

DIRECT EXPERIENCES IN NATURE

by

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ABSTRACT

This thesis puts forward a philosophical and educational justification for experiencing nature directly rather than indirectly, vicariously or symbolically through practices that essentially remove and distance us from nature. I argue that schools ought to provide direct experiences in nature, a conclusion supported by many benefits reviewed in the literature. An analysis of nature study/environmental education, place-based education, biophilia education and deep ecology informs the identification of three types of direct experiences in nature: initiation, immersion and intimacy. A philosophical inquiry examines these three types of direct experiences in the context of an affinity with nature. In particular, selected writings from Rachel Carson, Barbara McClintock, Mihaly Csikszentmihalyi and Thich Nhat Hanh inform qualities for each type of direct experience. Additional pedagogical perspectives flesh out my thinking and provide an educational justification for experiencing nature directly. Lastly, four vignettes illustrate human beings experiencing nature directly as proposed.

I draw from Carson's writings to identify two important qualities for initiation to direct experiences in nature: sensing and feeling in addition to knowing nature as well as having a companion in nature. The second type of direct experience, immersion, includes repeated experiences to help one become more observant and more connected to nature. This second level attends to the challenges of experiencing nature directly. I draw from Csikszentmihalyi's research to conceptualize a sense of flow experienced during immersion in nature. Carson's writings also help in articulating a sense of wonder from immersion in nature. These three aspects, repeated experiences, flow and sense of wonder, deepen our affinity with nature. Finally, I examine the importance of intimacy, the strongest affinity with nature that we can develop during direct experiences in nature. I address two aspects of intimacy with organisms in

nature: a feeling for organisms, human and non-human, drawing from McClintock's research as well as the notion of inter-being, explored by Nhat Hanh.

I suggest that these three types of direct experience—initiation, immersion and intimacy—develop different levels of affinity with nature that can inform the way we think about place-based education in schools.

Keywords: place-based education; direct experiences; initiation; immersion; intimacy; affinity with nature

DEDICATION

I dedicate this dissertation to my companions.

family

initiation

friends

immersion

learners

intimacy

non-human beings

affinity with nature

Our journey continues!

The lasting pleasures of contact with the natural world are not reserved for scientists but are available to anyone who will place himself under the influence of earth, sea and sky and their amazing life. (Carson, 1987b, p. 95)



(Photographed by Q. Mulder ten Kate)

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CHAPTER ONE: INTRODUCTION

Introduction to the Dissertation

What types of nature experiences contribute to becoming an educated person? What needs to change in our schools, in particular our pedagogy, to support these types of experiences? This thesis takes a step in answering these two questions by examining direct experiences in nature. My argument is founded on an affinity with nature and concern about how we conduct environmental education in schools. The problem for this thesis is an ever-widening separation between human civilization and the rest of the natural world. I see this problem to be at the root of an increasing concern for environmental degradation and need to return to direct experiences in nature. I address this problem as an educational matter, drawing on my experiences in nature as a young girl and as a friend, aunt and educator to propose that fellow educators and learners alike ought to have direct experiences in natural settings. After analyzing contemporary literature that informs the inclusion of nature experiences in education, I identify and examine three types of direct experiences in nature. A synthesis of pedagogical insights and illustrations of educational practices in nature support my position. The upshot of the thesis is a normative position about the quality of educational experiences afforded by direct contact in nature, together with a conceptualization of three distinct types or levels of affinity with nature.

The justification for this work rests on media reports and literature regarding an increasing occurrence and magnitude of an environmental crisis, together with what appears to be increasing public apathy and disregard for environmental degradation. I review current reports on environmental trends in the media, environmental education literature and British Columbia's Ministry of

Education documents that provide the context for my position. What are the effects of these trends on our lives and how do they affect our education in schools?

Environmental Education Barriers

As a secondary school classroom teacher in the province of British Columbia (BC), I experience four barriers that hamper my ability to implement environmental education (EE): conceptual barriers, logistical barriers, educational barriers and attitudinal barriers (Ham & Sewing, 1988). Conceptual barriers result from a lack of scope and sequence for EE. BC's Ministry of Education published the *Environmental Concepts in the Classroom: A Guide for Teachers* (1995) and recently published a revised edition, called *Environmental Learning and Experience: An Interdisciplinary Guide for Teachers* (ELE) (2007). The Environmental Educators' Provincial Specialist Association (EEPSA) and BC Hydro developed *The Environmental Learning & Experience Curriculum Maps: Environment & Sustainability Across BC's K-12 curricula* (2008/2009) in consultation with the BC Ministry of Education Green Schools Education Programs to complement the implementation of ELE by teachers. This document, a scope and sequence, links the principles and practices from ELE to mandated integrated resources packages that teachers consult when planning their lessons. Its rationale states:

In 2008, a set of ELE Curriculum Maps has been developed to help teachers turn theory into practice for environmental learning by connecting learning outcomes across K-12 curricula with elements of the ELE Guide. Teachers adept at integrating the environment and sustainability into their practice are often well aware of these curriculum links, while others may find the connections less obvious. These maps help to show us where the connections already exist, and how we might further incorporate environmental themes into our teaching and learning. (p. 7)

I frequently infuse my Science 9 and Science 10 courses with EE principles and practices outlined in these three documents. For example, I incorporate

curriculum activities such as exploring climate change, practising energy conservation, planting trees, raising salmon in the classroom, testing water quality and visiting a local hatchery.

I may also experience logistical barriers defined by Ham and Sewing (1988) as “those stemming from a perceived lack of time, funding, resources, suitable class size, and so forth” (p. 17). I believe that by infusing EE into school subjects, students learn how the environment connects to all aspects of their daily lives. This approach encourages me to be more efficient with my time and to be effective with limited resources. For example, my students walk through their community, remove invasive plants, examine creek geology and listen to community experts at no additional cost to the School District. Furthermore, students volunteer with local environmental organizations to help with their projects. However, I believe that extra time and funding would encourage more teachers to use EE as a means for more integrated, effective learning—teachers who may have limited access to community resources, limited EE awareness, understanding and skill, and who are willing to learn effective strategies.

The third barrier is educational in nature and results “from teachers’ misgivings about their own competence to conduct EE programs” (Ham & Sewing, 1988, p. 18). The first document mentioned above, *Environmental Concepts in the Classroom: A Guide for Teachers* (1995), stresses the importance of direct experiences:

Direct experience with the environment, both individually and in groups, is an important and vital way to learn. Such opportunities must be provided for the studies to be relevant, because they help provide students with a deeper understanding of natural systems and the impact humans have on those systems. (p. 7)

This dissertation examines direct experiences in nature. In particular, I propose that teachers ought to have direct experiences in nature with their students, regardless of an already overcrowded curriculum, lack of resources and limited professional development.

Lastly, attitudinal barriers “are those stemming from teachers’ attitude about EE and science instruction” (Ham & Sewing, 1988, p. 18). How can I support attitudes that promote the implementation of EE? These most recent Ministry of Education documents, available on line at http://www.bced.gov.bc.ca/environment_ed/, clarify the practices and principles of EE for BC teachers. This website offers resources for the infusion of EE into mandated curriculum.

Teachers who want to infuse EE must be able to address all of the four barriers for this approach to be effective. How do we encourage more teachers to make sense of EE, to infuse EE into mandatory curriculum and to give students opportunities to become more environmentally responsible, active citizens? It is my commitment to lead by example and this dissertation is another step in that direction.

Environmental Trends

I begin by reviewing a few environmental trends expressed in EE literature, recorded in BC’s media and outlined in BC’s Ministry of Education documents. What are the effects of these trends on our lives? How is our educational system responding to these environmental trends? This chapter is a first step toward supporting my proposition that schools ought to provide direct experiences in nature. Subsequent chapters philosophically analyze three levels of direct experiences—initiation, immersion and intimacy—and explore pedagogical perspectives that inform this normative stance.

Environmentalism in the Literature

Each generation of children experiences the consequences of their parents’ understanding of nature and their actions in nature. Orr (2002) discusses how children’s lives are changing from direct contact with nature to indirect contact with things other than plants and animals in nature to even symbolic abstractions of nature (p. 291). Louv (2005) identifies similar trends: “In

the space of a century, the American experience of nature has gone from direct utilitarianism to romantic attachment to electronic detachment” (p. 16). The five trends are:

... a severance of the public and private mind from our food’s origins; a disappearing line between machines, humans, and other animals; an increased intellectual understanding of our relationship with other animals; the invasion of our cities by wild animals (even as urban/ suburban designers replace wildness with synthetic nature); and the rise of a new kind of suburban form. (p. 19)

These trends demonstrate a decrease in human beings directly experiencing nature, changing our intellectual and emotional relationship with nature.

Orr (2005a, 2005b, 2005c) briefly discusses the changing relationships between people, places and nature over the past two centuries. He appeals to the reader to think carefully about current trends in, for example, technology, mobility, abstract thought and overspecialization that tend to separate humans from their places and nature. Children around the world still play in nature; however, time spent in nature has been steadily declining for the past few generations (Louv, 2005). For example, Nabhan (1994) states: “Yet the percentage of children who have frequent exposure to wildlands and to other, undomesticated species is smaller than ever before in human society” (p. 85). This decline is a result of: “Since World War II, television, formal classroom education, and urban migration have dramatically disrupted oral traditions, and reduced the frequency of most children’s involvement with other-than-human organisms” (Nabhan, 1994, p. 85).

Pyle (2002) notes that a decline in these types of “free” nature experiences may result in a general lack of concern for other living species, and, therefore, result in a disconnect and ultimate neglect of this earth and all its life forms. He writes:

The extinction of experience postulates that daily contact with a diversity of experiences—botanical, zoological, cultural, architectural, social—leads to an appreciation for the elements of a rich setting, if only implicit; to concern [*sic*]; and ultimately to the desire to conserve. But when common species disappear, they

might as well (in one sense) be wholly extinct for those with a narrow radius of reach. Further, when variety thus drops out of the local scene and a sameness sets in, the sequelae may include widespread ignorance of the world's diversity, followed by disaffection, alienation, and apathy. (p. 312)

The extinction of direct experiences in nature has physical, intellectual, emotional and moral implications. For example, Pyle (2002) notes:

Physically, youngsters suffer from the absence of exercise in fresh air that outdoor scrounging traditionally provides. The current epidemic of early onset obesity owes much to sedentary substitutes for outdoor play. This too creates a feedback loop, for the more slothful a child grows, the less likely he or she will be to seek physical play beyond the television or computer room, and the more likely he or she will habituate to recreational, even compulsive eating. (p. 315)

Even though Pyle acknowledges that intellectual development does not depend on being in nature, he argues that limiting access to nature greatly reduces awareness, imagination, reasoning, observation and creativity.

Fewer direct experiences in nature negatively affect, for example, a human's intellectual development, physical health, emotional well-being and an ability to connect with nature. "How should human beings live their lives?" is a fundamental question. Orr (2005a) urges everyone "to pay full and close attention to the ecological conditions and prerequisites that sustain all life" (p. ix) and to "foster ecological imagination, critical thinking, awareness of connections, independent thought, and a good heart" (p. x). Capra (2005), another advocate for ecological literacy notes: "These three basic phenomena—the web of life, the cycles of nature, and the flow of energy—are exactly the phenomena that children experience, explore, and understand through direct experiences in the natural world" (p. xiv).

Environmentalism in British Columbia's Media

I experienced environmental crises, such as deforestation, polluted soils and drinking water, regular traffic gridlock, manure overproduction, species

extinction and habitat destruction from about 1966 until 1983 when being raised in the Netherlands. Decades later, BC, my home for the past 28 years, is now in a very similar position. Species loss, water shortages and pollution, irregular West Coast Sockeye salmon returns, glaciers melting at rapid rates, air quality alerts, pine beetle infestations and extreme weather patterns are just a few of BC's current environmental crises.

I read every issue of *The Vancouver Sun* and the *The Tri-Cities* local newspapers during the month of April 2010 expecting to read articles to celebrate and to coincide with the 20th anniversary of Earth Day in Canada. My intent in this small project was to collect any article that referenced local and global environmental issues during the entire month. I removed just one page from the April 1st issue of *The Vancouver Sun* with two articles, titled "Breast cancer linked to chemical exposure Study points to synthetic fibres, petroleum products" ("Breast Cancer", 2010) and "Tories plan to skirt environmental assessment process, group says" (De Souza, 2010). Little did I know of bigger and blacker things to come!

On Wednesday, April 21, *The Tri-City News's* front page and pages A18 and A19 highlighted School District #43 initiatives that address waste reduction and displayed a colour photograph to advertise the upcoming Fingerling Festival at the Noon's Creek Hatchery in Port Moody. One day later on Earth Day, the *Vancouver Sun's* section F, entitled "Earth Day", addressed urban gardens, plastic waste bags, beverage container recycling and 20 years of Canadian grassroots environmentalism and accomplishments. In addition, Sankey (2010) wrote an article, called "Using information technology to fuel efficiency." McNally (2010) wrote an article, called "Working to make IT a whole lot greener" and Curran (2010) wrote an article, called "Urban villages reduce a city's carbon footprint." Other than this Earth Day special edition, for the first three weeks of April these two newspapers seem to report environmental issues in no greater or fewer numbers than any other month of the year, until later in the day on April 22nd!

On April 20th, the semi-submersible offshore drilling rig, *Deepwater Horizon*, exploded and caught fire at 10 pm (CST) in the Gulf of Mexico. It sank on Earth Day! The headlines in every newspaper and media outlet around the world captured this story, a top story for days in Canada as well. The irony does not escape me. One of the world's worst and largest oil-related environmental disasters happened on Earth Day. The headlines drew attention to this monumental disaster for months. Even though my intent had been to discuss issues closer to home, this event in the Gulf of Mexico would have inescapable local implications. Articles in *The Vancouver Sun* quickly turned to local waters and our addictive consumption of oil. The following headlines are just a small sampling of what I read during the weeks following this event:

"BC Workers ready to help battle U.S. Oil slick" (Luk & Lindell, May 3, 2010).

"Obama vows 'relentless' fight to stem spill" (Alberts, May 3, 2010).

"BP makes progress in capping Gulf oil leak" (Bigg, May 4, 2010).

"Dispersants keep oil in the deep ocean, away from shore" (Maugh II, May 4, 2010).

"B.C. firms, ministry chip in to fight massive US oil spill" (Luk, May 4, 2010).

"White House taking heat over spill" (Muskal, May 4, 2010).

"Lawmakers probe lack of 'trigger'" (Doggett & Gardner, May 4, 2010).

"Canadians reminded that offshore drilling is playing with fire" (Yaffe, May 4, 2010).

"Ships rush to islands as leaked oil arrives" (Oberman, May 5, 2010).

"Robots move dome over leaking oil well" (Pender, Wyss & Lebovich, May 8, 2010).

“The lesser of the evils: Fight the oil before it hits land” (Smith, May 8, 2010).

“Can oil tankers navigate safely in B.C. waters?” (Hunter, May 11, 2010).

“Era of easy oil is history: Accessible sources have been used up, meaning we must reduce our demand, experts say” (Bengali, May 11, 2010).

“Canada’s loosening of safety regulations is part of a trend” (Maeda, May 11, 2010).

“Oil companies’ liability a drop in the ocean” (Mayeda, May 13, 2010).

“Our own reminder of the dangers of offshore drilling” (Hume, May 13, 2010).

“From Alberta to Africa, pollution is an ugly reminder of the true cost of oil” (Knudson, May 17, 2010).

“Oil invades the bayous” (Sabourin, May 21, 2010).

“No end in sight to offshore oil moratorium, federal minister says” (Pynn, May 22, 2010).

“‘Jury is out’ on oil spill’s ecological legacy: Based on Exxon Valdez disaster, the damage could be felt for decades to come” (Munro, May 29, 2010).

“Critics of oil spill response take aim at Obama” (Alberts, May 29, 2010).

“No moratorium on offshore oil exploration in Canada’s Arctic” (Mayeda, May 29, 2010).

“Massive tankers, crude oil and pristine waters: A 5.5 billion project would transport 83.5 million litres a day from Edmonton to Kitimat and beyond by sea. Can the unthinkable be prevented?” (Simpson, June 5, 2010a).

“Minimal spill risk from proposed pipeline: Enbridge” (Simpson, June 5, 2010b).

“Scientists find ecosystem-killing oil from BP leak suspended in deep water” (Castro Olivera, June 9, 2010).

These newspaper articles do not link the consumer to this disaster. Is an increasing demand for steady, cheap oil not fuelling this supply? Do we seem to have disconnected ourselves from the resources we extract from nature? Our addiction to oil is hard to break as long as we consider its alternatives less reliable and too expensive. Will this disaster raise sales of electric cars? Will this disaster encourage more biking and walking? Will this disaster lessen our dependence on the Earth’s resources? Will this disaster teach us a valuable lesson? Only time will tell; however, there is a lot we already know.

This disaster damaged ecosystems that will take decades to recover. It is everyone’s responsibility. It may geographically be far from our home, but it hits us at home nonetheless. It shows us that we are interconnected. There is no escaping with similar risks closer to home. Oil tankers pass through waters and land-locked pipelines carry millions of litres of oil daily through many BC communities with fragile ecosystems.

My brief review of the media reporting on this environmental disaster of gigantic proportions provides just one example of our inability to connect the pieces. This disaster, like many others, demands that we examine our place in our communities with more scrutiny and sincerity and re-evaluate more wisely our contributions and connections to fragile ecosystems. What are the BC Ministry of Education and its schools doing to address some of these environmental trends?

Environmentalism in British Columbia’s Ministry of Education and its Curriculum

To take this one example of an environmental disaster seriously, we require a stronger commitment to environmental awareness, knowledge, understanding and action. McClaren (1989) states: “As major agencies of

education and socialization, public schools can play an important role in developing citizens who are environmentally informed and aware” (p. 2).

McClaren (1989) identifies nine elements of environmental literacy:

1. The Ability to Think About Systems
 2. The Ability to Think in Time: To Forecast, to Think Ahead, and to Plan;
 3. The Ability to Think Critically about Value Issues;
 4. The Ability to Separate Number, Quantity, Quality, and Value;
 5. The Ability to Distinguish between the Map and the Territory;
 6. The Capacity to Move From Awareness to Knowledge, to Action;
 7. A Basic Set of Concepts and Facts Plus the Ability to Learn New Ones and to Unlearn the Old;
 8. The Ability to Work Cooperatively With Other People; and
 9. The Capacity to Use Skills in Eight Processes: Knowing, Inquiring, Acting, Judging, Opening, Imagining, Connecting, and Valuing.
- (pp. 3-9)

According to McClaren (1989), an infusion of EE, especially these nine elements, into existing curriculum addresses teachers’ concern for adding another course to an already overcrowded curriculum. A thematic approach throughout the grades, school-wide planning and district and ministry policies are some of the steps needed to ensure its success (McClaren, 1989, p. 10). The publication of this article almost coincided with the start of my teaching certification in 1990. Being employed informally in EE prior to completing this certificate, I was aware of McClaren’s research and policy development in EE. After becoming a qualified teacher, I began to practise these principles in the formal school system, illustrated throughout this thesis. However, the success of the implementation of these principles throughout BC is unclear. A journal article by Mayer-Smith, Bartosh & Peterat (2009), called “Cultivating and Reflecting on Intergenerational Environmental Education on the Farm,” outlines similar struggles for teachers to infuse EE in the mandated curriculum, even ten years later. Their conclusion, based on research with students and farmers at an urban, organic farm at the University of British Columbia, alludes to a number of issues and solutions:

Although support for and interest in environmental education do exist, environmental education will remain marginalized in the

existing education system unless schools can blur the disciplinary boundaries fortified by the existing curricula. Furthermore, teachers and environmental education providers need to work together on a regular basis to create curricular opportunities that build on experiential learning and integrate field and school experiences. Much of this work may entail teachers assisting teachers and learning from each other. (2009, pp.118-119)

Teachers with an interest in EE must challenge the current divisions between courses, to infuse EE into these courses and to collaborate with other interest groups to provide hands-on experiences in the field. Teachers working with other teachers, especially in the same school, can design and implement these integrated environmental experiences for students. This example shows that many of the barriers to EE continue to exist; however, this research farm is able to make a difference in students' understanding of how to raise and to cook food—an understanding gained experientially.

Teachers with an interest in EE can also learn and reflect together during summer institutes conducted regularly by Zandvliet and Brown (2006). Zandvliet and Brown (2006) describe “a range of ecological, socio-cultural, and technical influences that influence educators' experiences with, and interpretations of, formal curriculum” (p. 207). An ecological framework, illustrated with narrative stories from a summer institute on Haida Gwaii, supports the implementation of EE by educators. Teachers who deliver EE from an ecological perspective can embed this practice within their choice of a physical setting. Zandvliet and Brown reference McClaren and Hammond (2005) to discuss the differences between students' learning *through*, learning *about*, and learning *from* a community. For example, students learn about Haida Gwaii by directly experiencing Haida Gwaii. Students and teachers can learn *about* Haida Gwaii by learning *from*, for example, Haida Gwaii elders and by learning *through* their ways of doing, thinking and feeling in the Haida Gwaii elders' home place. In other words, “Teaching with/in an ecological framework focuses teaching on attempts to improve the quality of life within communities while at the same time, assists students and teachers to develop a sense of “their place” within them” (Zandvliet

& Brown, 2006, p. 211). Direct experiences with/in this community are critical to the interpretation of curriculum (Zandvliet & Brown, 2006, p. 215).

Empirical evidence, theory development and conceptual frameworks modify and improve the design and implementation of EE in BC and elsewhere. Zandvliet, Brown, McClaren and Mayer-Smith research EE from various perspectives, such as students, teachers, schools, school districts, boards of trustees and BC's Ministry of Education. The Ministry of Education and various interest groups, such as Environment Educators' Provincial Specialist Association, Walk the Talk, BC Hydro and universities/ colleges develop resources, such as curriculum maps and videos to support EE implementation.

For the past sixteen years the BC's Ministry of Education has published and distributed documents to support EE for Kindergarten through grade 12. I briefly analyze two of these documents: *The Science 10: Integrated Resource Package* (2008) and *Environmental Learning and Experience: An Interdisciplinary Guide for Teachers* (ELE) (2007). These documents illustrate what and how I can teach environmental concepts and issues. Its integrated resource packages (IRPs) for all subjects include prescribed learning outcomes, teaching and assessment strategies as well as approved resources. The recently revised *Science 10 Integrated Resource Package's* rationale states:

Science education in British Columbia is designed to provide opportunities for students to develop scientific knowledge, skills, and attitudes that will be relevant in their everyday lives and their future careers. In addition to introducing them to current concepts, findings, and processes in various scientific disciplines—biology, physics, chemistry, astronomy, and geology—it encourages them to

- develop a positive attitude toward science
- examine basic concepts, principles, laws, and theories through scientific inquiry
- demonstrate respect for precision
- develop awareness of assumptions in all forms of science related communication
- separate fundamental concepts from the less important or irrelevant
- identify supporting or refuting information and bias
- recognize that scientific knowledge is continually developing
- use given criteria for evaluating evidence and sources of information

- actively gain knowledge, skills, and attitudes that provide the basis for sound and ethical problem solving and decision making
- assess the impact of science and technology on individuals, society, and the environment
- cultivate appreciation of the scientific endeavour and their potential to contribute to science

To prepare students for further education and for their adult lives, the Science 8 to 10 curriculum engages students in the investigation of scientific questions and the development of plausible solutions. Science education develops and builds on students' sense of wonder about the world around them and encourages a feeling of responsibility to sustain it. Science education fosters students' desire to meet a challenge, take risks, and learn from mistakes. It prompts a curiosity about the changing world and helps students understand that the skills and knowledge they are gaining will be refined and expanded to reflect advances in scientific knowledge and technology. (2008, p. 11)

As a teacher with a strong ecological identity (Thomashow, 1995), I can easily infuse directly or indirectly several environmental or ecological crises concepts into eleven of the 22 prescribed learning outcomes:

- A1 demonstrate safe procedures
- A2 perform experiments using the scientific method
- A4 demonstrate scientific literacy
- A5 demonstrate ethical, responsible, cooperative behaviour
- A6 describe the relationship between scientific principles and technology
- B1 explain the interaction of abiotic and biotic factors within an ecosystem
- B2 assess the potential impacts of bioaccumulation
- B3 explain various ways in which natural populations are altered or kept in equilibrium
- D1 explain the characteristics and sources of thermal energy
- D2 explain the effects of thermal energy within the atmosphere
- D3 evaluate possible causes of climate change and its impact on natural systems. (p. 30)

My school uses the *BC Science 10* textbook, published by McGraw-Hill Ryerson (Sandner, Fatkin, Lacy, Martha, Milross & Naso, 2008). Its biology unit includes activities such as hypothetical simulations, analysis of pre-determined data, evaluation of non-fiction information and analysis of media sources. The creation of a video script to record nature in the students' neighbourhood and an experiment to test salt concentrations on the growth of lettuce seeds are the only

two activities that involve some indirect and direct contact with nature. This Science 10 textbook addresses environmental concepts and issues such as climate change, biomagnification, invasive wildlife and chemical pollution. However, its recipients may rarely explore ecosystems and environmental issues in their own backyards first hand unless their teachers add these opportunities to supplement the textbook.

Teachers in BC have access to documents that demonstrate how to infuse EE into mandated curriculum. For example, the *Environmental Learning and Experience: An Interdisciplinary Guide for Teachers* (ELE) (2007) outlines two sets of principles for infusing EE into BC curriculum for Kindergarten through Grade 12 students. These ELE teaching and learning principles—the experiential learning cycle—include direct experience, critical reflection, conceptualization and negotiation (p. 9). Students usually participate in EE opportunities created by another person. They process the experience, generalize from the situation and apply the knowledge (Beard & Wilson, 2007; Würdinger & Carlson, 2010). Its principles for conceptualizing “environment” are complexity (understanding complex systems), aesthetics (reflective and aesthetic appreciation), responsibility (developing responsible action), and ethics (valuing an environmental ethic) (p. 11). This document provides formal and informal educational systems with a framework that assists with the design and implementation of environmental experiences and learning in BC.

Overview of the Dissertation

The dissertation is a philosophical exploration of the character of educational experiences in natural settings substantiated with an analysis of the literature, supported with pedagogical perspectives and illustrated with vignettes of direct experiences in nature. Chapter Two is a philosophical inquiry into concepts, such as “nature,” “direct experience,” and “affinity with nature,” that inform my argument. The second part of this chapter serves as a clarification of how empirical data, gathered throughout a lifetime of direct experiences in nature alone and with others, supports this philosophical analysis.

Chapter Three navigates through literature related to nature study/environmental education, place-based education/ nature literacy, biophilia education and deep ecology to address an affinity with nature. This literature review, supplemented with examples of teaching practices, arrives at three types of direct experiences: *initiation*, *immersion* and *intimacy*. In addition, I address many important benefits of direct experiences in nature throughout this analysis.

Chapters Four, Five and Six are a philosophical inquiry into these three types of direct experiences as well as several additional qualities supported with passages from Carson (1987a, 1987b), McClintock recorded by Keller (1983, 1984, 1985), Csikszentmihalyi (1990, 1993, 1997) and Nhat Hanh (1993, 1994). Pedagogical perspectives address the educational justification, adding further reflections and insights. Near the end of each of these chapters, one vignette illustrates human beings directly experiencing nature, extending the philosophical inquiry and the pedagogical perspective.

Chapter Seven concludes with a review of the three types of direct experiences—initiation, immersion and intimacy—in nature. What should educational institutions do to support students' intellectual, physical, social, emotional and spiritual health and development, staying directly in touch, figuratively and literally, with nature? In particular, I present a final pedagogical perspective from teachers for teachers, supporting direct experiences in nature for students. Lastly, I conclude my argument with limitations of this research and with recommendations for future research in experiencing nature directly.



(Photographed by Q. Mulder ten Kate)

CHAPTER TWO: PHILOSOPHICAL INQUIRY AND ENVIRONMENTAL EDUCATION RESEARCH

Introduction

This chapter addresses the meaning of constructs, such as “nature,” “direct experience,” and “affinity with nature” and their interconnections. The second part of this chapter discusses the shift in my research from an empirical investigation to a philosophical inquiry. Glaser and Strauss (1967) propose that we inductively discover concepts during a continuous process of comparative analysis of data and literature, developing a grounded theory. I induced constructs, or categories of meaning, and action from the literature that pointed to specific themes. In turn, these themes led me to deduce areas for further examination. Analyzing data, building theory, reading literature, writing vignettes, developing my argument and supporting my proposition happened simultaneously throughout the dissertation. Each process informed the other through several cycles of analyses and syntheses, resulting eventually in a philosophical articulation of my proposition.

I agree with Wolcott (1990):

To conduct an inquiry of any sort, somebody must have an idea. As inquiry proceeds, the ideas that prompted it should become both better formed, and better informed. The one critical attribute that qualitative and quantitative approaches share is that each begins with an idea that reflects human judgment. (p. 7)

Wolcott captures articulately the importance of human judgments that I made throughout the formulation of my proposition. I started my degree by recollecting and recording my own environmental autobiographies as a child and adult. Halfway through my coursework, I applied for ethical review to conduct an eighteen month long empirical investigation of teachers’ understanding of principles and practices of place-based education. However, during my

qualitative research, the thesis shifted toward a philosophical inquiry of direct experiences that develop an affinity with nature. I had initially planned to analyze the recorded fieldtrip conversations, structured interviews and written pre-trip and post-trip reflections. Instead, I accessed this collection of empirical data to compose various types of vignettes—a narrative analysis—to inform my pedagogical perspectives and my philosophical analysis. This final judgment resulted in a thesis that is a set of pedagogical categories for thinking about students' affinity with nature.

There is no general agreement on what we do when we philosophize. We frequently think of philosophy as a search for wisdom, its most literal translation. A problem with this definition is that “Many people who are wise are not philosophers and many good philosophers are not wise” (Hamm, 1989, p. 4). Cornel Hamm's views (1989) on becoming a philosopher of education include the importance of asking and trying to answer the following three types of questions:

- (1) What do you mean? (Or, what does it—the word, the concept—mean?)
- (2) How do you know? (Or, what, in general constitute the grounds or kinds of grounds for claiming to know something?)
- (3) What is presupposed? (Or, what assumptions or presuppositions are you now making or must you make for the presuppositions you are now asserting?). (Cornell, 1989, p. 5)

I asked and answered many of these questions throughout my degree in the context of EE.

Philosophical Inquiry

Thomashow (1995, 2002), Sobel (1996, 1998, 2004, 2008), Orr (1992, 1994), Bowers (1995, 2006), Gruenewald (2003a, 2003b, 2008) and Smith (2002) and others conduct EE research that addresses direct experiences in nature. I immersed in their work to make sense of my experiences in nature, asking and answering questions throughout this process. Analyzing this literature while simultaneously writing about my direct experiences in nature resulted in both processes informing each other. In other words, I began to merge our

stories—personal stories and other literary sources—to analyze and subsequently synthesize my proposition that schools ought to provide direct experiences in nature and its corresponding qualities.

I gained inspiration from Gruenewald's (2008) six questions that address place-based education. His last question, "What kinds of experiences are needed for people to learn how to perceive, critically analyze, and act on their human and nonhuman environments and its relationship?" (p. 150) is of particular interest in this dissertation. I subdivide this question into three other questions: What do we mean by "nature" or "natural area"? What are some of the characteristics of direct experiences in nature? What is an affinity with nature?

Nature

The meaning of "nature," one of many human constructs, is problematic and difficult to define and to delineate. Nature comes from the Latin *natura* or *nasci* which mean birth, origin, natural constitution, or a quality of a thing. Golley (1998) in *A Primer for Environmental Literacy* clarifies that the following definition no longer applies: "The natural environment is the environment before human presence or before human disturbance or management" (p. 5). Humans have become part of the landscape, impacting it daily with their activities. "Given these considerations, we can use the term *natural environment* in a practical way to refer to the environment that is not managed by humans for human purposes....Natural environment contrasts with environments dominated by human purposes, such as built environments" (Golley, 1998, p. 5). McKibben (1989) writes: "By changing the weather, we make every spot on earth man-made and artificial" (p. 58). Both Golley and McKibben conclude that nature no longer exists. Humans who live in a constructed world shared with non-humans can directly experience "nature" in wilderness or rural areas until humans eventually alter these areas, too.

Clayton and Opatow (2003) agree that meanings of "nature" and "the natural environment" are complex and contested. Wild nature or wilderness untouched by humans is "natural." In contrast, we may consider human

manufactured objects “unnatural.” One part of a hypothetical dialogue in Jacobs’ book, called *The Nature of Economies*, explores the notion that if human activities are not natural than they must be supernatural by definition (Jacobs, 2000, p. 143). Jacobs, a great Canadian urbanologist, argues that human activities and behaviours, such as economic systems, transportation, houses and cities, are an extension of human’s natural tendencies. Jacobs’ premise states:

that human beings exist wholly within nature as part of the natural order in every respect. To accept this unity seems to be difficult for those ecologists who assume—as many do, in understandable anger and despair—that the human species is an interloper in the natural order of things. (2000, p. ix)

Constructed objects are part of human activity and, therefore, are natural to its being (Jacobs, 2000).

Clayton’s and Opotow’s (2003) definition for “nature” and “natural environment” is as follows:

nature and *natural environment* in the average person’s sense, to refer to environments in which the influence of humans is minimal or nonobvious, to living components of the environment (such as trees and animals), and to nonanimate natural environmental features, such as the ocean shore. (2003, p. 6)

Clayton and Opotow (2003) conclude: “Thus, the idea that there is a separation between natural and social experiences is misleading” (p. 6) and “that the experience of nature can take place in urban settings as well as in remote wilderness areas” (p. 7). Nature is not out there!

