and into global connections (*Globalization*). Furthermore, children like Jackie were also able to incorporate historical and cultural factors into their understanding of environmental issues, which is reflected in the Earth Literacy element of *Trajectory of Now*.

Reflection

These stories demonstrate the significance of investigating and understanding children's experiences, conceptions and attitudes about the natural world so that we can better encourage, empower, and guide children to develop a holistic ecological identity and environmental consciousness. I also placed emphasis on understanding how the different spheres of influence in a child's life might affect and shape his/her conceptions and attitudes about the natural world, and how these in turn shape the child's experiences. Bringing a multi-perspective lens to the analysis allows for a more complete depiction of the true complexity of human existence (Peterat et al., 2004; Vaines, 1997).

These stories show how programs like the *ILLP* can be powerful practical venues through which educators can successfully implement education for environmental sustainability. My findings show that using direct experience at the farm as an outdoor place/community and classroom (Place-Based Education), and focusing on a holistic

integration of “heads, hands and heart” (Transformative Sustainability Learning), can empower children to develop a profound connection to the land, and acquire the skills and passion that will motivate them to act. I used and presented the Earth Literacy concept as a valuable interpretative frame that allowed me to better understand some of the children’s experiences and some of the educational outcomes from the *ILLP* at the UBC Farm. As proposed in earlier chapters, Earth Literacy can be also used to develop useful, comprehensive and effective curriculum initiatives geared towards enriching children’s ecological identities and environmental consciousness. The specific discussion on how Earth Literacy might be used to develop curricula, however, is beyond the scope of this thesis.

In the next section, I will present the limitations of this study, as well as some of the implications of these results for education for environmental sustainability, and thus, for the re-conceptualization of the way in which we teach and learn about the Earth. It will also provide general suggestions as to how educators might use the pedagogical and curricular tools previously presented to design meaningful and effective curricula, programs and venues to facilitate children’s ecological identities and environmental consciousness.

Limitations of the Study

Research Limitations

As in every study, there are some limitations of the research design and analysis that need to be addressed. Projects and theses like this one are no exception (Matthews, Limb and Taylor, 1998). One of the limitations that might be pointed out here is the small sample size that was chosen for analysis since it does not provide the breadth and variety that a larger sample size might offer (Hatch, 2002). Even though this might be considered a

significant shortcoming in quantitative research, the detailed study of participants' (children, in this case) experiences through qualitative research is regarded as a complement to the statistical significance that is so often sought and needed in quantitative research (Greene and Hogan, 2005; Hatch, 2002). Qualitative research aims to provide and understand the perspectives of the participants being studied by focusing largely on the experiences of these participants within the chosen contexts¹⁸ (Greene and Hill, 2005; Hatch 2002; Lincoln and Guba, 1985), and the qualitative methods "tend to be open-ended, narrative and holistic." (Greene and Hill, 2005; pg. 12-13). The value and significance of this particular study is the opportunity to understand how children make meaning of the natural world and their relationship to it (Eisner, 1994; Greene and Hill, 2005). I am aware that the stories I have presented here do not provide a complete representation of children's experiences in this 10-month environmental program. However, I argue that the insights gained by analyzing children's understandings and attitudes about nature point to the inspiring possibilities for enhancing education for environmental sustainability and thus, the re-conceptualization of environmental education. Focusing on how children think and feel about nature helps us understand how they experience and interpret the world around them. This in turn, helps us develop educational programs and curricula that are aimed at environmental sustainability (Erlandson et al., 1993; Hatch, 2002; Rickinson, 2001). The usefulness of the insights from the research findings are discussed in a later section.

Given that this study is based on children's experiences, it is important to remember that, "the nature of any child's (or adult's) experience is always in part inaccessible to an

¹⁸ The particular qualitative approaches adopted in this research aim to see children not as objects of study, but as active agents of their own lives and as social actors that own and shape their experience. This qualitative research aims to listen to children's voices and to (hopefully) faithfully represent their experiences (Christensen and Prout, 2005; Greene and Hill, 2005), and "involve children themselves reporting on, or in some way revealing or displaying, their experience." (Greene and Hill, 2005; pg. 12).

outsider” (Greene and Hill, 2005; pg. 5). Even though the process of interpreting and understanding children’s experiences is “highly inferential” (Greene and Hill, 2005; pg. 6), we can still identify shared ground within some of the understandings and interpretations that are, as Green and Hill (2005) argue, “socially mediated and therefore, in some essentials, shared.” (pg. 5).

Being both a researcher and an active participant in the Intergenerational Landed Learning Project (2005-2006) brought a rich, but complex perspective on the study. I did not take any part in the design of the project, nor did I have any control over the structure of the curriculum at the farm. However, I still had control over which data to collect and analyse, as well as the lens through which to analyse it. I had some input into the questions children were asked during the interviews, particularly in the third (and last) round of interviews. As an active participant in the program, my experience with the children had a strong influence on the way I understood and interpreted my interviews. Participating in farm activities helped me understand the processes that children went through during those 10-months. An important constraint for researchers is that we must be aware of limitations resulting from our own biases when we interpret and re-construct others’ experience. The researcher ultimately analyzes children’s voices, and controls the way in which the findings are reported. The extent to which the researcher can accurately represent the insights based on children’s understandings and behaviours is constrained by the researcher’s ideologies (Hill, 2005; Westcott and Littleton, 2005). Even though I aimed to be as unbiased as possible, understanding and making meaning of children’s experiences still remains a subjective interpretation. My own values, beliefs and assumptions are inevitably reflected in my analysis (Greene and Hill, 2005; Hatch, 2002; Janesick, 1998; Tudge and Hogan, 2005). I

tried to be as careful as possible not to make assumptions about what the child's experiences *might* mean, and not to make broad generalizations about children's understandings and attitudes. As Greene and Hill (2005) state "setting out to research children's experience implies a respect for each child as a unique and valued experiencer of his or her world." (pg. 3).

