ENVIRONMENTAL LEARNING IN BRITISH COLUMBIA: A GROUNDED THEORY EXPLORATION OF TEACHERS' PRACTICES

By

Constance Lee Cirkony

B.Sc., University of British Columbia, 1993
B.Ed., University of British Columbia, 1995

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We accept this thesis as conforming to the required standard

--------------------------------
Dr. David Zandvliet, Thesis Supervisor
Simon Fraser University

--------------------------------
Dr. Richard Kool, EEC Program Head
School of Environment and Sustainability

--------------------------------
Michael-Anne Noble, Director
School of Environment and Sustainability

ROYAL ROADS UNIVERSITY

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Abstract

This study explored how British Columbia K-12 teachers incorporate environmental education (EE) into their teaching practice. Using a mixed method design with surveys and interviews, I applied grounded theory method to understand teachers’ experiences. Teachers applied infusion, integration, and interdisciplinary approaches in most grades and many subject areas. Teachers’ rationale and philosophy supported their practices, implying strong teacher and student engagement. The more a teacher modified the school curricula and infrastructure, and collaborated with the education community, the more the EE course or program was likely to become embedded within the school culture. The experiences of these environmental educators can serve as a model for education transformation by identifying challenges and support systems, and demonstrating the importance of how teaching rationale and philosophy sustain innovative practices. The findings are of interest to BC teachers, administrators, school districts, the Ministry of Education, and organizations that support teachers.
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Chapter 1: Introduction

With the growing awareness of, and concern for human impacts on the environment, environmental education has taken an increasingly important, though contested role in education over the last 40 years. World organizations such as the United Nations (UN) have taken leadership in identifying significant global issues and making recommendations to address human impacts, with specific references to the role of education (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2012). National and provincial governmental and non-governmental organizations have also responded to these recommendations by enacting legislation and policy changes, recommending specific practices, and developing resources for use in the education community, where awareness and change can be realized through education.

Still, the degree and method by which education is addressing human impacts on the environment is at best, variable (Palmer, 1998). This thesis examines how environmental education (EE) takes place in British Columbia (BC) and is presented in six chapters beginning with an introduction, followed by a literature review, methodology, results, discussion, and implications and recommendations. I begin by describing the context and purpose of this research, then I outline the research questions, discuss the significance of the research as well as my perspective, and clarify key terminology.

Background

The environment plays a critical role in our lives. As part of the environment, natural systems consist of living and non-living parts, which are interdependent and integral to sustaining life (Capra, 1996; Millennium Ecosystem Assessment, 2005). These natural systems provide what are described as ecosystem services, processes and products of functioning ecosystems, such as water, food, timber, nutrient cycling, soil formation, genetic diversity,
climate stability, as well as aesthetic functions (Millennium Ecosystem Assessment, 2005). Humans rely on these services, but in the last few decades, have drawn on them such that the ability for natural systems to function and regenerate themselves to sustain life, including our own, is threatened (Erlich & Erlich, 2009; Millennium Ecosystem Assessment, 2005). The combined pressures exerted by increasing human population and consumption now threaten the basic necessities of life such as clean air and water, food, and energy (Erlich & Erlich, 2009; Millennium Ecosystem Assessment, 2005). As a consequence, there are issues of pollution, deforestation, overfishing, and climate change, which exist at a both local and global scale (Millennium Ecosystem Assessment, 2005). Human societies and economies are inherently dependent on the viability of natural systems, so when these systems become threatened, our local and global health, economies, and governing systems may also be affected.

Behaviors of past societies also give us important clues to the causes and consequences of living beyond the Earth’s capacity to regenerate resources. The collapse of the societies of the Mayans, Anasazi, Greenland Norse, and Easter Island are but a few examples of the consequences of increasing population and environmental pressures (Diamond, 2005). “Today, just as in the past, countries that are environmentally stressed, overpopulated or both, become at risk of becoming politically stressed, and of their governments collapsing (Diamond, 2005, p. 516). Modern societies operate under the same constraints, but have developed technologies that have far reaching implications compared to those in earlier societies. Current actions in one area can result in severe consequences in distant areas, well into future generations (Jonas, 1984). Regardless of where we live, we are inherently connected to and dependent upon the natural systems that provide ecosystem services (Capra, 1996; Diamond, 2005). No area is safe from water pollution or climate change (Millennium Ecosystem Assessment, 2005). However, the
brunt of environmental impacts is often borne by those who live on the margins of society in developing or developed countries, many of whom are challenged with basic subsistence and literacy (Bradford, 1985; Bullard, 1984).