In the “Obligation to Endure” in *Silent Spring*, Carson (1987a) writes: “Considering the whole span of earthly time, the opposite effect, in which life actually modifies its surroundings, has been relatively slight. Only within the moment of time represented by the present century has one species—man—acquired significant power to alter nature of his world” (p. 5). The conversion of wild areas to State or National Parks is only one step in the right direction. In another article that discusses the preservation of seashores, she writes:

Even public parks are not what nature created over the eons of time, working with wind and wave and sand. Somewhere we should know what was nature's way; we should know what the earth would have been had not man interfered. And so, besides public parks for recreation, we should set aside some wilderness areas of seashore where the relation of sea and wind and shore—of living things and their physical world—remain as they have been over the long vistas of time in which man did not exist. For there remains, in this space-age universe the possibility that man's way is not always best. (In Lear, 1998, pp. 193-194)

Cronon (1986), in *Uncommon Ground: Rethinking the Human Place in Nature*, writes: "Nature is a human idea with a long and complicated cultural history which has led different human beings to conceive of the natural world in very different ways" (p. 20). This book contributes to a conception of "nature" and our relationship with nature, offering a more detailed discussion beyond the scope of this thesis.

I briefly examine these constructs in the context of EE and reference a few authors whose research informs direct experiences in nature. Kaplan and Kaplan (1989) define "natural" areas as:

We are referring to places near and far, common and unusual, managed and unkempt, big, small and in-between, where plants grow by human design or even despite it. We are referring to areas that would often be described as green, but they are also natural when the green is replaced by white or brown or red and yellow.
(p. 2)

In other words, a natural area encompasses "green" areas, or vegetated areas, untouched by humans or "green" areas heavily populated or altered by humans. For example, a deer stalking through a pristine wilderness is nature; however, a dandelion wriggling its way through pavement is nature too! Wilson (2006) in *The Creation: An Appeal to Save Life on Earth* defines nature as: "Nature is that part of the original environment and its life forms that remains after the human impact. Nature is all on planet Earth that has no need of us and can stand alone" (p. 15). "Nature dies hard," Wilson (2006) writes, because "notice the little resilient little weed that peeps from a crack in the concrete, to tuft of grass holding on at the

curb, the faint colorous span of the cyanobacterial colony plastered next to the ticket kiosk” (p. 25). Even though an important distinction between *natural environment* and *built environment* or *urban* and *rural* exist, natural elements are not only restricted to natural areas and built environments are not only restricted to constructed elements (Kaplan and Kaplan, 1989, p. 3).

Louv (2011) defines nature as:

Human beings exist in nature anywhere they experience meaningful kinship with other species. By this description, a natural environment may be found in wilderness or in a city; while not required to be pristine, this nature is influenced at least as much by a modicum of wideness and weather as by developers, scientist, beer drinkers or debutantes. We know this nature when we see it. (pp. 52-53)

Wilson (2006) discusses our kinship with other species: “We took a wrong turn when we launched the Neolithic revolution. We have been trying ever since to ascend *from* Nature instead of *to* Nature” (p. 13). What can we do to ascend *to* nature? This thesis proposes that direct experiences in nature re-establish a kinship or affinity with nature in the most unexpected and surprising locations.

Direct Experience

Considered one of the fathers of the Laboratory School and community education, Dewey laid the groundwork for addressing the integration of learning taking place in schools and in the community beyond the school walls. Dewey (1959) states:

From the standpoint of the child, the great waste in the school comes from his inability to utilize the experiences he gets outside the school in any complete and free way within the school itself; while, on the other hand, he is unable to apply in daily life what he is learning at school. That is the isolation of the school—its isolation from life. When the child gets into the schoolroom he has to put out of his mind a large part of the ideas, interests, and activities that predominate in his home and his neighborhood. So the school, being unable to utilize this everyday experience, sets painfully to work, on another tack and by a variety of means, to arouse in the child an interest in school studies. (pp. 76-77)

While Dewey's school taught academic subjects derived from community activities, most schools currently do the reverse. Dewey's students addressed concepts and issues relevant in their lives in their communities.

Kellert (2002) categorizes three types of experiences with the living world and identifies three types of benefits with supporting empirical evidence for his theory. His conceptual framework shows how direct, indirect and vicarious experiences in nature influence affective, cognitive and evaluative learning in middle childhood and early adolescence. He states that:

Direct experience involves actual physical contact with natural settings and nonhuman species....direct encounters to creatures and environments occurring largely outside and independent of the human built environment—that is, plants, animals, and habitats that function, for the most part, apart from continuous human input and control. (pp. 118-119)

In contrast, indirect experience is “typically the result of regulated and contrived human activity” (Kellert, 2002, p. 119) in zoos, museums and nature centers or interaction with domesticated animals or plants. His last type of experience contrasts with the previous two experiences, because “vicarious or symbolic experience occurs in the *absence* [my emphasis] of actual physical contact with the natural world” (Kellert, 2002, p. 119). These three types of “nature” experiences affect children's affective, cognitive and evaluative development. Affective development emphasizes feelings, emotions and sensory perceptions of a person—an emotional intelligence; whereas, cognitive development includes thinking processes and the ability to solve problems. Evaluative development focuses on the formation of attitudes, values and beliefs—a moral development. Influenced by his work, I show that my proposed three types of direct experience in nature—*initiation*, *immersion* and *intimacy*—with their corresponding qualities address these three areas of human development: affective, cognitive and evaluative.

Direct Experiences in Nature

Being part of the American Nature Study Movement that started around the 1900s, Comstock (1974) notes:

The children are eager for it, unless it is spoiled in the teaching; and whenever we find a teacher with an understanding of out-of-door life and a love for it, there we find nature-study in the school is an inspiration and a joy to pupils and teacher. (p. xi)

Pyle (2008) notes that from the early 1900s until the 1950s more US students participated in nature studies of local flora and fauna—local knowledge and processes of more-than-human life—as part of their regular education. In contrast, Pyle (2002) notes a decline in nature literacy in schools for the past fifty years. He proposes that “immersion in the so-called natural world, particularly in those special places...where initiation and imprinting on nature take place” (Pyle, 2008, p. 157). Louv (2005) supports this position for experiencing nature in childhood: “Then we were bound to the natural world and remain to do so today” (p. 7). Pyle (2008) argues for a reintroduction of nature study in schools:

If people knew even a little about the plants, animals, soils, waters, and atmospherics of their places, and how they fit together in a fragile and functioning whole that utterly supports us, I don't believe they would permit our present course. (p. 169)

This present course refers to, for example, population growth, capitalist expansion, ecological illiteracy and systematic collapse (Pyle, 2008, p. 169). Pyle's final statement in his article “No Child Left Inside: Nature Study as a radical Act” urges schools to offer direct nature experiences:

Whatever works to rub young noses in nature must be done, before the out-of-doors becomes as quaint to the average child as a slide rule or the slide projector, the film or the typewriter. Even if it takes something as radical as that gentle pursuit of yore, Nature Study. (2008, p. 171)

For approximately the past ten years, more public policy makers, educational researchers and teachers are making a more concerted effort to “Leave No Child Inside” (Pyle, 2008, p. 155). This “movement” into the out-of-doors takes

students into their communities to learn first-hand and to understand their communities from historical, economical, cultural, social and natural perspectives.

Pyle (2002) realizes that our experiences in nature may not always be harmless; however, we can set aside natural areas for their own sake and other natural areas for human interaction. In *The Thunder Tree* Pyle (1993) writes:

It is through close and intimate contact with a particular patch of ground that we learn to respond to the earth, to see that it really matters. We need to recognize the humble places where this alchemy occurs, and treat them as well as we treat our parks and preserves—or better, with less interference. Everybody has a ditch, or ought to. For only the ditches—and the fields, the woods, the ravines—can teach us to care enough for all the land. (pp. xviii- xix)

Schools ought to provide students with opportunities in these natural areas as long as teachers take the necessary precautions for students' safety as outlined by school districts' policies.

What should these natural areas look like? Pyle (2002) writes:

For special places to work their magic on kids, they need to be able to do some clamber and damage. They need to be free to climb trees, muck about, catch things, and get wet—above all, to leave the trail. Such activities are normally proscribed in reserves and for good reason. I support the strict protection of natural areas wherever possible, for the careful perpetuation and management of scarce elements of diversity. But the unofficial countryside—the domain of unsupervised outdoor play—needs to be recognized and protected among the built landscape, as well as the official preserves. (p. 319)

Our understanding about the importance of direct experiences in natural environments is slowly shifting. This thesis supports this shift by identifying educational practices, or qualities, that support different levels of affinity with living non-human organisms and non-living elements in natural areas.

Direct Experiences to Develop an Affinity with Nature

Chapter Three analyzes “fields” such as nature study, place-based education/nature literacy, biophilia education and deep ecology to gain insights into the type of relationships or affinities we have or should have with nature. I briefly return to Wilson’s notion of “biophilia” to clarify what I mean with the term “affinity.” Wilson (1984) uses the term “biophilia” that describes “the urge to affiliate with other forms of life” (p. 85). Cajete (1999) notes: “...this biophilic sensibility appears to be a primal and innate dimension of our humanity” (p. 190). In *Earth in Mind*, Orr (1994) states that it “is inscribed in the brain itself (p. 138). Cajete (1999) concurs by stating that it maintains “our physical, mental, and psychological health” (p. 190) and it “forms the foundation upon which humans construct meaning from their relational existence” (p. 191). Especially at a young age, children develop relationships with other living things they encounter in natural areas. Orr (1994) supports this view when he writes that humans continue to evolve when participating in many cultural, social, natural and educational experiences in our lives (pp. 134-155). Recognizing that other affinities demand our attention, Orr writes that “biophobia disguised beneath the abstractions and presumptions of progress found in economics, management, and technology” (p. 132) competes with our ability to have an affinity for life, or biophilia. The following passage addresses important elements of biophilia that support a respectful relationship with nature:

The biophilia revolution is about the combination of reverence for life and purely rational calculation by which we will *want* to be efficient and live sufficiently. It is about finding our rightful place on earth and in the community of life, and it is about citizenship, duties, obligations, and celebrations....The biophilia revolution must come as an ecological enlightenment that sweeps out the modern superstition that we are knowledgeable enough and good enough to manage the earth and direct evolution. (Orr, 1994, pp. 145-146)

Smith and Williams (1999) identify seven principles that can re-establish a relationship or affinity with nature. Their first two principles are of particular interest when teaching others in nature. Their first principle states the importance

of the “Development of personal affinity with the earth through practical experiences out-of-doors and through the practice of an ethic of care” (p. 6). And, their second principle states: “Grounding learning in a sense of place through the study of knowledge possessed by local elders and the investigation of surrounding natural and human communities” (p. 6). These two principles suggest that we need to spend more time in nature to reconnect and re-establish our relationships, or affinity with nature. Smith and Williams (1999) propose that by “developing a sense of affinity with the land, students of all ages may come to recognize its beauty and then take the steps needed to guard its integrity” (p. 8). Experiencing nature directly in local natural areas develops a stronger sense of affinity with nature. Who can offer these direct experiences in nature? My simple answer is “Almost everyone.” However, in the context of this thesis, I address teachers in the formal educational system.

Schools Ought to Provide Direct Experiences in Nature

What educational qualities can develop a stronger affinity with nature that contributes to becoming an educated person? The experiential learning cycle as described in *Environmental Learning and Experience: An Interdisciplinary Guide for Teachers* (ELE) (2007) outlines four pedagogical practices: direct experience, reflection, conceptualization and negotiation. I explored aspects of the latter three practices that address mostly the cognitive domain in my master thesis. Hence in this dissertation, I choose to examine direct experiences that address the affective domain, in particular. I limit this thesis to direct experiences only, one component of the experiential learning cycle; however, I, hereby, do not imply that the remaining practices are not important.

Having already stated the importance of honoring and supporting a relationship with nature for children, I briefly acknowledge a few influential authors in the field of environmental adult education. Other researchers offer insightful perspectives on environmental learning in which I situate direct experiences. Belanger (2003) notes “four key principles of an ecological reorientation of education.” His first principle suggests:

Effective environmental education needs to take into account the environment. Significant environmental learning is not only *about* and *for* the environment but also needs to proceed *through* and *within* the environment. Relevant learning can take place only when the subject is able to relate newly acquired knowledge to his or her own experience with his or her environment. (p. 85)

Secondly, these experiences for adults must address local problems and risks. Belanger (2003) suggests: “Direct engagement with concrete challenges helps people to construct a new reflective relationship with his or her life-context” (p. 85). Thirdly, environmental learning is a life-long, continuous process. Belanger (2003) states: “Environmental learning begins early in life and develops through a built-in inner movement whereby initial positive experiences create curiosity and aspirations for continuing, enlarging, and deepening an individual’s educational life” (p. 85). The fourth principle addresses some of the benefits of sharing direct experiences between communities. Belanger (2003) includes examples, such as: “Environmental education will gain by relying on the reflexive interaction taking place when people exchange perceptions about their shared environment and when they can build on the complementary contribution of their respective skills and share their problem-solving capacity” (p. 85). Adult educators, Clover and Hill (2003), concur with Belanger:

Environmental adult education should use outdoor learning for the dual purposes of provoking outrage and encouraging awe, wonder, and a renewed faith in human capacity to create change. By learning in place, we begin to see the community and its surrounding environment as a landscape of resistance, a source of regeneration, and a site of inspiration, beauty, or neglect. (2003, p. 91)

The remaining chapters continue to address Clover, Hull and Belanger’s recommendations for educational change. Orr (1994) also advocates for changes in all educational institutions:

The crisis we face is first and foremost one of mind, perceptions, and values; hence, it is a challenge to those institutions presuming to shape minds, perceptions, and values. It is an educational challenge. More of the same kind of education can only make things worse. (p. 27)

In other words, educational institutions ought to educate humans to act in more environmentally responsible ways that help and not harm the earth any further.

Changes in family structure, community design, recreational activity, mobility and technology have drastically reduced the amount of time adults and children share experiences in nature. Yet studies by Pyle (2002), Moore (1986a, 1986b) and Sobel (1998) suggest that direct experiences in nature benefit humans intellectually, physically, socially, emotionally and spiritually. Kellert (2002) agrees that direct experiences in nature “provide children with unique and critical developmental opportunities for discovery, creativity, and personal autonomy” (p. 146). Louv (2011) very recently addressed the importance of nature experiences for adults as well:

Young, old, or in between, we can reap extraordinary benefits by connecting—or reconnecting—to nature. For the jaded and weary among us, the outdoor world can expand our senses and reignite a sense of awe and wonder not felt since we were children; it can support better health, enhanced creativity, new careers and business opportunities, and act as a bonding agent for families and communities. Nature can help us feel fully alive. (pp. 5-6)

What is going to provide these direct experiences in nature and how?

Bell (1997) suggests that teachers ought to teach natural history to their pupils. Natural history is an alternative for fragmented, rationalistic and out-of-context learning in classrooms that detaches students from experiencing directly and from interacting with non-humans in nature. Teachers who only use “Human artefacts (symbols, theories, books, computers, laboratory equipment, and so on)” (Bell, 1997, p. 133) confine their students’ learning. Students must also learn from and through non-human contact in nature. Direct experiences provide health and educational benefits different from indirect and vicarious experiences. Teachers ought to present an experience that meets the lesson’s objectives and

that develops students' cognitive, affective and evaluative domain. Bell (1997) suggests benefits for teaching natural history:

When grounded in the sensual and the social (broadly construed to include relationships with nonhuman beings), natural history oversteps the epistemological boundaries set by conventional, unduly cerebral approaches to education. It represents an opportunity to experience, understand and value learning as something other than a diet of information. (p. 137).

Moore (1986b) conducted research involving teachers, administrators, students and local residents who designed and reconstructed their schoolyard. He concluded: "In the community design program, a need was strongly voiced, especially from the children, for natural elements like ponds and streams, trees, flowers, animals, rocks, dirt and sand" (p. 52). Chawla (1988) completed a review that showed "children care about nature more when they are familiar with it, at a time when this opportunity is becoming less and less available" (p. 19). These studies support my proposition that the educational system ought to provide direct experiences that support a strong affinity with nature.

Environmental Education Research

After completing a Master Degree and teaching full-time for twelve years, I returned to academia to embark on an analysis of teachers' dialogues focused on infusing place-based education in teaching practice or pedagogy. After an ethics review, I researched place-based education principles and practices with six teachers over a period of eighteen months to gain an understanding of teachers experiencing nature directly. In the end, I chose a more philosophical stance for the doctoral dissertation.

This thesis aims to take the reader on a storied journey of my direct experiences as a child, adult, teacher and teacher of teachers, in addition to engaging in a philosophical inquiry. Three of the four narratives, called vignettes, incorporate empirical data collected during the course of developing this proposition. These three vignettes chronologically follow the first vignette that

illustrates direct experiences in nature prior to embarking on the Ph. D. program. Sections of vignettes illuminate important pedagogical perspectives that support why teachers ought to provide direct experiences in nature. This thesis is primarily a normative stance, retaining only short passages of empirical data used to compose vignettes that embellish pedagogical perspectives.

The Researcher

I am a middle class Caucasian woman born in Apeldoorn, six kilometres South of Vaassen in the Netherlands. Twenty-eight years ago, I immigrated at the age of sixteen with my parents and brother to Langley, BC where I completed the final two years of high school. I obtained a Bachelor Degree in Science (Zoology) from the University of British Columbia (UBC), Vancouver, BC four years later. Several park naturalist positions in most of Greater Vancouver Regional District Parks refocused my attention to nature but this time as a university student who presented direct experiences for adults and other people's children.

Earth-Care Consulting, a company that I founded, offered children and adult science and nature programs for ten years until the start of my Ph. D. program. Children participated in experiential science/nature programs that used local trails, creeks, ponds, rivers, estuaries, wetlands, swamps, forests, fields, mud puddles and oceans. At Simon Fraser University (SFU), Burnaby, BC, I completed a professional teaching certificate in 1990, a Post-Baccalaureate diploma in learning disabilities, science and environmental education and French as a Second language in 1992 and a Master in Science (Education) in 1993. I eventually completed a second Post-Baccalaureate diploma in English as a Second Language, linguistics and adult education in 1998. A combination of my UBC Bachelor of Science degree and my SFU professional teaching certificate qualified me to teach. It was my turn to share what I had learned in various educational institutions and in nature.

After teaching on call in Surrey, Maple Ridge and Coquitlam from 1991 until 1992, I continued employment and residency in the latter district with its offerings of outdoor education and environmental education programs. I continued to be a teacher-on-call from 1992 until 1995 at which time I obtained a permanent teaching contract. As a teacher-on-call, I presented a port study per canoe program for grade sevens and served on the environmental education committee that developed curriculum and presented workshops for teachers for a number of years. The Coquitlam School District's Winslow Centre had purchased a large selection of outdoor equipment such as snowshoes, canoes and skis during the 1970s to support environmental/outdoor education until the late 1990s. Even though we used the term "environmental education" rather than "place-based education," we frequently visited local natural areas to explore their natural history and cultural history. A few years later, cutbacks cancelled our committee work and resulted in the redistribution of outdoor equipment to interested schools. After teaching for one year at an elementary school and three years at a middle school, I have now been teaching at a secondary school for the past twelve years. Professional development continues to immerse me in the field of place-based education and adult education.

In 2005, I became the researcher and author of this dissertation and the teacher and coordinator of an interdisciplinary program for identified gifted grade nine and ten students in the Coquitlam district. The T.A.L.O.N.S Program (The Academy of Learning for Outstanding, Notable Students) integrates the core curriculum: Social Studies 9/10, Math 9/10, Science 9/10 and English 9/10 (with an option to add English 11) as well as Planning 10 and Leadership 11. This program will add Physical Education 11 in September 2011. Students who spend half a day for two years in this program participate in frequent, direct nature experiences along Scott Creek and other local natural areas. In addition, they experience a three-day camping retreat in the fall and a five-day camping adventure in the spring. Students are in charge of planning and implementing trips that explore additional natural areas further away from the school, using modes of transportation, such as hiking, biking, kayaking and canoeing.

Community service learning projects include such activities as planting native vegetation, removing invasive species, identifying wild salmon, recording water and air temperatures, assessing environmental pollutants, identifying local birds, adopting and cleaning trails, completing geological inventories, identifying creek invertebrates and restoring creek habitat. These frequent, local, nature-based opportunities support the development students' emotional, aesthetic and even spiritual affinity with nature in one particular location. Students' direct experiences include intimate contact with non-humans in their community, developing a sense of attachment and belonging to one particular natural area.

After completing my UBC degree, I moved to Eagle Ridge, Coquitlam, BC in 1990 where I have lived ever since albeit at different locations. Thirteen years ago, I moved into a strata complex that calls itself the "The best little community in a community," located within walking distance of work. I participate in community garage sales, barbecues and clean ups, look after pets and children, host summer parties, compost food waste, borrow tools and assist with maintenance projects. I know our gardeners, strata council members and many residents by name. I identify birds that nest in nearby trees: American robins, white-crowned sparrows, Northern flickers, Steller's Jays, spotted towhees, black-capped chickadees, varied thrushes and dark-eyed-juncos. I recognize invasive squirrels that frolic through my native garden and eat its hazelnuts. I knew several trees that fell in a heavy storm during the winter of 2006. I study on the grass, grow some of my own vegetables and fruits, eat fresh strawberries rescued from wood bugs and watch kids and their parents play in the playground outside my study room window. This community network stops me from selling my townhouse and moving elsewhere despite our occasional disagreements and financial challenges in maintaining our aging units.

Having revealed some important aspects of the context in which I position myself, I now turn to the EE research literature.

Researching Environmental Education

As an educator and researcher, I am interested in teaching students, life-long learning, teacher professional development, EE curriculum and natural environments. I unite these elements in an examination of direct experiences in nature that contribute to humans having an affinity with nature. Clandinin and Connelly (2000) remind readers: "...social sciences are founded on the study of experience. Experience is therefore the starting point and the key term for all social science inquiry" (p. xxiii). The end of their book's prologue states:

...narrative became a way of understanding experience....With narrative as our vantage point, we have a point of reference, a life and a ground to stand on for imagining what experience is and for imagining how it might be studied and represented in researchers' texts. (p. xxvi)

Polkinghorne (1995) uses "the term *narrative* to refer specifically to texts that are thematically organized by plots" (p. 5). I support his definition of story as "to signify narratives that combine a succession of incidents into a unified episode" (p. 7). I agree that "Stories are concerned with human attempts to progress to a solution, clarification, or unraveling of an incomplete situation" (Polkinghorne, 1995, p. 7). My commitment and interest in EE inform my research proposition. "My mucking about" in the field, alone or with others, is a story that informs my philosophical stance. In other words, the inclusion of various vignettes is intended to support my dissertation.

Chawla (2006) compares EE research that arrives at a rational understanding of our world, its issues and solutions to EE research that addresses an "emotional need for identification and affiliation with the earth" (p. 359). My philosophical inquiry addresses EE research in the latter category, supporting the analysis of three types of direct experiences differing in affinity with nature. We need more qualitative research that informs the "motivational side of environmental learning" (Chawla, 2006, p. 360). Qualitative research offers many benefits for understanding EE:

The most important strength of research about significant life experiences is that it *is* qualitative, within a wider tradition of environmental education research which is predominantly quantitative. Thus, it is equipped to explore the emotional and interpretative side of environmental experience that research otherwise avoided, but which forms a necessary complement to a full understanding of not only what people do, but why. (Chawla, 2006, p 361)

Chawla (2006) acknowledges the importance of the affective domain in EE and qualitative research. Ethnographic documents such as photos, e-mails, teachers' pre-trip and post-trip reflections, recorded field conversations and structured interviews address the affective domain of experiencing nature directly. I decided to use excerpts of this data to compose four vignettes that support my proposition rather than to complete a discourse analysis of this data. The vignettes illustrate direct experiences in nature from a child's, adult's, teacher's and teacher of teachers' perspectives, contributing a better understanding of our extra-rational, or emotional, identification and affiliation with the earth.

Instead of an analysis of narratives, I used a narrative analysis approach to compose vignettes informed by personal, qualitative experiences in nature. Polkinghorne (1995) identifies two types of narrative inquiry:

(a) analysis of narratives, that is, studies whose data consist of narratives or stories, but whose analysis produces paradigmatic typologies or categories; and (b) narrative analysis, that is, studies whose data consist of actions, events, and happenings, but whose analysis produces stories (e.g. biographies, histories, case studies). (pp. 5-6)

Polkinghorne (1995) concludes: "Thus, analysis of narratives moves from stories to common elements, and narrative analysis moves from elements to stories" (p. 12) and "The purpose of narrative analysis is to produce stories as the outcome of the research" (p. 15). Polkinghorne's comment, "The result of a narrative analysis is an explanation that is retrospective, having linked past events together to account for how a final outcome might have come about," (1995, p. 16) guides my work. I judge available empirical data and adhere to validity and fidelity criteria, to be addressed in the pages to follow. These

vignettes, often autobiographical in nature, illustrate the strong emotional side of direct experiences and incorporate explanations of knowing, doing and feeling in nature.

Environmental Autobiographies

Corcoron (1999) teaches the use of autobiographies with his environmental studies undergraduate students, enabling them to recall memories of “wild” childhood places. He states:

There is a sense of drama as students mine their past and recollect their experiences. These autobiographies collectively present multisensory experiences that are memorable to the students: the preciousness of undeveloped land; the expanse of time; a sense of adventure; a sense of comfort; experiencing nature without a specific purpose; a sense of wonder, magic, and mystery, associated with natural things incomprehensible to the inexperienced; and a sense of service. Thoughts and emotions intermingle in their voices. The autobiographies capture how students cherish what is alive at a particular moment in their lives. Often, the memories also bring to the surface a sense of loss and grief for what is no longer there. In their recollections, students occasionally mention an older person who has served as a guide or mentor in showing the beauty or meaning of place. Affection for these lovers of nature is deep and abiding and is often accompanied by a desire to emulate their efforts to preserve it....
(p. 186)

His students write environmental autobiographies to reflect and to reminisce about their connections with the living world. They recall its beauty and their love for its organisms other than human. Concoron (1999) suggests that rekindling this connection is important when preparing environmental educators:

By reacquainting future teachers with the powerful impact that encounters with the natural world have had in developing their own sense of themselves, they become more likely to seek ways to provide their own students with experiences that will instill a love for that world in the next generation. (p. 187)

Concoron (1999) incorporates Carson’s *The Sense of Wonder* in his course, because it exemplifies the importance of developing a sensory and emotional

connection with nature in addition to a cognitive connection. Environmental autobiographies are merely a retrospection of emotive and cognitive experiences, illustrating the importance of natural environments in our lives.

Inspired by his approach, I wrote many environmental (auto)biographies, called vignettes, that incorporate qualities of direct experiences in nature examined in this philosophical inquiry. Didactic dialogues use empirical data to develop my argument further. These dialogues invite the reader into the storied argument. I agree with Jacobs (2000) who writes:

A book is equipped to speak for itself, more so than any other artefact. But to be heard, a book needs a collaborator: a reader with a sufficiently open mind to take in what the book is saying and dispute or agree, but in any case think about it. (p. x)

Jacobs (2000) concludes: “Insofar as that process is enjoyably interesting as well as possibly useful—as I hope it may be—so much the better” (p. x). The purpose of my dissertation moves beyond mere thought by proposing that interested readers, educators in particular, adopt its views and change their practices in educational institutions.

Finally, Carson’s autobiography (Carson, 1987b; In Lear, 1998) and McClintock’s biographies (Keller, 1983, 1984, 1985; Comfort, 2001) support my work as a naturalist, scientist and companion for others experiencing nature with me. Selected passages from their writing in the hypothetical “dialogues” merge our understandings of direct experiences in nature. In other words, ironically speaking in the context of this thesis, I participate in their experiences vicariously because these women are no longer alive. The supporting vignettes are in chronological order for ease of reading only. This order does not imply that a particular type of direct experience ought to happen in a certain stage of life, such as childhood or adulthood.

Validity, Reliability and Fidelity

Polkinghorne (1995) references Dollard’s work that outlines seven criteria for writing narratives or vignettes. First, he states: “The researcher must include

descriptions of the cultural context in which the storied case study takes place” (p. 16). I include my geographical landscape and cultural heritage and traditions throughout this dissertation. Second, I address his second criteria, “taking care of the embodied nature of the protagonist” (p. 17) by sharing relevant details of my life as child, family member, adult, resident of Eagle Ridge, teacher, companion of other teachers and researcher. I situate myself in various protagonist positions in the context of this dissertation. I include a section, called “The Researcher,” to reveal many personal details that provide a context for this dissertation. Third, I include details about my relationship with significant others who accompanied me in nature directly. These roles and relationships include being a classroom teacher, free-lance environmental educator, curriculum writer, godmother, sister, aunt, daughter, granddaughter, teacher of teachers and companion. The fourth criterion is:

To understand the person, we must grasp the person’s meanings and understandings; the agent’s vision of the world; and his or her plans, purposes, motivations, and interests. Attention to the inner struggles, emotional states, and valuing of the protagonist provides important data. The protagonist is not merely a pawn buffeted by the setting, but an actor who alters the scene. Different people respond differently to the same events. The story needs to describe the interactions between this particular protagonist and the setting. (Polkinghorne, 1995, p. 17)

My proposition analyzes meanings and motivations within an educational frame. Dialogues with other teachers and their reflections mirror some of my inner struggles and show my interactions as their companion in nature. Fifth, Polkinghorne (1995) suggests: “People are historical beings retaining as part of themselves their previous experiences. Past experiences manifest themselves in the present as habits and are partially available through recollection” (p. 17). My plot is my “struggle to change habitual behaviours and to act differently” (Polkinghorne, 1995, p. 17). Vignettes from childhood to adulthood demonstrate a change in awareness, understanding and actions in nature; however, they also illustrate a core set of beliefs, values and attitudes that essentially define me as someone with an ecological identity shaped from a very young age. Sixth, my

story, the result of a narrative analysis, has a beginning, middle and end. These chronologically sequenced vignettes begin in childhood and end, for now, with me teaching teachers to teach in nature. Last, my intention is to make a “plausible and understandable” (pp. 17-18) storied argument for direct experiences in nature. Polkinghorne (1995) reminds us: “The story is a reconstruction of a series of events and actions that produced a particular outcome” (p. 18). Furthermore, he carefully warns: “Because the story is offered as a scholarly explanation and realistic depiction of a human episode, the researcher needs to include evidence and argument in support of the plausibility of the offered story” (Polkinghorne, 1995, p. 19). The philosophical inquiry and the pedagogical perspective prior to each vignette address this “evidence”.

Merriam (1991) states: “For if *understanding* is the primary rationale for the investigation, the criteria for trusting the study are going to be different than if discovery of a law or testing a hypothesis is the study’s objective” (p. 166). The vignettes support my normative stance formulated during an extensive analysis of related literature in Chapter Three. I applied Merriam’s six strategies to ensure internal validity that lend more credit to these vignettes: triangulation, member checks, long-term observation, peer examination, participatory modes of research and researcher’s bias clarification (pp. 169-170). Firstly, I employed a form of triangulation, using available evidence, such as conversations, e-mails and photos, to check my stories for inconsistencies and contradictions. Secondly, I returned to the Netherlands a year ago to re-experience some of the significant places in nature from my childhood and to check my interpretation of events with family members who are still living there. Furthermore, participating teachers provided feedback and comments during their exit interviews. Thirdly, I wrote many of the vignettes based on similar, repeated events, increasing the validity of the vignettes’ content. Fourthly, my peers, such as friends, family members, co-workers and committee members, not participating in my research, heard or read all or parts of the vignettes and provided feedback as well. Furthermore, teachers contributed content and concepts to the vignettes in a number of ways: e-mails, written reflections and informal chats. They, however, did not contribute

to the final form and function of the vignettes. Lastly, I reveal my assumptions, beliefs, bias, worldview and background throughout this dissertation so that the reader is aware of the context in which I position myself.

The ability to replicate results, reliability, is a criterion more applicable to quantitative research not qualitative research. Researchers tend to associate reliability with positivist science and objective truth. Merriam (1991) states: “Qualitative research, however, is not seeking to isolate laws of human behaviour. Rather, it seeks to describe and explain the world as those in the world interpret it” (p. 170). In qualitative research, Blumenfeld-Jones’ criterion of fidelity (1995) is a better fit for qualitative research. He states, “In this distinction I take truth to be “what happened in a situation” (the truth of the matter) and fidelity to be “what it means to the teller of the tale (fidelity to what happened for that person)” (1995, p. 26). The vignettes are from a number of different people’s perspectives, mostly a re-collection of emotions and re-telling of experiences in which I was one of the main participants. I was able to recall nature experiences by rereading diaries written as a teenager, informally interviewing family members as well as accessing extensive photo albums that my mother had assembled from my birth until the age of eighteen. Having access to these sources of information addressed the fidelity of these personal vignettes. The last three vignettes incorporate empirical data from teachers retelling and reflecting on their experiences in nature with me.

As mentioned previously, I collected ethnographic data with the intention to analyze teachers’ direct nature experiences. After my thesis shifted to a philosophical inquiry, I realized the potential of some of this data to illustrate the proposed qualities in a practical setting. The second vignette mostly incorporates data from structured interviews with teachers. The third vignette includes data from teachers’ written post-trip questionnaires, structured interviews and a field conversation. The final, fourth vignette extracts data from exit interviews with teachers. I edited their oral language to improve the reading of these texts in print, removing long pauses, deleting repetitive content and correcting grammar.