The primary source of data¹⁹ in this study was the three rounds of interviews that were carried out during the program. This might be considered a limiting factor in my research since the ways in which children best express their understandings are not wholly represented. The expression of children's understandings is largely restricted to oral language, and a richer data set might include children's art, written journals, and photographs (Greene and Hill, 2005; Holstein and Gubrium, 2003; Westcott and Littleton, 2005).

Nonetheless, interviews by themselves can be very powerful tools, since they elicit a personal narrative in which children show, at least partially, what they understand and feel about their experiences (Engel, 2005). I argue that, as a farm participant who recorded observations in this naturalistic setting, I was able to witness growth in children's attitudes and understandings about nature. I was not detached from the reality of their experiences, but shared program activities with them.

Researching and working with children

Doing interviews with children is still inherently problematic. There are several challenges that need to be considered when using interviews as part of the research, and some of these are discussed in the next section. One of the biggest challenges is the child's

¹⁹ Other sources of data were recorded observations, but these were not used in the analysis since the observations were specific to the three children I worked with during the 10-month experience, and there were restrictions of parental consent for interviews. I therefore decided not to include specific observations, but the general recorded observations nonetheless aided in the analysis of the chosen interviews.

perceived expectations of authority and his/her desire to comply with social structures. Since the researcher is in a perceived position of power, children might “give answers that are determined more by their desire to please than their desire to be truthful.” (Greene and Hill, 2005; pg. 9). In this study, I noticed that some of the children hesitated before replying, perhaps wondering whether the ‘answer’ they were giving was ‘right’ or ‘wrong’. Children’s suggestibility is also an important factor to consider, since children are easily influenced by the fact of being studied, and are not always able to remain true to their own experience (Greene and Hill, 2005).

The position of power that the researcher holds over children needs serious consideration, since it is important to give the child the opportunity to feel empowered and express him/herself in an authentic way (Greene and Hill, 2005; Westcott and Littleton, 2005). Being careful not to fall into condescension towards the child, the *ILLP* research team made a conscious effort to engage the child in an active recount of his/her experience. The child was not viewed as a passive and detached subject in this study (Tudge and Hogan, 2005; Westcott and Littleton, 2005).

Power dynamics are present when researching human experiences. Carefully monitoring one’s assumptions can help the researcher to be conscious of these limitations and adapt the methodology accordingly. Even though adults are often viewed as powerful, children can choose to challenge this dynamic by resisting or declining cooperation. This resistance may be the result of the child’s level of comfort, trust and familiarity with the researcher (Greene and Hill, 2005).

Even with these challenges, I argue that there are not sufficient obstacles to keep us from investigating how children think and feel about their experiences in the natural world.

Implications for Education for Environmental Sustainability

As presented throughout this thesis, particularly in Chapter One, the current educational practices regarding the way we teach and learn about the Earth contain many problematic areas that must be reconsidered. The re-conceptualization of environmental education is needed if we are to effectively empower our children to understand the complexity of our reciprocal connection and interdependence with(in) the natural world, and to encourage them to develop a sense of connection and informed responsibility and action. This study holds many implications for the enhancement and implementation of Education for Environmental Sustainability. My findings showed that multi-disciplinary, place-based experiences like the *ILLP* are able to provide the space and nurturing environment for children to start to develop strong ecological identities and environmental consciousness. The study offers evidence that implementing a more holistic approach to teaching and learning about the Earth is effective and can transform children's understandings and attitudes about the natural world. The re-conceptualization of environmental education calls for the creation, development and implementation of more programs that enhance children's awareness, sense of empathy, compassion, respect and responsibility towards the natural world. The findings of this study can be especially helpful in providing educators and planners in different educational settings with starting points to create and implement effective curricula that emphasize place based, hands-on, and multi-disciplinary approaches. It also gives them the opportunity to effectively link educational theories and theoretical frameworks (such as the ones proposed in this thesis) to practice.

There is still much left to investigate with regards to teaching and learning about the Earth, however, and more needs to be understood about the way in which children develop

their ecological identities and environmental consciousness (Hart and Nolan, 1999; Louv, 2005; Rickinson, 2001; Sobel, 2004). This study can aid educators, curriculum planners, and community members in being more conscious of the importance of alleviating the disconnection between self and the natural world, as well as the need to understand the intimate interconnections and interdependencies between and within the natural world. Developing a profound connection to the natural world through caring and understanding is the first step in developing holistic ecological identities and environmental consciousness that can empower children to take action.

Suggestions to Educators, Curriculum Planers and Community Members

I hope that this contribution to the enhancement of education for environmental sustainability serves both as professional and personal inspiration that can empower educators to actively incorporate and live the changes that they want to see. On a personal note, I share that every step of this study was a chance to grow and to be empowered to further my commitment to education for environmental sustainability. Both my participation in the *ILLP*, and my research, provided me with the inspiration to further my skills as an educator. After my contribution as a farm friend in the *ILLP*, I got involved in a summer program (also at the UBC Farm, and also as a volunteer) that aimed to teach children about the farm environment through science and fun activities. This was the Farm Wonders Summer Camp (FWSC) in which I was able to keep testing my ideas and developing my skills. I was also inspired to start, and be actively involved, in the creation of a school garden project at one of the schools that has been participating in the *ILLP* since 2004. With the help of many passionate individuals, teachers, administrators and St. John's College, the

garden came to be, only 8 months after its conception. Plants are flourishing and the children now have a space of their own in which teachers and students alike can practice place-based education. It not only allows the school and their community to learn about growing their own food, but the children who have gone through the program at the UBC Farm can share their knowledge with younger classes. The possibilities are endless.