For those of us who live in developed countries such as Canada and The United States, we not only have regular access to the necessities of life, but take well more than our share: given that there is only 1.5 hectares of productive land on earth available for each person (including wilderness areas), we require four to five hectares to support our current standard of living (Wackernagel & Rees, 1996). We also have guaranteed access to education, and thus should exhibit greater awareness and responsibility in these challenges, including taking action (Jonas, 1984). Current and future generations rely on the healthy functioning of these systems, thus leadership form both a local and global level is key in addressing the challenges we face: “No other issue of politics, economics, and public policy will remain unaffected by the crisis of resources, population, climate change, species extinction, acid rain, deforestation, ozone depletion, and soil loss” (Orr, 1992, p. 83).

Increasing global awareness of the globally destructive actions of modern industrial society has, over the past decades, prompted action at the highest levels of government, including the UN. Almost four decades ago, the UN defined a role for EE in formal education systems, (UNESCO, 1978). Since the first Intergovernmental Conference on EE in 1977 to the current Decade of Sustainable Development, EE has been introduced and implemented in educational systems all over the world, encouraging an integrated and interdisciplinary approach in all grades and subject areas (UNESCO 1978, UNESCO, 2012).

In Canada, this approach has been recommended by a number of organizations, including the Canadian Council of Ministers of Education (CMEC), a governing body for all provincial
Ministries of Education, including that of the Province of BC (BC Ministry of Education, 2007; Council of Ministers of Education, Canada [CMEC], 2010). The BC Ministry of Education has included required environment-related outcomes throughout the curricula as well an optional framework suggesting how these outcomes can be integrated in all grades across the subject areas (BC Ministry of Education, 2007).

**Statement of Research Problem**

Though international assessments suggest BC students seem to exhibit a strong awareness of environmental processes and concern about the issues (Programme for International Student Assessment [PISA], 2009), it is not generally known how BC teachers approach EE or if it takes place in all grades and subject areas. My study investigates how a group of BC kindergarten to s 12 environmental educators incorporates EE into their practice.

**Research questions.**

The central research question in this study is: **How do BC K-12 teachers incorporate environmental education into their practice?** There are three sub-questions that relate to this central question:

a. What facilitates incorporation of EE into the curriculum?

b. What barriers hinder incorporation of EE into the curriculum?

c. How do the *Environmental Learning and Experience* (ELE) resources assist teachers?

**Significance**

Despite the worldwide call for EE, research suggests that implementation is not taking place to a large extent (Canadian Council of Learning [CCL], 2009; Palmer, 1998; Simmons, 1989; Yueh & Barker, 2011). The barriers are well documented: lack of time, overcrowded
curriculum, teachers’ lack of content-specific knowledge, teachers’ inability to apply interdisciplinary approaches, pressures from examinations, lack of support from colleagues, administration, and parents (CCL, 2009; Eames, Cowie & Bolstad, 2008; Hart & Nolan, 1999; Puk & Behm, 2003; Puk & Makin, 2006; Yueh, 2007). Despite these barriers, international assessments suggest Canadian students exhibit a strong awareness and understanding of environmental processes as well as concern about the issues, suggesting that some degree of EE is taking place in formal educational systems (PISA, 2009).

For the first time, PISA measured students’ proficiency in environmental sciences, their attitudes toward the environment, and where they learned about the environment by compiling specific questions from the 2006 science assessment. The rationale for this report (PISA, 2009) reflected the increasing urgency in having an environmentally competent generation of young people to understand the science of the environment, have the interest and willingness to address the problems, and be aware of how they influence and adopt environmentally responsible behaviour. This finding is significant as more than 400,000 15-year old students in 57 industrialized countries participated in this assessment.