Furthermore, the vignettes' reflections and dialogues combine passages of text from different teachers to provide believable illustrations for my proposition.

Blumenfeld-Jones (1995) concludes: "Fidelity in this context becomes: an obligation towards preserving the bonds between the teller and receiver by honoring the self-rapport of the teller and the obligation of the original teller to be as honest as possible in the telling" (p. 28). Several challenges may arise:

First, the narrative inquirer must maintain fidelity both toward the story of a person (and what the person makes of his or her story) and toward what that person is unable to articulate about the story and its meanings (the context in which the story exists). Second, what the original teller makes of her or his own story is bounded by her or his purposes in telling the story. This reminds us that even the original teller is also reconstructing the narrative. To make the situation still more complex, the narrative inquirer must remember that she or he has intentions and reconstructing as well. (p. 28)

My vignettes reflect specific intentions and reconstructions. I act as morally as possible by identifying reasons for including specific vignettes, by stating my role in each of the vignettes upfront and by explaining the construction and reconstruction of these vignettes.

Emihovich (1995) offers other useful insights into the criticism that narrative inquiry is nihilistic and relativistic: "The key for transformation through narrative lies in collaboration, of constantly testing our meaning against that of others, building consensus around shared meaning, and ensuring that as many voices as possible are included" (p. 45). As mentioned previously, I insert passages from Carson and McClintock into the vignettes to present a more believable storied argument. In addition, I returned to the Netherlands one year ago to check my stories against those of others. When I re-experienced nature in many locations significant in my childhood, I re-called my childhood memories and re-lived those moments in my adulthood. I agree with Emihovich (1995): "the world has no fixed rules for assigning meaning to behaviour" (p. 45) and "the laws governing human interaction are constantly shifting; and a negotiated consensus as to what constitutes reality is always in effect" (p. 45). Postman (1992) writes: "Unlike science, social research never discovers anything. It only

rediscovers what people once were told and need to be told again” (p. 157). In fact, my storied argument is not entirely new. It is a review of what some of us already knew a long time ago and a reminder to those who have forgotten or have ignored the importance of experiencing nature directly.

Collaboration between family members, between researcher and fellow teachers and between committee members and author of this dissertation provided opportunities for every one of us to examine our relationships with nature and to assess our commitment and contributions to support this relationship. Emihovich’s eloquent conclusion applies to many different situations that contribute to becoming human:

If we collaborate in the work of making real to ourselves the “innerness of others’ lives” and find ways to restore passion and genuine commitment, the texts we create today will become the blueprints for tomorrow, guiding us to the most critical narrative construction of all, becoming human. (1995, p. 45)

Even though the main thrust of this thesis is philosophical and not empirical, ideally the reader must agree with the inclusion of these vignettes and must agree that my “version of reality can usually or meaningfully redescribe their situation” (Emihovich, 1995, p. 31). Ellis, one of the co-authors, states:

To me validity means that our work seeks verisimilitude; it evokes in readers a feeling that the experience described is lifelike, believable, and possible. You might also judge validity by whether it helps readers communicate with others different from themselves, or offers a way to improve the lives of participants and readers or even your own. (In Ellis & Bouchner, 2000, p. 751)

In other words, I draw readers into the vignettes with the intent to convince them that these experiences and emotions happened as described by myself, the narrator and as described by the teachers, the participants. My stories blend with stories of parents, children and teachers in a form of collaboration that expresses and explains our inner thoughts and feelings. This qualitative approach contributes to my normative position that schools ought to provide direct experiences in nature.

Interconnection

This chapter identifies the philosophical and practical landmarks on the map that guide readers through the remainder of this dissertation. The next chapter analyzes contemporary literature related to direct experience in nature. Different forms of EE provide direction for three types of direct experiences in nature. Each of these three direct experiences in nature, initiation, immersion and intimacy, is beneficial for human development and health, including an affinity with nature. Chapter Four, Five and Six address the meaning of these constructs by assigning and analyzing prescriptive qualities to each type of experience. These chapters also provide pedagogical perspectives that contribute to becoming an educated person. Carefully constructed vignettes illustrate possibilities for these experiences and qualities.



(Photographed by Q. Mulder ten Kate)

CHAPTER THREE: LITERATURE REVIEW

Public Education Critique

A recent issue of British Columbia Teachers' Federation's monthly magazine, *BCTF Teacher*, includes an article, "In Defence of Public School Teachers in a Time of Crises," by Giroux (2010). He criticizes the current state of public education in the United States, also evident in British Columbia: "Since 1980s teachers have been under an unprecedented attack by those forces that view schools less as a public good than as a private right" (p. 6). The next seven quotes summarize his message poignantly:

...teachers are being deskilled, unceremoniously removed from the process of school governance, largely reduced to technicians or subordinated to the authority of security guards. (p. 6)

Put bluntly, knowledge that can't be measured is viewed as irrelevant, and teachers who refuse to implement a standardized curriculum and evaluate young people through objective measures of assessments are judged as incompetent or disrespectful. (p. 6)

Removed from the normative and pedagogical framing of classroom life, teachers no longer have the option to think outside the box, to experiment, be poetic or inspire joy in their students. (p. 6)

At their worst, teachers have been viewed as merely gatekeepers. At best, they are one of the most valued professions we have in educating future generations in the discourse, values, and relations of democratic empowerment. (p. 6)

Teachers all over America now labor under the shadow of a number of anti-democratic tendencies extending from a ruthless market fundamentalism that mistakes students for products and equates learning with the practice of conformity and disciplinary mindlessness. (p. 7)

There are those critics who, in tough economic times, insist that providing students with anything other than work skills threatens their future viability on the job market. (p. 7)

Democratic struggles cannot over-emphasize the special responsibility of teachers as intellectuals to shatter the conventional wisdom and myths of those ideologies that would relegate educators to mere technicians, clerks of the empire, or mere adjuncts of the corporation. (p. 7)

What happens when teachers embrace standardized testing as their main form of assessment, implement mandated ministry curriculum without any regard for local needs and issues and solely rely on secondary sources of information without accessing primary experiences in the school's community? Do their students become objects on an industrial assembly line? Do students move sequentially from subject to subject, from grade level to grade level, from building to building until they leave or graduate from school? Are their unique personalities, passions, interests, dreams, goals and cultural identities neglected in this type of education? BC's educational system uses mostly schools to educate children from Kindergarten through Grade 12, divides the curriculum into convenient, manageable and distinct subjects and segregates children based on age into different grade levels.

Furthermore, how are increasing costs such as salaries, learning resources, retirement pensions, medical insurance, natural gas and electricity and the recent BC's carbon tax affecting a district's ability to fund education? Giroux (2010) writes that large corporations are co-opting our educational system from funding programs to donating curriculum binders to supplying equipment and to advertising on school property. I worry when undemocratic, top-down decisions, corporate and private agendas, Pan-American standardized curriculum dictate my teaching. Sobel (1996), Bowers (2000), Orr (1992, 1994) and many others argue that a community's ability to adapt and to survive depends on such factors as its local history, politics, culture, grassroots economies, traditions, beliefs, values and inter-generational support networks. I concur with them. In particular, I argue that we ought to develop students' affinity

with nature within walking distance of their school, if possible. Direct nature experiences address many aspects of human development and health in a local, responsive, interactive, natural environment.

Teachers may not be able to change what they teach and in which grade, but they have the professional autonomy to decide how to teach the curriculum. For example, I can substitute textbooks, videos, and Internet research with direct experiences in nature. Louv's book (2005), *Last Child in the Woods: Saving our Children from Nature-Deficit Disorder*, addresses the importance of direct nature experiences for children. His latest book, *The Nature Principle: Human Restoration and the End of Nature-Deficit Disorder* (2011), addresses the importance of direct nature experiences for adults. Robin Moore (1986a) also echoes my sentiments:

The forging of connections between the way things *are* and the way they *ought* to be—the present to the future, the descriptive to the prescriptive—is a complex, multilevel, cyclical and cumulative process. This complexity makes it imperative that long-term purposes be explicitly embodied in the conduct of research activity. Assessments of current conditions must cycle into on-going processes of decision making and change—where 'researcher' and 'community' are distinguished on the basis of role, rather than power and position. Knowledge must be given back to the people it came from so they can use it to improve their own circumstances. (p. xvi)

This analysis of the literature traces developments in nature study/environmental education, place-based education/nature literacy, biophilia education and deep ecology. These fields address different aspects of a community, such as its cultural, historical, social, political, economical and natural dimensions; however, I only focus on the importance of natural areas in education. This literary analysis contributes to the identification of three types of direct experiences in nature: initiation, immersion and intimacy. In addition, a number of benefits of direct experiences in nature expressed throughout these theoretical and empirical perspectives help formulate and frame my proposition.

Nature and Environmental Education

Started during the late nineteenth and early twentieth century, the nature study movement contributed to the origins of EE. Pioneers such as Jackman (1904), Bailey (1915), Beggs (1966) and Comstock (1974) used the local environment for science investigations. In her most recent, 24th edition, Comstock (1974) writes that her *Handbook for Nature Study*:

...does not contain more than any intelligent country child of twelve should know of his environment; things that he should know naturally and without effort, although it might take him half his life-time to learn so much if he should not begin before the age of twenty. (p. xi)

Gaining knowledge from natural areas in a community differs from learning, externally mandated, content knowledge in schools. School's isolation from the daily activities in a community makes learning alongside of its members—an apprenticeship model—more challenging.

Being a biologist with interests in ecology and marine biology, I am particularly fond of Carson's first three books, *The Sea around Us* (1989), *The Edge of the Sea* (1963) and *Under the Sea-Wind: A Naturalist's Picture of Ocean Life* (1964). These books illustrate her passion for natural history, making it understandable for others who are not necessarily biologists. Linda Lear (1998) examines Carson's writings:

major themes—the timelessness of the earth, the constancy of its processes, and the mystery of life—are found over and over in the body of her writing, but they had a special freshness and intimacy when Carson spoke them aloud. (p. 91)

In 1962 Carson's published a book, *Silent Spring*, which became an instant bestseller read by millions. Brooks states in *Silent Spring's* foreword that Rachel wrote to a friend the following words:

The beauty of the living world I was trying to save has always been uppermost in my mind—that, and anger at the senseless, brutish things that were being done....Now I can believe I have at least helped a little. (p. xiii)

MacGillivray calls *Silent Spring*: “The green manifesto that made ecology a household name, and pesticides a dirty word” (2004, p. 6). This most important book on environmental issues “is about DDT and other pesticides and the problems they cause wildlife and humans. Widely, it is a radical critique of technological progress and “control of nature”—and as such it has continued to be inspirational” (MacGillivray 2004, p. 122). More than forty years later, chemical pollution is still a concern as well as many other issues, such as genetic engineering, climate change, habitat loss and soil erosion. *Silent Spring’s* introductory quote by Albert Schweitzer, “Man has lost the capacity to foresee and to forestall. He will end by destroying the earth,” captures the message of this book.

Carson’s publication of *Silent Spring*, one of the most important environmental books ever published, drew attention to the growing environmental destruction, fueled a growing appreciation for the environment and increased concern for the well-being of ecosystems. It also contributed to a more active environmental movement in the 1960s. Brooks (1987) states: “In fact her book helped to make ecology, which was an unfamiliar word in those days, one of the great popular causes of our time. It led to environmental legislation at every level of government” (p. xiii). The United States enacted the Environmental Education Act and National Environmental Policy Act (NEPA) in the same year of 1970. The freeway revolts during the 1960s to oppose the construction of the US Interstate Highway that bulldozed communities and ecosystems country-wide, the 1969 Santa Barbara oil spill, an Eisenhower Outdoor recreation report and several other acts related to wilderness, clean air and clean water contributed to the formation of these two influential acts.

Gaylord Nelson, United States Senator for Wisconsin suggested an environmental teach-in, or Earth Day, on April 22, 1970 the same year as the implementation of the Environmental Education Act and NEPA. Seven years later, in Tbilisi, Georgia (USSR), an intergovernmental conference organized by the United Nations Education, Scientific, and Cultural Organization (UNESCO) in

cooperation with the U.N. Environment Programme (UNEP) identified three main goals for EE in the Tbilisi Declaration (1977):

to foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;

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

to create new patterns of behavior of individuals, groups, and society as a whole towards the environment.

In addition, EE is a continuous life-long, experiential learning process. EE contributes to changing human behaviours that instill “a sustainable and environmentally friendly quality to life” (Daudi & Heimlich, 2002, p. 6). Orr (1992) states: “All education is environmental education” (p. 12).

These acts, declarations and events contributed to the development of EE programs and resources that address our knowledge of the natural world. For example, I consider *Alberta’s Knee High Nature* series (Wishart & Hayley, 1994) and *Hands-on Nature: Information and Activities for Exploring the Environment with Children* (Lingelbach, 1986) excellent resources for presenting nature activities. During the 1980s and 1990s EE with an emphasis on environmental issues and problem-solving gained popularity. Hungerford, Litherland, Peyton, Ramsey and Volk (1988) developed an instructional program that addresses environmental issues and skills. Middle school and junior high school students complete activities in six sequential modules: environmental problem solving, getting started on issues investigations, using surveys and questionnaires, interpreting data from investigations, investigating an environmental issue and using environmental action strategies. Its goal is for students to become concerned and responsible citizens who develop skills that address environmental issue. The Canadian Wildlife Federation wrote a Canadian version of *Project Wild Activity Guide* in 1990 that was originally developed by the United States’ Western Association of Game and Fish Agencies and Western Regional Association for EE. This program aims: “to provide quality educational

programmes and assist in preparing our young people to make well-informed choices” (Maxwell, 1990, p. iii) and “to make a positive contribution toward the appreciation of the value of our natural heritage and maintenance of a quality environment” (Maxwell, 1990, p. iii). Maxwell (1990) notes: “The goal of *Project Wild* is to assist students of any age in developing awareness, knowledge, skills, and commitment to result in informed decisions, responsible behaviour and constructive action concerning wildlife and the environment upon which all life depends” (p. iii). The North Dakota State Water Commission established the WET program in 1984. A few years later in 1995, Montana State University published the *Project Wet Curriculum and Activity Guide*, a non-profit water education program for educators and young people, grades K-12. Its goal is: “to facilitate and promote awareness, appreciation, knowledge, and stewardship of water resources through the development and dissemination of classroom-ready teaching aids and through the establishment of state and internationally sponsored Project Wet programs” (Durney, 1998, p. i).

The field of EE continued to receive lots of attention from other interest groups as well. The Peace Corps Staff developed *Environmental Education in the Schools Creating a Program that Works!* “...to develop strategies for creating effective environmental education programs” (Braus & Wood, 1993, p. 2). Braus and Wood (1993) acknowledge that EE “cuts across all subject areas, including business, economics, language arts, history, social studies, and the humanities” (p. 2). The National Environmental Education Advocacy Project published *Promoting Environmental Education: An Action Handbook for Strengthening EE in Your State and Community* (Ruskey and Wilke, 1994). In this resource’s introductory letter, Digerness (1994) writes: “Educators will now have the tool needed to integrate environmental education into state and local school programs...” and “This book provides ideas, direction and a step by step process to achieve the reader’s EE initiatives, whether they involve a statewide program or a local one” (p. vi). These EE resources and many others include activities that take students into nature; however, more recently designed place-based education practices are an attempt to provide support for teachers to access

community resources without using these generic guides as their primary source of information and activities.

Place-based Education

Place-based education has received a lot of attention over the past few years (Sobel, 1996, 1998, 2004 & 2008; Smith & Sobel, 2010). In one of Sobel's books entitled *Beyond Ecophobia: Reclaiming the Heart in Nature Education* (1996), Gilliam and Lane-Zucker define place-based education and summarize the role of community in education as follows:

One might call this common sense education—an education of personal experiences in the community (*communis*) derived through an engagement of all the senses (*sensus*). Starting on the student's home ground, where family, culture, and natural history resonate in a personal, grounded manner, this education requires that students leave the confines of the classroom. Then, by blending scientific research, artistic response, and frequent interactions with a variety of members of the community—from conservation biologists, restoration ecologists, and others working at the grassroots level, to local historians, storytellers, artists, and town elders—the students begin to learn how to read the world in an authentic, integrated way. (p. vi)

They continue by writing:

This is a web that binds the generations and reinforces our sense of responsibility toward our places. It holds the stories and experiences that reveal a community's true identity. And it reveals to us our own uniqueness as well as our connectedness with all life. Nature literacy, we believe, can rebuild communities. (p. vii.)

Clark & Glazer (2004) state: "Place-based education is learning about, learning from, and learning within the context of where we are" (p. 1). They identify five core practices. First, we need to investigate natural areas and examine the influence of cultural practice within our communities. Second, we need to study local issues in depth apply what we learn to regional, national and global concerns. Third, primary and secondary sources of knowledge must deepen our understanding of these issues. Fourth, the knowledge of elders, community

organizations, and neighbours contribute to our understanding. Last, it is important to share the “lessons learned” through community service (pp. 1-2).

These five practices show that place-based education focuses on unique characteristics of places within the school’s community and “learning to be where we are” (Smith, 2002, p. 584). Gruenewald (2003b) writes:

Because the structures and processes of schooling are based on institutional patterns of isolating teachers and students from places outside school, one can claim that schools limit experience and perception; in other words, by regulating our geographical experience, schools potentially stunt human development as they help construct our lack of awareness of, our lack of connection to, and our lack of appreciation for places. (p. 625)

A complexity of perceptual, sociological, ideological, political and ecological dimensions shapes these places (Gruenewald, 2003b). McClaren (personal communication, July 3, 2011) suggests that “the separation of school from the community may reflect a desire to insulate schools (and education) for the vagaries of local politics, religion etc.” This may be true; however, we have to be careful that this separation does not result in an entire disconnect from our community. A community, including its natural areas, shapes us while we live there, affecting our choices, decisions and actions. What do we need to do “get to know this community” so we can be better prepared to live in it?

I turn to Sobel who identifies nature literacy as one important ecological element of place-based education, the focus of this dissertation. Gilliam and Lane-Zucker define “nature literacy” as:

...the ability to learn from and respond to direct experience of nature—means seeing nature as a connected, inclusive whole. Furthermore, it means redefining community as an interwoven web of nature and culture, a relationship marked by mutual dependence and one enriched and sustained by love. (1996, p. vi)

A community supports nature *and* culture and its relationship. This relationship is an interaction based on love, or at least mutual respect. Place-based education literature does not address this love, in detail. I turn to biophilia education for that insight.

Biophilia Education

Cajete's approach to biophilia education also emphasizes community-based, child-centered, cultural, community involvement with direct experiences in natural areas (1999). He notes that "It is about learning to sustain one's life in a natural community. This is the essential test of understanding ecological process, relationship, and responsibility" (1999, p. 204). The focus is on pedagogy of place, or learning grounded in place, particularly natural areas if possible. It develops an understanding of ecological processes and relationships that support humans' responsibilities to act sustainably.

Wilson (1984) defines "biophilia" as follows: "the innate tendency to focus on life and lifelike processes" (p. 1) and continues with: "I will make the case that to explore and affiliate with life is a deep and complicated process in mental development" (p. 1). Later, he suggests that "the urge to affiliate with other forms of life is to some degree innate, hence deserves to be called biophilia" (p. 85).

Kellert (1993a) writes in *The Biophilia Hypothesis*:

The biophilia hypothesis proclaims a human dependence on nature that extends far beyond the simple issues of material and physical sustenance to encompass as well as the human craving for aesthetic, intellectual, cognitive, and even spiritual meaning and satisfaction. (p. 20)

Kellert's remarks suggest a further shift toward human's innate need to connect to nature in a manner that goes beyond using nature to extract resources to make a living. Instead, nature can nurture every domain of human development, such as aesthetic appreciation, intellectual development and spiritual support that can fill our lives with meaning and can help us to live within our means. In this same book, Kellert (1993b) comments on the human's need to affiliate with life and lifelike processes:

This proposition suggests that human identity and personal fulfilment somehow depend on our relationship to nature. The human need for nature is linked not just to the material exploitation of the environment but also to the influence of the natural world on our emotional, cognitive, aesthetic, and even spiritual development. (p. 42)

Kellert reminds us that we need additional theoretical inquiry and empirical research into the biophilia hypothesis, reminding that this is still a hypothesis and not a fully formed theory, yet. “This cautious approach may help us avoid the inevitable suggestion that our exploration is but the disguised attempt to promote a romantic idealization of nature” (Kellert, 1993b, p. 21). This dissertation adds to this theoretical inquiry by explicating certain qualities that contribute to experiencing nature more fully, more deeply and more intimately.

Deep Ecology

Deep ecology takes human beings’ connection to nature another step further and deeper. We do not have a relationship with nature as an outsider. In fact, we are an integral part of nature—an insider—connected to every living and non-living part. Deep ecologists suggest that humans need: “to embrace the fundamental relationship of interconnectedness that we share with all life on this planet” (Deval and Sessions, 1985, p. ix). In 1973 Naess coined the term “deep ecology” which articulates a philosophical view that encompasses a more spiritual approach to nature as portrayed in writings of Leopold and Carson. Deval and Sessions (1985) in *Deep Ecology: Living as if Nature Mattered* suggest:

Deep ecology is emerging as a way of developing a new balance and harmony between individuals, communities and all of Nature. It can potentially satisfy our deepest yearnings: faith and trust in our most basic intuitions; courage to take direct action; joyous confidence to dance with the sensuous harmonies discovered through spontaneous, playful intercourse with the rhythms of our bodies, the rhythms of flowing water, changes in the weather and seasons, and the overall processes of life on Earth....The deep

ecology movement involves working on ourselves....the work of really looking at ourselves, of becoming more real. (p. 7)

Deval and Sessions (1985) offer suggestions and reasons for human beings to change the way we view nature, the way we interact with nature and the way we feel part of nature. By examining our part in nature, they suggest we may become real, implying that many of us do not live a fully human life. We need to examine our relationship *with* nature, or better yet we need to examine our relationship with all living and non-living things *in* nature. In an attempt to avoid dualism, Pyle (2003) suggests in his essay "Nature Matrix: Reconnecting People and Nature" that we must reject the preposition "with" and see nature and humans as one and the same thing:

Ultimately, reconnecting people with nature is a nonsense phrase, for people and nature are not different things, and cannot be taken apart. The problem is, we haven't yet figured that out. (p. 213)

This statement raises many questions. Is it important to accept humans and nature as one, interconnected whole? What do we need to do to embrace this idea? Recent poverty, increased food prices and natural disasters affect human and non-human survival (Worldwatch Institute, 2011). Will these factors and other concerns help us to understand, to accept and to act on Pyle's (2003) idea? With population growth rapidly reaching seven billion near the end of 2011, how much more time do we need or have before we respond to Pyle's idea? What happens if we do not respond?

Pyle's worldview espouses an ecological relationship between humans and nature. Darder (2009) offers some insights from the Western World:

...the Western ethos of mastery and supremacy over nature has, to our detriment, supported the unrelenting expansion of capitalism and its unparalleled domination over all aspects of human life. This is the worldview that has been unmercifully imparted within the hidden curriculum of schools and universities. (pp. ix)

Orr (1992, 1994), Bowers (1995, 2006) and others explore these western views of dominion over nature, expansion of capitalism and endless progress, in detail.

Even though I embed my thesis in these very complex concerns as stated in Chapter One, I explore Darder's last comment about the hidden curriculum in educational institutions in subsequent chapters, especially in terms of pedagogical perspectives.

Deep ecologists coined another phrase, called "ecological consciousness," that provides some additional insights in terms of a much needed change in perception and action on our part when being in nature. Deval and Sessions (1985) define the term as follows:

...involves becoming more aware of the actuality of rocks, wolves, trees, and rivers—the cultivation of the insight that everything is connected. Cultivating ecological consciousness is a process of learning to appreciate silence and solitude and rediscovering how to listen. It is learning how to be more receptive, trusting, holistic in perception, and it is grounded in a vision of nonexploitive science and technology. (p. 8)

I return to "ecological consciousness" in Chapter Six when I inquire philosophically into *intimacy* as a form of direct experience. For now, it is important to note that ecological consciousness stresses that everything interconnects and that by being still and listening, in its broadest sense, humans have the ability to be and to feel more intimate with nature in nature.

Naess developed two norms that support ecological consciousness: self-realization and biocentric equality. The first norm highlights the importance of nurturing and growing as a self, or as a human being; however, this happens within the context of a larger whole that includes all living species. Deval and Sessions (1985) write: "the deep ecology sense of self requires a further maturity and growth, an identification which goes beyond humanity to include the nonhuman world" (p. 67). The second norm takes it a step further by suggesting that each living organism has an intrinsic worth. In other words, humans have the same worth as all other living organisms, not a dominion over the rest of nature. Their second norm states: "all organisms and entities in the ecosphere, as parts of the interrelated whole, are equal in intrinsic worth" (p. 67). These two norms have important implications. Deval and Sessions (1985) argue that "Biocentric

equality is intimately related to the all-inclusive Self-realization in the sense that if we harm the rest of Nature then we are harming ourselves. There are no boundaries and everything is interrelated” (p. 68).

Van Matre’s book, *Earth Education: A New Beginning*, offers an approach that incorporates the theory and practices of deep ecology. Van Matre (1990) states:

Environmental problems are viewed as the result of something or someone out there, rather than within us as individuals. It encourages the perspective that if only *they* would do this, or if *they* hadn’t done that, then everything would be fine. But that’s not true; we are the *they* we complain about later. (p. 22)

Van Matre warns that “for the past twenty years *we have been led to believe* [my emphasis] that there is a significant educational response underway around the world for dealing with the environmental problems of the Earth” (1990, p. v).

Two decades have passed since the Environmental Education Act with very few changes in human behaviours in response to worsening environmental issues, according to Van Matre. In response, Van Matre and his colleagues design Acclimatization experiences part of his Earth Education programs, such as *Sunship Earth* and *Earthkeepers*. These program’s principles aim “to help people build an understanding of, appreciation for, and harmony with the Earth and its life” (1990, p. 83). Van Matre believes that a “...genuine learning program is a carefully crafted, focused series of sequential, cumulative learning experiences designed with specific outcomes in mind” (p. 16) and “people learn when they take something in, do something with it, and then use it” (pp. 65-66). Van Matre’s goals for Earth Education are to help people improve their cognitive and affective relationship with natural areas on Earth and develop a lifestyle that lessens their impact on earth.

Interconnection

So far, this analysis identifies, assesses and critiques important elements of direct nature experiences drawn from environmental education/nature study,

place-based education, biophilia education and deep ecology. People with an ecological identity view human beings as part of nature. On the other hand, people with a more ethnocentric perspective see themselves as separate from nature. They tend to believe that they are not part of natural cycles and processes, such as evolution. They may even view themselves as separate or special creations. Cajete (1999) concludes that schools play a major role in disconnecting students from their natural place (p. 192). Schools must redirect their purpose to a biophilic education that restores affective connections with natural areas in communities—an interdependence with earth. Biophilia education supports four principles: community-based, child-focused self-exploration, active involvement and direct encounters with natural areas. This dissertation addresses the fourth principle, in particular. So far, an analysis of these four types of environmental education informs my identification of three types of direct experiences—*initiation*, *immersion* and *intimacy*—that can restore an affinity with the natural environment. The next three chapters analyze these three types of direct experiences, in detail.

I do not argue that humans necessarily have to participate in these three types of direct experience in nature with its supporting qualities in a certain sequence or in a certain developmental stage in their lives. Instead, I show that there are benefits to participating in these experiences at any time or in any order.

This literature review supports my dissertation's proposition that we ought to experience nature directly. The next chapter examines qualities of initiation type of direct experiences. I incorporate Carson's experiences with her grandnephew, Roger, in her book, called *The Sense of Wonder*, as well as some of my experiences in nature as a child.



(Photographed by Q. Mulder ten Kate)

CHAPTER FOUR: INITIATION

Introduction

Direct experiences in nature benefit human health in a number of ways as already outlined in Chapter Three (Louv, 2005). These experiences exclude activities such as being exposed to predation or natural disasters that can possibly severely harm a person. Louv (2011) notes: “The long-held belief that nature has a direct positive impact on human health is making the transition from theory to evidence and from evidence to action” (p. 46). Furthermore, “Health isn’t just about absence of illness or pain, it’s also physical, emotional, mental, intellectual, and spiritual fitness—in short, it’s about the joy of being alive” (p. 71). Louv (2011) writes a prescription for Vitamin N—for nature. It is a low cost remedy that physically, emotionally, intellectually, mentally and spiritually benefits humans. Teachers ought to write this prescription for their students, too. Louv (2011) claims:

There was a time when developing a spiritual, psychological, physical attachment to place came naturally; today, awareness of our surroundings and our role in this larger life must be developed purposefully, not only by each of us, but by governments and business. (p 120)

Provincial governments, including their Ministries of Education, ought also to support teachers to provide these benefits of attachment or relationship with nature. BC’s *Science 10 Integrated Resource Package* (IRP) states: “Science education in British Columbia is designed to provide opportunities for students to develop scientific knowledge, skills, and attitudes that will be relevant in their everyday lives and their future careers” (2008, p. 11). This goal parallels Louv’s recommendation and the three goals for EE stated in the Tbilisi Declaration (1977). Teachers trying to meet this goal face a number of challenges, in addition

to the four barriers outlined in Chapter One. Students usually change teachers every year from Kindergarten to grade seven or eight and, later, change teachers for most of their secondary subjects. In our school district, students also move from an elementary school building to a middle school building to a secondary school building in an ever-widening geographical radius.

Teachers tend to deliver content knowledge from secondary sources such as textbooks, DVDs, videos, TV and the internet to their students. Secondary teachers tend to administer chapter tests, unit tests and midterms and final school exams and/or provincial exams to assess learning, to measure progress and to provide data for the Ministry of Education, parents and the Fraser Institute¹. In addition, foundational skills assessment tests in grade four and seven and mandatory provincial exams for Science 10, Math10, English 10, Social Studies 11 and English 12/ Communications 12 provide students, parents, teachers and the Ministry of Education with more academic achievement data. The Fraser Institute uses this data to rank schools in BC.

Giroux (2010) believes that teachers partake in a neo-liberal system² that prepares citizens for the work place. This efficient system of education tends to reduce costs, to increase accountability, to stifle local flexibility, to encourage conformity and to deprive districts of acting on behalf of their community and its needs. This efficiency eliminates direct experiences in nature that may take time away from the classroom lessons. This accountability does not endorse direct experiences in nature not easily measured over time. This conformity

¹ The Fraser Institute's website, <http://www.fraserinstitute.org/about-us/overview.aspx>, states, "The Fraser Institute is an independent non-partisan research and educational organization based in Canada. The Fraser Institute conducts peer-reviewed research into critical economic and public policy issues including taxation, government spending, health care, school performance, and trade."

² Neo-liberalism, a market-driven, economic and social policy based approach, stresses the efficiency of private enterprise, choice and open markets to shift control from the public to the private sphere in determining the political and economic policies and priorities of the country.

discourages visits to local, unique, natural areas. Yet, some teachers introduce students to nature, overcoming, often externally imposed challenges and barriers.

Differences between direct, indirect and vicarious experiences offer great opportunities for a range of experiences in schools and beyond. Rather than suggesting that one type of experience is better, I acknowledge they have the capacity to contribute to affective, cognitive and evaluative human development in different ways. However, in addition to research conducted by Kellert (2002), Pyle (2002) and Thomashow (1995, 2002), Louv's emerging research on human experiences in a nature, stories from other people and his personal reflection contribute convincing evidence that direct experiences provide a human connection to nature that restores our relationship with nature (Louv, 2011). What can teachers do to implement practices for human restoration?

I completed a one-year diploma in EE while teaching on call in Surrey, Maple Ridge and Coquitlam. A year later, I accepted a permanent job in the Coquitlam School District where I accessed nearby, natural areas for my science and art lessons with a grade three/four class at a local elementary during a part-time position for six months. This short-term assignment infused sensory-based local, direct nature experiences into mandated curriculum. I introduced students to different natural areas, such as a forest, a stream, an ocean and a playground. I was their companion when they sketched plant life along a forest trail, listened to birds in the forest, collected and observed plankton from Burrard Inlet that supports salmon from their local creek and painted a watershed scene on their classroom portable. These short, introductory activities are personal examples that contribute to the conceptualization of the construct *initiation*. This type of direct experience involves, in short, "visiting" nature for the first time.

"Initiation" implies a beginning, an opening, an induction, a commencement or a launch. "Introduction" generates a similar list of words. These words suggest a start of something. I was able to introduce these grade three/ four students to the evergreen forest along Noon's Creek with administrative approval. As my students' companion, I started to take them out of

their regular classroom, taking them to new, unfamiliar, natural areas beyond school property on many occasions. These short experiences stimulate students to sense, to feel and to get to know nature. These short introductions, inaugurations, inductions, or launches into nature provide students with very different experiences—perceptions and stimuli—compared to experiencing nature indirectly or vicariously in an indoor classroom. Classroom vicarious exposure to nature is a representation of nature without smells, tastes, sounds, textures or sights from three-dimensional, living organisms interacting in their natural areas. Introductions to different natural areas are unpredictable and random. Again, this differs from nature observation in a classroom when the teacher usually selects organisms that students observe.