I encourage educators, planners, and community members to reflect on their own journey with respect to the development of a relationship with nature. Whether they are experienced environmental and sustainability educators or they have just begun to explore the possibilities in this field, it is important that educators are aware of their own influences, values and ideals. Reflecting on this personal process can help educators explore their personal motivations for engaging in environmental and sustainability education, and how these interests have shaped (and have been shaped by) their experience (Connelly and Clandinin, 1988; Clandinin and Connelly, 2000; Hatch, 2002). Hopefully, environmental and sustainability educators who hope to improve the way we teach and learn about the Earth can identify (or develop) the positive elements of their own ecological identities and environmental consciousness in order to enrich their own practice.

Educators, curriculum planners and programmers might find Earth Literacy (Grimm, 2006) to be a useful set of curricular and pedagogical tools to aid in the development of programs and lesson plans that address the needed re-conceptualization of environmental education. Earth Literacy provides a comprehensive, multi-disciplinary approach that not only focuses on developing a relationship to nature, but also on acquiring valuable skills and a more holistic knowledge of the complexity of the natural world. By focusing on the integration of "head, hands, and heart" (Sipos-Randor, 2005) and the use/integration of place

as classroom and curriculum, educators can either create new effective and empowering programs, or re-evaluate already existing ones. This integration can be particularly easy in programs that are designed to be wilderness or outdoor education, but that have not yet incorporated a component of environmental and sustainability education (Louv, 2005; Rickinson, 2001; Wood and Knapp, 2000).

There are several ways in which educators can choose to implement programs and curricula. One of them, as shown in this study, is the long-term engagement with a particular theme that allows children to develop not only a strong emotional connection to place, but also a deeper understanding of natural cycles at different spatial and temporal scales. There is also the possibility of engaging children in a short-term, more intensive program. This method would allow the child to be fully immersed in the experience for a short period of time. Studies have showed that children can start to develop an emotional connection, and acquire competent understandings of the issues they are dealing with, in relatively short periods of time. There are studies that report effective 5-day programs in which children care for living things and quickly develop a strong sense of care (Haluza-Delay, 2001; Kruse and Card, 2004; Scott, 2007). Research supports the effectiveness of 5-day programs, and presents this length as the optimal length of a short-term immersion, particularly in informal learning settings (Gallant and Kydd, 2004; Kydd, 1996). Another way in which educators and community members can provide children with the opportunity to develop a sense of care, respect and responsibility is to create green spaces within the school and/or community. These spaces not only allow the children to experience hands-on, place-based learning, but also allow for the integration of the larger community into the learning process (Esteva and

Prakash, 1998; Leslie, Tallmadge, and Wessels, 1999; Smith, 2002; Sobel, 1996; Sobel, 2004; Vaske and Kobrin, 2001).

Next Steps in Research

This study focused on the growth of children's understandings and attitudes about nature. Even though I was aware of the possible influences and sources shaping children's understandings and attitudes prior, during, and after an experience like the *ILLP* experience, I did not study these influences in-depth. Further investigation of the way in which age, gender, culture and socio-economic status might affect children's attitudes and understandings about the natural world is essential (Barnhardt and Kawagley, 2005; Bowers, 1999; Cajete, 2000; Czech, Devers and Krausman, 2001; Fisman, 2005; Van Velsor, 2004; Zeleny, Chua and Aldrich, 2000). It is important to understand how these factors shape the way children feel and think about nature so that we can adapt our curriculum and pedagogies accordingly. Since this study focused on a narrow age-range, it would be interesting to research how children of different ages respond to similar experiences. David Sobel's (2004) developmental model (identified in earlier chapters) in which he suggests that children's sense of empathy, exploration, and social action might be differently highlighted at different ages is a logical next step. It would be interesting to design a long-term study in which the development of ecological identity and environmental consciousness is mapped from early childhood to young adulthood. This could reveal ways in which we can create nurturing environments that minimize the possibility of children losing touch with their ecological identities, as well as to provide different approaches to education for environmental sustainability. With the aid of these different approaches, children (like Ben in my study)

who do not relate to an experience like the *ILLP* may find other ways to reconnect to nature and develop a stronger sense of interconnection, interdependence, and responsibility.

Since the last (third) set of interviews was carried out immediately after the program ended, the long-term effects of the program on children's understandings and attitudes were not recorded. Even though it is important to document the way children understand and feel about the natural world right after a program like the *ILLP*, it is also important to understand how this experience might shape children's long term understandings about their relationship with the Earth. This study does not speak to the ways in which this program might continue to define characteristics of the child's attitudes towards the natural world. Jackie's case was special in this sense, because she was returning to the program for the second time, and after a year. In her case, I had the opportunity to glimpse how a child reconstructs this experience over the long-term, and how he/she is able to use the knowledge and skills gained during the experience. The permanent *ILLP* research team intends to do follow-up interviews with the first year's participants (2002-2003) in order to document how the project has influenced the children's ideas and attitudes about nature over time. They also hope to find out how children's understandings and attitudes shape their choices and commitments to environmental action (Mayer-Smith, 2006 Pers. Comm.).