The results demonstrated that most Canadian students have acquired higher than average proficiency in environmental science and in geosciences, suggesting sound foundational knowledge of environmental processes (PISA, 2009). In addition, most Canadian students expressed a strong interest in environmental issues, felt responsible for the environment and wanted their countries to do so as well. Canadian students reported a high degree of familiarity of significant environmental issues and felt most concerned about air pollution, clearing of forests, and extinctions (PISA, 2009). However, Canadian students were not optimistic about their future.
A strong student-driven proficiency and interest implies EE is taking place in Canadian schools. However, the lack of optimism indicate that the approaches may be focusing too much on knowledge, issues, and problem identification, and not enough on the values, active participation in solutions, or the visioning of a future sustainable society (McKeown & Hopkins, 2005; Moser, 2007; Wolf & Moser, 2011). If the PISA results reflect the outcomes of general teaching practices across Canada, in-depth studies of teachers’ practices may provide additional insight into how EE takes actually takes place.

My research focuses on the practices of BC K-12 teachers who have self-identified as environmental educators. They have shared with me their practices, as well as the supports and the challenges they experienced. Because they have found ways to implement a non-core subject into our current education system, they offer tremendous insight into EE implementation. In addition, teachers’ experience with supports and barriers have implications for the design of learning environments, as well as organizations that produce learning resources and are interested in the broader implications of curriculum implementation. The findings will be of interest to BC teachers, administrators, school districts, the BC Ministry of Education, and organizations that support teachers.

Methodology

Informed by a pragmatist rationale, I used a mixed method approach to better understand the complexity of factors that influence teaching practices, and represent my findings in a manner that is meaningful to the education community (Creswell & Plano Clark, 2011; Onwuegbuzie, Johnson & Collins, 2009; Tashakkori & Teddlie, 2003). Through EE-related associations, I invited K-12 teachers to participate in an online survey. From this sample of respondents, I interviewed 12 survey respondents to find out how they incorporated EE into their
practices, the supports and challenges they faced, and how they used the ELE resources. Using grounded theory, I identified the emergent themes as they related to the central and sub-questions to develop an understanding of and a plausible explanation of their practices (Charmaz, 2006; Morton, 2009).

**Researcher’s Perspective**

Both personal and professional interests in the environment have led me to explore this research question. My career has focused on science, education, sustainability, and combinations thereof. Since childhood, I have spent a great deal of time in natural settings, which influenced my decision to study biology. During and after university, I assisted scientists and graduate students with their environmental-focused research projects, from researching the effects of heavy metal contamination of freshwater lakes on fish to measuring the efficacy of biological control of insect pests on berry crops. I returned to school to pursue my education degree, and then spent the next seven years teaching in the formal classroom environment. Following this, I continued in the non-formal education sector, supporting educators in the area of science and sustainability.

All of these experiences have caused me to think deeply about how we live in the world, the role of school, and kind of support teachers need to inform and inspire their practice. My current role as science and environmental learning curriculum coordinator with the BC Ministry of Education affords me a new perspective on the education system. I conducted this research at a time when jurisdictions across the world, including BC, were re-visioning their education systems. Environmental educators may well serve as important role models: using integrated and interdisciplinary approaches, connecting curriculum to the real world, and enabling
participation in hands-on action-based projects, with a vision of teaching students how to live in the world in a manner that allows life to flourish for generations to come.

Clarification of Key Terms

**Environmental Education:** Broadly speaking, EE describes the development of knowledge and the skills needed to understand how ecological systems function, how humans interact with and affect these systems, and what actions humans need to take to change behaviours that would adversely affect the quality of these systems to sustain life for all into the future (Stapp, 1969; McClaren, personal communication, November 6, 2011). In addition, experiencing natural outdoor environments is a significant component of EE (Sobel, 2004). Other terms such as *Education for Sustainable Development* and *Environmental Learning* describe similar features of EE, and for the sake of my research, are considered synonymously (CMEC, 1999; Environment Canada, 2002; McKeown & Hopkins, 2005).