Introducing ourselves to organisms or initiating contact with organisms implies a “meeting” between a human and another human or non-humans for the first time. An introduction is at the beginning of a book, a paper, a show or a thesis! It tends to be the first part of the book that people read or experience. Any time this same experience happens again, there is no longer the same sense of newness or unfamiliarity. Humans and non-humans interacting for a second time or more often have a sense of recognition between them or recognition for the non-living elements in this natural area. For example, when humans are bird watching for the first time, they might spot a particular bird species. The second time these birders visit nature, they may spot a bird again, possibly a different species. They can recall and compare features of the bird from their first visit with the bird spotted during their second visit to determine if it is the same species or not. Chapter Five examines repeated experiences, a quality of immersion.

Two qualities, *sensing and feeling in addition to knowing* as well as *companionship* enhance this first type of direct experience. My philosophical inquiry examines these two aspects and, in particular, it analyzes their contributions to humans’ affective and cognitive domains.

Sensing and Feeling as well as Knowing Nature

Advances in technology can project nature images on screens with matching sounds so that an audience can passively observe nature indoors. This type of technology is not a substitute for messy play outside, because it carefully controls the observer's experience and can objectify nature. It separates us from the actual, immediate physical experience by re-presenting nature into tiny electronic fragments sequenced by others.

Ironically, I type this philosophical inquiry about direct experiences in nature on a laptop, sitting in my indoor office—out-of-nature. This process limits sensory input from nature other than observing a playground with non-native trees and mowed grass through a window on my right. This printed text can only partially convey a wealth of nature experiences obtained by my senses. How can my writing adequately portray what I sense in nature and what I feel about these experiences? This text is more about knowing than sensing. The irony of this dilemma does not escape me.



(Photographed by Q. Mulder ten Kate)

Photos may add to this text; however, they will never exactly recall, review or represent my experiences in nature. When returning to the Netherlands last year after a long absence, I photographed some local, natural areas important in childhood and now relevant in adulthood. Other than illustrating this dissertational text, do these photos provide any other insights or purpose? Do photos trigger my sensory connections to nature? Photos tickle my senses and might lift nostalgic memories from my brain. I can view the colours of fall on a photo even though it is now spring.



(Photographed by Q. Mulder ten Kate)

At any time of year, a photo may remind me about the smell of rotting Chum or Coho salmon spawning in Scott Creek. A photo may remind me of the sound of birds early in the morning, regular visitors to the Dogwood tree just outside of my front door or the beechnuts I used to collect to feed wildlife in the winter. I can even re-call the texture of bark from another tree by viewing a photo, even though I am standing nowhere near it.

Sensory information stored in a brain or shown indirectly by a photo in a textbook can only partially be available at a moment's notice. I agree with Carson that experiencing nature directly accesses sensory information, a smell, a touch, a taste, a sight or a sound, that is not available in written text or illustrations in a book. Words and illustrations only partially and indirectly describe nature. Assigning terms such as "brown," "small" and "rough" to a beechnut is only partially informing us about its appearance. Furthermore, each beechnut is unique amongst all other beechnuts. We cannot adequately describe it in words. Sensing a beechnut as well as knowing it as a beechnut is part of a direct experience. Identifying it as a beechnut is the assignment of a term that tells us little about this one beechnut. However, it enables us to re-call past information about beechnuts touched before. So assigning terms to non-human beings in nature is helpful, but limits our knowledge until we sense them thoroughly ourselves. Media sources can describe them, but this knowledge is incomplete without any immediate sensory input. McKibben (1993), in his book *The Age of Missing Information*, supports this notion when collecting information from 93 cable television channels and comparing it to spending 24 hours atop an Adirondack mountain. McKibben (1993) concluded that his unmediated, direct

experience in nature provided “information” that cannot be replaced by anything else.

When our body physically interacts with nature, our sensory system receives information from nature that we process, store and evaluate. Louv (2005) writes that “...as human beings we need direct, natural experiences; we require fully activated senses in order to feel fully alive” (p. 57). Reed (1996) writes in *The Necessity of Experience*: “There is something wrong with society that spends so much money—as well as countless hours of human effort—to make the least dregs of processed information available to everyone everywhere and yet does little or nothing to help us *explore the world for ourselves*” (p. 3). Reed (1996) notes the irony of the information age:

The information being left out of these developments is, unfortunately, the most important kind: the information—termed *ecological*—that all human beings acquire from their environments by looking, listening, feeling, sniffing, and tasting—the information, in other words, that allows us to *experience things for ourselves*. (pp. 1-2)

I consider processed, secondary information useful. However, I suggest that primary, sensory sources of information develop a stronger affinity with nature than secondary sources of sensory information, because we interact with nature directly. Reed (1996) continues: “It is on firsthand experience—direct contact with things, places, events, and people—that all our knowledge and feeling ultimately rest. The meaning of second hand experience derives from and is dependent on primary experience” (p. 3). The notion of “primary experience” means experiences in which we are directly engaged with our senses. Reed (1996) writes:

We have been persuaded that learning about things on the basis of processed information—on the basis of what others tell us the thing is about—is an adequate substitute for coming to understand things for ourselves through primary experience. (p. 4)

When we are in nature, we are initiated into its basic elements: earth, water, fire, air and other living species. The five senses enable us to receive nature’s

wonders as well as respond to them. I agree with Louv (2005) who writes: “While environmental education focuses on how to live correctly in the world, experiential education teaches through the senses in the natural world” (p. 201).

Nature stimulates and tickles our senses and our feelings about nature that contribute to our human development and health. We can experience nature first-hand without the mediation of another tool, such as a TV, book or computer that tries to convey nature experiences vicariously. How do we emotionally respond to these experiences? What effects do these experiences have on our psychological well-being? What types of nature experiences support human beings on an emotional level? When we experience nature directly, what do we feel at an emotional level and what feelings do we develop? Brody (2007) writes: “feeling is the development of values and value structures....It is personal and social and feelings give rise to attitudes, values and beliefs” (p. 610). Answers to these questions depend on the kind of experiences in nature.

Chawla (1994 & 2002) also acknowledges the importance of nature on our health, concentration, creative play and our emotions. Sensory interactions with nature stimulate our imagination, expand our horizons and support our emotional well-being. We may begin to feel more native in these natural places (Jackson, 1994) and may act more responsibly when we know and feel part of nature. We develop an affinity with nature, including its living organisms and non-living components. When we feel part of nature, we are more likely to feel a sense of belonging and attachment to nature. Referring to work by Farrell Erickson, Louv (2005) states:

In the world of child development, attachment theory posits that the creation of a deep bond between child and parent is a complex psychological, biological, and spiritual process, and that without this attachment a child is lost, vulnerable to all manner of later pathologies. I believe that a similar process can bind adults to a place and give them a sense of belonging and meaning. Without a deep attachment to place, an adult can also feel lost. (p. 156)

Adults and children who experience nature together strengthen their emotional bond as well as their bond with nature.

It is important to note that *sensing and feeling in addition to knowing* is a quality that is also present in the other types of direct experiences, immersion and intimacy. In fact, every quality discussed chronologically in this thesis is part of the subsequent types of direct experience; however the reverse sequence is not possible. For example, inter-being is not a quality that describes initiation type of activities. The chronology of initiation to immersion to intimacy and its supporting qualities supports a progressively deeper and deeper affinity with nature as shown throughout.

Pedagogical Perspective

How should schools teach local, ecological knowledge? Students can read about nature in books, hear about nature on TVs and write about nature in assignments and on tests. I observe that it is rare for them to have any direct contact with nature in their schoolyard and beyond their school's boundaries into their neighbourhood to strengthen their ecological and sociological intelligence. Instead, teachers in my school use the *BC Science 10* textbook in British Columbia to teach about biomes, ecosystems, biodiversity, sustainability, invasive species, habitat fragmentation, resource depletion, deforestation and climate change. As mentioned previously, this textbook has very few activities that take students outside to explore and to discover for themselves aspects of an ecosystem. Instead, students read a textbook that describes how we all are destroying these ecosystems at an alarming rate. Sobel (1996) states: "If we fill our classrooms with examples of environmental abuse, we may be engendering a subtle form of dissociation" (p. 2). Louv (2005) warns that when "lacking direct experience with nature, children begin to associate it with fear and apocalypse, not joy and wonder" (p. 133). Orr (1994) writes:

Education that supports and nourishes a reverence for life would occur more often out-of-doors and in relation to the local community....It would help people become not only literate but ecologically literate, understanding the biological requisites of human life on earth. It would provide basic competence in what I have called the "ecological design arts," that is, the set of perceptual and analytic abilities, ecological wisdom and practical

wherewithal essential to making things that fit in a world governed by the laws of ecology and thermodynamics. (p. 148)

Even though these “techniques” or “strategies” appear highly mechanistic, Orr’s intentions are more ecologically in tune with experiencing nature directly.

Teachers can substitute textbook experiences with introductory direct experiences in nature. Carson’s writing reminds us that sensing and feeling nature ought to occur in addition to knowing nature. Students who use their senses obtain valuable insights into nature. Their senses introduce them more directly to other organisms. Sensing nature informs their knowing of nature and knowing informs their sensing of nature, endlessly spiraling to a more in-depth affective and cognitive understanding of nature. Carson herself makes it clear that sensing nature arouses the emotions which lay the foundation for the assimilation of more knowledge, including such naturalists’ activities as, plant and bird identification (1987b, p. 45). Carson shared her enthusiasm for nature by sharing her extensive knowledge of natural history (1987b, p. 18). By experiencing nature with their senses directly, students—young and old—develop an affinity with nature which is different from reading about nature in books or watching nature on television.

Companionship

I agree with Thomashow (1995, 2002) that these short and initial direct experiences in nature contribute to my ecological identity, currently as a resident of the Pacific Ranges–Coastal Mountains as well as a teacher in the Coquitlam School District, BC. In turn, family members and friends also influence my ecological identity. Maria, Rachel’s mother, accompanied her daughter on bird, insect and flower explorations during the 1900s when Carson was growing up. Lear (1997) notes:

Maria impressed her respect and love for wild creatures on all her children. When they returned from their woodland adventures with treasures to show her, Maria instructed the children to return them to where they had been found. This kind of care for the natural

world had a spiritual dimension that at least for her youngest daughter embraced and would practice all her life. (p. 15)

In *The Sense of Wonder*, Carson describes her companionship with her grandnephew, Roger. During the 1900s nature study, as noted in Chapter Three, was a popular activity to reconnect children to nature when many of their families left farming behind. I focus on the role of a companion during my childhood and adulthood.

First, a companion can model curiosity and respect for nature. Second, each one is the companion for the other; therefore, we demonstrate these ways of being for each other. The one being initiated into nature experiences it alongside the one who has had previous experiences in nature. This is not necessarily a prerequisite. The other can be, but does not have to be, the expert. Hence, the term companion is a more accurate term than mentor or guide that implies a transfer of knowledge or skill from the mentor or guide to the apprentice. We can experience nature together, exploring it for the first time without any prior wisdom. During a companionship in nature, we may experience or may interpret these moments in different ways. Being together opens our eyes to the other person's ways of seeing and experiencing nature. We can use the other person as a mirror that reflects back our own experiences. We use them to interpret our experience and to gain an understanding of our experience. Thus, we gain practical knowledge as well as propositional knowledge that influence our subsequent experiences in nature.

When companions introduce children or adults to nature, they take them literally and figuratively by the hand to share their affinity with nature. The companion may already be comfortable in nature and may show the other person what an experience in nature looks like and feels like. We can start to pay attention to nature's ways, becoming aware of its parts and presence. We interpret what we experience through our own mind, possibly asking questions of our companion if something confuses us or challenges us. We do not need to listen to what others have to tell us and we do not need to read what others have written us. We make sense of our direct experience in nature in our own way with

others nearby to support us if needed. At the same time, we copy our companions' ways of moving through nature, companions' ways of interacting with nature and companions' ways of responding to nature.

These interactions with nature must respect nature by not destroying or damaging nature. Companions demonstrate an understanding of nature, slowly initiated into the other person. Thus, companions enhance these initial visits in nature by sharing their experiences, expertise and emotions. As Carson (1987b) notes, exploring nature is about becoming receptive to nature while being engaged to-get-her in a moment of discovery. It is receiving nature's signals and signs that awaken in us an experience that only nature can offer. We share our enjoyment and engagement with nature that introduces us to its mystery and magic.

What can nature teach us directly that we cannot read about in books? In other words, when we see, hear, taste, touch and feel nature with other persons nearby, what does it contribute to our intellectual understanding of nature? First, many non-fiction books usually contain knowledge that is not very specific to a particular community. This generalized knowledge excludes local fact and figures that change too rapidly to keep up with in print. If this knowledge is not available in print, such as in standardized textbooks in my school, then how are we gaining to access to it?

Experiencing nature directly can be a very social process. Rogoff (2003) identifies people closest to the child, a parent or caregiver, and eventually teachers as being the most important members in a community to take responsibility for a child's learning and integration in society. Children learn skills from family members closest to them. Family members initiate children as an active participant in the community. Rogoff (2003) writes:

The opportunities to observe and pitch in allow children to learn through keen attention to ongoing activities, rather than relying on lessons out of the context of using the knowledge and skills taught. In this pattern, children's relationships often involve multiparty collaboration in groups rather than interactions with one person at a time. (p. 9)

This relationship provides opportunities for guided practice that alter with evolving socio-cultural changes as well as human developmental changes over time (Rogoff, 2003). Mutual involvement during communication and coordination of activities affects how we develop. Even though Rogoff (2003) focuses on children's socio-cultural development, I think a few of her characteristics are important when someone of any age experiences nature: a mentor/companion, experiencing in context, experiencing alongside each other and direct participation through guided practice.

Bowers discusses the importance of oral, intergenerational knowledge shared between local elders and the next generation (1995, 2000, 2005, 2006). Community members must count on each other to act responsibly in nature for their survival. Local elders' oral knowledge tells the natural, social, economic and cultural history of the community and its people. This knowledge may offer solutions to problems that require an immediate response from the community. Knowledge from other locales may not provide the "right answer." This localized, propositional knowledge may slowly fade and disappear without direct, immediate interaction between generations. When we standardize knowledge across different communities, we become less flexible or less adaptable in responding to changing local circumstances.

Bowers (2000) notes: "Local knowledge of relationships within the human and biotic communities is learned largely implicitly and contextually, through participatory face-to-face relationships" (p. 65). Five years earlier, Bowers (1995) states: "Just as who we are depends upon who we are interacting with, how we think, behave, and value depends upon the intelligence immanent within the dynamic patterns of the larger systems within which we find ourselves" (p. 15). He continues: "We need to adopt a view of the individual as an interactive member of the larger and more complex mental ecology that characterizes the culture/ environment relationship" (1995, p. 15).

This dependence on networks of people in the community is similar to how natural ecosystems maintain themselves. Capra (2005) writes:

The systematic understanding of life that is now emerging at the forefront of science is based on three fundamental insights: life's basic pattern of organization is the network; matter cycles continually through the web of life; all ecological cycles are sustained by the continual flow of energy from the sun. These three basic phenomena—the web of life, the cycles of nature, and the flow of energy—are exactly the phenomena that children experience, explore, and understand through direct experiences in the natural world. (p. xiv)

By interacting with ecosystems as frequently as possible and everywhere, we expand our intellectual understanding of some of these basic facts of life.

Bowers (2000) and Rogoff (2003) identify people closest in relation to the protégé or apprentice as the most important mentor, master or companion. These parents, caregivers, relatives or elders are responsible for initiating a younger member as an active participant in the community and transferring their social/cultural/ecological/natural wisdom through observation, participation, and eventually independent action. These local, social interactions in nature support the transfer of technical knowledge as well as practical knowledge about all living organisms in and non-living aspects of natural areas.

Sobel's books, *Beyond Ecophobia: Reclaiming the Heart in Nature Education* (1996) and *Place-based Education: Connecting Classrooms & Communities* (2004) address the importance of mentorship in a larger ecological context. Sobel (1996) states the importance of a role model: "...to be in the natural world with modeling by a responsible adult" (p. 10) and connectivity: "...we want to cultivate that sense of connectedness so that it can become the emotional foundation for the more abstract ecological concept that everything is connected to everything else" (p. 13). This connectivity is between people, such as teachers and students, of all generations and with their surroundings. In Sobel's third book (2004) introductory words by Lane-Zucker connect these two important goals: "Place-based education might be characterized as the pedagogy of community, the reintegration of the individual into her homeground and the restoration of the essential links between a person and her place" (p. ii).

Companions share their enthusiasm, awareness and knowledge, initiating the other into directly experiencing nature that can last a life-time. They move beyond the exchange of technical knowledge or *know-what* to an exchange of more practical or tacit knowledge or *know-how*. MacKinnon (1996) examines the metaphor “*learning to teach at the elbows*” in the context of teacher education. As a science teacher educator, he prefers to teach alongside beginning teachers so that they can mimic his manners manifested within a social and cultural context and science pedagogy. This approach “embeds learning in the activities of teaching with my students,” he writes (MacKinnon, 1996, p. 661). This apprenticeship model complements standard lectures, courses and readings provided in teacher education programs. This article cautions that “Teaching manner embodies virtue, trustworthiness, the pursuit of truth, respect for evidence, and regard for reasons—things often taken to be the normative criteria for judging teaching acts” (MacKinnon, 1996, p. 659). The act of learning to teach is partially tacit when being initiated alongside a more experienced teacher. Expert teachers have to take extra caution to engage in the right manners. On the other hand, student teachers have to be part of the action, be willing to mimic these expert teacher’s behaviours and incorporate critical reflection to improve teaching practices.

Even though companions do not have to introduce us to nature, they can provide insights and inspiration that support the inexperienced human with discovering nature in a relational way. Companionship between different generations also facilitates transfer of past skills and local, ecological knowledge unavailable in recorded texts or images.

Pedagogical Perspective

Teachers, companions of students, who share their direct experiences in nature, should focus on sensing and feeling nature in addition to knowing nature. Using Rachel Carson’s interactions with Roger as a foundation for this dissertation, I extend her work to explicate the importance of feeling, especially sensing nature as a form of extra-rational knowing (Cranton, 2006), with or

without the presence of a companion. This extra-rational way of feeling or developing a feeling for nature can initiate students into nature more affectionately and deeply. Van Matre's Acclimatization programs emphasize sharpening students' senses in addition to sharpening their understanding of ecological concepts. Experienced companions, the third component of his programs, facilitate the process of sharpening the senses as well as sharpening ecological concepts. These facilitators, like classroom teachers, know something about the mechanics of learning (Van Matre 1990, p. 65). The final and fourth component sharpens the students "*nonverbal skills*—skills like watching, waiting, silencing and stilling, opening and receiving. In a word, it was solitude... They could feel the processes and process their feelings" (pp. 69-70). Van Matre later added another element, called "magic," to improve the effectiveness of his acclimatization activities.

Teachers can develop a feeling for nature and an emotional connection with nature and with their students. Sensing nature and companionship in nature are two important qualities of being initiated into nature. These two qualities introduce an affinity with nature to students and their teacher. An initiation type of experience is the first exposure that a student has to nature. Nature is still an object out there to be explored and to be sensed. As shown shortly, this type of direct experience, in comparison to the two other types of direct experience, immersion and intimacy, barely scratches the surface or engages us not very deeply into nature. This connection is weaker than the next two types of direct nature experiences; however, it is a starting point for gaining an awareness of nature and an appreciation for nature.

Vignette One: Children Directly Experiencing Nature

The first part of this vignette illustrates my sensory experiences in nature as a child and the second part of the vignette illustrates the role of companions in these experiences. What was my fertile soil? What nature was part of my childhood? What impressions did my senses absorb for me? I spent lots of time in nature from a very young age. Especially later in life, many of these

experiences were unaccompanied so I had to rely on my senses to perceive and process my experiences in nature. This sensory input affects how I feel about nature and how I connect to nature.

Playing outside in our backyard involved very little plastic or metal equipment. Instead, many of nature's objects such as birds, feathers, trees, leaves, piles of dirt and worms entertained me for hours. Most of these adventures involved exploring nature on my own without any parents nearby. I invented my own play, my own fun and my own games. Nobody told me what to do or how to do it. I tried and I failed or I succeeded. These unstructured introductions to nature allowed for lots of exploration, experimentation and observation.

It is learning again to use your eyes, ears, nostrils and fingertips, opening up the disused channels of sensory impression. (Carson, 1987b, p. 52)

I lived at the "Eekmars" for the first six years of my life, long enough to develop a feel for its surrounding nature. I experienced seasonal changes such as decay, death and rebirth of deciduous leaves on my two favourite trees: a beechnut in the centre of the yard and a chestnut in the back corner surrounded by our compost pile. I raked beechnut leaves into huge piles in the fall so that I could jump into them or throw them in the air to bury me moments later.

Roger delighted in its texture, getting down on chubby knees to feel it, and running from one patch to another to jump up and down in the deep, resilient carpet with squeals of pleasure. (Carson, 1987b, p. 39)

My favourite place was the compost pile around the chestnut tree. I exposed creatures that tried to hide. Even after moving just down the street when we converted the old home to a larger family-owned bank, this back yard continued to be one of my favourite places for many years.

...you can still look up at the sky....You can listen to the wind.... You can still feel the rain on your face... (Carson, 1987b, p. 49)

In addition to collecting old, soon to be recycled, newspapers, I also collected chestnuts, beechnuts and oak nuts. My mother pureed the chestnuts, like mashed potatoes, and served them with wild game at our traditional Christmas dinner. I collected beechnuts at the Eekmars and collected oak nuts along the Elspeter Weg. A ranger in town who fed these nuts to local deer and wild boar populations during the cold winter months paid me small amounts of cash for every pail. I picked up one beechnut at a time, twisting it between my fingers to check which one was full and which one was empty. Each of the beechnuts had a very distinctive shape, texture and colour. It was not going to be a good payday if too many empty nuts were amongst the full nuts!

With this beginning, it is easy to share with them the beauties we usually miss because we look too hastily, seeing the whole and not its parts. (Carson, 1987b, p. 59)

This lesson in identifying and collecting nuts taught me lots of patience, too. After I had separated nuts from leaves, I had to squeeze each one of them hard and repeated this process many times to fill the pail. This beechnut tree produced fewer full seeds each year, a sign that the tree was nearing its lifespan. This activity was an exercise in patience and pleasure with hours of searching and sensing in return for a small amount of cash. What other wildlife would have scurried past by my nose and eyes? What smells reached my nose? What sounds entered my ears? My sense of touch improved. How many hours of fresh air reached my nostrils and lungs? I introduced myself to a natural area by using all of my senses. I felt a relationship, or sense of affinity, with my observed organisms.

I also loved using binoculars or magnifying glasses to explore nature in a different way, opening my senses to its subtle sights otherwise hidden from my perception. Props make me stop and look more carefully at what might otherwise be unavailable to my senses. In other words, they may bring nature closer.

Some of nature's most exquisite handiwork is on a miniature scale, as anyone knows who has applied a magnifying glass to a snowflake. (Carson, 1987b, p. 59)

I lived in my first town surrounded by forests and heather fields on the west and south of town and agricultural fields on the east and north of town for the first sixteen years of my life. Endless horizons stretching in most directions created a feeling of openness and expansiveness. Following the “movement of the sun” from East to West gave me clues about time and location. I frequented most natural places on foot or by bike, rarely asking my parents drive me. In addition to daily walks back and forth to elementary school five days a week, I walked to run errands, to visit friends and to recreate in neighbouring parks. In addition to these activities, many informal, annual family outings introduced me to tasting wild, edible plants, to listening to the deer during rutting season, to skating on local flooded fields or on frozen canals during very cold winters, or to walking the trails for a few hours on Sundays. My senses help me to feel my way around and to re-call past memories in these natural places.

For the sense of smell, almost more than any other, has the power to recall memories and it is a pity that we use it so little. (Carson, 1987b, p. 66)

Famous for biking, the Netherlands organizes many cycling events. One of these events is the “fiets vierdaagse” (*trans.*: a four day cycling event) with three distance options. I started biking four times ten kilometres routes, followed by four times twenty kilometres routes and eventually four times thirty kilometres routes for many summers. Eventually, my town added four-day walking events in June to these popular cycling events in July. My classmates and I walked five kilometres for four consecutive evenings. These annual physical activities and family “fieldtrips” initiated me to our community’s natural treasures and trails. I had direct contact with nature such as forests, heather fields, rivers and creeks and its flora and fauna. These outings heightened my senses in every way possible. I tasted the sweet, dwarfed wild blueberries discolouring my fingers and tongue, smelled pinkish heather flowers spreading their fragrance, listened to local wildlife participating in the cycle of life, touched the bark of trees along the way and saw birds gathering twigs for their nests. I led a life, filled with pleasure,

appreciation and awareness, developing an affinity with nature that would last a lifetime.

Hearing can be a source of even more exquisite pleasure but it requires conscious cultivation. (Carson, 1987b, p. 68)

These explorations of natural areas opened my eyes and ears to its beauty and wonder—something that books could not convey as vividly and as wonder-fully. Seeing it with my own eyes, making sense of the sounds and smells while cycling through fields with wildlife and reading nature’s signs to determine the correct route contributed to my sense of how the pieces fit together in my community and in nature. I remember fondly this direct contact with nature through my senses, having more difficulty recalling events in my life that took place in school. While growing up in the Netherlands, we faced many ecological crises, such as drinking water pollution, manure overproduction, rising energy costs, disappearing species, regular commuting gridlock and soil degradation. Yet, I do not remember a single lesson taught in my elementary and secondary school to address these issues. School taught me mostly the basics such as reading, writing and arithmetic during my formative years.

Why do I still have this affinity with nature? These experiences were about being there and taking it all in. I had no names to memorize, no long lists of words to store in my brain and no pages of text to read.

I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused—a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love—then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning. It is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate. (Carson, 1987b, p. 45)

We remember many unplanned lessons in nature sometimes far better than the best-planned lessons in school. These experiences and many others initiated and stimulated my senses to become observant in nature and to develop a feeling for nature.

In addition to my senses, companions also introduced me to nature. One set of paternal grandparents lived in a house surrounded by large gardens, fields and forests just beyond town limits and a short bike ride from home. I explored these natural surroundings for hours with my grandparents, interacting with domesticated and wild organisms!

Exploring nature with your child is largely a matter of becoming receptive to what lies all around you. (Carson, 1987b, p. 52)

I remember one experience, in particular. Every spring for a number of years, I rode my red bicycle to their bungalow style house to attend to their garden. The act of gardening or growing domesticated fruits, flowers and vegetables is an example of indirect experiences as defined by Kellert (2002). Humans regulate this activity by deciding what, where, how and why to grow certain species of plants. However, I include this example in this dissertation, because throughout the gardening process, I interacted with many other non-living and living factors not introduced by humans. For example, I touched earthworms in the soil, listened to birds visiting the garden, selectively removed the weeds and smelled the aroma of the soil in the early morning hours or later in the evening to avoid the scorching heat of the mid-day sun.

He will never forget the experience of a specially planned early rising and going out in the predawn darkness. (Carson, 1987b, pp. 68-69)

I may not have gotten up too early or stayed up too late for every planned experience with my grandparents; however, I was an integral part of these annual gardening experiences with them. Their garden consisted of several smaller plots in which I spent hours tilling the soil, building dirt rows, sowing seeds, watering young sprouts, weeding unwanted ones and eventually

harvesting veggies for their kitchen and cut flowers for their living room. My grandparents presented their “lessons” in crop rotation, pest management and soil fertilization on the spot in the garden! Books were conspicuously absent. I watched, copied and repeated each procedure step-by-step.

We have let Roger share our enjoyment of things people ordinarily deny children because they are inconvenient, interfering with bedtime, or involving wet clothing that has to be changed or mud that has to be cleaned off the rug. (Carson, 1987b, p. 22)

My grandparents were patient with my mistakes. Strings tied between stakes provided the straight lines underneath which I piled the mounds of dirt, raised to distinguish new sprouts from weeds. They carefully watched every step from a distance. I am sure they peaked out of the corner of their eyes to make sure I would not bury the seeds too deep or would place too many in one hole. I was reminded what was germinating underground by seed packages taped to stakes.

If a child is to keep alive his inborn sense of wonder without any such gift from the fairies, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in. (Carson, 1987b, p. 45)

Repeated watering and almost constant weeding usually led to success when a few frail sprouts quickly broke through the soil. Regular watering and weekly weeding preceded the pleasure of harvesting. I have no misconceptions of where my food comes from! After years of experiencing gardening alongside my grandparents and tending to my own plot in their garden, I convinced my parents to donate part of our yard, despite the possible challenges of clay and shade along the cedar hedge. This plot, requiring much preparation before being ready for any crop, produced mostly green beans, potatoes, butter lettuce, radishes and carrots.

My grandparents enjoyed spending time with me, sharing and showing me their passion for experiencing nature directly. With them along my side, I tried to figure it out, giving me a huge sense of satisfaction and accomplishment.

...we are continuing that sharing of adventures in the world of nature that we began in his babyhood, and I think the results are good. (Carson, 1987b, p. 10)

We moved to Langley, BC in 1983 attracted to its vast wilderness and apparent lack of development compared to the Netherlands, a country the same size as Vancouver Island, but with more than 30 times its population. Within a few months of our arrival, my mother joined a local natural history society. I had the pleasure of coming along on many of her Friday evening meetings as well as her weekend outings with more experienced companions. They introduced me to many local parks, its issues and their actions to restore some of these semi-natural places to their original glory. I learned about environmental action by doing it. I planted native vegetation to repair riparian zones along local waterways. I walked many trails, identifying local fauna and flora with patience and precision. I regularly counted overwintering and migrating birds in rain, snow, hail and sun to help monitor local populations. Binoculars around my neck, bird book in my pocket and clipboard in my hand were a common sight. Having just moved to this region, I was unfamiliar with nature in my new community, but that quickly changed with the companionship of more experienced naturalists who had already observed these places for an entire generation before me.

When Roger has visited me in Maine and we have walked in these woods I have made no conscious effort to name plants or animals nor to explain to him, but have just expressed my own pleasure in what we see, calling his attention to this or that but only as I would share discoveries with an older person. (Carson, 1987b, p. 18)

After living at home for two years, I graduated from secondary school and started a bachelor degree at UBC. I fondly remember one of my UBC summer jobs supported with a provincial employment grant. I prepared materials for first year biology laboratories, maintained fruit fly cultures and repaired microscopes. Lunchtime walks with a biology professor who supervised my employment added to my overall enjoyment that summer. While walking the Pacific Spirit Regional Park trails adjacent to UBC, he introduced me to local plants by asking me to repeat my newly obtained knowledge before introducing another plant species. I

heard the name of the plant species supported with an interesting story and observed its botanical significance with him. Bending my knees, I smelled flowers and touched their leaves to distinguish between different species. I recognized new, native plants during each visit, slowly gaining confidence and experiencing botany first hand. His stories about each plant helped me to remember them more vividly.

I am sure no amount of drill would have implanted the names so firmly as just going through the woods in the spirit of two friends on an expedition of exciting discovery. (Carson, 1987b, p. 18)

I returned to the Netherlands one year ago after a long absence and was particularly interested in how I would experience some familiar places as an adult rather than a child. I was fortunate to have a companion who was very knowledgeable about the history of our town's Celtic fields. After a brief introduction that included reading the interpretive sign, we walked silently around the raised beds of heather. Even though his interest was from a historical perspective, I experienced my surroundings from an ecological perspective. The Celtic fields were only visible from higher up so a diagram illustrated the many plots used to farm this soil. Nearby undulating landscape hides a burial ground. I imagined bones underneath my feet, smelled fragrant heather covering the graves and imagined people who would have walked around them, not realizing anything unusual about these humps in the middle of a forested area.

I hope Roger will later experience, as I do, the rush of remembered delight that comes with the first breath of that scent, drawn into one's nostrils as one returns to the sea after a long absence.
(Carson, 1987b, p. 66)

I was experiencing these native grounds in a different way during this return visit. These natural areas were familiar in some ways and unfamiliar in other ways. I had cycled past these locations as a child, not realizing their historical significance until my companion brought it to my attention. This companion assisted me in reading the landscape differently. I again smelled heather blooming at its best after a disease had decimated these hardy plants the

previous year. I again listened to bird sounds that I used to recognize but now they sounded unfamiliar to my ears. My companion and I walked behind each other through the ancient graveyard, respecting and acknowledging what was beneath our feet. I had returned to experience this natural site for the first time through the eyes of a companion who had a historical perspective rather than an ecological perspective. Different questions and other interests concerned me as an adult during this visit. I was now fascinated with how others had lived and experienced nature before me in a community that had been my home for nearly seventeen years.

Interconnection

This first vignette recollects memories of childhood merged with passages from Carson's book, *The Sense of Wonder*, to provide a practical example of my introduction to nature. The underlined segments of text emphasize specific qualities that inform my philosophical inquiry. In addition to my philosophical inquiry, this vignette illustrates a pedagogical perspective that lends further support to my proposition for initiating humans into nature. I reuse some of Carson's passages to address additional qualities of direct experiences in subsequent chapters. The next chapter analyzes the construct of "immersion" with its three corresponding qualities, *repeated experience*, *flow* and *sense of wonder*.



(Photographed by Q. Mulder ten Kate)

CHAPTER FIVE: IMMERSION

Introduction

Four months of planning, attending local stream keeper meetings, contacting city planning department staff and getting approval from the Federal Department of Fisheries and Oceans resulted in dividing a portion of a creek across the middle school into five-meter sections. Two other grade eight teachers and I assigned three students, one from each class, to one of the thirty five-meter sections of creek. The first student monitored creek geology, the second student identified plants and animals and the third student measured water quality parameters, such as pH and air and water temperatures. After multiple visits, the three students drew their five-meter section on one meter squared poster board and recorded their data. Independent research projects provided further understanding of the local watershed and its issues. A roundtable conference with experts from different levels of government and non-profit, local environmental groups with interests in this creek added to students' awareness and understanding of this watershed. A one-day fieldtrip included visiting a local hatchery, birding with local experts and planting native trees. This watershed project culminated with an evening celebration to share students' place-based experiences and learning. This project involved just a small portion of the students' watershed; however, through repeated experiences and successive skill development, they "got to know" this area very well. This personal example of place-based education contributed to the identification of the second type of direct experience, called *immersion*.