Concluding Thoughts

As much as this study was aimed toward understandings children's conceptions and attitudes about nature, it was also an empowering personal journey in which I was able to grow as an educator. Being with the children at the UBC Farm taught me lessons that helped me shape and expand my notions about what education for environmental sustainability

should be and could be. I had a tendency to over-romanticize the idea of re-conceptualizing environmental education (and perhaps still do to some extent), but the children showed me that some of the assumptions I had made prior to the experience were too general, and did not always apply to particular learning situations. The children also reminded me that every child is unique, and that each learns in his/her own way. The children taught me patience, and taught me to challenge myself as a mentor figure in order to let go of the urge to direct their learning, and instead allow them to own their experience. In this way, they made choices about the way they wanted to learn.

The research findings focused on the growth of children's attitudes, engagement and understandings about nature. These findings provide evidence that multi-disciplinary and multi-sensorial experiential education is beneficial. This type of education needs to incorporate cognitive, affective, and practical components that offer children opportunities to experience nature and develop ecological identities that will enhance their environmental consciousness over time. Through their powerful journeys at the UBC Farm, the children not only understood the interconnections and interdependence between land, food and community, but they also nurtured an empathic connection to nature while building social relationships with their farm friends during the intergenerational experience. This study presents a window into the value of potentially incorporating Earth Literacy, Transformative Sustainability Learning, and Place-Based Education into experiential settings, as well as their usefulness in creating future, effective curricula.

The goal of education for environmental sustainability is not only to empower our children to become stewards of the Earth, but also to enable them to truly understand, embody and feel the magnificence of this planet we call home.

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APPENDIX B

Interview Questions

Protocol B.1.

First interview. From the ILLP Research team.

Project: Cultivating Environmental Stewardship in Young People Through an Intergenerational Landed-Learning Experience on UBC Farm

Guiding Interview (Student) 1 Questions LL Project 05-06

Initial interviews – some students who participated in the project last year.

The purpose of these interviews is to gain a sense of students' experience with nature, the environment, and their experiences with caring for living things.

Introductory questions

1. Tell me about yourself and your family.
2. Do you have any siblings? Older, younger? Do you take care of them at all? Do you have grandparents?
3. Have you ever had a family pet? How did you care for it?
4. What kinds of things are you expected to do around the house? Do you help out with any chores?
5. Have you ever planted or grown anything before coming to the UBC farm? What? When? With whom? Did you like the experience? What did you do? Do you have plants in your house? On a balcony? Do you have a yard? A garden? Do you look after any of these plants? What do you do? Etc.
6. What types of places do you find special to you? Where (how) do you like to spend time that you have to yourself?

Farm questions

7. When you think about a farm, what do you imagine? (If I ask you to draw me a picture of a farm, what would you draw?) - *We can ask students to bring their farm journals with them and use drawings they have.*
8. Have you ever visited a farm before this project? Tell me about your experience
9. Are farms important? To whom? If so, how, why?

Environment questions

10. If I ask you to draw a picture of the environment what would you draw? Why? What would you include in your picture? What other things could be there?
11. When you hear the word "nature", what do you think about? If I ask you to draw "nature" what would you draw?
12. What sorts of issues in nature / environment have you heard about?
13. We often hear the word "organic". What does the word organic mean? What does organic farming mean?

Project questions

14. Have you participate in this project last year? Are you happy to be back? Why? Why not?
15. is there something that you want to learn this year? What do you want to do at the farm this year?
16. What do you remember from the last year? (what do you remember from the last year's visits to the farm?)
17. Have you any questions about the project?

Protocol B.2.

Second interview. From the ILLP Research team.

Project: Intergenerational Landed-Learning Experience on UBC Farm
Interview #2 - Students -- Guiding Questions (March, 2006)

Questions about the project and how they value this experience

1. Do you like going to the farm? What do you like or not like? In what ways?

SUBQUESTIONS for Questions #2:

On Groups: *If Students talk about working w/ their friends in Groups ask these..., [If not you can ask - do you like working in Groups?...]*

- How successful was your group so far? How is the growing going? How do you feel about it? Is there a competition between groups?
- How does your group make decisions?
- Is there a specific role you have?

On Farm Friends: *If Students talk about their Farm Friends ask these... If not you can ask them directly about their Farm Friends... (Value of being, working with elder people?)*

- How do you like working with your FF? How do you like talking with your FF? Is he/she easy to talk to?
- What are you doing with your FF?
- What are you learning from your FF? How?

Construction of the view of work

1. What do you think about the farm-work? What job/s do you prefer to do? Why? What counts as a difficult task and why?
2. What activities do you like...?

If they say they like tools then follow up with the next question...

- Why /How do you like using tools?

Learning and Links to curriculum

1. What have you learned from the project so far? *Ask lots of follow up questions here... Rationale Note: Here we want to see how they are imagining this project: That is are they seeing this project as /learning things about science? Environment? People? Farms? Food?*
2. What other activities have you been doing that you enjoy... or don't enjoy? Please describe these.
3. Do you see the connections between project activities and what you learn in class? Please Explain...

Communication about the project, links to home [This question may fit with the ones above...]

1. Do you talk about your farm activities with anybody? Who? What do you tell them. What do you say? What do they say/feel?
2. What about your friends in the class think about the project? Do you think they enjoy going to the farm? What do they say about it?
3. Is there anything in this project that you can use at home? What? How? In what ways?