**Infusion:** Infusion describes the process of weaving EE content or approaches through the regular curriculum where appropriate, without altering the learning outcomes or the structure of the course (McClaren, personal communication, November 6, 2011). Infusion can be limiting because it may not be appropriate to all curricular areas. Furthermore, infusion may not lend to the logical sequencing of EE content and approaches because of its intermittent nature (Lane, 2006).

**Integration:** Integration describes the process of using an EE theme or topic (i.e., based on real-world issues, concepts, or problems) as the center from which curriculum, projects, and courses stem; it transcends subject boundaries (Beane, 1995; McClaren, personal communication, November 6, 2011). Integration requires the intentional re-arrangement of learning outcomes in a subject, or from different subjects, or the re-design of the course itself.
(Lane, 2006). Whereas infusion is the addition of EE content or approaches to an already established curriculum, integration is the re-design of the curriculum or a course around EE-related themes or topics.

**Interdisciplinary:** An interdisciplinary approach is one that relates a given theme or topic to one or more other disciplines (Jacobs, 1989). For example, EE content and approaches can relate to other subjects such as science, social studies, math, etc., resulting in a more holistic and relevant understanding of the curriculum (Jacobs, 1989). Interdisciplinary approaches may also compare how different disciplines might address a common concept or topic without seeking a common outcome, which is the case with integration (McClaren, personal communication, November 6, 2011).

**Summary of Chapter 1**

The significance of EE resides in the increasing impact humans are having on the environment. Education systems and across the globe, including BC have incorporated EE to varying degrees. My research focused on how BC teachers incorporate EE into their practices, along with the supports and challenges they experienced. The next chapter presents a review of the literature to provide further context for this research.
Chapter 2: Literature Review

In this chapter, I provide a context for EE by outlining a historical overview, describing how implementation takes place, and relating the key benefits of EE. Because my research used grounded theory method, I conducted most of my literature review after analysis of my results to minimize bias and to complement the themes that have emerged from the data (Charmaz, 2006; Morton, 2009). I located relevant books, dissertations, journal articles, reports, and theses via online searches using the following databases: Academic Search Premier (EBSCOHost), Environment Complete (EBSCOHost), ERIC (EBSCOHost), Google Scholar, as well as ProQuest. All searches included the following keywords in the subject terms to ensure the topic related to EE and the K-12 audience: environmental education, environmental learning, education for sustainable development, and focused on the formal kindergarten to grade 12 classroom learning environment. Depending on the themes, I used other keywords in the search windows subject terms and abstracts such as: curriculum, implementation, integration, infusion, interdisciplinary, and pedagogy. I limited my search to include scholarly works from 1997-2012, with the exception of seminal works that were identified by previous readings, and filtered them by reading the titles and abstracts. In addition, I conducted four interviews from educators who were integral to the development of EE internationally and in Canada, and through them, accessed additional materials regarding the history of EE.

I begin with an account of key international events and frameworks that influence the current rationale and goals of EE, and then describe the context in BC. I also present how EE implementation is taking place, referencing both Canadian and international contexts, and end with a discussion on the benefits of EE.
Historical Overview of Environmental Education

This overview introduces a brief history of EE including its original definition and objectives. I compare EE with education for sustainable development and describe recommended strategies for implementation in education systems across the world including BC.

Emergence of environmental education.

Awareness of environmental issues was increasing at the same time many social movements were taking place in North America in the late 1960s (M. McClaren, personal communication, January 27, 2012). Schoenfeld first published the term environmental education in 1968 (Hammond, 1998). One year later, Stapp described its purpose: “Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solutions” (Stapp, 1969, p. 34). Stapp was instrumental in the development of an international framework that contained the role, objectives, and characteristics of EE, which was presented in 1977 at the first Intergovernmental Conference on EE as The Tbilisi Declaration (UNESCO, 1978). The document stated: “The ultimate aim of environmental education is to enable people to understand the complexities of the environment and the need for nations to adapt their activities and pursue their development in ways which are harmonious with the environment” (UNESCO 1978, p. 12).