Immersion suggests an involvement with something that completely occupies all time, energy, concentration and full absorption of a person. The immersion usually is "with" a particular task, person or location. For example, French Immersion is an alternate, educational approach to an English education

offered in many BC's school. Students immerse and engage with the French language and culture during the majority of their school time. When humans immerse in an experience, they are engrossed, wrapped up or absorbed deeply in the moment, often forgetting a sense of time or ignoring other distractions or choices that may interfere with the activity. In the example of French Immersion, students usually do not speak much English in class so that they stay focused on learning the French language.

I support this second type of direct experience, immersion, with three different qualities. First, I focus on having repeated experiences in nature to improve observational skills that help us experience and concentrate on nature more closely and more deeply. Next, I propose that higher, more advanced observational skills prepare us for more challenging physical tasks part of experiencing nature. For example, locating any, generic bird with our eyes is a relatively simple task compared to identifying a specific bird species using binoculars. When the task or goal becomes more complex, we need to develop matching skills in order to succeed in this task.

Csikszentmihalyi's research offers insights into the conditions for flow. In accordance with his work, we are more likely to be in the zone, also called optimal experience or flow when a high level of skill matches a high level of challenge. Lastly, I draw attention to Carson's sense of wonder that includes descriptors such as beauty, enchantment, imagination and magic.

It is important to keep in mind that I do not suggest that these three aspects are specific, sequential steps. Instead, these aspects support my cumulative proposition that we ought to immerse in direct nature experiences to strengthen an affinity with nature.

Repeated Experiences

One experience in nature is a start but it means so much more when repeated. Repeated experiences show us what organisms belong in nature, or what organisms invade nature in our neighbourhoods. Some aspects of nature disappear one season only to return the next season. Patterns observed over

time show what we can expect or what we cannot expect. Invasive species in one natural area may be native species in another natural area. When we frequently visit the same natural areas, we can observe effects of negative and positive human impacts, too.

Experiencing nature repeatedly and regularly may help us pay more attention to different non-human species in nature, observing details, patterns and changes. We may observe how non-humans play an important role in nature and how humans do, too. A quick snapshot of nature is clearly not enough. When we re-turn to familiar places in nature, we re-call past memories that may re-new our affinity with nature. A repeat contact with non-human organisms brings experiences from other places and other times to this new nature experience. We review and relive experiences from the past to make sense of present experiences. Improved observational skills deepen our relationship with these natural places. Connecting to these natural places regularly adds to an appreciation, awareness and understanding of nature closer to home. Repeated direct experiences over time can strengthen an affinity with nature.

Experiencing nature with our senses repeatedly gives us a sense of familiarity or having been there before. It also builds confidence in terms of having the skills needed to observe nature. These repeated experiences have a cumulative effect on our physical, emotional, intellectual and spiritual health, providing reassurance that nature is part of our lives in sickness and in health. However, we should not enter dangerous areas in terms of terrain or wildlife and we should not partake in high-risk activities beyond our skill level. A lack of childhood and adulthood repeated direct nature experiences deprive us of something very elemental. Carson poses two important questions: “What if I had never seen this before?” and “What if I knew I would never see it again?”

I argue that repeated experiences can show us patterns, differences and changes over time, important aspects of nature. Repeated experiences can also develop observational skills that make us more observant. We gain intellectual wisdom, *know-what*, as well practical wisdom, *know-how* (Polanyi, 1958). Oakeshott (1962) also distinguishes between propositional knowledge known as

content knowledge or declarative knowledge recorded in books or recited in lectures, for example, and practical or procedural knowledge known as skills often acquired in the presence of another person. For example, the Latin name of the bird is content knowledge; whereas, knowing how to bird is practical knowledge! When we share our direct physical exploration of nature with someone more experienced, we tend to develop skills that books or technological/ electronic devices cannot teach us.

A brief inquiry into Oakeshott's and Polanyi's work examines why spending time together in nature during repeated visits contributes to developing, for example, observational skills. I use birding as an example, because I am familiar with this practical knowledge. Oakeshott (1962) emphasizes the importance of the master and apprentice being in the same place at the same time for tacit knowledge to become gradually evident in the apprentice:

On the other hand practical knowledge can neither be taught nor learned, but only imparted and acquired. It exists *only in practice* [italics added], and the only way to acquire it is by apprenticeship to a master—not because the master can teach it (he cannot), but because it can be acquired only by *continuous contact* [italics added] with one who is perpetually *practicing* [italics added] it.
(p. 11)

I examine these three characteristics first before adding two more characteristics based on Polanyi's work. The first characteristic, "in practice," distinguishes this knowledge from knowledge taught "in theory." In other words, teachers can give theoretical knowledge, content or factual information, directly to students by telling them or asking them to read this propositional knowledge. In contrast, teachers cannot tell or students cannot read about practical knowledge and then use and apply this skill successfully without any practice. Skills have components that teachers must show students in practice.

When birding, I can tell the person to buy a certain type of binoculars, propositional knowledge; however it is an entirely different matter to teach them how to use this equipment. I can also tell them to place the strap around their neck and hold the binoculars with two hands and raise it up in the air and then

scan for a bird. When it comes to other aspects of birding, our language limits our ability to teach without practicing this skill or at least demonstrating this skill. Skills involve tacit knowledge that we cannot express in words (Polanyi, 1958). In addition to developing this skill “in practice,” the apprentice must have “continuous contact” with the master, requiring time and patience. During this contact, the apprentice carefully observes the master in action and copies aspects of the skills involved in birding with binoculars. For example, imitating what the more experienced birders do, asking for clarification and listening carefully to any hints might tell the beginner birder how to develop this skill. Each of these interactions leads to refining the ability to bird. “Practising” a skill requires time, repeated trials and lots of effort.

Polanyi (1958) describes the nature of that contact between master and apprentice more precisely:

By watching the master and emulating his efforts in the presence of his example, the apprentice *unconsciously* [italics added] picks up the rules of the art, including those which are not explicitly known to the master himself. These hidden rules can be assimilated only by a person who *surrenders* [italics added] himself to that extent uncritically to the imitation of another. (p. 53)

The third characteristic, “practising,” does not have to occur in the presence of the other; however, if it is, more aspects of the skill can transfer and become ingrained in a way of birding without consciously being aware of it. It is like picking up people’s accent during frequent conversations with them or copying someone’s body language patterns when being totally engaged in the conversation. These subtle aspects of imitation happen automatically and, at that moment, are not within our control. It is important to realize that some birders have more expertise than others and, therefore, they may be able to provide more insight into how they bird and to share this information. Yet, our language limits how well we can describe a skill or help us acquire a skill. A skill has so many components that have to work together in perfect unison in order for it to help us complete a task.

Birding with binoculars is far more than just holding up the binoculars and trying to scan a tree or the sky for a bird. Variables, such as distance between birder and bird, height of the bird from the ground, amount and direction of sunlight, type of bird and bird behaviour, influence the use of the binoculars. Therefore, the notion of “surrender” is important. Using Polanyi’s notion of surrender in the context of birding, it suggests that the new birder needs to surrender to the entire imitation of the expert birder. The expert developed this skill with repeated practice over time. Even though some experts may be able to describe components of their skill in more detail than others to the apprentice, there are always going to be parts, or hidden rules, that transfer between apprentice and expert subconsciously in practice and over time. These five characteristics in italics occur during face-to-face interactions in the context of skill. Even though experts can tell us propositional knowledge such as bird species and gender of a bird, they cannot teach us tacit knowledge involved in observing birds, in particular, or experiencing nature, in general. Instead, they mostly impart practical knowledge without articulation that others acquire during shared experiences in nature. Practical, mostly tacit, knowledge becomes part of us when being in the presence of another person.

Pedagogical Perspective

Schools rarely offer more than one fieldtrip per year per class due to some of the barriers identified in Chapter One. How are students able to get repeated experiences in natural areas? My analysis of place-based education in Chapter Three offers some possibilities for overcoming many of these barriers. Curriculum guides prescribe what teachers have to teach; however, they are somewhat flexible in suggesting how teachers have to teach. What type of experiences in nature ought teachers design and implement for their students? When teachers feel familiar with the curriculum, they might pay more attention to how to teach and where to teach, overcoming some of the barriers described previously. What can nature teach students and their teachers and what do they need to do to be open to that experience? When I teach others, I always keep in

mind what enhances their appreciation and understanding of nature. I focus on hands-on activities and information that students can extract from their own observations—not textbooks and not TVs.

Content knowledge discovered and written by others—usually in textbooks—leaves little to students' imagination, enjoyment and creativity. The *BC Science 10* lacks science experiments, inquiries or hypotheses for open-ended student investigation. In fact, students just follow the activity's purpose, materials and procedure to obtain the desired results. When completing these activities, they may not wonder what this world is about and how it works. These activities steer them in a certain direction to prep them for the next science concepts in the book. In contrast, when students immerse in nature, they immerse in an open-ended inquiry. They can ask their own questions, design their own experiments and collect their own results. Some may argue that this is a challenge with an already overcrowded curriculum. I propose that teachers can substitute many of the current, textbook based, indirect and vicarious experiences with direct experiences. Teacher may need some extra time for the initial planning of these direct experiences in nature. Resources are already available from sources mentioned earlier, requiring only some modifications for specific local natural areas. Immersion is a more intense, immediate, deep involvement in an experience over time. Teachers ought to provide repeated, direct experiences in nature for students to expand their propositional and practical knowledge of nature.

Sobel (2008) identifies seven design principles for educators: adventure, fantasy and imagination, animal allies, maps and paths, special places, small worlds and hunting and gathering. These practices strengthen the child's affinity with nature by encouraging their natural tendency to play in their free time, resulting in transcendent experiences (p. 28). These practices are excellent examples of giving students "free" time to experience nature repeatedly during school hours. Teachers ought to experience nature alongside their students to introduce observational skills, being a role model in terms of how to interact with nature in a caring and respectful manner. Teachers demonstrate practical

knowledge in the presence of their students in nature so that students can assimilate these skills in practice. Repeated visits in nature are necessary to imitate the companion and to learn the skill. Teacher and students must have frequent and continuous contact for this subconscious transfer to occur. Students ought to immerse in nature.

Teachers can question students in terms of their propositional knowledge observed and assimilated in nature. This questioning probes students' observations further and deeper with the intent to gain a more immersed, involved or intense relationship with nature. This repeated immersion in nature provides for more intense engagement, interaction and commitment in making sense of the experiences in nature as well as seeing the long-term effects of our participation and actions in nature.

This quality, repeated experiences in nature, focuses mostly on developing observational skills in nature. The next quality, flow, takes this quality a step further by linking it to the challenges teachers face when experiencing nature directly. In this thesis, I focus on any challenge related to the four barriers, conceptual, logistical, educational, or attitudinal, described in chapter one. The quality of flow addresses the educational and attitudinal barriers, in particular. The educational barriers are due to teachers' perception of their competence or their actual skills to conduct EE and the attitudinal barriers are due to their specific ways of feeling and thinking about EE. These barriers prevent teachers from infusing EE, especially direct experiences in nature.

The ministry of education, school districts and administrators may impose challenges on teachers such as mandating a certain curriculum or suggesting the infusion of EE. The first, external challenge is obviously not within teachers' control, because it is mandatory. In contrast, the second, external challenge is within teachers' control because it is currently optional in BC. Teachers can choose not to infuse EE; however, professional development and resources offer support for the opposite choice. In the current context of environmental degradation and trends of public apathy, the infusion of EE probably ought to

become mandatory, too. Teachers can control their internal, emotional response to these challenges probably more easily compared to removing these challenges entirely from their responsibility. Various options for how to deal with externally imposed challenges exist. For example, teachers can ignore them, they can move to avoid them or they can learn to address or overcome them. Experiencing a sense of flow is pertinent to this latter choice.

Associated emotional reactions or feelings such as lack of confidence/anxiety, worry/fear, disinterest/apathy and arousal/lack of control are a result of a mismatch between a skill and an experienced challenge. What happens when the acquired skill matches the challenge? The birding example is useful in terms of the development of skills required to spot, to identify, to engage and to get deeply involved in the experience. Chapter Four demonstrated how observational skills introduce nature to humans. This Chapter demonstrates how more advanced observational skills immerse humans in nature, feeling a sense of flow that develops “strong ties and commitments to other people and the environment in which they live” (Csikszentmihalyi, 1990, p. 10). A sense of flow can strengthen our affinity with nature.

Flow

Csikszentmihalyi’s principle of optimal experience, or flow, offers insights into immersion type of direct experiences in nature. When do we experience a state of flow in nature? What do we feel when we are experiencing flow in nature? Inspired by this theoretical model, I argue that flow is an important second quality of immersion supporting a stronger affinity with nature.

Csikszentmihalyi’s research (1990, 1993, 1997) suggests that we may experience a sense of flow, or feeling in the zone, when a high level of skill matches a high level of challenge. “Thus, the flow experience acts as a magnet for learning—that is, for developing new levels of challenge and skills” (Csikszentmihalyi, 1997, p. 33). If our skill level is low, then we may move from a state of apathy to worry to anxiety with an ever-increasing level of challenge. On the other hand, if our skill level is high, but the challenge level decreases, we

move from a state of control to a state of relaxation. Finally, at a medium skill level with increasing challenge level, we may move from a state of boredom to a state of arousal.

Optimal experience is “the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it” (1990, p. 4). Csikszentmihalyi (1990) adds that “We have called this state *flow experience*, because this is the term many of the people we interviewed had used in their descriptions of how it felt to be in top form: ‘It was like floating,’ ‘I was carried on by the flow’” (p. 40). I address three questions in the context of direct experiences in nature. What is flow? Who experiences flow? What are the conditions that create a sense of flow?

Csikszentmihalyi (1990) states: “‘Flow’ is the way people describe their state of mind when consciousness is harmoniously ordered, and they want to pursue whatever they are doing for its own sake” (p. 6). Other qualities of people who tend to experience flow more often or more intensely are:

Such individuals lead vigorous lives, are open to a variety of experiences, keep on learning until the day they die, and have strong ties and commitments to other people and to the environment in which they live. They enjoy whatever they do, even if tedious or difficult; they are hardly ever bored and they take in stride anything that comes their way. Perhaps their greatest strength is that they are *in control of their lives*. (p. 10)

Csikszentmihalyi’s research examines flow experiences in a diverse group of people, including doctors, artists, athletes, musicians and gifted learners. The type of professions or roles of the persons involved are not as important in determining if they experience flow. I extend his discussion to another group of professionals, teachers. I limit my philosophical analysis to teachers and teaching to stay within the thesis’ pedagogical context. However, this same discussion applies to students as well. Chapter One addresses the types of barriers that stand in the way of teachers infusing EE. Any one of these four barriers, conceptual, logistical, educational, or attitudinal, challenges teachers in their

professional lives. However, teachers can always choose to change their educational practices that support direct experiences in nature for students

Teachers who want to improve their ability to infuse EE in their classrooms benefit from the following analysis. The following questions influence my work as a teacher and teacher for teachers. What support do teachers require to experience flow? What does flow contribute to developing a stronger affinity with nature? What types of practical skills in nature contribute to experiencing flow in nature? The remainder of this analysis examines these types of questions.

Csikszentmihalyi (1990) offers other insights:

The most important step in emancipating oneself from social controls is the ability to find rewards in the events of each moment. If a person learns to enjoy and find meaning in the ongoing stream of experience, in the process of living itself, the burden of social controls automatically falls from one's shoulders. Power returns to the person when rewards are no longer relegated to outside forces. It is no longer necessary to struggle for goals that always seem to recede into the future, to end each boring day with the hope that tomorrow, perhaps, something good will happen. Instead of forever straining for the tantalizing prize dangled just out of reach, one begins to harvest the genuine rewards of living. But it is not by abandoning ourselves to instinctual desires that we become free of social controls. We must also become independent from the dictates of the body, and learn to take charge of what happens in the mind. (p. 19)

Teachers can control what happens in their mind and how their mind perceives a situation. Csikszentmihalyi (1990) writes: "This simple truth—that the control of consciousness determines the quality of life—has been known for a long time; in fact, for as long as human records exist" (p. 20). In the context of this dissertation, teachers have to address and to improve their skills in nature so that their skills match their experienced challenges. Csikszentmihalyi (1990) states:

...it must be earned through trial-and-error experience by each individual, generation after generation. Control over consciousness is not simply a cognitive skill. At least as much as intelligence, it requires the commitment of emotions and will. It is not enough to *know* how to do it; one must *do* it, consistently, in the same way as athletes or musicians who must keep practicing what they know in theory. (p. 21)

This quote is congruent with Polanyi's and Oakeshott's understandings of acquiring practical knowledge, addressed in the previous section. Teachers can complete a challenging task with skills that prepared them for this challenge, achieving flow. Teachers need to learn these skills prior to or simultaneously with their students. "Knowing" what it feels like to learn these skills and leading by example strengthen relationships between humans as well as with non-humans. Observational skills can only develop with deep involvement and repeated practice only possible during immersion in nature.

Csikszentmihalyi (1990) offers two suggestions for achieving flow that improves the quality of life: "The first is to try making external conditions match our goals. The second is to change how we experience external conditions to make them fit our goals better" (p. 43). Teachers frequently have no control over their external conditions. For example, they have to teach mandated curriculum "in a school." However, they can determine how to teach the curriculum by leaving the classroom in search of nature or introducing nature to their schoolyard. What type of direct nature experiences can teachers and students immerse in that encourage flow? Csikszentmihalyi (1990) comments:

What makes these activities conducive to flow is that they were *designed* to make optimal experience easier to achieve. They have rules that require the learning of skills, they set up goals, they provide feedback, they make control possible. They facilitate concentration and involvement by making the activity as distinct as possible from so-called "paramount reality" of everyday existence. (p. 72)

This passage addresses a number of conditions that contribute to achieving flow. These conditions are equally applicable to achieving flow in nature. First, the teacher must strive for clear goals, must receive immediate feedback and must acquire the right level of skills for the challenging activity. For example, in the previous birding example, the teacher's goal may be to identify birds. As long as this experience is enjoyable and positive, the teacher probably returns to do more birding. The skills have to match the challenge for having an optimal experience, or flow. Therefore, a teacher who lacks the necessary skills can

acquire these skills through an apprenticeship model of learning as explained in the previous section. The feedback from other people or a sense of flow received from this activity may encourage and convince teachers to repeat this experience. Over time, boredom may set in because the acquired skill set makes the challenge too easy. In that case, teachers can participate in more challenging experiences. Csikszentmihalyi (1993) states:

Whenever we discover new challenges, whenever we use new skills, we feel a deep sense of enjoyment. To repeat this desirable feeling, we must find ever higher challenges, build more sophisticated skills; in doing so, we help the evolution of complexity move along one more step (p. 189).

Teachers may develop increasingly higher levels of skill or they may seek higher levels of challenge to continue to achieve flow.

Csikszentmihalyi identifies a few other features of flow that are of interest in this analysis: “Concentration leads to involvement, which can only be maintained by constant inputs of attention” (1990, p. 211). Teachers in flow have their action and awareness merge, focused totally on the experience. Furthermore, they must pay attention to what happens and how they participate in the challenge. Csikszentmihalyi (1997) reminds teachers: “The excellence of daily life finally depends not on what we do, but on *how* we do it” (p. 47). Later, he concludes that “One cannot lead a life that is truly excellent without feeling that one belongs to something greater and more permanent than oneself” (Csikszentmihalyi, 1993, p. 131). The individual becomes part of a system or becomes part of nature, achieving a higher level of complexity and experiencing full immersion. Teachers become deeply involved and engaged in nature. They are in flow.

What type of teacher is more likely to achieve flow? Csikszentmihalyi (1997) observes that creative people tend to achieve flow more frequently because “Creative people are especially good at ordering their lives so that what they do, when, and with whom will enable them to do their best work” (p. 41). Csikszentmihalyi suggests: “Thus the first step in improving the quality of life is to pay close attention to what we do every day and to notice how we feel in different

activities, places, times of day, and with different companions” (1997, p. 47). By observing these conditions and by becoming aware of them, teachers can choose activities that recreate these conditions. In other words, they can seek out direct experiences in nature that closely match these conditions so that they are more likely to provide opportunities for flow. Csikszentmihalyi notes: “Yet over and over again creative individuals stress the importance of seeing people, hearing people, exchanging ideas, and getting to know another person’s work” (1997, p. 94). Creative individuals exhibit many traits that make them more successful at achieving flow experiences compared to other individuals. These guidelines offer some insight:

First, one must pay attention so as to understand thoroughly what is happening and why; second, it is essential not to accept passively that what is happening is the only way to do the job; then one needs to entertain alternatives and to experiment with them until a better way is found. (Csikszentmihalyi, 1997, p. 105)

Creative individuals, including creative teachers, tend to seek new ways for something that may or may not be happening as expected. They probably do not let any barrier stand in their way! Even when teachers achieve a desired result, they may be looking for a better way to achieve it. They have an inner urge to understand an experience that achieves flow. In other words, teachers who do not get the desired results for themselves or their students ought to seek other possibilities in terms of their skills or view their challenge differently. This second quality of nature immersion, achieving flow, suggests that teachers who experience flow in nature are more likely to feel a sense of enjoyment. Teachers can increase a sense of enjoyment in life by seeking out more experiences for flow in nature, and, in return, strengthen their affinity with nature.

Pedagogical Perspective

Walking the same trails repeatedly, my skills and challenge are low and can result in boredom. I become immune to nature’s daily and seasonal changes. Walking through a natural area is often the quickest way to work or to home and not much more. I do not stop to smell or to listen any more along the way. Yet,

taking students outside for short walks makes me stop, smell, touch, taste and listen to novel situations, previously missed and now pointed out by students. Do students challenge me to experience nature differently? Do they see a novelty in nature that I neglected to observe or to sense before? Do their ways of experiencing nature differ from me, helping me to develop new skills or to take existing skills to a higher level? Whatever it is, I start experiencing nature again, but this time through their experiences. Their observations and questions re-open windows to my eyes and re-open doors to my ears. I do not need to travel to new areas to challenge myself. Taking companions on my walk, such as my students, is an excellent way to see the new in what appeared to have become routine, mundane or even boring. Students' questions can challenge teachers to find an answer, to develop a new skill or to strengthen another skill during direct experiences in nature.

If parents do not take their children into nature, then who does? Who is that one companion who can share experiences in nature with children? Do teachers play that role? Teachers spend more time with students during the day than most parents. Staying nearby and exploring the natural world in the school's community within walking distance is a challenge for some teachers. External barriers, such as mandatory testing and restrictive fieldtrip policies, may impose high levels of challenge on teachers' ability to experience nature directly with their students. Yet, some teachers take their students into nature and find ways to take control of their professional lives. In addition to these external barriers, teachers may have internal, more subjective, concerns about their perceived abilities, such as their skills required to take students into nature. Other teachers easily acquire propositional knowledge and practical knowledge to overcome their feelings of anxiety, worry or relaxation, resulting from these same externally or internally imposed conditions.

School district #43 uses learning teams that support professional development for teachers. Dockendorf (2006/2007) writes:

Learning Teams are small groups of educators that meet to engage in a professional growth experience focused on improving instructional practice and student learning. Learning Teams are facilitated by a variety of educators who have expertise in the topical/curricular area, and in facilitation. (p. 2)

Teachers select their own question and follow an action research model to examine how this question plays out in their own classrooms. Sharing amongst teachers is an integral part of this process. Teachers converse about pedagogy, share resources and consult professional development staff and colleagues. These learning teams develop teachers' skill set to meet challenging professional situations that, when combined, can achieve flow.

Teachers in this chapter's concluding vignette talk about wanting to take baby steps when experiencing nature directly alone or with their students. They immerse students in nature after having developed some sense of comfort and confidence with being in nature themselves first. In other words, they have to have a high level of skill to match a high level of challenge when participating in direct experiences in nature with a high level of involvement or immersion. Teachers may feel a sense of enjoyment that contributes to continued improvement of their skills. Achieving flow is a result of a physical act, or using a skill, in nature.

Teachers have to learn how to perform skills, a form of practical knowledge. In contrast, we cannot learn a sense of wonder (Orr, 1994). The traditional sense of learning in a school setting is not conducive to developing a sense of wonder. Teachers and their students who experience nature directly are more likely to nurture a sense of wonder. Who can develop a sense of wonder? Does a sense of wonder have any prerequisites? How do people experience a sense of wonder? The next section examines these questions in the context of direct experiences in nature.

Sense of Wonder

In 1954, Carson presented a speech to the Sorority of Women Journalists in Columbus, Ohio about "her ideas about the meaning of life, particularly the

crucial role natural beauty plays in the spiritual development of an individual or society” (Lear, 1998, p. 226). Carson’s speech about the importance of “sensory impressions and emotional response” suggests that “No one can dwell long among such subjects without thinking rather deep thoughts, without asking himself searching and often unanswerable questions, and without achieving a certain philosophy” (In Lear, 1998, pp. 244-245). Carson’s speech suggests that life is a mystery that reveals itself only partially to those who pay attention and ask the right questions. Those humans immersed in the “field” more deeply have questions that access a profound understanding of species under observation. Immersion in the field is a long-term nurturing of curiosity and sense of wonder—a commitment to seek an in-depth understanding. Later in the same speech, Carson comments: “Every mystery solved brings us to the threshold of another one” (In Lear, 1998, p. 245). Research leads to more research, a never-ending search for answers.

BC teachers teach Science 10 students that life depends on the flow of matter and energy. Students also learn that harmful chemicals, like DDT, move up the food chain rapidly, magnifying their toxic effects with every step to the top of the pyramid. Biomagnification is a very challenging and difficult process to observe in a classroom. Limited knowledge of a complex biochemical process probably has not much impact on our environmental choices, habits and attitudes that can reverse trends, like those discussed in Chapter One. In fact, since the introduction of EE in the 1970s, environmental degradation is rapidly getting worse rather than getting better (Worldwatch Institute, 2011). Even though many humans restore local habitats and practise more sustainable personal habits (Louve, 2011), they have not reached a critical mass yet that tips in favour of global protection and restoration of natural areas.

Propositional knowledge stored and retrieved from the mind contrasts with practical knowledge used to move the body to complete a task. What are the contributions of tacit knowledge addressed in Chapter Four? Reviewing briefly, we can gain tacit knowledge by imitating an expert in practice. Tacit knowledge involves the body and the mind as well; however, it involves a deeper

engagement with the other. The expert has an attitude about something or has a display of “something.” By being in the presence of this expert, we can absorb whatever this person displays or conveys to us in the moment without any direct instructions for a skill or information for the brain. This expert may emanate a sense of wonder that we can emulate. We require no prior knowledge or skill, just the ability to pay attention, to be aware, to appreciate nature’s ways and wonders. Accepting the fact that we have limited knowledge hopefully makes us humble and vigilant. The magnificence of nature of which we are part might inspire us to step back and to accept its ways rather than our ways. We let awe and wonder into our lives, hopefully challenging us to think with care and with deference. We might even make local and global environmental choices and take actions more congruent with our newly formed high esteem, admiration and awe for nature. I agree with Carson that “Man’s future welfare and probably even his survival depend upon his learning to live in harmony, rather than combat, with these forces” (In Lear, 1998, p. 256). Glasser (2002) writes:

The ecological crisis is not merely a topic for academic bantering and internecine battles over the existence of nonexistence of the “intrinsic value” of nonhumans. We *feel* nature’s wonder, joy, beauty, and possibility, so it exists. It is under fire, so we *must*, with all our might, fight for it. We fight for it because it exists *and* because we depend on it for our survival; because in its profound otherness lies a key to our own spiritual, emotional, and cultural development—our maturation process both as individuals and as a species; and because its loss is our loss. (p. xiv)

Nature is more than a place for recreation or resource of fuels to meet humans’ wants and demands beyond basic survival needs. Nature offers a sense of wonder. Thomashow (2002) believes that “A state of wonder is the basis for an ethic of care” (p. 57).

What is a “sense of wonder”? Orr (1994) references Schweitzer (1965a) who writes in *Reverence for Life*:

It hurt me to think that we never acknowledge the absolutely mysterious character of Nature, but always speak so confidently of explaining her, whereas all that we have really done is to go into fuller and more complicated descriptions, which only make the mysterious more mysterious than ever. (p. 8)

Schweitzer (1965a) continues:

The deeper we look into nature, the more we recognize that it is full of life, and the more profoundly we know that all life is a secret and that we are united with all life that is in nature. Man can no longer live his life for himself alone. (pp. 37-38)

Schweitzer, like Carson, believed in the interdependence of all living organisms: “all life is sacred, including forms of life that from the human point of view may seem to be lower than ours (1965b, p. 47). Schweitzer called this a reverence for life, described by Orr (1994) as: “arising from awareness of the unfathomable mystery of life itself” (p. 138). Orr (1994) points out that the German translation for reverence or *Ehrfurcht*, used by Schweitzer: “implies greater awe than is implied by the English word *reverence*” (p. 138). A person who has a reverence for life has respect, admiration, and amazement for all living organisms, humans and non-humans on Earth. Quaratiello (2010) provides several examples of Carson’s life that illustrate a reverence for life (pp. 10-11). For example, Carson returns a starfish to the ocean after studying it all day and Carson rescues a small dog from the fast moving, incoming tide during another visit to the ocean. Quaratiello writes: “Rachel always had a great appreciation for the natural world as well as a deep respect for the interconnectedness of all creatures” (p. 10). Orr (1992) suggests that Carson’s sense of wonder is similar to a reverence for life.

Carson (1987b) writes:

A child’s world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. (p. 42)

Amis (2009) in *Commemorating Epimetheus* writes: “Wonder: a sharing in sharing forth of all-that-is” (p. 39) and “Wonder: the unfathomable mystery of all-

that-is” (p. 39). Wonder awakens us, moves us throughout, is not within our control and makes us share and care (pp. 39-41). Mysteries give rise to wonder, according to Amis: “The mystery is not a nut to be cracked—but a seed to be scattered, nourished, and perhaps cultivated” (p. 40). We cannot reduce wonder to thinking or questioning. Amis (2009) notes: “Wonder is far more primordial than thinking—and thinking, even a meditative thinking, is but one way of responding to wonder. In wonder, we are amazed, astonished. We are awe-struck” (p. 41). Amis (2009) adds: “Wonder is far more primordial than questioning—and questioning is but one way of responding to wonder. Lost in wonder, the occasion to question is still on the way” (p. 40). Amis (2009) suggests that wonder is part of human nature and that “Wonder always awaits us” (p. 44).

When do people tend to experience a sense of wonder in nature? Thomashow (2002) states: “In those speechless moments, when you’re surrounded by such grandeur and fragility you feel as if you are of bearing witness to the magnificence of creation” (p. 57) and “you are overwhelmed with wonder” (p. 57). Thomashow (2002) suggests that wonder occurs when we witness nature’s splendour, glory and unexplainable forces part of creation.

Wonder is about not knowing. The phrase “I wonder” suggests an element of not knowing or of not having an answer. “What is this?” or “What may happen next?” suggests an element of surprise or wonder. Wonder is about not having answers, simply observing nature and wondering. Admiring its beauty, dismissing its ugliness and appreciating its sliminess are simple acts that are part of a wondrous experience. Asking questions that we cannot answer gives a sense of the unknown or possibly magic. How does this organism perform this act? That is impossible! We see it in front of us, but we do not understand it. We do not need to understand it. We just appreciate the fact that this other organism is able to do something we cannot perform ourselves. This organism is full of wonder. It has a way of surviving that we cannot comprehend and have no need to comprehend.

Wilson (1984) writes about the sense of wonder somewhat differently:

Our sense of wonder grows exponentially: the greater the knowledge, the deeper the mystery and the more we seek knowledge to create new mystery. This catalytic reaction, seemingly an inborn human trait, draws perpetually forward in a search for new places and new life. Nature is to be mastered, but (we hope) never completely. A quiet passion burns, not for total control but for the sensation of constant advance. (p. 10)

Nature is full of wonder. Nature is full of mysteries we may or may not be able to understand. Many mysteries have not revealed themselves, yet. My hope is that some of these mysteries remain mysteries. If we could unravel all of nature's mysteries, then nothing remains to wonder about.

I agree with Carson who believes that a sense of wonder protects against boredom and disenchantment. Enchantment, joy, beauty, excitement and magic inform a sense of wonder, an emotional response when experiencing nature directly. A sense of wonder adds an element of mystery as well as supports an affinity with nature in our daily lives. A sense of wonder is strongest with direct contact with nature. Even though Carson writes mostly about the sense of wonder for children, she suggests that anyone is able to have wondrous interactions with the natural world at any age.

A sense of wonder is an affective or emotional reaction to experiencing nature that takes us beyond a basic sensory response. We see beyond the obvious and feel touched in a way far beyond what words can describe. Carson (1987b) asks:

What is the value of preserving and strengthening this sense of awe and wonder, this recognition of something beyond the boundaries of human existence? Is the exploration of the natural world just a pleasant way to pass the golden hours of childhood or is there something lasting and deeper? (p. 88)

She answers her own question by writing that feeling a sense of awe in nature's repeated cycles, such as ebb and flow of tides and migration of birds, gives us a sense of contentment, excitement, contemplation, healing and assurances. Kingsolver (2002) in *Small Wonder Essays* concludes: "Maybe life does not get

any better than this, or any worse, and what we get is just what we're willing to find; small wonders, where they grow" (p. 264).