Protocol B.3.

Third interview. From the ILLP Research team, with some of my contributions

**Project: Cultivating Environmental Stewardship in Young People
Through an Intergenerational Landed-Learning Experience on UBC Farm**

Guiding Interview Questions LL Project 05-06

Student interview 3

1. Now that the farm project is finished, is there anything that stands out in your mind? Something you will really remember? What? Why?
2. What part of activities at the farm did you like most of all? Least of all? Why? What job/s do you prefer to do?
3. Tell me what you know / think about farms and farming now? What have you learned about farms from this project? What about farming and farmers?
4. What did you get along with your Farm Friend?
5. Would you like to work on a farm in the future? Why? Why not?

6. What have you learned at the farm/ at school? about science? Math? Art? Other subjects? Could you give me an example....? Is there a connection between what you do at the farm and what you do in school?
7. Do you feel that you've learned something about the environment?
8. What else have you learned during your visits to the farm?
9. Did being at the farm introduce you to any new food? What was your favorite thing to taste at the farm?
10. What did you learn about organic food?
11. Do you talk about your farm project at home? What do you tell them? What do you say? What do they say/feel? What would you tell your friends about working on a farm project?

My contributing questions:

12. Do you think environment and nature are the same thing?
13. Do you consider yourself part of nature/environment? Why? Why not?
14. Do you think Farms are important places? Why? Why not?
15. What are/is your favourite food(s)?
16. Do you eat organic food at home?

APPENDIX C

Understandings and Attitudes Range Scales

Table C.1. Range of understanding of interactions, interdependences and interconnections in the natural world. Simple (1) ←-----→ Complex (4)

Range	Description
<i>Simple</i>	The child has considerable difficulty conceptually understanding interactions, interdependences and interconnections in the natural world, as well as recognizing different spatial and temporal scales among these. He/she is able to grasp simple concepts and individual parts or cycles but cannot link them together. He/she often uses only simple terminology to describe concepts or might even sometimes misuse or confuse these terms (often scientific).
<i>Developing</i>	The child is beginning to conceptually understand the interactions, interdependences and interconnections in the natural world, and is able to recognize simple spatial and temporal scales among these. He/she is able to connect simple concepts and individual parts as well as identifying different cycles using slightly more sophisticated terminology. He/she still might confuse or misuse terms (often scientific).
<i>Becoming established</i>	The child is able conceptually understand the interactions, interdependences and interconnections in the natural world, and is able to recognize some spatial and temporal scales among these. He/she is able to grasp more difficult concepts and individual parts, connecting them to various cycles. A more ecological understanding emerges and the child is able to use concepts and terms in mostly appropriate ways. There might still be confusion or misuse of (often scientific) terminology.
<i>Complex</i>	The child is able to understand, recognize and apply complex processes at most spatial and temporal scales, and has an embedded and good understanding of interactions, interdependences and interconnections in the natural world (a better shaped systems thinking perspective). The child uses the appropriate (often scientific) terminology when referring to specific concepts.

Table C.2. Range of children's attitudes and levels of engagement towards the natural world.

Attitude Range	Description of Attitudes
<i>Hostile</i>	The child displays fear or dislike for interacting with the natural world and is largely uninterested in engaging with learning and with the surroundings. He/she is often unwilling to participate and not likely to share or show emotion and empathy towards his/her surroundings, including people and environment.
<i>Passive</i>	The child seems indifferent towards interacting with his/her surroundings and might display some fear towards the natural world. The child might participate if asked to do so, but the quality of engagement will be minimal since participation is not desired or voluntary. He/she shows reservation in showing emotion and empathy towards his/her surroundings, including people and environment.
<i>Interested</i>	The child displays a noticeable interest in interacting with his/her surroundings but there are still some evident fears and hesitation about engagement. The child needs lots of encouragement. He/she shows signs of emotion and empathy towards his/her surroundings, including people and environment. A sense of connection and compassion seems to be developing.
<i>Engaged</i>	The child displays active interest in interacting, exploring and getting to know his/her surroundings, and to willingly participate in activities. Minor reservations/insecurities might still linger and therefore, reassurance and guidance are needed often. He/she shows higher degrees of emotion and empathy towards his/her surroundings, including people and environment, and has an evident sense of connection and compassion.
<i>Impassioned</i>	The child displays a strong and active interest in interacting, exploring and getting to know his/her surroundings. Guidance and encouragement are still an important component, but the child is mostly self-guided and very willing to be engaged (also showing signs of leadership). He/she has a deep level of emotion and empathy towards his/her surroundings including people and environment. The child has a deep sense of connection, compassion and respect for everything around him/her.

APPENDIX D

Summary Tables of Children's Stories

Table D.1.

Jason's summary

	Jason – shy
Highlights and unique characteristics	<ul style="list-style-type: none"> - Established sense of place - Relationships with mentors - Transforming attitudes related to his engagement through direct experience
Depth and change in understandings	<ul style="list-style-type: none"> - There was not much change about his views on the importance of farms – he did not think they were that important - Understanding of environment and nature were unclear. Little mention of env. problems, and seemed to view nature as “out there”. These understandings did not change much. - Understanding of complexity with respect to farming was unclear at the beginning. Some understanding began to emerge by the end of the program - Conceptions of organic farming and planting were starting to emerge, and some specific understandings about farms and farming were transformed.
Depth and change in attitudes and levels of engagement	<ul style="list-style-type: none"> - Started to see the value in learning through direct experience - Jason's level of engagement increased as the program progressed, which in turn lead to an increase in learning – eg. his knowledge of spacing and planting - He had a special connection to Ottawa and, particularly, to his experiences with his grandmother before the program – he related this to the development of a more interactive relationship with his farm mentor. - The most striking change in Jason's attitudes was his opinion about sharing and sharing of decision-making, responsibilities. He felt a more communal process. - Jason's affinity to plants (a developing sense of attachment) increased, even though his understandings and feelings about farms did not change much.