The Tbilisi Declaration is considered “the seminal influence on the development of environmental education policies around the globe” (Palmer, 1998, p. 8; UNESCO, 1978). From the outset, the definition of EE encompassed content, rationale, and approach. The guiding principles outlined in the Declaration proposed EE engage all ages, be a lifelong process, be interdisciplinary, and focus on current and future local and global issues. The Declaration
assigned a specific role for EE in both public and private, formal and informal education systems. It guided the development of EE programs worldwide for the next 20 years, a testament to Stapps’ enduring influence. By the early 1980’s, EE had an established definition and structure which built on the objectives of Tbilisi resulting in the following four goals: “1) ecological foundations, 2) a conceptual awareness of issues and values, 3) an investigation and evaluation of issues, and 4) the training in and application of citizenship action skills” (Hungerford, Peyton & Wilke, 1983, p. 2).

**Emergence of EE in BC.**

While EE was emerging on the international front, BC already had an established community under the auspices of outdoor education and recreation (M. McClaren, personal communication, January 27, 2012). In 1971, a group of BC educators requested the British Columbia Teacher’s Federation (BCTF) to set up a Task Force on EE (H. Walker, personal communication, January 17, 2012; M. McClaren, personal communication, January 27, 2012). The Task Force consisted of teachers, principals, university representatives, and superintendents, and it purpose was to define, promote, and advocate for EE and its objectives in BC, as well as distribute resources to BC teachers (BCTF, 1971; BCTF, 1972). The Task Force suggested EE programs be interdisciplinary, be developmental throughout K-12, and involve the whole community; these guidelines acted as a catalyst for a new approach to curriculum (BCTF, 1971; BCTF, 1972; H. Walker, personal communication, January 17, 2012). These guidelines were reiterated in various international documents, and continue to influence the culture of EE in BC today, including the direction encouraged by the BC Ministry of Education.

Although BC had an established culture of outdoor educators, along with environmental-related outcomes in the curriculum, some teachers felt EE needed a stronger presence in the
formal education system. In 1991, The BC Environmental Educators Provincial Specialists Association (EEPSA) prepared a special report reviewing EE content in the current BC curricula and made recommendations, including the need for “a province wide curriculum assessment guide…[to] provide that framework to allow teachers to develop exciting programs that integrate goals of several subject areas” (BCTF, 1991, p. 44). Environmental Concepts in the Classroom would become BC’s first EE framework, which is discussed later in this chapter. The emergence of EE and the suggested interdisciplinary approach had strong concurrent and complementary foundations both internationally and within the Province of BC.

**Emergence of education for sustainable development.**

Growing worldwide tensions between those who were pro-development and those who were concerned about the ensuing environmental consequences resulted in the Brundtland Commission: a four-year series of public meetings organized by the World Commission on Environment and Development (WCED) to investigate a “global agenda for change” (WCED, 1987, p. ix). The Brundtland Report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 43). The Report described the role of EE:

> Environmental education should be included in and should run throughout the other disciplines of the formal education curriculum at all levels- to foster a sense of responsibility for the state of the environment and to teach students how to monitor, protect, and improve it. (WCED, 1987, p. 113)

The new global focus on sustainable development resulted in the emergence of education for sustainable development (ESD), broadly defined as “education that allows learners to acquire the skills, capacities, values and knowledge required to ensure sustainable development”
(UNESCO, 2006, p. 1). Since 1987, most of the documents produced from international organizations began referring to ESD instead of EE, and some use them interchangeably. However, it is worth noting that there exists a tension in the literature regarding these two terms.

Some believe the goals in EE and ESD are similar in that they both subscribe to a vision for a more sustainable future: drawing on a collaborative effort to find a balance with society, the economy, and the environment while promoting action-based solutions (McKeown & Hopkins, 2005). However, others have concern about assumptions implicit in the term, sustainable development, and its implications for the role of education. Sustainable development implies economic growth and development are inevitable, instead of a choice (Jickling 1994, 2001; Sauvé, Berryman, & Brunelle, 2007). It presents the economy, society, and the environment as equal entities, implying that the economy exists outside the constraints of the environment, and is on equal footing with the environment and society (Jickling, 1994, 2001; Sauvé et al., 2007). Finally, it implies that the environment serves as a pool of resources, and society, a pool of producers and consumers (Sauvé et al., 2007). The role of education for sustainable development would thus support the strategy of continued growth and development, which reflects the status quo (Sauvé et al., 2007).