Pedagogical Perspective

Thomashow (2002) concludes that "For decades, all manner of environmental educators, conservation biologists, and field ecologists have been striving to find ways to cultivate wonder in regard to natural history" (p. 57). As stated in the previous section, a sense of reverence and commitment to the amazement of nature supports a care for the earth. In times of global environmental degradation, now more than ever, teachers have to "cultivate wonder in the presence of the biosphere" (Thomashow, 2002, p. 58).

Thomashow (2002) questions if it is even possible to teach wonder or if teachers only exude wonder that students might tacitly imitate. Thomashow's statement: "The issues isn't so much to teach wonder as it is to exude it, to let it emerge unencumbered, to value its expression, to set up experiences where its manifestation is clear" (2002, p. 58) provides suggestions for pedagogy. At this moment in time, apathy, boredom and indifference contribute to habitat degradation. How is it even possible for a teacher or a student, or anyone, to be bored or having nothing to do, when habitats and species are disappearing at alarming rates? Direct experiences in nature's grandeur, beauty and magic support a reverence of life, or a sense of wonder.

Van Matre's Acclimatization activities address natural awareness skills, such as sharpening sense, seeking patterns, perceiving wholes and distilling essence (1990, pp. 230-231). His advanced programs develop an affective relationship or affinity with earth by sharpening four special "senses", called sense of wonder, sense of place, sense of time and sense of beauty. Van Matre distinguishes between these two types of senses as follows: "If perception is the ability to mentally grasp things through the senses, then the special senses above are like perceptual peepholes on our world. They enable us to glimpse a whole new dimension of our place in space" (p. 232). Van Matre's sense of wonder includes four parts that are of interest in this inquiry as well: "Looking

upon the world with habitual awe, maintaining curiosity about life's comings and goings, revelling in the unusual and unexpected facets of the common place and exploring and seeking in unselfconscious ways" (1990, p. 231).

Teachers who radiate a sense of wonder in nature lead by example. Nature is full of mysteries that humans have not been able to solve and might never solve. Teachers do not need to concern themselves with having all the answers when experiencing nature directly with their students. Propositional and practical knowledge enhance teachers' experiences and students' experiences; however, these types of knowledge are not prerequisites.

Chapter Four has already addressed the importance of sensing and feeling nature as well as knowing. Teachers with their students need to experience these mysteries and miracles that nurture their sense of wonder in nature. A sense of wonder contributes to immersed affinity with nature. These three qualities, repeated experiences, flow and a sense of wonder can deepen students' affinity with nature and their teacher's affinity with nature, contributing to an ethic of care.

Vignette Two: Adults Directly Experiencing Nature

The first part of this vignette illustrates the importance of repeat experiences. The middle part of this vignette shows what flow feels like for teachers. The last part of the vignette portrays humans experiencing the sense of wonder in nature. Direct experiences in nature do not stop in childhood. Humans of all ages, especially teachers of children, ought to seek opportunities to be in contact with nature, including non-human organisms in different stages of their lifecycle! For example, I picked mushrooms for a summer, raised pigs on a farm for a few weeks, worked as a sea-gull research assistant at UBC one summer and volunteered as a lab technician at a federal pathology lab for two summers. Many of these interactions with the living world were unfortunately inside buildings. Even though I prefer close encounters with most non-human organisms in nature, these experiences helped me gain insight into non-human behaviour, physiology and anatomy. During the last summer before my Bachelor

degree's graduation, I interrupted research on salt infusion experiments with Glaucous-winged sea gulls inside a dilapidated, wooden building. A graduate student needed volunteers to research killer whale feeding behaviour and to identify salmon species used as a food source. A research camp on a rocky cliff at Boat Bay, West-Cracroft Island, across from the famous rubbing beaches in Robson Bight, became my new home for six weeks. Killer whale communication recorded by a hydrophone in the waters below signalled the start of a new day. This experience focused my attention on the basics of life: edible food, fresh air, clean water and stable shelters!

One way to open your eyes to unnoticed beauty is to ask yourself. "What if I had never seen this before? What if I knew I would never see it again?" (Carson, 1987b, p. 52)

Weather and presence or absence of killer whales determined our daily routine. To keep bears out, we kept camp clean and stored food in cupboards on a platform between the trees, only accessible by a ladder safely tugged between these trees during our absence. I dug holes for bodily wastes, watched Japanese film crew's video recordings of Killer Whales' activities and visited the Tsitika River across the bay to replenish our fresh water supply. After six hours of daily whale observations from a small boat, we would admire bioluminescence behind tails of killer whales during full moon evenings, would watch a frenzied feeding session by a super pod, a rare occurrence, or would collect wood and water or wash dishes in the ocean. This experience in reading nature's signal also immersed me in how to live lightly in a small space with at least ten people for six weeks in nature.

After finishing all general course requirements, I chose mostly ecology-based electives such as theoretical ecology, oceanography and biogeography. A native plant identification course and a native animal identification course were supposed to address my limited knowledge of local, natural history. Lab assistants picked plant samples from neighbouring fields and forests and others retrieved stuffed and stored animal samples from an attic somewhere on the top floor of the biology building.

Of course it is always convenient to give a name to things that arouse our interest. But that is a separate problem, and one that can be solved by any parent who has a reasonably observant eye and the price of the various excellent handbooks that are available in quite inexpensive editions. (Carson, 1987b, p. 82)

Even though I attended a university surrounded by natural areas high in abundance and high in diversity of local flora and fauna, I was going to spend hours in dusty rooms with displaced organisms in jars and with organisms stuffed with cotton. These two, one semester courses with weekly three-hour labs were supposed to teach me identification skills and Latin names. I withdrew from these two courses after a few weeks! I graduated with a degree in zoology that lacked in local natural history and that rarely took me beyond the boundaries of the university campus. This degree included mostly knowledge heard in lectures, read in books and experimented with in laboratory settings. Now, I bring a variety of identification books on frequent walks in my neighbourhood's natural environment and beyond throughout the year to develop my identification skills.

One day I smell the rotten salmon carcasses in the creek washed away by heavy rain the next day.

For the sense of smell, almost more than any other, has the power to recall memories and it is a pity that we use it so little. (Carson, 1987b, p. 66)

I remove invasive English Ivy, immersing myself in mud and noticing creatures such as millipedes, earthworms and spiders awoken from their winter sleep. The Ivy's roots resist removal from the compacted sandy soil. I embrace a mass of Ivy leaves and their twisting stems, fully engaged and part of the experience. I return the following year to remove more English Ivy along the same stream. Is the creek flowing higher or lower than normal? Why is this tree dying? How many Coho returned to Scott Creek this year? What is this coyote doing here so early in the morning on a non-garbage pick-up day? Why are bears visiting this creek, so close to civilization? Walking regularly the same creek trail helps me to identify, to "get to know" living organisms that cross this path, to recognize different species and to determine which species prefers what habitat. I feel for

the earthworm wriggling on the sidewalk after its soil flooded by heavy rain. I return it to the soil. I feel for the battered, partially decayed wing with a few feathers still attached and dangling from a branch. How did it get there? Did a predator drop it from the sky? I hear the black-capped chickadees flocking to protect themselves from the freezing wind blowing through the trees. I see deer tracks in the snow that just kept piling up one year, making it challenging to find food. I touch beaver teeth marks in another tree after the first tree unsuccessfully landed across a friend's yard instead of across Scott Creek. I smell the salmonberry blossoms, noticing that hummingbirds were ahead of me again.

It is learning again to use your eyes, ears, nostrils and fingertips, opening up the disused channels of sensory impression. (Carson, 1987b, p. 52)

Several local groups counted birds to develop baseline data twice a year for about ten years in case of a chemical spill in Burrard Inlet. These counts were early in the morning because birds are most active at dawn and dusk. Furthermore, walkers with dogs disturbed the birds too much later in the day. I identified migrating and resident birds along the Shoreline Park trail with the help of avid, expert birders year after year after year. "Listen to this sound!" "Look at that one!"

I think we have felt that the memory of such a scene, photographed year after year by his child's mind, would mean more to him in manhood than the sleep he was losing. (Carson, 1987b, p. 22)

I am eventually able to predict where to spot certain bird species along the trail, to monitor changes from year to year and season to season and to notice a decline in bird species' diversity and abundance. Whenever possible, I partake in the annual December Audubon Bird Count along Scott Creek and Hoy Creek. I start to notice what birds live where.

But I think we felt the same spine-tingling response to the vast, roaring ocean and the wild night around us. (Carson, 1987b, p. 9)

Are there more bird species than the year before? Which bird is most abundant this year? Why do I not see any Bald Eagles this year? How is the snow on the ground affecting the bird populations this year? Repeated experiences every season or every year in the same natural places help me recognize patterns and changes. Questioning and reading my natural surroundings contribute to local knowledge not obtainable anywhere else.

Other times I experience nature repeatedly with colleagues. The following reflection illustrates how other teachers feel during our repeated visits into nature.

“It has to be fun. I guess it is about anything when you are going to a particular place. It is about experiencing that place. What is happening? What is living there? We need to connect that to own lives and the lives of others. I had one teacher in my first year who would take us on quite a few walks. We walked along the creek and along the path. He was great. The class was different. He structured it in a particular way. We went outside and were supposed to be quiet. We wrote in journals and identified some plants along the way. I enjoyed it. It was a powerful experience. I remember it now. It was affective as well. Growing up on the Coquitlam River is an affective connection. It is an admiration for the place. In my early years of teaching, I used *Project Wild* and *Adopt-A-Tree*. The kids enjoyed it. It has these affective dimensions. It was fun. They enjoyed it.

I learn best by doing, too. The fact that we actually go to these various locations helps me to visualize what it would be like to take my class on an outdoor educational outing. It helps me to enhance my own understanding of these locations and all that they have to offer. These outings open my eyes to the number of public spaces available to us as educators and some incredible opportunities for educational experiences in nature. In addition to the physical aspects, this group gives me the opportunity to share ideas with fellow educators, which is invaluable to me as an educator. It helps me to grow more confident in my ability to lead an outdoor experience with my class. You can take baby steps and not do something too big. Keep it simple. I think the locations are very useful, because they are all doable. We can go again to all the places we have been to.

We do not have to ask permission to go to these places. It is enjoyable. It is better than reading from the textbook.

I like trying out some activities that we can use with our kids in some local natural areas (e.g. guessing games, pond dipping, sifting soil). I also enjoy being able to share ideas with one another on what will and will not work and how we will work through some of the challenges of an outdoor trip like this. I am able to share ideas and work out some of the ways we might alter an activity to suit a particular situation. More people mean more ideas. I value the location because they are easy to navigate and they are local. They will be similar to other areas with ponds in terms of the activities we do there. This makes it easy to use the same activities in another setting with a pond and some natural wildlife. The activities are general enough to apply to a variety of natural spaces. I will try these activities with my class. It helps me feel even more comfortable taking them out to local areas. I feel like I have enough ideas to keep them engaged and organized at the same time. Even if we do not have the skills to identify various species of plants and animals in an area, we still have a variety of activities that we can play and a number of observation skills that we can practise and learn. I have seen some interesting pond creatures that I had never noticed before. It is cool to be able to look at them closely to try and to learn more about them. It is okay not to be able to name everything. The discovery is such an integral part of the process. I feel like I have more freedom now. Before, I would hold myself back due to my lack of skill. Now I feel like it is okay to go outside, to explore and to learn from each other. I am learning the skills I need to take my own class into nature. I always like to try out new activities that are easy to organize and fun to do with my students. My experiences in this project help me improve my self-confidence. I believe in my ability to lead a group of students in an effective way outside of the school. Having the space to discuss strategies with colleagues is an incredible way for us to share ideas and talk about what has and has not worked in the past. It is an opportunity to practise and to help me work through what will and will not work well with my student group. It gives me the courage to try new things with my students more often and in a variety of

accessible places. This new confidence is the most positive aspect for me. The two things that hold me back from taking my students to different places outside of school are my lack of knowledge about an area and my inability to implement activities in an area. After participating in this study, I feel much more comfortable bringing a group of students to an area that I may not know very well as I have learned a variety of activities that I can do with them to make learning fun and meaningful. To be honest with you, sometimes as teachers we try to do too much. I need to make it enjoyable. Make it doable. This is a very huge stress job. I need to make it manageable. Show me a place where you can go and play.”

Deep involvement in nature over time, or immersion, helps adults/teachers develop their observational skills as well as meet the challenges of experiencing nature. Benefits, such as achieving flow and feeling a sense of enjoyment, confidence and comfort continue to strengthen our *know what* and *know how* of nature while deepening an affinity with nature.

A sense of wonder reaches beyond our ability to understand nature and adds a third, important quality to immersion type of direct experiences. In addition to experiencing nature with my colleagues, I continue to spend time in nature with other people’s children, sharing my affinity with nature as an aunt, friend and teacher. Blessed with other people’s children, I provide them with experiences in nature that I enjoyed in my youth, too.

I hope Roger will later experience, as I do, the rush of remembered delight that comes with the first breath of that scent, drawn into one’s nostrils as one returns to the sea after a long absence. (Carson, 1987b, p. 66)

Preconceived notions of what is popular, cool or neat have not altered yet many of these five-year and six-year old children’s sense of wonder, fun and magic. Their way of discovery, exploration, adventure and enjoyment rubs off on me.

The sharing includes nature in storm as well as calm, by night as well as day, and is based on having fun together rather than on teaching. (Carson, 1987b, p. 10)

I become more like a child again, filling with a sense of wonder from these direct experiences together in nature.

You can still drink in the beauty, and think and wonder at the meaning of what you see. (Carson, 1987b, p. 55)

For example, we were delighted with a bush that contained at least twenty snails along a busy railroad track. We feverishly dissected a large compost pile filled with previously unexplored wildlife. We were stunned with the numerous mayflies and stoneflies attached to the underside of rocks in Scott Creek. We were in awe with a hummingbird hovering in front of a salmonberry flower. We were enchanted with chum salmon struggling their way up a local river to spawn. These are just five of the hundreds of experiences I am fortunate to have shared with other younger human beings in nature so far. After introducing other people's children to nature in informal settings for several years, I made this a career choice by becoming a qualified teacher.

One way to open your eyes to unnoticed beauty is to ask yourself, "What if I had never seen this before? What if I knew I would never see it again?" (Carson, 1987b, p. 52)

These shared moments are brief, temporary and infrequent. Six years ago that all changed with the birth of my niece and a year later with the birth of my nephew. Most of our times together involve an adventure in nature. As soon as my niece was able to walk, her parents would take her for short walks around the cul-de-sac. I came along one day. We walked hand in hand on the sidewalk past blooming gardens. She was not able to reach most of the flowers with her nose, so I lifted her towards each patch of flowers. Next, we stroked the leaves and petals one by one and searched for bugs in the thick bushes.

When Roger has visited me in Maine and we have walked in these woods I have made no conscious effort to name plants or animals nor to explain to him, but have just expressed my own pleasure in what we see, calling attention to this or that but only as I would share discoveries with an older person. (Carson, 1987b, p. 18)

She loved smelling flowers and hearing their exotic names.

If a child is to keep alive his inborn sense of wonder without any such gift from the fairies, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in. (Carson, 1987b, p. 45)

Another recent experience with my niece in her backyard parallels the recollections of Rachel with her grandnephew, Roger. During an unusual warm day on her birthday in late March, my niece came running barefoot towards me and announced her discovery of a slug. She grabbed my hand, took me along a garden path covered with round paving stones and showed me her small, soft and slimy friend. “Look auntie, Q, a slug!”

A child’s world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. (Carson, 1987b, p. 42)

My task was to move the slug closer to her, because she was hesitant to touch it herself. It was time for slug power! We held one of our fingers up in the air, waved it three times back and forth and then tried to pick up something dry from the ground. We were unsuccessful! “Let’s go through the same motions again, but this time we added three strokes on the slug’s back from head to tail.” “Let’s touch something now,” I requested. Pieces of dried, crumbled leaves stuck to her finger. She quickly rubbed them off. Then, she held up her hand in the air so that I could transfer the slug to her. She showed her new friend to her girlfriends, attending her birthday party.

I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused—a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love—then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning. It is more important to pave the way

for the child to want to know than to put him on a diet of facts he is not ready to assimilate. (Carson, 1987b, p. 45)

We began another slug hunt with two more girls. Crisscrossing through the soft, green, wet carpet of grass mixed with moss, we intensified our exploration. We looked under leaves, turned over rocks and checked between blades of grass.

Roger delighted in its texture, getting down on chubby knees to feel it, and running from one patch to another to jump up and down in the deep, resilient carpet with squeals of pleasure. (Carson, 1987b, p. 39)

Each girlfriend eventually possessed a slimy slug. Their slugs eventually revealed themselves with their long outstretched bodies, their antennas and stalked eyes. These girls were in awe. Their parents were less impressed with my impromptu slug appreciation lesson.

I was glad to find Roger noticing and responding to the magic change in their appearance wrought by the rain. (Carson, 1987b, p. 39)

After returning the slugs to their homes and rolling the slime of our hands, we continued to play with plastic toys scattered in the yard.

A few months later when returning to her yard, I heard that the neighbour's daughter had found a slug, asked her parents a question that could not be answered by them upon which she said, "Q can answer it." We resumed the slug search at my sister-in-law's birthday celebration two months later. The yard was wet after days of rain. My niece's grandmother who had been babysitting that weekend had managed to keep her out of the yard. As soon as I arrived, she immediately asked me to take her out before her parents could object. While changing into suitable footwear, my brother, her dad, had one stipulation, "You are not to touch them directly."

We have let Roger share our enjoyment of things people ordinarily deny children because they are inconvenient, interfering with bedtime, or involving wet clothing that has to be changed or mud that has to be cleaned off the rug. (Carson, 1987b, p. 22)

With a small shovel in her hand and plastic bucket in my hand, the next slug search got underway. We had no trouble finding any slugs this time. They were everywhere and, therefore, easy to spot. She announced, “There is one, auntie Q.” No sooner was it in her bucket, or she had spotted another one. The bucket came alive with slugs.

You can still drink in the beauty, and think and wonder at the meaning of what you see. (Carson, 1987b, p. 55)

She took great delight in their attempt to crawl over the edge of the bucket, but we got ahead of them. Instructed by her father to release them in the forest in the back of the yard, we hopped from paved stone to paved stone, opened the gate and took a few more steps into the forest to turn the bucket upside down on the leaf litter below. After banging the bottom of the bucket a few times, most slugs fell out and the rest of them got some help from the shovel. We continued our adventure because we had barely made it through a quarter of the yard. About an hour later, the yard was slug free, while the neighbouring forest had received more than fifty new inhabitants, but for how long! We were oblivious to others around us during our immersing adventure in nature.

If I had influence with the good fairy who is supposed to preside over the christening of all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from the sources of our strength. (Carson, 1987b, pp. 42-43)

Interconnection

The three qualities, repeated experiences, flow and sense of wonder, contribute to a person’s ability to know and to feel nature in more depth and with more involvement. Humans who immerse in direct experiences in nature engage in repeated interactions, achieve flow and a sense of wonder that support a stronger affinity with nature. The next chapter is the last and third part of this philosophical inquiry that proposes that all human beings, especially teachers

and students, must develop a feeling for the organism to deepen their affinity with nature even further. Rather than seeing ourselves as separate from nature, we become more intimate with it. We may re-connect with nature or re-insert ourselves back into nature, becoming part of the flow of energy and matter and experiencing a form of intimacy, called inter-being.



(Photographed by Q. Mulder ten Kate)

CHAPTER SIX: INTIMACY

Introduction

Experiencing nature directly contributes to becoming an educated person. Teachers and students are no exception. Chapter Four addressed the importance of sensing and feeling as well as knowing and the importance of companionship during initiation type of direct experiences in nature. Chapter Five examined repeated experiences, flow and a sense of wonder during immersion type of direct experiences in nature. Feeling for the organisms and inter-being are two qualities of intimacy type of direct experiences in nature, the strongest form of affinity with/in nature.

Many scientists develop a sense of intimacy with their research subjects (Comfort, 2001) and the environmentalist Carson and scientist McClintock are no exceptions. In addition to her bestseller *Silent Spring*, Carson wrote *The Sense of Wonder* that inspired an examination of my direct experiences in nature as a child and adult. Carson shares her love for nature with Roger, her grandnephew, illustrating a feeling of intimacy with her companion and with nature during their explorations in nature. Carson writes that “I am sure no amount of drill would have implanted the names so firmly as just going through the woods in the spirit of two friends on an expedition of exciting discovery” (1987b, p. 18). Direct experiences in nature nurture this intimate relationship between child and adult.

McClintock, a geneticist and 1983 Nobel Prize winner, had an intimate relationship with her organisms as well. I draw inspiration from her research methodology that led to the discovery of “*controlling* elements not *transposable* elements....the genetic control of development” (Comfort, 2001, p. 9). McClintock discovered controlling elements that contribute to corn’s genetic diversity, using her intuitive experience in addition to more commonly acceptable science research methodologies. Comfort (2001) states: “McClintock’s allegedly holistic,

intuitive scientific style was in fact highly rational and based on immense experience and reading. All good scientists develop a feel for their experimental material” (p. 9). McClintock is no exception and developed an intimate relationship with her research subjects while maintaining an objective stance to her work (Comfort, 2001). However, Comfort (2001) concludes: “McClintock was distinctive in speed and facility with which she solved problems” (p. 9) and “Rationality and intuition, experiment and observation, manipulation and attentiveness are components of all good science” (p. 10). Comfort (2001) acknowledges that McClintock “had a unique mixture of elements and the extraordinary ways in which she manifested them” (p. 10). Comfort does not elaborate clearly on these elements in chapter one; however, in chapter two, he states that “Later themes of her life and science—integration, pattern, control, complexity—are elaborations and implications of her need for freedom” (2001, p. 19).

Comfort had access to all of McClintock’s correspondence, research papers and journals for his Ph. D. and his book, *The Tangled Field Barbara McClintock’s Search for the Patterns of Genetic Control*. This book addresses the theme of independence and freedom in McClintock’s life and science while chronologically reviewing and explaining her research and contributions to science. Other historians, journalists and scientists in the 1970s interviewed McClintock repeatedly. According to Comfort, “like anyone asked to tell and retell a story, she settled into a pat version, easy to understand and ornamented with anecdotes and humour” (2001, p. 4). Keller, a physicist and a bacterial and viral geneticist, interviewed McClintock as well as McClintock’s colleagues who corroborated her information in 1978 and 1979. Keller published *The Feeling for the Organism: The Life and Work of Barbara McClintock* in 1983. I reference Keller’s book that offers insights and examples for the third type of direct experience, called *intimacy*.

These two passionate individuals, Carson and McClintock, inform the development of my argument. In fact, my life and work parallel these companions’ life and work in many ways, briefly illustrated in “The Researcher”

section in Chapter Two. A strong sense of independence and a love for nature fuel my passion and tenacity for understanding Earth and its non-human organisms. Inspired by Carson's auto/biographies and her natural history books and by McClintock's biographies during another project about ten years ago, I choose to examine these remarkable women again in more depth during my Ph. D. Having already researched their propositional knowledge, I examine their practical knowledge in this dissertation instead. In other words, rather than examining what they had discovered, this thesis examines how they made their discoveries. With Chapter Five's analysis of Carson's sense of wonder completed, this chapter examines McClintock's research methodology that suggests that we ought to develop a feeling for the organisms. My argument continues to elaborate on the idea that when we feel for the organisms in nature, we feel part of nature rather than apart from nature. Lastly, I address the seventh quality of direct experience in nature, called inter-being. Nhat Hanh suggests that human beings inter-are with nature.

I call this last type of direct experience, "intimacy," for a number of reasons. This chapter's introduction, in addition to previous chapters, mentions the intimacy that Carson and McClintock felt for their organisms. This intimacy involves an intense, deep love for their organisms. Their relationship with their organisms was one of respect, care and protection. For example, Chapter Four illustrates Carson's passion for the seashore, illustrated in her first three books. Her "auto"biography of the mackerel demonstrates her ability to perceive and to portray this organism's struggle for survival from the perspective of the mackerel itself.

These two women not only immersed themselves into the experience of "getting to know" these organisms, they "merged" with the organisms. Humans can put themselves in the position of other organisms to appreciate and to understand, for example, their anatomy, physiology and behaviours. Intimacy also implies a familiarity and closeness. Neither woman ever married. Their biographies show that they were independent women focused on their professional careers that consumed most aspects of their lives (Keller, 1983;

Comfort, 2001; Lear, 1998). I carefully suggest that these non-human organisms were part of their extended family. Family members are part of our lives by being born into the family and, therefore, by definition, they are supposed to be very familiar or recognizable, well known and common to us, of course with a few exceptions such as adoption. Seashore organisms were Carson's treasures and maize and *Neurospora* were part of McClintock's life. These organisms were like their family members, having a closeness that was often stronger than their closeness with family members and colleagues.

Their scientific research for a book or journal articles was thorough, in-depth, exhaustive and very detailed. They had a profound sense of commitment, determined to figure things out whatever that may have been at the time. They did not quit or gave up, no matter what anyone else thought of them or their work. Carson and McClintock expressed the importance of being intimate with non-human organisms in order to appreciate, to understand and to build a relationship with them. The first type of direct experience, initiation, introduces human beings to nature at a very superficial, preliminary level. The affinity or relationship with non-human organisms has not had enough contact or time yet to develop very strongly. In fact, it is like an introduction *to* nature albeit in natural areas. Humans experience nature directly for brief periods in different natural areas so a thorough "getting to know" is not possible. The second type of direct experience, immersion, demands more involvement and concentration over time, developing a stronger connection. Repeated interactions in the same natural area or with the same non-human species contribute and strengthen humans' familiarity, awareness and understanding, leading to tighter bonds between humans and non-humans. Humans directly experience *with* nature, in a way that nature is still the "other." The last and third type of direct experience, intimacy, shifts that relationship to experiencing *with/in* nature, analyzed in this chapter. This analysis shows that intimacy supports the strongest affinity with/in nature.

A Feeling for Human Beings

A few years ago, I was ready to supervise a number of student teachers entering the teaching profession. Teachers had shared their classrooms and expertise during two mandatory work experiences part of my teaching certificate. My master degree examined the importance of reflective moments in conversations between an experienced environmental educator/teacher and a classroom teacher new to implementing EE (Mulder ten Kate, 1993). This research concludes that learning and reflecting in practice facilitate the implementation of EE.

While supervising three student teachers who experimented with environmental concepts in my sciences classes, I reflected deeply on my practice as their companion. Their lessons provided clues to my own learning and teaching. I also observed barely noticeable and subtle changes in my student teachers. It was like copying someone else's accent when frequently being in the presence of that person. They adopted my ways, my mannerisms or my strategies without being fully aware of it until I saw myself reflected in them and I brought it to their attention. Rather than telling the other what to do and how to do it, the other observes intently, often subconsciously, and eventually becomes like the observed in some small way. This tacit knowledge only transfers when being in the presence of the other (Oakeshott, 1962).

I felt inspired by McClintock's life and work eight years ago when I read about her genetics research. Rereading Keller's book, called *A Feeling for the Organism: The Life and Work of Barbara McClintock*, several times for this chapter, I analyze McClintock's work from an entirely different perspective. Rather than focusing on what she discovered, I analyze how she discovered the controlling elements in corn. I argue that to gain an understanding of an organism humans ought to put themselves in the position of this organism, a notion that McClintock called "a feeling for the organisms". An analysis of her ability to develop a feeling for these organisms or to be intimate with these organisms informs my argument.

When I support students and teachers in their experiences in nature, I try to see nature through their eyes. What was it like for me when experiencing nature for the first time? By remembering my experiences in nature, I recall past events, sensory inputs and practical and propositional knowledge. I become a member again in nature and a companion for others. I can relate to others who explore nature for the first time. In fact, I can put myself into their shoes and can remember what it feels like. We also have the benefit of communication to compare our experiences. I can develop a feeling for the organism, the human being, in this case. I can feel what they feel, becoming in tune with other human beings. In other words, I can feel the same as them, can feel with them and feel like them. I can feel the same intimacy with them, or feel a close loving relationship, as McClintock felt with her corn.

McClintock researched so intuitively and intimately that she felt ONE with the corn, its chromosomes and their controlling elements. This ability to be intimate with her subjects led to her explanation of genetic patterns and diversity in corn. Smith (1992) notes eloquently: “She has instead been concerned about understanding the way in which organisms interact as members of larger environmental contexts” (p. 78). The field of science tends to be objective and rational; however, McClintock’s approach was also subjective and intuitive. Keller (1985) writes:

McClintock is not here speaking of relations to other humans, but the parallels are nonetheless compelling. In the relationship she describes with plants, as in human relations, respect for difference constitutes a claim not only on our interest but on our capacity for empathy—in short on the highest form of love: love that allows for intimacy without the annihilation of difference. I use the word love neither loosely nor sentimentally, but out of fidelity to the language McClintock herself uses to describe a form of attention, indeed a form of thought! Her vocabulary is consistently a vocabulary of affection, of kinship, of empathy. (p. 164)

This quote also stresses the importance of recognizing the differences between organisms. Being intimate does not simply mean that we have to feel the same as the other. As Keller acknowledges the similarities in human relations as well, I

can become intimate with other people in nature; however, we are still different from one another. By becoming intimate with other humans in nature, I can gain some understanding of how they are experiencing nature.

Therefore, I propose that having directly experienced nature previously, I can put myself in the position of teachers whom I support. However, I do not suggest that other teachers' experiences in nature are the same as mine. I do not become like them exactly! Instead, I have some insights that help me to examine and to support their experiences in nature and in the process deepen my own direct experiences in nature, too.

Keller (1983) writes that McClintock had a deep emotional investment and sympathetic understanding of her corn, characterized by her ability to "hear what the material has to say to you," her openness to "let it come to you," "feeling for the organism" and "heightening her powers of discernment" (pp. 198-200). In other words, "...the objects of her study have become subjects in their own right; they claim from her a kind of attention that most of us experience only in relation to other persons" (Keller, 1983, p. 200). What happens when I see teachers as subjects rather than objects? What happens if they see themselves as subjects in nature rather than objects when they experience nature directly with their students?

McClintock epitomizes many of qualities I aspire to as our lives travel parallel paths even though mine is more than fifty years later. It is helpful at this point to explore briefly a few other aspects of McClintock's work because they so closely reflect my journey in life, exhibiting qualities that inform this dissertation. I agree with Keller: "We can say that her vision of biological organization was too remote from the kinds of explanations her colleagues were seeking, but we need to understand what that distance is composed of, and how such divergences develop" (1983, p. xii). Seeing it with my own eyes gives me an insight into our experiences in nature. I cannot capture seeing it again with my own eyes and feeling it again with my own emotions on a tape or a photograph. Keller notes: "The role of vision in her experimental work provides the key to her understanding. What for others is interpretation, or speculation, for her is a

matter of trained and direct perception” (1983, p. xiii). McClintock’s approach and my approach are similar when making sense of our experiences. I feel my approach parallels McClintock as described by Keller:

She herself cannot quite say how she “knows” what she knows. She talks about the limits of verbally explicit reasoning; she stresses the importance of her “feeling for the organism” in terms that sound like those of mysticism. But like all good mystics, she insists on the utmost critical rigor, and, like all good scientists, her understanding emerges from a thorough absorption in, even identification with, her material. (1983, p. xiv)

While McClintock was able to stay with her subjects for as long as she needed or wanted, I had to move in and out of accompanying others during our direct experiences in nature. I was able to receive and to retain just brief glimpses of what it might be like to develop a feeling for human beings during our times together. Gaining insights into our experiences in nature and getting a feeling for other human beings were shorter in time compared to McClintock’s lifelong endeavours. In contrast, I have had many shorter opportunities to develop a feeling for non-human beings in nature, so far.

Pedagogical Perspective

This chapter examines direct experiences in nature between a companion and other human beings, usually students and teachers. Teachers observe nature in the presence of their students. When students observe their teachers closely, they can gain an understanding of how teachers experience nature, too. These teachers, like all other human beings, ought to develop a feeling for the organisms, a love for experiencing nature and a sense of being part of nature. Students may start to develop a feeling for their teachers, to develop a feeling for other non-human beings and to experience an affinity with nature.

When teachers explore nature intimately with their students, they take a different stance from their colleagues who prefer to use secondary sources of information to teach about nature. Being different by doing something different is an autonomous act. In McClintock’s case, Keller (1983) writes:

Her decision to pursue what gave her most pleasure had become a commitment. And around it, she had had to make rules for her own existence—rules that had by now become a source of pride, and just as binding as those of the conventions she rejected. They were an essential part of her self-definition—visible evidence of her difference. (p. 85)

Sharing intimate experiences with other organisms in nature while being with other human beings such as students and other teachers may require breaking rules, disregarding rules, designing new rules and defending a position to others. This dissertation is just one example. With the recent, increased public awareness about climate change and other forms of global degradation, this pedagogical perspective probably becomes somewhat easier to accept and to implement near the completion of this dissertation compared to its start six years ago.