	<p>- I think that, if given more time, Jason would have further developed a more defined, complex and holistic cognitive understandings about the natural world, and would have had even higher levels of engagement and positive attitudes towards nature.</p>
Comparison	<ul style="list-style-type: none"> - In contrast with Ben, Jason's attitudes and engagement changed, but his understandings did not, where as Ben's understandings changed but his attitudes and level of engagement did not. - Unlike Ben, even though Jason wants to be a hockey player and cannot see himself as a farmer, there was some change in attitudes and levels of engagement in Jason's experience. - Understanding of complexity, or at least his expression of it, was a simpler than the other kids. - Unlike Christa, Jason was not able to see the connection between learning at the farm and learning at school. He was, however, able to connect and apply at home some of the learning from the farm; re: tools. - Unlike Daniel and Jackie, Jason was not as articulate. Like Aaron, she was shy about sharing his views and understandings, but did show excitement about the experience when talking about it.
EL	Living Together, Bioregionalism

Table D.2.
Christa's summary

	Christa – chatty and energetic
Highlights and unique characteristics	<ul style="list-style-type: none"> - A lot of enthusiasm and positive attitude. - I was best able to map the spheres of influence in a child's life. They were clearly and explicitly defined. - Sense of interconnection, interdependence, as well as respect (for farms and farming) and a sense of responsibility were already established from the beginning due to the previous experience in the family farm. - Connections between learning and experience being able to relate all learning contexts (school and farm). - Sense of pride and accomplishment. - Social relationships and a sense of respect for farmers and farming - Feels that the farm is like recess at school.
Depth and change in understandings	<ul style="list-style-type: none"> - Good understanding of interconnections, and it grew stronger as the program progressed. - Good understanding of farms and their importance from the beginning, growing stronger as the program progressed. - Understanding of organic food and farming a bit unclear, and by the end of the program, still had not changed significantly. She was surprised to learn, however, that organic farms were not as common as she thought. - Views on environment, nature showed a good understanding of interconnection and became a little bit more encompassing by the end of the program. - Her understanding and conceptions of environmental problems were a little bit fragmented and limited. She struggled to make connections between the causes of these problems, but she was still able to bring her sense of responsibility to start to develop some ideas about actions that can be taken to alleviate these problems. It did not change that much. - Christa also felt that she could employ the knowledge about tools else where.
Depth and change in attitudes and levels of	<ul style="list-style-type: none"> - Positive attitudes about farms and farming were well developed even before ILLP. Her previous experiences aided in shaping this attitude. The experience at the farm enhanced this attitude. - Always excited to learn. - However, even with these positive attitudes and understandings, she still showed some reservation towards

engagement	<p>close contact (interaction) with creatures at the farm. Eg. worms and chickens.</p> <ul style="list-style-type: none"> - Social relationships with mentors seemed to give her a stronger sense of respect for farmers. - It was a meaningful experience and developed a sense of attachment to the farm space, but above all, she cared about the social relationships and bonds she had form. Showed a strong sense of belonging. - Her sense of responsibility and stewardship also grew stronger. - She felt more self-confident and felt a sense of pride and accomplishment.
Comparison	<ul style="list-style-type: none"> - Both Christa and Jackie were expressive and chatty. Christa's understanding and sense of interconnection and interdependence came from previous experience, just like Jackie, but Jackie had the farm experience, whereas Christa's previous experience was outside the farm. - Both Christa and Daniel made social relationships and learning through community one of their top priorities. - Christa was the only one that could see the complete connection between learning at the farm and learning at school.
EL	Complexity, Ecoliteracy, Living Together

Table D.3.

Daniel's summary

	Daniel – open and genuine
Highlights and unique characteristics	<ul style="list-style-type: none">- Creative imagination - great sense of wonder, adventure, discovery and exploration.- Understandings and attitudes were mainly shaped by the sphere of home.- He loves learning new things and his level of engagement and positive attitudes are enhanced when he meets new people.- He has a unique, international perspective on farms.- He displayed a more global understanding and made connections beyond home, school and community.- Feels proud of his knowledge and learning at home.
Depth and change in understandings	<ul style="list-style-type: none">- His understanding and knowledge of farming and specific processes of gardening are well developed, and his language and terminology are more sophisticated.- His understanding of gardening and planting (specific processes) changed throughout the program. However, his understandings of larger scale concepts such as farms, farming and environment remained largely unchanged after the program.- His understanding of environmental issues is well developed, because of his learning at home, but it did not seem to change much after the program.- Though he did not find this a new experience at the farm, he did express that he learned a few things about gardening and planting.- One specific change in his understanding was his knowledge about organic food and farming.- His understanding of the importance of farms was not clear.- His conception of what international farms are like in comparison to the ones here was most interesting.- Daniel's understanding of environment was complex and was intricately related to environmental problems.- His understandings about environment and farms did not seem to change much from the experience at the farm. They are largely influenced by his learning at home through his siblings. His sense of interconnection and interrelationship at a more global scale was prominent.- His understanding of interconnection and interdependence was there, but was weaved in his words, not explicit.- It was unclear whether or not he thought nature and environment were the same thing, but I could see that he