In contrast, the term environmental education encompasses a broader understanding of the environment (Sauvé et al., 2007). EE implies a relationship between humans and the environment beyond resource management. EE includes the understanding, stewardship, and ethic required to protect systems that are necessary to support all life forms for their intrinsic value (Jonas, 1984; Sauvé et al., 2007). EE challenges the assumptions of a growth economy, and presents an alternate model of sustainable development where the economy and society exist within the constraints (i.e., carrying capacity) of the environment (Daly, 2009).
Though international organizations can provide an important leverage point in awareness of global issues (Sauvé, Brunelle, & Berryman, 2005), there is a risk that their inherent political and economical agendas can impose their ideals through educational strategies (Jickling, 2001). Educating for sustainable development subscribes to the model of development and economic growth thereby excluding other economic models or ways of living in the world. Thus, ESD is contrary to what some consider the goals of education: to allow learners to question underlying cultural assumptions, to transform environmental and social realities, to judge for themselves how they should live in this world, and to develop responsible societies (Jickling 1994, 2001; Sauvé et al., 2005; Sauvé et al., 2007).

**Implementation of EE and ESD.**

The UN Conference on Environment and Development in 1992, known as the Earth Summit in Rio, was the second time world leaders came together to discuss environment and development (British Columbia Round Table on the Environment and the Economy [BCRTEE], 1993). National leaders signed the *Agenda for the 21st Century* (i.e., *Agenda 21*), which was the action plan for sustainable development (BCRTEE, 1993, p. 24; UNESCO, 1992). “Its successful implementation is first and foremost the responsibility of Governments” (UNESCO, 1992, Preamble, para. 3). Within Agenda 21, Chapter 36 focused on education and the reorientation of “education towards sustainable development (UNESCO, 1992, Chapter 36, Introduction, para. 2). Members of the team that drafted Chapter 36 of Agenda 21 unanimously agreed EE alone would not be enough to support the goals of sustainable development and building a sustainable future, hence the introduction of the ESD approach (Chuck Hopkins, personal communication, January 13, 2012).
Chapter 36 emphasized the integration of EE in all disciplines, suggested that all curricula be designed to accommodate a multidisciplinary approach, and that all countries should set up national bodies or round tables to promote and support EE (CMEC, 1999; UNESCO, 1992). The unanimous support of such a diverse membership of countries in the United Nations had significant impact on the renewed worldwide focus on the environment. ESD now had the traction EE did not achieve, although the principles of EE were critical in the evolving capacity of ESD (C. Hopkins, personal communication, January 13, 2012). Canada was a signatory to this international agreement and was expected to develop a national plan for ESD. Because education is the domain of the provinces and territories, each developed their own approach to EE or ESD, often in collaboration with other governmental and non-governmental organizations within their jurisdiction (Courtney-Hall & Lott, 1999; Jarnet, 1998).

In 1995, BC’s first provincial interdisciplinary framework for EE-related curricula was published. *Environmental Concepts in the Classroom* (ECC) was developed to “assist teachers in all subjects and grades to integrate environmental concepts into their daily lesson plans” (BC Ministry of Education, 1995, p. 3). It emerged from the Ministry’s response to a series of discussions on sustainable development, hosted by the BC Ministry of Environment (Courtney-Hall & Lott, 1999). The ECC outlined six guiding principles for integrating EE into the classroom: direct experience with the environment, responsible actions, understanding of complex systems that sustain life, consequences of human decisions and actions, aesthetic appreciation of the environment, and environmental ethics (BC Ministry of Education, 1995).