Teachers are able to develop a feeling for human beings in nature, including their students, in addition to feeling for the non-human beings in nature, analyzed in the next section. By repeatedly observing students in nature, students become their research subjects whom they are getting to know intimately. They can try to understand students' questions, hesitations, inquiries and experiences because they experienced similar moments themselves. This is an excellent example of teacher professional development! Keller writes:

Her respect for the unfathomable workings of the mind was matched by her regard for the complex workings of the plant, but she was confident that, with due attentiveness, she could trust the intuitions the one produced of the other. (1983, pp. 104-105)

To understand students' complex experiences in nature, teachers must see themselves in their position. Teachers have one advantage over McClintock's ability to understand her corn. Keller (1983) writes:

She had developed her ideas alone, without benefit of the mutual understanding that can grow out of ongoing discussion with colleagues. Once the details had fallen into place and the patterns had become clear to her, she had to confront the task of making it visible to others. (p. 145)

Teachers are able to express in words what they are feeling, thinking and doing every step of the way. They can ask their students questions or have conversations with other human subjects, such as friends, family and colleagues. Their understanding becomes clearer during conversations in the field with students and colleagues or in reflections afterwards. Teachers can use this insight to adjust their teaching practice that includes more and better direct experiences for students in nature, too.

A Feeling for Non-Human Beings

Macro-invertebrates cling underneath rocks to endure the strong currents, staying hidden from most people's views. Many people have never seen leeches or caddisflies in a creek before. Washing rocks, separating these organisms and identifying them in ice cube trays is a time-consuming task. When totally engaged in an activity, humans can lose track of time and place while being in constant awe and wonder about the surprises revealing themselves in a fast-flowing creek. We may feel for these organisms and their struggle to survive in this cold, inhospitable environment. Even close contact with leeches can renew an appreciation for nature and non-humans' struggle for survival, including their ability to live in pollution. How much do we know about these organisms and what does it take to get to know them better? A few hours is not enough to get to know them much better, but at least we start to get to know them and we can continue our discovery at any time. Like any scientist, we only just scratch the surface, just like Carson, McClintock and any other scientist.

Carson in a memo to Mrs. Eales on "Book I-Edge of the Sea" in *Under the Sea-Wind* writes:

As far as possible, I wanted my readers to feel that they were, for a time, actually living the lives of sea creatures. To bring this about I had first, of course, to think myself into the role of an animal that lives in the sea. I had to forget a lot of human conceptions. (In Lear, 1998, p. 97)

When explaining book II-The Gull's Way, Carson states:

In this section, which pictures the strange world of the open sea, I have written the biography of a mackerel, beginning, as biographies usually do, with the birth of my central character. (In Lear, 1998, p. 101)

These examples illustrate the importance of writers, according to Rachel Carson, to be “pioneers in new areas of thought and knowledge” (In Lear, 1998, p. 151). These quotes illustrate Carson’s intimacy with non-human organisms. However, as a writer she presents these stories vicariously. I have no doubt that she personally had experienced most of these non-human organisms first hand to gain her understanding, so eloquently and lyrically written for us.

McClintock is another person who felt intimate with her organisms. Keller writes:

In McClintock’s working philosophy, the familiar virtues of respect and humility take on a new significance. To her, nature is characterized by a complexity that vastly exceeds the capacities of the human imagination. Organisms have a life and order of their own that scientists can only begin to fathom. (1984, p. 46)

McClintock believes that scientists must “listen to the material” and “let the experiment tell you what to do” (In Keller, 1984, p. 46). We sometimes participate in a new experience to be open to the possibilities. We may not have any expectations or pre-conceived notions about this new experience. We may be taken by surprise or we may be overwhelmed by what is happening around us. These are just two of the many possibilities that can describe direct experiences.

McClintock proposes that we must be open to any possibility. The experiment or experience shows us what to do or how to perceive it. Also, she warns that we only get a small glimpse of the complexity of these organisms. Keller continues: “This world view implies a special attention to difference and idiosyncrasy. Each organism has an enduring uniqueness that must be respected” (1984, p. 46). Organisms may look alike at first, but they are not. There are differences between them that repeated, intimate, intuitive observations may slowly and partially reveal. I repeat Keller’s quote from McClintock: “No two plants are exactly alike. They are all different and as a

consequence, you have to know that difference” (1984, p. 46). We only just started to get to know the leeches’ differences in terms of their external, physical appearance such as colour, size and shape and their location in the creek. When we begin to know the leeches’ differences, we begin to gain insight into their ways.

Later, McClintock says: “I don’t feel I really know the story if I don’t watch the plant all the way along. So I know every plant in the field, I know them intimately, and I find it a great pleasure to know them” (In Keller, 1984, p. 46). We only briefly got to know a few leeches that we had collected, sorted and observed in the ice cube trays. Again time was brief and with more time we could have continued our feeling for these organisms and added to our understanding of their lives. Keller notes: “From days, weeks, and years of patient observation comes what looks like privileged insight. The result, as one colleague described it, is an apparent ability to write the “autobiography” of every plant she works with” (1984, p. 46). What would we understand or come to know if we spend more than two hours with these leeches? Imagine what we could understand about leeches if we observe them intimately for years?

Keller (1983) states: “As a child McClintock had a striking capacity for autonomy, self-determination, and total absorption. But what was truly exceptional was the extent to which she maintained her childlike capacity for absorption throughout her adult life” (pp. 35-36). Keller quotes McClintock saying that she would “do things others didn’t do—I never thought anything about it” (In Keller, 1983, p. 83). This child like capacity as an adult supports an intimacy with nature, even leeches as the vignette at the end of this chapter illustrates!

Pedagogical Perspective

Teachers and students ought to have a feeling for the non-human organisms during their direct experiences in nature. When they have opportunities to see the differences amongst and within species, they may start to appreciate and to experience nature’s diversity as well as its unifying features.

Direct experiences in nature can clarify, strengthen and deepen their intimacy with nature. This intimacy is the strongest form of affinity with nature possible.

McClintock also contributes an important insight into inductive research methods that has pedagogical implications. Keller notes how McClintock defines “understanding”:

The word “understanding” and the particular meaning she attributed to it, is the cornerstone of Barbara McClintock’s entire approach to science. For her, the smallest details provided the keys to the larger whole. It was her conviction that the closer her focus, the greater her attention to individual detail, to the unique characteristics of a single plant, of a single kernel, of a single chromosome, the more she could learn about the general principles by which the maize plant as a whole was organized, the better her “feeling for the organism.” (1983, p. 101)

Like McClintock, teachers who try to understand their individual experiences in nature with students, continue to gain a better insight into experiencing nature directly, in general as well. Even though teachers have less time with each human and non-human organism in nature compared to the time McClintock had with each corn plant, they can re-examine their experiences in nature during every visit. They can gain new insight into their intimate affinity with nature and continue to develop their feeling for non-human organisms during every visit.

Furthermore, they can lead by example, merge with other organisms in nature, and develop the highest form of affinity with nature possible, a sense of inter-being, addressed later. I agree with McClintock that a feeling of the organism merges the self with the other. Object and subject are no longer distinct entities. McClintock states: “As you look at these things, they become part of you. And you forget yourself. The main thing about it is you forget yourself” (In Keller, 1983, p. 117). She tells the reader: “I’m not there!” (In Keller, 1983, p. 118). McClintock concludes, “The self-conscious “I” simply disappears. Throughout history, artists and poets, lovers and mystics, have known and written about the “knowing” that comes from the loss of self—from the state of subjective fusion with the object of knowledge” (In Keller, 1983, p. 118). In schools, nature is an object of knowledge. The subject is the student who learns about nature,

hopefully in nature as well. McClintock suggests that our knowing arises from merging the subject, the “I,” and the object, nature, in this case. This is a challenge that teachers need to address in their teaching. The analysis of the last quality of direct experiences, inter-being, sheds some light on this pedagogical perspective.

Inter-being

What do we mean when we say, “We are part of nature” and “Every organism interconnects with every other organism”? This last section tries to address these comments by analyzing the quality of “inter-being.” This way of being is important in Nhat Hanh’s work within Buddhist philosophy and practices and it is an idea explored in detail by Chernus who examines the history and practice of nonviolence in the US.

I refer to Nhat Hanh who supports a notion of inter-being to gain additional insight into experiencing nature directly with others, humans and non-humans. His views also resonate with some of the perspectives of deep ecologists discussed earlier. Nhat Hanh writes:

All phenomena are interdependent. When we think of a speck of dust, a flower, or a human being, our thinking cannot break loose from the idea of unity, of one, of calculation. We see a line drawn between one and many, one and not one. But if we truly realize the interdependent nature of the dust, the flower, the human being, we see that unity cannot exist without diversity. Unity and diversity interpenetrate each other freely. Unity is diversity, and diversity is unity. This is the principle of interbeing. (1994, p. 131)

Nhat Hanh recognizes an interdependent nature. In *Teaching the Common: Place, Pride, and the Renewal of Community* Theobald discusses a similar term, “intradependence,” that means: “To exist by virtue of necessary relations within a place” (Theobald, 1997, p. 7). Nature includes a diversity of organisms that depend on each other for their existence. Matter and energy have to flow between different species to keep them alive. This flow connects all species. Diversity makes this process possible. Nhat Hanh writes: “Diversity and unity

interpenetrate each other freely” (p. 131). This is “the principle of interbeing” (p. 131). This principle refers to the interconnectedness of everything. Chernus (2004) writes:

There is no such thing as a separate object, event, or experience, because no [sic] any part of the world can exist apart from all others. Rather, everything that looks like a separate entity is actually dependent on, and therefore interwoven with, something else. Everything (object, event, idea, experience, whatever) is made up of other things. Whatever appears to be an isolated "thing" is actually a combination of its constituent elements. These elements are the influences from the other things with which it is interwoven. And those elements, too, are made up of other combinations. The world is an endless web of combinations. (pp. 192-193)

In Nhat Hanh’s view, humans are just one species amongst all species between which energy and matter flows. Every species is equally important in this system. Nhat Hanh warns human beings what happens when they do not practise this principle:

If you are the mountain climber or someone who enjoys the countryside or the forest, you know that forests are our lungs outside of our bodies. Yet we have been acting in a way that has allowed millions of square miles of land to be deforested, and we have also destroyed the air, the rivers, and parts of the ozone layer. We are imprisoned in our small selves, thinking only of some comfortable conditions for this small self, while we destroy our large self. To be our true selves means we have to *be* the forest, we will experience the hopes and fears of the trees. If we don’t do this, the forests will die, and we will lose our chance for peace. When we understand that we inter-are with the trees, we will know that it is up to us to make an effort to keep the trees alive. In the past twenty years, our automobiles and factories have created acid rain that has destroyed so many trees. Because we inter-are with the trees, we know that if we do not live, we too will disappear very soon. (1994, pp. 131-132)

This example shows that forests and human beings depend on each other for their survival.

Nhat Hanh’s next quote compares interpenetration with interbeing:

Interpenetration is an important teaching, but it still suggests that things outside of one another penetrate into each other. Interbeing is a step forward. We are already inside, so we don't have to enter. In contemporary nuclear physics, people talk about implicit order and explicit order. In the explicit order, things exist outside of each other—the table outside of the flower, the sunshine outside of the cypress tree. In the implicit order, we see that they are inside each other—the sunshine inside the cypress tree. Interbeing is the implicit order. To practice mindfulness and to look deeply into the nature of things is to discover the true nature of interbeing. There we find peace and develop the strength to be in touch with everything. With this understanding, we can easily sustain the work of loving and caring for the earth and for each other for a long time. (1994, pp. 136-137)

Inter-being, an example of the implicit order, embraces that “we see that they are inside each other.” When we practise this principle, we “stay in touch with everything.” We are not apart from nature but we are a part of nature. Everything interconnects and exists in relationship to one another. Chernus (2004) states:

The elements that make up the world are patterns of dependency and interweaving. In other words, they are relationships. When we are fully aware, we see that there are only relationships. All relationships are patterns of interaction. So they are, by definition, dynamic; they are patterns of change. There are no individual things, but only ongoing processes. These processes are made up of other, constantly changing processes. All of reality is combinations of patterns of relationships in process. (p. 193)

According to Nhat Hanh, human beings exist in relationship to everything else.

Nature and human beings are not separate entities. Therefore, what we do to nature, we do to ourselves. Nhat Hanh reminds us that if we harm nature, we harm ourselves, too! Instead of degrading the environment, this new understanding ought to lead to caring for the earth and its species. Nhat Hanh warns that by staying on our current path of environmental degradation, we might orchestrate our own species extinction. Chernus (2004) notes:

We can never define, or even know, our self. We can know only the infinite relationships between self and not-self. That is because what we call the self has no independent existence apart from those infinite relationships. The reality is not the self or the things

we call other; the reality is only the constantly changing patterns of relationship between self and not-self. The reality is only the endless web of connections. As Nhat Hanh puts it, everything "inter-is" with everything else. Since everything depends on the totality of all, everything is already inside of everything else. (p. 194)

Nhat Hanh identifies an interdependent relationship between environment and the environmentalist: "The best way to take care of the environment is to take care of the environmentalist" (1993, p. 132). Chernus' suggestion is: "The best way to take care of the environmentalist is to grow in nonviolence, meditative mindfulness in full awareness of the truth of interbeing" (2004, p. 202). Again, Chernus (2004) reviews Nhat Hanh's Buddhist's perspective:

Nature is our "larger self." All our environmental problems stem from the illusion that there is a basic difference between the human self and nature. Once we see through this illusion, we extend our compassion to every natural species. We respond immediately, in the present moment, to suffering anywhere in nature. We understand that suffering anywhere is our own suffering. So we must also take care of nature to ease our own suffering. We need the right kind of natural environment to maintain personal harmony, and we need personal harmony to have the right kind of natural environment. (pp. 201-202)

These suggestions offer alternatives for environmentalism, especially environmental action part of the C.A.R.E. framework in ELE in BC. Instead of radical and destructive activism often associated with many environmentalists, Nhat Hahn offers suggestions more congruent with being intimate with every living organism. "Do not do to others what you do not want them to do to you!" captures this idea succinctly. In the context of inter-being, it is ironic and ignorant to harm people and places during violent protests when trying to draw attention to the harm we do to Earth.

Suggesting a sense of intimacy, the quality of inter-being embraces and supports the other six qualities analyzed in this thesis. Sensing/feeling/knowing enables humans to get in touch with and get to know every living and non-living thing. Companionship facilitates the sharing of propositional and practical

knowledge between human beings that encourages a cognitive and affective understanding of nature. Repeated visits provide for experiencing nature more deeply and more frequently throughout the year. When our ability to observe nature matches the challenges while being in nature, we feel a stronger sense of flow in nature. We have a sense of wonder, an emotive response, when being in nature, discovering new things all the time and realizing that some things always remain a mystery. We may discover a cognitive and intimate understanding of organisms when feeling for the organisms. When we put ourselves into a non-human being, we may gain insight into it. When human beings re-insert themselves into the flow of nature's matter and energy, we are part of nature and nature is part of us. This relationship helps human beings to define their values, beliefs and attitudes about the way we inter-are with nature. This evaluative stance supports an intimate compassion for nature, or the strongest form of affinity with nature.

Pedagogical Perspective

As mentioned previously, Nhat Hanh and deep ecologists have very similar perspectives on developing an intimate relationship with nature. Deep ecologists offer the following four processes for experiencing wilderness:

- 1) developing a sense of place, 2) redefining the heroic person from conqueror of the land to the person fully experiencing the natural place, 3) cultivating the virtues of modesty and humility and 4) realizing how the mountains and rivers, fish and bears are continuing their own actualizing processes. (Deval and Sessions, 1985, p. 110)

The first suggestion offers insight into experiencing "where we are" or "where we live." Their second suggestion explores "who we are" when directly experience this place, including nature. The third suggestion addresses "how we should act." Finally, the fourth suggestion supports deep ecologists' principle of bioentric equality that non-human organism are equal in worth to human beings. Nhat Hanh takes it one step further in suggesting that there are no "selves" because all organisms contain parts of the others and so there are no distinct boundaries

between living organisms. So far, I have argued that the three types of direct experiences in nature support these four practices. What insights can Nhat Hanh offer teachers in terms of their instructional practices?

So far, the analysis of Nhat Hanh's work discusses the merging of a human being, a self, with nature, the other—the implicit order. Buddhist teachers, including Nhat Hanh, suggest:

The student will discover that we do not "have" perceptions, thoughts, feelings, and desires. Rather, we *are* all those processes, and nothing else. When we look carefully, we discover that those processes are all interactions between what we call self and what we call not-self. From this perspective, too, we are nothing but a constantly changing pattern of relationships. So everything that we call "out there" is already inside us. (Chernus, 2004, p. 195)

Discussed in Chapter Three, current EE pedagogy provides students with knowledge, understanding, skills, attitudes and actions to become environmentally, responsible citizens. The quality of inter-being suggests quite a different teaching approach. Chernus (2004) states:

Awareness of interdependence makes it immediately evident that each of us shares responsibility for all that happens and will happen: "There is no phenomenon in the universe that does not immediately concern us." As soon as we recognize that responsibility, we are moved to act to improve the situation: "If we are very aware, we can do something to change the course of things." We are most motivated to work for change when we realize that our sense of being a separate self is illusory. We are all part of the same human process, all driven by the same human process. Changing that process means changing both situation and self:... (p. 196)

Even though addressing "awareness" is part environmental education, Nhat Hanh takes it a step further. His type of awareness includes the interdependence between nature and humans. We are nature. In other words, if we harm nature, then we harm our-selves.

The *Science 10: Integrated Resource Package* (2008) states that "Science education develops and builds on students' sense of wonder about the world

around them and encourages a feeling of responsibility to sustain it” (p. 11). Chernus (2004) reminds us:

Since the individual and society "inter-are," as Nhat Hanh says, each must nourish the other, or both will wither. The preservation of oneself is the same thing as the preservation of all; the improvement of self is the same thing as the improvement of all; the healing of one's own suffering is the same thing as the healing of all suffering. (p. 196)

Buddhists call this compassion, defined as "feeling together with" (Chernus, 2004, p. 196). This “feeling together with” includes all living organisms—humans feeling together with non-humans. Compassionate teachers and compassionate students experience “one’s own fate and the fate of the supposed other as identical” and, therefore, “it means experiencing the other’s suffering as one’s own suffering” (Chernus, 2004 p. 196). Nhat Hanh suggests that this way of being, inter-being, encourages a care for the earth that is more likely to halt any further environmental degradation.

Students ought to become intimate with nature or merge with nature, following this path of care for earth, too. Orr (2002) warns:

...children in modern society are heavily shaped by a contemporary political economy that stresses materialism, economic growth, and human domination of nature and that tolerates large-scale ecological risks with irreversible consequences. Children’s view of nature is increasingly distant, abstract, and utilitarian. (p. 291)

What consequences does this view have? Is nature a commodity that humans can exploit until nothing remains? On the contrary, human beings and their institutions, including schools, need to reverse these environmental trends. Unless our intent is to devise our own extinction, it makes no sense to continue on this path of environmental degradation (Worldwatch Institute, 2011). For example, Carson’s concern was for the “possibility of the extinction of mankind by nuclear war” (p. 8). These hazardous, industrial chemicals with long-term human and non-human implications are more difficult to manage and to contain

compared to diseases introduced by nature that we can still mostly manage with medical interventions, such as drugs, vaccinations and better sanitation.

Humans ought to preserve what remains of natural areas and to design and to restore natural spaces for future generations to enjoy. These direct experiences in nature benefit humans' physical, emotional, intellectual, social and spiritual well being. In addition, schools ought to provide direct experiences in nature for students to develop their affinity with nature. Orr (1994) writes that we need:

...hundreds of thousands of young people equipped with the vision, moral stamina, and intellectual depth necessary to rebuild neighborhoods, towns, and communities around the planet. The kind of education presently available will not help them much. They will need to be students of their places and competent to become, in Wes Jackson's words 'native to their places.' (p. 271)

An education that includes this third type of direct experience, intimacy, supports students to become native again to their places, especially in nature.

Vignette Three: Teachers Directly Experiencing Nature

This two part reflective vignette is from the perspective of teachers, including myself who experience intimate contact with nature. It uses elements of empirical data discussed in Chapter Two to compose a teacher's perspective that illustrates this chapter's philosophical inquiries and pedagogical perspectives. The first part of the vignette focuses on feeling of the human organisms whereas the middle part focuses on the feeling of the non-human organisms. The last part illustrates the inter-being quality between humans and leeches in Maple Creek.

"I love just be able to "get my hands dirty" and do the activities. It is engaging for me and gets me excited about the possibilities with my students. I like being able to participate in each of the activities as if I was a student. It really helps me to visualize what the lesson might look like with my own class and it helps me to remember as I learn best by doing. I also love being able to do these things in my own schoolyard. These activities help to remind me of how simple it can be to bring our classes outside and do something engaging with them. They

open my eyes to what we have available in what I thought was a meagre field and parking lot. You give us some incredible resources and ideas to use with our students. I love that you show us how to make equipment out of cheap or reusable items. Activities become accessible to my students since we have very little resources available to use at our school. It is my school! That is awesome! It is so easy. It is right there. It is always available. What more could I ask for? Who knew there would be so many fun and exciting things to do in our very own backyard? I was a sceptic but now I feel like I am seeing more and more opportunities in areas that I might have otherwise dismissed.

As always, it is so amazing to do these activities with my colleagues. They really add a new dimension to the whole experience. They have great ideas and questions to add that help me prompt my own ideas and questions. This is valuable in curriculum exploration and design as it helps us to open our minds to alternate perspectives and assists us in getting a more holistic view of the activity or experience we are discussing. I can think of so many more things that are now available to my students. They are right at our fingertips. It helps to open my eyes to what is available in our immediate surroundings and gives me ideas as to how to use alternate environments as 'classrooms' that are clearly more interesting and engaging. Because the activities are so simple and straightforward I feel like it helps me in my ability to come up with my own creative ways to use alternative learning environments to complement my program in a variety of subjects. This will be so useful for me in helping me to create a more engaging and interesting program for my students.

As teachers, we borrow and use each other's resources all the time. There is something much more valuable in having someone guide us through the activities as the students. It helps us to visualize how the activities will work and what they will look like, sound like and feel like. It helps us to take on the perspective of our students and problem solve as far as what will work and what will not work with our particular groups. Furthermore, it helps us to analyze critically the activities and use one another as resources as we brainstorm alternative methods, possible extensions, and the question of assessment. This

guidance is so incredibly valuable. It is unfortunate that we do not have more opportunities to do things like this. I think the most surprising thing is just seeing how I can utilize our school grounds in such an engaging way. I feel as if we have very little natural areas that would allow us to explore but those small patches that you show us are phenomenal places for learning to take place. Who knew? I would love to continue to try out different activities in environments that are easily accessible to my students. These types of experiences are so engaging and easy to plan and to do. How many different things can I do in my own schoolyard? Sometimes the simplest activities can be incredibly engaging and serve as a great way to start a discussion among our students.

I really like using the flow learning format [Joseph Cornell's framework]. I find it very intuitive and engaging. This format flows naturally and grabs my interest while learning. I am excited to use this strategy with my students. I especially love the element of mystery in the beginning when sparking their curiosity. It drives them a bit nuts but in a good way because they are so curious and are really thinking about what might be happening next. We are doing so many great things and I love all of it. I think we have covered quite a nice range of activities and ideas so I cannot think of anything else that I would like to do that we have missed. I love it all! You have been doing such a great job. For me, I always love to participate in the activities personally. Every time we get a chance to do these activities ourselves I remember so much more and I am more likely to use it with my students."

Like these teachers, I also like to sense, to feel and to know what it is like to be experiencing nature intimately in a particular natural area prior to my students, including composters!

My fingers roam through the black, rich soil on my compost sifter. Amazed yet again, how grapefruit peels, broccoli stalks and potato peels are no longer recognizable. These veggie and fruit wastes travelled through digestive tracts of earthworms, wood bugs and millipedes. Leaves and grass, added nutrients that also keep the compost pile free of flies, are now unrecognizable and mixed thoroughly with all the other plant species. Millions of fungi released their

enzymes into this soupy mix only to suck the digested juices through their cell walls for nutrients. The crushed egg shells are now crushed some more while my fingers continue to push the wet, soggy stuff through small holes in the sifter. These crushed shells will soon decorate gardens, looking like snow has fallen in the summer. Hundreds of wood bugs, about ten centipedes and a few millipedes scurry about, disturbed by my pitchfork that lifts a pile of compost on the sifter placed on top of a wheelbarrow. This had been their home for six months while the pile slowly rotted and became almost unrecognizable.

The lasting pleasures of contact with the natural world are not reserved for scientists but available to anyone who will place himself under the influence of earth, sea and sky and their amazing life. (Carson, 1987b, p. 95)

I am thrilled with the cycling of nutrients right before my eyes. Every month while turning the pile, bright colours slowly fade and become more homogeneous. When sifting, I try to identify many of the pieces from the original species. The homemade sifter, constructed from recycled parts, separates larger pieces, such as fir cones, twigs, rocks, from rich soil and a few wood bugs that fall through the holes, too. In addition to the sense of touch changing during this composting process, the smell changes from a repugnant, sour smell to an earthy, fresh aroma, too. Every one of my stimulated senses is acutely aware of these changes. I lose track of time and three hours later, I have sifted and delivered ten wheelbarrows of healthy, rich soil to neighbours. The sun has set and the sky is dark.

The night is a time, too, to listen for other voices, the calls of bird migrants hurrying northward in spring and southward in autumn. Take your child out on a still October night when there is little wind and find a quiet place away from traffic noises. Then stand very still and listen, projecting your consciousness up into the dark arch of the sky above you. Presently your ears will detect tiny wisps of sound—sharp chirps, sibilant lisps and call notes. They are the voices of bird migrants, apparently keeping in touch by their calls with others of their kind scattered through the sky. I never hear these calls without a wave of feeling that it is compounded of many emotions—a sense of lonely distances, a compassionate awareness of small lives controlled and directed by forces beyond

volition or denial, a surging wonder at the sure instinct for route and direction that so far has baffled human efforts to explain it. (Carson, 1987b, p. 81)

Is this sense of intimacy with nature part of me, because I consciously choose it to be? I keep returning to nature, including the compost that is never quite the same again. I just love going back and experiencing it as if it was my first time. I feel a sense of attachment or affinity with nature that started in childhood. Local community creeks are other places for experiencing nature directly. I dress students and teachers in hip-waders and literally immerse them halfway in the creek to become part of the creek and to relate and to inter-are with all its wonders, including those leeches I was referring to earlier!

Barbara McClintock says, "I start with the seedling, and I don't want to leave it. I don't feel I really know the story if I don't watch the plant all the way along. So I know every plant in the field. I know them intimately, and I find it a great pleasure to know them." (In Keller, 1983, p. 198)

After measuring and marking a square of 30 cm by 30 cm at the bottom of the creek, the teachers and I vigorously wash and rub each rock in the square to remove the attached macro-invertebrates and to dump them in a tub with creek water. Next, we transfer the bugs from the tub into ice cube trays for identification and a head count! We are intimate with the creek and its creatures, especially leeches, as selected segments of our recorded dialogue in the field illustrate.

Teacher 1: There is something in here?

Teacher 2: It is right here!

Teacher 1: Squeeze and then blow them out again.

Teacher 2: Yikes!

Quirien: Keep washing the rocks.

Teacher 2: Is there something inside of it?

Quirien: You want to get the rocks wet.

Teacher 2: What is this? We are just going to leave this on this rock.

Teacher 1: Little pile of rocks stuck to the rock. They stick to the rocks.

Teacher 2: How do we know we are done?

Resource person: We are done as soon as we have sorted and washed everything.

Teacher 1: That looks good. What is that?

Resource person: We have another worm.

Teacher 1: Goes into the net.

Teacher 2: What is that?

Resource person: We have another worm.

Teacher 2: This is environmental education or boot camp 101.

Resource person: They are just swimming around.

Teacher 1: You got it.

Teacher 2: I got it.

Resource person: When you suck it up, you cannot let go of the bulb.

Teacher 1: I think it is one of those things floating in there.

Teacher 2: That one is very fast.

Quirien: You got it.

Teacher 1: Try it again.

Teacher 2: You must suck it and let it go!

Teacher 1: Do not wait. Go. Go. You got it.

Resource person: On the other side of the creek is a pond and you can find a whole lot of them.

Teacher 2: Is it moving? Is it slowly moving? Suck and go. You have it.

(Teacher 2 continues to suck insects from the tub with teacher 1's encouragement)

Teacher 1: Is that something moving? Yeah. Oh.

Teacher 2: No, I do not think it is in there. Where did it go? Is it in there?

Teacher 1: Yes

Resource person: Is it sitting at the bottom of the white tub?

Teacher 2: Is that it?

Teacher 1: I do not know. It might be. Yeah, it is.

Resource person: Looks like you have an aquatic worm, right there.

Teacher 1: Yes, I do.

Resource person: Wash the rocks. As soon as there might be a bug on it, you freak out. You just disturbed its house.

Teacher 2: I understand. Sorry.

Resource person: It feels like you dropped it from twenty stories high.

Quirien: You give it a big headache. Do not worry. Nothing is wriggling around.

(Teacher 1 and Teacher 2 continue to sort and to identify macro-invertebrates)

Quirien: Oh, look! One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen leeches.

Teacher 1: That is what I saw. I thought it was harmless.

Quirien: Tell your students on Monday what you were doing. Look at this!

Teacher 1: The leeches look bleached.

Teacher 2: We washed our marker rock.

Teacher 1: That is no good!

Teacher 2: Do you want me to pick it up?

Teacher 1: What do you do if there is something on it, but it does not come off? They are way stuck on there.

Teacher 2: They cemented themselves on the rocks. What are those? They curl up.

Quirien: Yes, leeches mean polluted water. If you do not find the other species, then you know they live in the polluted water.

Teacher 1: We have forty pounds of rocks in our tub.

Teacher 2: What is this?

Quirien: It measures pH.

Teacher 1: You match it up. It is 5.7

Teacher 2: There are three colours.

Quirien: You have to match them all up.

Teacher 1: It is over there! It is hard to stand over there.

Teacher 2: You must bend down! My body is burning.

Teacher 1: We need water in there.

Teacher 2: I am sorry!

Quirien: More leeches. We have no stoneflies and very few mayflies.

Resource person: I found a caddisfly right there. They found all sorts of things.

Teacher 1: There is one.

Teacher 2: It is right below, there!

Quirien: She is finding them all over the place.

Teacher 1: It has legs over all of them. It is not a mayfly. It looks like a centipede.

Quirien: Is it a dobsonfly? The other group had them as well.

Teacher 1: This is leech habitat.

Teacher 2: See something alive right there.

Quirien: Is it a mayfly?

Teacher 1: There is one right here. This is a mayfly.

Quirien: Looks like a moult.

Teacher 2: How old is it?

Quirien: Moults of a mayfly.

Teacher 2: Is it alive or dead?

Quirien: It is playing dead or could also be a skeleton.

Teacher 2: There it is.

Teacher 1: It is playing dead.

Teacher 2: That is a leech. I think.

Teacher 1: There is something right below. It is not moving at all.

Teacher 2: I see three things in there.

Teacher 1: Is it a pine needle? It is moving along. They are taking advantage of our skills. There is something down below. It is right on the rock.

Teacher 2: Our tray is full. There is another mayfly. We are getting some.

Teacher 1: Is it a pine needle or a dead something?

Quirien: It is a pine needle.

Teacher 2: There is another one.

Teacher 1: Put the same one in the same hole. Get this one. We can sort later.

Teacher 2: Stop for a second. My leg is getting sore. This is exciting.

Quirien: I like this part.

Teacher 2: There is another one there.

Teacher 1: (laughs)

Teacher 2: Who would have thought that a little pan has so much in there?
There is another one.

Interconnection

Experiencing nature directly ought to become second nature to all human beings again. Teachers and students are no exception. Chapter Four addressed the importance of sensing and feeling as well as knowing nature and the importance of companionship. Chapter Five examined that human beings can develop their observational skills, be in state of flow and experience a sense of wonder during repeated, direct explorations in nature. Feeling for the organism and inter-being are two more qualities that assist teachers in becoming effective companions for their human beings in the classroom, their students.



(Photographed by Q. Mulder ten Kate)

CHAPTER SEVEN: CONCLUSION

What is the value of preserving and strengthening this sense of awe and wonder, this recognition of something beyond the boundaries of human existence? Is the exploration of the natural world just a pleasant way to pass the golden hours of childhood or is there something deeper?

I am sure there is something deeper, something lasting and significant. Those who dwell, as scientists and laymen, among the beauties and mysteries of the earth are never alone or weary of life. Whatever the vexations or concerns of their personal lives, their thoughts can find paths that lead to inner contentment and to renewed excitement in living. Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts. There is symbolic as well as actual beauty in the migration of the birds, the ebb and flow of the tides, the folded bud ready for the spring. There is something infinitely healing in the repeated refrains of nature—the assurance that dawn comes after night, and spring after winter. (Carson, 1987b, pp. 88-89)

“At no time had I ever felt that I was required to continue something, or that I was dedicated to some particular endeavor,” she says. “I remember I was doing what I wanted to do, and there was absolutely no thought of a career. I was just having a marvelous time.” (McClintock In Keller, 1983, p. 34)

Reviewing my Proposition

These inspiring words by Carson and McClintock capture the essence of this dissertation. Ahead of their times, these two remarkable women were my inspiration to publish my proposition. Their printed words of wisdom helped me arrive at my conclusions. As I am nearing the end of this journey, I reflect on where it started and where it has taken me. I argue that schools ought to provide direct experiences in nature supported with an analysis of three types of direct experiences, *initiation*, *immersion* and *intimacy*. Additional qualities for each type of direct experience inform my argument. It is important to remember that we

ought not necessarily to “complete” these three types of direct experiences and qualities sequentially. Instead, the contribution of these qualities to an affinity with nature may depend on other variables beyond the scope of this thesis.