	was one of the few that included humans in this conception.
Depth and change in attitudes and levels of engagement	<ul style="list-style-type: none"> - His level of enthusiasm and engagement increased as the program progressed - He had positive attitudes to begin with, but he thrived in learning in a new setting, and with new people. - He really valued the time spent with his farm mentor as well as the knowledge he gained from that experience. - Daniel's identity as a gardener was largely shaped by experiences and learning at home, but also (although to a lesser extent) through the farm experience. - His sense of responsibility and stewardship was well developed and understood causes of sources of some of the environmental problems.
Comparison	<ul style="list-style-type: none"> - Like Chirsta and Jackie, Daniel really valued social relationships and a sense of community. - Unlike Jason or Jackie, Daniel did not have a special place. But unlike them, his sense of wonder and exploration were prominent. - In contrast with Christa, but like Jason, Daniel's previous experience with gardening comes from home and his family. - Like Jackie, Daniel's knowledge about science and specific processes is well developed. They both articulate it well. - Like Christa and Jackie, Daniel felt proud of his knowledge.
EL	Complexity, Globalization

Table D.4.
Aaron's summary

	Aaron – quiet, observant, contemplative, nurturing
Highlights and unique characteristics	<ul style="list-style-type: none"> - A deep connection/longing to be in contact with nature - Appreciation and value of the natural world - A more holistic and caring/nurturing sense of empathy, showing sensitivity and compassion towards plants. - Easily makes connections between the natural and social worlds and how they are interconnected and interdependent. - Sense of responsibility - Best example of Anthropomorphosis
Depth and change in understandings	<ul style="list-style-type: none"> - His knowledge of terminology is sophisticated. - His understanding of interconnection and interdependence was weaved through his theme and experiences rather than explicit. - His conceptions of farms were not clear at the beginning, and I was not able to discern how much this particular conception changed. From his other responses, I can safely assume that his understanding did change towards a more holistic view. - His understanding of the importance of farms (in terms of nutritional and economic matters) was shown through his understanding of our dependence on the natural world. His understanding of the importance of farms and the effort it takes to grow food was only stronger after the program experience. It was here that his understanding of interconnection and interdependence was most clear and articulate. - He was the only child that showed a more holistic understanding of the interconnection, interdependence and interrelationship of our world, along with displaying a strong sensitivity towards fragility and complexity of the natural world. - His understandings of environmental problems were partly shaped by what he learned at school and partly by his experience at the farm. Furthermore, he understood that the causes of these are human induced and that we need to find alternatives.
Depth and change	<ul style="list-style-type: none"> - The depth of his connection was uplifting and he had a deep sense of belonging to nature. - He also deeply appreciates not only the interdependence, but also the intrinsic value of the aesthetics of

in attitudes and levels of engagement	<p>nature.</p> <ul style="list-style-type: none"> - Has a connection to a special place that provides comfort and calmness. - It was through Aaron's profile that I was best able to show the importance of the development of a nurturing sense of empathy in a child's relationship with nature that can foster a sense of responsibility. - Aaron was always concerned about how to keep plants "happy" and "healthy". His concern for the well-being of the plants was only stronger as the program progressed. He was most excited by watching and wondering what the plants would turn out to be. However, curiously, the same sense of wonder was challenged by a sense of impatience about waiting for the plants to grow. - Though a quiet boy, his level of engagement was not low and he seemed to be involved and engaged in the experience of planting and gardening. He always had a nurturing and positive attitude, and loves being outside, doing hands-on learning through direct experience. - His sense of responsibility was evident. He understood that we need to "help" the Earth and keep it healthy, and he knows that we should try to change things.
Comparison	<ul style="list-style-type: none"> - Like Daniel, Aaron's experience with gardening came from home and particularly his dad. However, Aaron's home planting experience did not seem to be as influential or as vast as Daniel's. - Like Daniel and Jackie, Aaron's knowledge of terminology is more advance than the other kids even though Aaron is not as eloquent. - Unlike Daniel, Aaron's views are less anthropocentric and more inclusive of non-human species. - Like Jackie, he represented our need for contact with nature, not only for our physical and mental health, but also for our emotional health. - Unlike Christa, Daniel or Jackie, Aaron did not emphasize social relationships. - Like Jason and Jackie, it was through Aaron that I was able to see another manifestation of a sense of place. - Like Jackie and Daniel, he was able to really express his environmental concerns and awareness. - Unlike Ben, Aaron was most nurturing and caring.
EL	Deep Ecology, Complexity, Ecoliteracy.