The document drew criticism because it did not provide relevant examples, or recommend curriculum resources or instructional strategies (Courtney-Hall & Lott, 1999). Courtney-Hall and Lott (1999) also identified the lack of implementation as a significant
omission: “…the Ministry has not continued an effective correspondence between practicing educators, academics, and Ministry personnel on the implementation of the guidelines” (p. 90). It is important to note there was a change in provincial government during this time, which altered the Ministry’s direction in curriculum; additionally, the introduction of Bill 19 unionized the BCTF thereby changing its role as a catalyst for EE (M. McClaren, personal communication, November 2, 2011). Despite these changes, the guide served symbolic importance by outlining the guiding principles: EE should be integrated across the curriculum, promote responsible action, and provide opportunities for students to question their values and cultural assumptions (Courtney-Hall & Lott, 1999).

**BC’s current approach to EE/ESD.**

Despite the emergence of ESD in Canada, BC has tended towards EE though the Ministry of Education has presented it under a variety of terms such as *environmental concepts*, *sustainability education*, and *environmental learning*. In 2006, funding from the Ministry of Education helped establish BC’s first network for sustainability education, known as *Walking the Talk*, whose role was “connect individuals, organizations, and government” (*Walking the Talk*, 2012, para. 1) and contributed to the next version of the ECC.

A year later, BC became the first jurisdiction in North America to require that all public sector organizations, including all school districts, become carbon neutral (BC Ministry of Environment, 2012, para. 1). Funding was made available to support sustainability-related initiatives across the province, including the production of videos related to the ELE guide (BC Ministry of Environment, 2012, para. 1; D. Zandvliet, personal communication, November 27, 2012). The ELE guide replaced the ECC and provided the theoretical framework for EE integration (BC Ministry of Education, 2007). Both the ECC and ELE signified BC’s support
for an integrated or interdisciplinary approach, as opposed to EE being a stand-alone course. Complementary resources include *Curriculum Maps*, videos, professional development workshops, and web links that addressed some of the missing elements identified in the ECC document. Development of these resources was through a collaborative effort of EE educators in EEPSA, at Simon Fraser University, and Royal Roads University. The BC Ministry of Education supported initial implementation by funding professional development workshops.

In terms of instructional strategies, the guide presented an “experiential learning cycle model” (BC Ministry of Education, 2007, p. 9) using direct experience, critical reflection, and negotiation to help students understand new concepts and experiences. The ELE guide also proposed the *CARE* model, where complexity, aesthetics, responsibility, and ethics are taken into consideration during the learning process to enable the student to engage more deeply with environmental concepts, akin to the approaches proposed in the late 80’s and early 90’s (Orr, 1992). The *Curriculum Maps* connect the components of CARE with the K-12 curricula, assisting teachers to infuse or integrate EE into their lesson plans. One of my research questions explored if and how teachers use the ELE.

Recurring themes from international, national, and provincial organizations and documents unanimously support the following principles of EE: education is key to our sustainable future, the K-12 formal education system plays a significant role in changing attitudes and actions of students, and the approach should be of an interdisciplinary or integrated nature where EE is taught throughout all subjects and grade levels. The next section focuses on how jurisdictions worldwide implemented EE.
Environmental Education Implementation

Since the Tbilisi Declaration, EE has been introduced and implemented in educational systems all over the world, promoting an integrated and interdisciplinary approach in all grades and subject areas (UNESCO 1978, UNESCO, 2012). Studies from other jurisdictions in Canada and internationally show implementation has taken place with varying degrees of success (CCL, 2009; Eames et al., 2008; Lane, 2006; North American Association for Environmental Education [NAAEE], 2000; Puk & Behm, 2003; Puk & Makin, 2006; Yueh & Barker, 2011). The following section describes approaches to implementation in the K-12 classroom and outlines reasons why implementation is not taking place.

Implementation approaches and instructional practices.

I reviewed research on education systems similar to BC to learn about how they implemented EE. Two studies from the United States provided insight into EE implementation from a nation-wide and a statewide perspective. The NAAEE sponsored a nation-wide survey for K-12 teachers regarding their EE practice (NAAEE, 2000). In a random sample with 1505 respondents from all subject areas, 61% included environmental topics in their teaching; from this group, 70% incorporated EE into the regular curriculum, 4% taught EE-specific courses, and 26% combined both practices. Specific pedagogies included discussion (89%), hands-on activities (80%), problem-solving activities (57%), and field trips (49%). Survey respondents accessed resource materials via textbooks, libraries, newspapers, magazines, Internet, and groups or agencies, with the latter was considered most satisfactory. Respondents included environmental topics as a way to encourage students to become more active in protecting the environment (51%) and also because it was relevant to their curriculum (22%). The reasons for not teaching about the environment were that it did not relate to their curriculum (49%), and
there was too much other material to cover (27%). The NAAEE study concluded that most US teachers incorporated environmental topics into their regular courses, relied on a variety of teaching practices, and included an outdoor component.