Qualitative and quantitative research can examine what combination or sequence of qualities is most effective. Human beings with an ecological identity may accept and may act on this proposition with more ease and conviction because it already matches their understanding of the world.

I discussed that we are sensory beings as well as intellectual beings. In addition to using our intellectual wisdom, we have the capacity to use our sensory input to strengthen our affective interactions with nature. We are amongst beings, including other humans, who are our companions on this earth. We experience many things more than once while being on this earth. Life is a repetition of basic bodily needs as well as a repetition of experiences we try to understand and possibly to act on. Repeated experiences, including repeated experiences in nature, can help us refine our understanding of our lives in nature. We can gain skills through repeated practice, too. We may reach an optimal experience, or flow, when a high level of skill matches a high level of challenge. Our sense of wonder expands when experiencing nature is full of discovery, enchantment and beauty. Developing a feeling for organisms that are part of this direct experience helps us to get to know and to understand them better. We inter-are with nature and feel part of nature. Every human part includes parts of non-human parts and vice versa. Distinct boundaries between any human “selves” and non-human “selves” are non-existent. Any of these seven qualities contribute to human’s affinity with nature that can only strengthen with every involvement and interaction. Initiation, immersion and intimacy are the keys to opening classroom doors enabling teachers and students to enter nature.

Implications for Environmental Education

This thesis proposes that schools ought to provide direct experiences in nature that benefit the physical, social, emotional and spiritual dimensions of becoming an educated person. In particular, this philosophical inquiry addresses

the importance of having an affinity with nature. This relationship with nature supports, most importantly, an emotional and spiritual interconnection with nature. Environmental education's main goal is to develop environmentally responsible and active citizens (Roth, 1970; UNESCO, 1980). A meta-Analysis study by Hines, Hungerford and Tomera (1986/87) attempts to determine which variables motivate individuals to become environmentally responsible and active citizens. Hines, Hungerford and Tomera (1986/87) conclude: "Approaches which address both affective and cognitive experiences and which provide individuals with opportunities to develop and to practice those skills necessary to lead environmental action must be developed and implemented in the school system" (p. 8). This thesis adds to this research and analyzes qualities related to initiating *into* nature, immersing *in* nature and being intimate *with/in* nature.

Keller (1985) concludes in *Reflections on Gender and Science* that McClintock's science exemplifies a love and intimacy with nature that blurs the lines between object and subject or self and other. As mentioned previously, McClintock inserts herself into her subject of study and identifies herself with the subject so that she can understand the inner workings of her subject of study. Keller described it as McClintock becoming intimate with her organisms, feeling a sense of belonging and affinity with them. In contrast, Comfort (2001) states: "McClintock called it integration" (p. 14). McClintock, in an interview with Keller, states:

I found the more I worked with them, the bigger and bigger they got, and when I was really working with them, I wasn't outside. I was down there. I was part of the system....It surprised me because I actually felt as if I were right down there and these were my friends....As you look at these things they become part of you. And you forget yourself. (In Keller, 1983, p. 117)

McClintock is part of the system, seeing herself inside chromosomes part of non-human organisms. In fact, these chromosomes became part of her as well. I interpret her phrase, "And you forget yourself," as suggesting that the objects, in this case the chromosomes in corn, merge with the subject, the researcher McClintock. This intimate connection enables us to see that whatever we do to

the Earth, the Earth does to us. A continued separation between humans and non-humans can only lead to further environmental degradation and harm to human health.

People with an ecological worldview embrace a stronger awareness of nature, have closer relationship with/in nature, probably taking moral actions more supportive of nature's natural processes. Thomashow's work on ecological identity describes these people as having "strong value orientation and ethical conscientiousness, relative freedom from self-preoccupation, cooperativeness, and leadership potential" (1995, p. 4). Four questions guide an ecological identity: "Where do things come from? What do I know about the place where I live? How am I connected to the Earth? What is my purpose and responsibility as a human being?" (p. 205). Teachers, including environmental educators, ought to provide direct experiences in nature to address these four questions. As argued previously, written texts or visual media in classrooms barely begin to answer these questions. These texts do not teach students, residents of Eagle Ridge in Coquitlam, where their things come from? Students do not learn about their community by reading their *BC Science 10* textbook or by viewing its illustrations.

The BC Ministry of Education's integrated resources packages in conjunction with their recently released curriculum maps for ELE support educators "with a navigational tool to enhance teaching and learning with the environment and sustainability as core elements" (Environmental Educators' Provincial Specialist Association and BC Hydro, 2008/2009, p.11). These curriculum maps assist a diverse audience, including teachers, administrators, professional development coordinators, teacher education program instructors and community program and resource developers. The document states:

Teachers take curricula and translate these guidelines with other essential ingredients into high quality, engaging experiences for learners. With IRP PLOs as the desired ends, the ELE Curriculum Maps are designed to assist teachers in emphasizing the environment and sustainability across provincial curricula. Most notably, the maps are intended as a guide for program planning and unit/lesson plan development so that C.A.R.E. can be brought alive in daily practice. Beyond their practical usefulness, these maps also give teachers permission in Ministry of Education

curriculum to approach environmental concepts and sustainability as core content. (Environmental Educators' Provincial Specialist Association and BC Hydro, 2008/2009, p.11)

This document gives school and district administrators and professional development coordinators the same permissions as teachers:

The curriculum connections may also be useful for outreach to parents and the community in support of environmental learning and sustainable practices. With respect to professional development, these maps are a useful tool to help teachers implement the ELE guide in their practices. They can also provide curricular foundations for school and district planning around sustainability and environmental initiatives. (Environmental Educators' Provincial Specialist Association and BC Hydro, 2008/2009, p.11)

This document also suggests that pre-service and beginning teachers need relevant curriculum with adequate background; however, I would argue, as my four barriers illustrated that current teachers often seek this too. These curriculum maps:

support teachers in the process of turning educational theory into best practices. The maps are also an excellent resource to approach learning about cross-curricular integration as well as the developmental aspect of learning outcomes through the grade levels. New teachers can often find a lack of background knowledge to be a significant barrier to implementing new curricula—these maps can help find paths to overcome these challenges. (Environmental Educators' Provincial Specialist Association and BC Hydro, 2008/2009, p. 11)

Lastly, for educators in informal settings and curriculum developers, these curriculum ELR maps:

are a valuable tool in further connecting community programs and learning resources with PLOs across K-12 curricula. Connecting your programs and resources to the Learning Cycle and elements of C.A.R.E. is an important aspect of this process. With a stronger sense of the ELE and emergent curriculum connections, community organizations can also enhance their outreach and marketing to teachers and community members. (Environmental Educators' Provincial Specialist Association and BC Hydro, 2008/2009, p. 11)

These curriculum ELE maps bring attention to the need for infusing EE into existing curricula. Raising the awareness of these curriculum ELE maps with teachers is an equally, if not more, important part of this process. Giving permission is one step and informing about available resources is another step entirely.

The infusion of EE into existing curriculum is not mandatory in BC. To support this document's rationale: "These maps help to show us where the connections already exist, and how we might further incorporate environmental themes into our teaching and learning" (Environmental Educators' Provincial Specialist Association and BC Hydro, 2008/2009, p. 7). The BC Ministry of Education's website, http://www.bced.gov.bc.ca/environment_ed/, offers sample video-taped lessons. These lessons demonstrate how some teachers address this rationale and infuse ELE into their teaching. What incentives or motivations do teachers have to take that next step? This dissertation supports this next step by offering three types of direct experiences with supporting qualities that inform grassroots pedagogical practices. Seven different but complementary pedagogical perspectives address the implementation of environmental concepts and initiatives. In addition, Carson, McClintock, Csikszentmihalyi and Nhat Hanh contribute to an understanding of how teachers and students might conduct themselves as human beings on this earth and might nurture a relationship or affinity with nature.

The student's existing evaluative domain, defined by Kellert (2002) as attitudes, values and a moral stance, affects their conduct. Moore (1986a) concludes that experience contributes to the formation of these values in childhood and yet little is known about the type experiences that affect environmentally responsible actions by adults:

Since major users of the local environment are children, and since values are acquired through experience, then the values underlying adult environmental behaviour must be partly rooted in childhood environmental experience. The quality of such experience merits a level of attention that is curiously absent from most child development literature. (p. 232)

Schools must provide experiences in nature that contribute to environmentally responsible behaviours. Orr (1992) had it almost right: “All education is environmental education” (p. 12). Bowers (personal communications, August 26, 2005), modifies Orr’s statement with: “All education is a form of environmental education” as exemplified by the analysis of at least four forms of environmental education in Chapter Three. Louv (2005) supports Moore’s position (1986a): “Surely children need a quality attachment to land not only for their own health, but in order to feel compelled to protect nature as adults—not only as common-sense conservationists, but as citizens and voters” (p. 155). What educational experiences are ecological and moral? What educational experiences reconnect students to nature and integrate them back into earth’s web again?

Orr (1994) writes about our current ecological crisis and outlines a root cause: “the failure to comprehend our citizenship in the biotic community. From the modern perspective we cannot see clearly how utterly dependent we are on the “services of nature” and on the wider community of life” (p. 32). Orr (1994) suggests:

We need decent communities, good work to do, loving relationships, stable families, the knowledge necessary to restore what we have damaged, and ways to transcend our inherent self-centeredness. Our needs, in short, are those of the spirit; yet, our imagination and creativity are overwhelmingly aimed at things that as often as not degrade spirit and nature. (p. 33)

One year later, Bowers (1995) states that ecological intelligence focuses on sustainability of the earth. In addition, Bowers (1995) suggests that schools need to address six principles of ecosystems: networks, cycles, solar energy, partnership, diversity, and dynamic balance (Capra, 2002). Even though Bowers criticizes critical reflection, he acknowledges that critical reflection may bridge the gap between destructive human behaviour and more sustainable practices.

Hallen (1995) writes that McClintock embraces the world:

...so that Nature—the ultimate ‘other’—will reveal her secrets. Hence, there is within science a very different tradition than that of domination, manipulation and control exemplified by one of the founding fathers of modern science, Francis Bacon. And it is this

alternative tradition of science, represented by Barbara McClintock's love of plants, that we need to understand and emulate, if we are going to have an ecologically sound and sustainable society. (p. 208)

Dominant, technological and intellectual approaches continue to degrade natural areas. In addition to improving our cognitive understanding about nature and our effects on nature, we need to develop an interdependent, affective relationship with nature.

Implications for Pedagogy

We need to re-examine our EE approach. Schools ought to provide as many types of direct experiences in nature as possible for their students. These students are more likely to become more intimate with nature, the strongest form of affinity with nature. In 1968, Baba Dioum, an environmentalist, gave a speech in New Delhi, India to the general assembly of the International Union for Conservation of Nature. This speech includes a famous, frequently cited quote: "In the end, we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught" is profound, offering some valuable lessons for teachers, in particular. Reading this quote backwards provides a goal for EE. Teachers who teach students *about* nature *in* nature and *through* nature provide propositional and practical understandings of nature and its processes, illustrated by the seven qualities in this thesis. Teachers ought to demonstrate an admiration of, a wonder of, or a reverence for nature with/in nature that their students can imitate. These students are more likely to have an affinity with nature—a loving relationship with/in nature. Lastly, human beings usually tend to support, to nurture, to protect, to heal and to restore what they love. We need to extend this care for other human beings to a care for nature as well. Those of us who believe that we are nature can display this attitude and can take these actions without probably too much further argument. Those of us who believe that we are separate from nature can hopefully accept this attitude and these actions with more ease and with more

agreement near the conclusion of my argument! Direct experiences in nature support teachers and their students becoming more aware of nature, gaining an appreciation of nature, entertaining an engagement with nature and nurturing a loving relationship with nature.

The pedagogical perspectives in Chapter Four, Five and Six address the impact of my normative stance on teaching and teachers in the context of each type of direct experience: initiation, immersion and intimacy. The remainder of this pedagogical perspective demonstrates some of the interrelationships between the qualities assigned to each type of direct experience: sensing and feeling as well as knowing, companionship, repeated experiences, flow, a sense of wonder, feeling for human and non-human organisms and, finally, inter-being. My philosophical inquiry analyzes three types of direct experiences: initiation, immersion and intimacy that contribute to this goal. What needs to change in terms of our pedagogy to meet this goal?

Students who experience nature directly develop a sense of affinity with nature that indirect experiences or vicarious experiences cannot provide. I propose that schools ought to provide initiation types of direct experiences that include qualities such as sensing and feeling as well knowing and companionship for their students. Repeated experiences, optimal experiences and a sense of wonder are part of the immersion type of direct experiences for students in nature, encouraging a deeper affinity with nature. Two qualities, a feeling for the organisms and inter-being, connect students more intimately with nature, contributing to the strongest affinity with nature.

There are profound differences between a second-hand experience about nature and a first-hand experience in nature. Schools tend to stress *know what* or content or propositional knowledge often at the neglect of *know how*, or experiential, practical knowledge and at the neglect of tacit knowledge. Teachers who use secondary sources of information such as print and electronic resources to teach “nature’s concepts” can remain in a classroom with their students. In contrast, teachers who use primary sources of information to teach “nature’s concepts” must be in nature with their students. Indirect and vicarious

experiences only provide limited perceptions of nature. These types of experiences lack any direct contact with nature as defined in Chapter Two. Someone else usually selects what students read, see or hear, limiting perceptions and interactions with nature. Museum, botanical garden or zoo staff members select what to exhibit and how visitors sense, receive and interact with the exhibit, limiting their indirect experiences with nature. Supported by McKibben (1989) and others, I agree that humans continuously alter even natural areas in their communities. Direct contact with non-humans in a pristine, natural area is no longer possible. However, teachers ought to provide their students with direct encounters with non-humans in these natural areas. Indirect and vicarious types of experiences do not inform human minds, support human bodies, touch human hearts and strengthen human spirit in the same way that direct experiences in nature can.

Thus, teachers and students ought to have face to face interactions with non-human beings and human beings in nature. These simultaneously experienced interactions in nature stress the importance of all organisms in nature, including humans. These interactions support caring relationships in community. A community is a unified collection of diverse populations that depend on each other for survival. These communities are part of a more complex ecosystem that includes all living and non-living parts that interconnect, supporting the flow of matters and energy. When we experience nature directly, we sense, we feel and we know this community in a profoundly different way. This primary experience in nature is direct contact with organisms that helps students understand and clarify their uniqueness in nature as well as that of other non-human beings. Students observe with every one of their senses and express a feeling for the organisms, seeing for them-selves that humans and non-humans are part of nature.

Teacher companions have to provide opportunities for their students to feel for the organisms so that they can understand the inner workings of their subject of study in nature. Teachers have the benefit of checking with each other and with their students about their experiences in nature. Teachers and students

may not feel it the same way, but they have a way to see if they know it the same way. I extend McClintock's views by arguing that when teachers and their students develop a feeling for organisms, they become more intimate with nature.

Teachers and students cannot develop this same feeling when reading about these organisms in books or viewing them indirectly on screens. Like all other human beings, they need to interact with other organisms directly and repeatedly because it goes beyond what secondary sources of information can share with them. By observing nature intimately, we develop a strong affinity with other organisms. In other words, we do not become the other, but we develop a feel for the other and we gain access to their inner lives and ways of making a living. This act helps us appreciate the other and recognize the importance of the other in our lives as well as the importance of our lives for the other. This affinity with nature is what matters the most to every living organism!

By keeping students inside buildings, by showing them videos and by giving them a lecture, teachers deprive students of becoming more intimate with nature. The notion of inter-being reminds students that they are part of the web of life. They are part of nature. They are nature. Students ought to emulate scientists and philosophers, such as Carson, Nhat Hanh and McClintock when they experience nature directly, alone or with others. A love or affinity with nature guides students how to live more sustainably on this earth. Teachers and their students have to implement more ecologically sustainable practices, becoming more ecologically just.

Vignette Four: Teachers and Students Directly Experiencing Nature

This last vignette illustrates how direct experiences in nature affect teachers and their students. The integration of direct experiences in an educational setting is often a challenging and complex endeavour for teachers. This last "dialogue" incorporates empirical data collected from exit interviews with teachers, explained in Chapter Two. The numbers in brackets refer to the

following qualities: (1) sensing and feeling as well as knowing nature; (2) being accompanied and being the companion; (3) repeated directed experiences; (4) flow; (5) sense of wonder; (6) feeling for the organism; and (7) inter-being. I assigned the aforementioned qualities to this text after the fact to highlight how these qualities may play out in an educational setting.

Teacher: It could be outside on the pathway or outside in the parking lot. Nature can be anywhere. It is being in a variety of different environments. You are in that place, seeing things connected (1, 6 and 7). I thought of going on a fieldtrip to a national park or a river and learning in that environment. Now, I believe I can just go outside. It can be anywhere. Being in nature is about exploring interactions between nature and participants (2 and 7).

Quirien: Do you have an example?

Teacher: You learn the topic or information in different environments in different ways. You interpret your understanding of the information you are gathering in the field.

Quirien: Do you have an example with your students?

Teacher: Observation and classification in the classroom would be different for them than outside. They start to notice a lot more things (1). You know what classification is in prescribed sense. When you go outside, for example, the school field becomes more animated. The creativity and curiosity comes out. The whole experience is real (5). They are taking on the role of observer themselves (1 and 3).

Quirien: Does it become an immediate experience?

Teacher: It becomes more meaningful for them and more personal rather than how would you describe these pictures in a book. It becomes more tangible for them. They are moving and catching things, using different learning styles as well as the information they are learning (4).

Quirien: Is it firsthand rather than second hand?

Teacher: Yes, it is. It is information through a conduit. They are more active in their experiences I think. They are drawing all these connections at a much higher level. The classroom is a fake environment.

Quirien: You mean, is it an artificial place for experiences?

Teacher: Yes, it is an artificial place for experiences.

Quirien: In the classroom, they disconnect from the outdoors. When they are outside, they experience nature directly (1 and 2).

Teacher: Rather they are experiencing it for themselves, immersing themselves in what it is. Experiencing it directly is a more powerful experience (4). It is being out in the field. It is hands-on. It is getting out there. There are no textbooks. It captures their interest more. I just think that getting kids' noses out of the books is important. Get them out there. Have them see it in different light.

Quirien: Are there different perspectives?

Teacher: For me it is to try and to get the children attuned to or aware of their natural environment (1). Where do they live? Where are we working? Where are we (7)? That is what it was for me putting a magnifying glass on the obvious.

Quirien: That is great metaphor. Can you give me an example of where this has happened?

Teacher: For example, it has happened at Como Lake. Coquitlam is not bad and has a lot of green space. We have an industrial model classroom. Especially in the city, they lose perspective of their natural environment. It is so much more developmentally closer to them. It helps facilitate more engagement (4) with the students. If the teacher is leading an activity in the classroom, it is so a routine. "Tell me what to do and I will do it. Give me the worksheet and I will do it." If we get out of the classroom, do something active and inspiring. They cannot help but get excited with others. It is fun (5).

Quirien: It is a natural process.

Teacher: Get myself out there. Get the little push I needed. I would have never taken them to Lion's Park. Now, I would. I am changed. My level of comfort changed (4). We often put a lot of work into making things concrete for kids. This is concrete. Going out in the outdoors is concrete. It is the most natural way (7). It is great. I like taking kids outside (4). We do not like sitting in the classroom that much. It drives me crazy sometimes. I maybe think it has to start from the beginning of the year.

Quirien: I break many rules. It is so different from any classroom. They have to get to know you. They have to know that I mean well. It takes a lot of time. Parents are supportive. They know me. They have heard and seen me. We need time for play.

Teacher: I think you have a more personal experience. You learn more when things are meaningful to you (2). Experiencing some thing first hand increases the chance of a more personal connection. They are otherwise disconnected and they regurgitate what you teach them. They may not understand that whole feeling of what they are doing. They create that connection more meaningfully. Students must engage more with their experiences. The kids decide how they relate to what they see in the outdoor environment (7). In the classroom, it is about what I do and what I say. In the outdoors, it is about what they want to do and how they want to learn. I give them that kind of freedom. They have a sense of influence.

Quirien: You lead by example. It takes time. Now people are paying attention to what is going on.

Teacher: We separate ourselves from the natural world and the closest the most people get to is a street. We do not see and do not get into nature and so we forget we are part of it (7). We are part of nature. So we have no understanding of pollution, carbon problems and that there is a balance we have to maintain. Kids are addicted to TV and computers rather than exploring nature. I just feel discouraged. It has been so piecemeal for me and half-hearted. I did not have a sense where I was going with it. I actually planned to pursue it quite actively after spring break. Then the weather was so bad so I gave up on it.

Quirien: Do you think it could be different next year?

Teacher: This might be a place for me to start. I can use nature for those outcomes. I used to rely heavily on my resources as a generalist.

Quirien: What kind of resources do you mean?

Teacher: I mean books. Teach it to the books and then adapt it from there. It is a survival mechanism as an elementary teacher. I have not found nature resources

that I can use in that way. I got the rediscovery book and a bunch of things. None of them quite fit sometimes.

Quirien: Then I have given you bits that never go from beginning to end. I do not think it is out there to be honest. I cannot use one book. It is about picking and choosing. Some of them you have to modify carefully.

Teacher: It is a more natural environment for kids. It makes absolute common sense, because they are born to be outside (7). I am an urban person. However, having said that, I had a fabulous childhood. I had a great childhood. I had to go to the beach and play outside. I could play. If they told me what to do, I told them no.

Quirien: At what point in your childhood did it change?

Teacher: Students used to get an opportunity to focus on real life. They do not just write notes about it. They get a chance to apply it. They experience their education and they see the wonder and awe in that (5).

Quirien: What has been most useful for you?

Teacher: I like going out to the places, trying out the activity. I like doing the activities that I would do later with the kids (6). I have a horrible memory. When I do things, I remember them more. Auditory processing is not working for me. Out there and doing the activities and figuring them out together. I like having resource people, including you, planning the activities. Furthermore, it is important having other teachers trying to figure them out. What is the idea? How does it relate to our practice? It seemed like a big commitment. It was on Sundays. Not enough time to get your planning done or marking done. Every time we had a trip, it was time to relax. Getting ideas felt relaxing and it was a comfortable environment for learning. Felt like fun (4). I learned so much more than reading a book about strategies. I love the different communities. Finding out what was available. I really felt like I was able to know an area (6) and got some ideas. Where can I take my kids? I enjoyed our conversations, such as we are having right now.

Quirien: How have these experiences helped you?

Teacher: I think the only way to learn about nature education is to do nature education (6). This is actually quite humorous. I mean for me. I liked that the project was for two years, going new places and learning new things. You just develop a natural understanding of nature education. It is not prescribed or formulaic. It was about trying things and doing it. I think for me that was huge in my learning. I was developing my relationship with several different environments around me (6). In the beginning, I wanted to know, when I get to a place, what do I do? I feel when I get there I do not know what to do. I let the students run around, not having them organized. Doing and being there in these different places helped me deal with some of the unknowns. Sometimes you have the kids shape what it becomes. Some hate instructions. I can see where they take it and they like to visit the same place again and see it in a different way (3).

Teacher: That is what I mean exactly. When I started, I had no direction and I sort of wander. I am all over the place. First, I write the detailed lesson plan; however, I never look at it during the day. Now, I write one word on a piece of paper. It comes with experience. You know I am so worried about my lack of knowledge. What can I teach them about and what can they teach me? You just worry about accountability.

Quirien: Even when you have a plan, they may not learn that.

Teacher: I can have great lesson plans; however, these plans are useless when students are not engaged in them. I need to give up that kind of control. I need the confidence to do it myself (4). I need to be doing different things. You just encouraged me to get me out there. I need to retry to find things that are fun for the kids (4).

Quirien: You have an idea. Mull it over in your head. Find the right moment to do it.

Teacher: The range of subjects that are included in nature education helps me make some connections with what I teach and what I can do with the outdoors. Just the idea of using art and poetry to learn about nature in nature is inspiring. It is taking up a bigger part of my brain than before.

Quirien: How has going into nature helped?

Teacher: Everything is so interlinked (7). They become more sensitive around and calmer. They would now look at nature (1). Now, they look at the little leaves, the little things they did not look at in the beginning. We were collecting stuff, picking up five or four things to bring back to the classroom. Now, they do it on their own (5).

Quirien: Do you do sharing circles? Do they bring natural objects into the classroom?

Teacher: They bring natural objects, such as plants, living things and rocks. Rocks are everything.

Quirien: What is it about rocks?

Teacher: They just love rocks. Something shiny with different colours appeals to them a lot. They like polished rocks. I like rocks myself. That is a natural thing for them. I let them do their own thing whatever it may be. In that respect, my lesson makes it broad enough. I think it is neat to show them a larch, but they could care less. I can spend time in front of the school where the trees are. I do it now.

Again, it is confidence (4), taking more risks.

Quirien: Is that rubbing off?

Teacher: I can choose more places close by. Maybe I am just feeling stronger. I just do not care what others think. This is who I am. Take it or leave it. That is part of who I am.

Quirien: There is nothing wrong with that all.

Teacher: I like being stronger in who I am. I am okay with being different. Life is too short. We must continue to be kind to others. We talked about flow learning [Joseph Cornell's framework]. You took us through that at least once and it has contributed to my understanding. I want to explore more and apply it. It makes a lot of sense. We do enthusiasm first and then go deeper. It reminds me when I was taking classroom management course. You need a hook (4). It is more interesting than saying, "Open your book to page 65."

Quirien: So, do you not jump right into it?

Teacher: The flow learning idea connects to what I already know. It is great. I need more of that. Furthermore, you guided us through the activity as if we were

the participants (6). I could see how it may turn out, could imagine what it may be with our kids and have fun with it (4). We experienced in the field what it is like from a student perspective (6). I put myself in the student's place (6).

Understanding my experience helped me to teach it later. What did I respond well to and what did I like? How will that affect my students? Then, I planned my lessons accordingly. I liked having the fun activities that you led for us, asking us questions and answering our questions. Learning in nature is how we experience it. We were actually in there doing what the kids were doing rather than talking about it all the time (6). I understand we would not start out that way. The comfort level amongst the participants improved as well (4). I think that experiential stuff, dealing with flow learning, hearing the stories and finding little creatures. It was less academic. That was great.

Quirien: Have you become familiar with nature or more intimate with nature?

Teacher: Nature imprints on you (6).

Quirien: It is part of who you are. I love that.

Teacher: The way you planned and organized things was very impressive. You are passionate about nature. When you are passionate about it, you want it to be better (6). Experience the most you can in the time we have. This is more exciting. I remember the resources people who were there. I like the person who was there to tell it. You can sort of feel that you lose that connection if someone tells the story (5). I do not know. It is not that personal.

Quirien: It is their voice.

Teacher: I enjoyed the elderly gentle man (2) who had grown up there. He had a real connection to his story. How he felt? It reminded me about how I felt about the area I grew up in (1). The beach where I grew up had not that kind of development near his river (6).

Quirien: He was growing up in it (7). He walked across the backs of the salmon. He still does not live far from the river.

Teacher: I enjoyed meeting him. I wish I had found a way in earlier, to make it a more significant part of my teaching time. All the strategies that draw students into direct experiences mean a lot to me.

Quirien: It is all right at your doorstep.

Teacher: Yes, it is at my doorstep. You can never have too many of those opportunities. I like to do these activities several times with my students (3).

Quirien: The kids know the instructions and they catch on. Then, I do not worry about them getting it and I can focus on actual experiences.

Teacher: It is both teaching and learning.

Quirien: It is interconnected.

Teacher: Simplicity is the hardest.

Quirien: It takes time. You need to take it inside out. It is still the same thing but not quite the same. We need to go outside more (3).

Teacher: It is challenging. It certainly made me think and open my mind to the possibility and now I need to do something about it (4). I have absolutely enjoyed (4) going on our monthly trips and trying out different ideas. As I said earlier, I learn best by doing and having the opportunity to actually visit these different spaces and try out different ideas and activities is so much fun (4). I find it relaxing and I always enjoy our trips together. It is nice to get outside and spend some time with other educators (1). While we are discussing practice, it does not feel like work as it is more relaxing and we are in an open environment. This is an entirely different feeling than attending a workshop for a day (4). Being outdoors really helps me relax and feel more at ease (1). I can enjoy nature (4 and 5). Our students will definitely enjoy this opportunity, too.

Quirien: Thank you.

I end this journey by outlining limitations, proposing directions for future research and making a few concluding comments.

Limitations

This dissertational journey took a few detours and a few wrong turns. Finding a balance between related literature and personal narratives that support the dissertation's argument was challenging. In the end, I shifted away from analyzing my field research about my experiences in nature to inquiring more philosophically into direct experiences in nature. I included only a few vignettes to

support my proposition for direct experiences in nature. Pedagogical perspectives add further depth to my philosophical inquiry and educational position.

Another personal limitation was sitting behind a computer screen and keyboard to get this proposition in print, removing me from experiencing nature directly. The third and final limitation during these past six years was to narrow the topic so that I was able to formulate a concise proposition.

I overcame these limitations in a number of ways. I agree with Keller (1983):

In practice, scientists combine the rules of scientific methodology with a generous admixture of intuition, aesthetics, and philosophical commitment. The importance of what are sometimes called extrarational or extralogical components of thought in the *discovery* of a new principle or law is generally acknowledged. (p. 145)

This extra-rational component struck a chord with me throughout this dissertation. Like Carson, McClintock emphasizes the importance of vision or sight in understanding the world. We have to see it with our own eyes! Keller (1983) writes:

For all of us, our concepts of the world build on what we see, as what we see builds on what we think. Where we know more, we see more. But for McClintock, this reciprocity between cognitive and visual seems always to have been more intimate than it is for most. As if without distinguishing between the two, she knew by seeing, and saw by knowing. (p. 148)

McClintock's careful observations of corn helped her understand controlling elements, because "For her, the eyes of the body *were* the eyes of the mind" (In Keller, 1983, p. 148). I saw a lot when working with teachers; however, I supplemented this sight with hearing the teachers' words and reading their written responses. Secondly, I benefited from many conversations with committee members and friends. Keller writes: "Inevitably, "seeing" entails a form of subjectivity, an act of imagination, a way of looking that is necessarily in part determined by some private perspective" (1983, p. 150). What I see, is not

always what someone else may see. McClintock used experimental procedures to check what she saw with the corn (Comfort, 2001).

Keller (1983) notes: “The very task of consensual validation, of “appealing to the evidence,” requires a degree of intersubjectivity, of shared vision as well as shared language, on which she found she could not count” (p. 151). In contrast, I was able to count on shared language and had many opportunities for discourse with other people throughout my dissertation. However, the following question from Keller is more challenging to answer: “What is it in an individual scientist’s relation to nature that facilitates the kind of seeing that eventually leads to productive discourse?” (1983, p. 197). Keller (1983) summarizes McClintock’s comments to her question as follows:

Her answer is simple. Over and over again, she tells us one must have the time to look, the patience to “hear what the material has to say to you,” the openness to “let it come to you.” Above all, one must have “a feeling for the organism.” One must understand “how it grows, understand its parts, understand when something is going wrong with it. [An organism] isn’t just a piece of plastic, it’s something that is constantly being affected by the environment, constantly showing attributes or disabilities in its growth. You have to be aware of all of that....You need to know those plants well enough so that if anything changes,....you [can] look at the plant and right away you know what this damage you see is from— something that scraped across it or something that bit it or something that the wind did.” You need to have a feeling for every individual plant. (p. 198)

I exercised an enormous amount of patience in developing and supporting this proposition. I developed a feeling for my subject in this dissertation, while snowshoeing on Grouse Mountain, swimming in the Pacific Ocean, cycling the Galloping Goose Trail and kayaking in Burrard Inlet. Suggestions from many others, in person and in the literature, contributed to the understanding proposed in this argument.

Implications for Future Research

Many years of ever-spiralling research led to three types of direct experiences supported with several qualities that inform the nature of education in our schools. My proposition is just another, small step in changing how we think about our current environmental/educational practices in schools and in nature.

This examination of direct experiences in nature adds to our collective storied understanding of the importance of natural areas and the importance of our affinity with nature. Without any one of these three types of direct experiences in nature, we deprive ourselves of some distinctive human qualities that nature can instil in us far better than a book, even this book! I continue this important work as a practising teacher in a public school, as a Mulder ten Kate family member and as a resident in Coquitlam. Future research may identify other types or levels of direct experiences in nature. Other researchers will add to the seven qualities that I derived from my own experiences in nature and the literature. More theoretical and empirical research should focus on interactions between an affinity with nature and human development.

Concluding Comments

This proposition for direct experiences in nature consists of three types of direct experiences, called *initiation*, *immersion* and *intimacy*, supporting various levels of affinities with nature. With each re-turning to nature, our affinity with nature strengthens, deepens and touches our mind, body, heart and spirit more intimately. Once again, T. S. Elliott comes to mind for this degree as well as my master degree: “We shall not cease from exploration and the end of all our exploring will be to arrive where we started and know the place for the first time.” Direct experiences in nature develop a stronger affinity that is not circular but spiral in nature. We strengthen our affinity with nature—a deepening level of awareness and connection with nature—with each new direct experience in

nature. This supports the main goal of EE to develop a commitment to act responsibly and to live more lightly on this earth.

This proposition informs teachers who are responsible for the education of others. Students ought to experience nature directly, not just experience nature indirectly by interacting with non-humans removed from their natural environment or symbolically or vicariously by reading books or by watching TV documentaries. Teachers and students need to close some books and open some doors to experiencing nature directly!



(Photographed by Q. Mulder ten Kate)

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