Table D.5.
Ben's summary

	Ben – active, focused
Highlights and unique characteristics	<ul style="list-style-type: none"> - He was the one that showed me that not every child is profoundly moved or changed by an experience like this. - He really likes soccer, and is determined to be a professional soccer player. - Showed sufficiently developed understandings about farms, planting and growing food, the environment, but his attitudes towards it were indifferent and not of concern.
Depth and change in understandings	<ul style="list-style-type: none"> - Ben had had gardening experience before the program, but I was not able to discern his understandings in that respect because he relate to it and therefore did not include it in his conversations. - Ben did not think farming was important, and his view did not change much as the program progressed. However, he recognized, even at the beginning of the program, the importance that farms have in relation to providing food. - His conception of farms was interesting: at the beginning he thought of farms as only rural, and was surprised to find that the UBC farm was an urban farm. - It was his conception about organic farming that was most clear amongst his understandings with respect to the farms and farming, and it expanded as the program progressed. - He understood the work and effort that goes into food production. - There were some surprises in Ben's understandings with respect to how plants grow. He learned that plants can grow fast and healthy, if given the right conditions. He also knew what those right conditions were. - He saw a clear difference between environment and nature, though he also so a few similarities. He included humans in environment, but excluded them from nature. These views did not change much after the program. The similarities between nature and environment, for Ben, came together in the "problems" - He showed very few emerging signs of an environmental consciousness, and understands (quite well) the complexity of environmental problems, but this knowledge was not accompanied by an empathic connection or concern, or a sense of responsibility. - He showed budding understanding of interconnection, and was even able to see a little bit of a connection between learning science and about the environment both at the farm and at school – something Jason could not see.

Depth and change in attitudes and levels of engagement	<ul style="list-style-type: none"> - He was indifferent towards planting and the farming experience. He did not dislike it, but would rather play soccer. - He cannot see himself as a farmer. - He had fun interacting with the chickens and other live creatures such as worms, and still by the end of the program he thought this was a lot more fun than planting. Planting was still more fun than school. - Although he understood the importance of farms, and knew the amount of work and effort involved, he still was not engaged, neither did he have a more positive attitude towards the process. He was still indifferent. - The only attitude change in Ben's experience was probably his realization that working in groups is not so bad, and was able to see the value in doing so. He felt a sense of ownership and accomplishment. - He was somewhat reluctant to share his views and understandings.
Comparison	<ul style="list-style-type: none"> - Like Christa and Daniel, there was a slight sense of ownership and pride in the work accomplished. But unlike them, Ben's level of excitement about the farm experience was low. - As Jason, Daniel and Jackie, Ben thought that environment and nature were not the same thing. However, Ben thought that environment included humans, but nature did not. - Ben's understandings were sufficiently advanced, even more than Jason's, but he was not able to develop an emotional connection, like Aaron did, because he could not relate this experience to his passion.
EL	Complexity (cognitive)

Table D.6.
Jackie's summary

	Jackie – articulate and expressive
Highlights and unique characteristics	<ul style="list-style-type: none"> - She has had the opportunity to experience this program for 2 years in a row - She showed that, given the opportunity and encouragement, children can feel part of their learning and feel confident to contribute. She felt empowered during and after the program. - She was one of the best examples of the benefits of Intergenerational Learning. - She was able to intricately weave knowledge about culture, history, heritage and the natural world into her conception and attitude towards the environment. - She allowed me to see the development of a sense of place while in the program. She rekindled a sense of wonder, adventure and connection. - She showed the most advanced scientific understanding, probably due to the fact that her farm friend was specifically emphasizing that aspect. - It was through her profile that I was best able to see how children can make meaningful connections between land, food and community. - Intricate understanding of the interconnection and interdependence between humans and the natural world. - I was able to get a glimpse of the lasting effects of a program like this, a year later. I was able to see how she reconstructed and embodied that information.
Depth and change in understandings	<ul style="list-style-type: none"> - She learned even more about planting, plants and soil. - Her understanding of interconnections and interrelationships was quite developed, perhaps because the previous year's experiences. - This year at the farm she learned about hydroponics and was able to formulate hypotheses. What was most striking about this was her ability to propose alternative solutions to farming. - Jackie's conceptions of farms had not changed that much by the end of this year's program, but after two years in the program, she came to really value the work that farmers do. - Her understanding of more global connections was the most articulate among this sample, and what is more, she was able to articulate best the importance of farms, and the importance of programs like the ILLP. - Her understanding of interconnections was well developed, and she understood the complexity of the natural world quite well.

	<ul style="list-style-type: none"> - She sees nature and environment as the same thing, but intriguingly she did not include humans in that sphere.
Depth and change in attitudes and levels of engagement	<ul style="list-style-type: none"> - She was most excited about group work and working towards planting in community. - I was able to see the excitement and willingness to participate in the program, especially knowing that she had had this experience before. - She did not present any signs of fear towards the live creatures at the farm, unlike Christa. - Her environmental consciousness and sense of responsibility (and also wanting to take action) were well developed and were articulated well. - Her understanding of environment, nature and environmental problems because more focused on her experience at the farm by the end of the program. - She expressed a strong desire to be outdoors and learning in nature. - She developed a new sense of belonging and found a special place in the forest, sparking a new found sense of wonder, adventure and connection. She felt this as an escape from the stresses of society.
Comparison	<ul style="list-style-type: none"> - Just like Daniel, and Christa too, Jackie found that social relationships were very important. - Unlike Christa, Jackie had saw no connection at all between the experience at the farm and what she learns at school, even after 2 years. - Like Christa, Jackie had a profound respect for farmers and the work they do. - Like Daniel, she was able to add a more global and community component to the importance of farms, and like Aaron, she was able to relate the importance of farms well to the social sphere. However, she gave me a sense of bioregionalism. - She gave me the most clear picture of how understandings and attitudes about environment can converge to produce responsibility. - Like most, she thrived in learning through direct experience at the farm. - Unlike Aaron and Jason (whose sense of place was already established), she developed and enhanced her sense of place during the program. - Like Daniel and Aaron, she is very aware of environmental problems and seems to be able to handle them well, unlike Christa who was a little bit confused about the issues.
EL	Globalization, Trajectory of Now, Bioregionalism, Complexity, Ecoliteracy