In the smaller statewide study, Lane (2006) investigated how Wisconsin K-12 teachers responded to the state-mandated implementation of EE. Using surveys and interviews, Lane found that teachers blended infusion and integration, but tended toward insertion, where they added prepared EE-related units or activities into the curriculum. Teachers’ practices included: issue-based discussions, indoor activities to teach about ecological concepts, using the environment to teach certain concepts in their subject area, and taking students outdoors to study nature. Teachers incorporated environmental concepts in their teaching for a variety of reasons: because of their personal passion, to increase students’ awareness of the environment and related issues, to make their subjects more relevant to students, and to encourage students to become more environmentally responsible. Teachers identified time and test pressures as the most significant challenges. Lane’s (2006) results reflected those of the NAAEE (2000), demonstrating Wisconsin teachers were also able to incorporate EE into their courses.

A study in New Zealand (NZ) also offered insight into EE implementation. The NZ Ministry of Education facilitated EE implementation by publishing a document similar to the ELE Guide to assist teachers. Eames et al. (2008) investigated teachers’ practices through their mixed method study. Using a purposeful sample, they surveyed 200 schools and performed eight case studies. They found that most teachers (75%) taught EE, but only in the past five or fewer years, which coincided with the new Ministry of Education direction on EE. Responses from both surveys and case studies reflected a strong teacher passion toward EE, emphasizing education about the environment while encouraging students’ care and respect for the
environment. A majority of respondents integrated EE into science (70%), with a smaller percentage integrating EE into social studies (38%), technology (33%), and English (31%). Supports for EE included the use of formal EE programs (i.e., EnviroProgramme), Ministry-provided professional development programs, and the use of the school’s local environment as a context for learning. Challenges included lack of support from colleagues and leadership, fitting EE into an over-crowded curriculum (this was especially the case with secondary teachers), and the time necessary to partner with local EE-related organizations. Eames et al. also found schools with embedded EE programs tended to prioritize professional development for their staff, focus on building student leadership and responsibility, and use a whole-school approach where more than just one or two people sustain the programs. Though not formally mandated, NZ teachers responded to the direction suggested by their Ministry and were able to incorporate EE with experiences similar to their counterparts in the US.

These studies provided examples of EE implementation, reporting most teachers practiced EE, relied on the supportive resources to assist their practices, and identified challenges with time, curriculum, and colleagues. Next, I provide studies demonstrating limited implementation in both mandated and non-mandated education systems to compare and contrast any differences in approaches, supports, and barriers.

**Limited implementation.**

Despite these examples of successful implementation, there is wide consensus in the literature that implementation is not taking place to a significant degree (Culen, 1998; Palmer, 1998; Simmons, 1989; Yueh & Barker, 2011). Two studies in Taiwan and Canada depicted limited implementation in both mandated and non-mandated systems. Similar to the State of Wisconsin, the Taiwanese government mandated the implementation of EE across the
Yueh and Barker’s (2011) case study of three public junior high schools involved document analysis and interviews of both administrators and teachers over a three-year period. Despite the national mandate, allocated classroom time for EE and teachers’ agreement to the importance of EE, they continued to focus on their own subject areas with little change in their practices and limited incorporation of EE. Yueh and Barker attributed this lack of implementation to the following three reasons: the influence of the more prestigious subjects with specific outcomes that could be measured by examination, the required examinations for specific academic pathways (i.e., from high school to university), and the lack of professional development in EE methodology also resulted in teachers maintaining traditional teaching approaches.

Another example of limited implementation was in Ontario, Canada. Rather than being mandated, EE implementation was encouraged, but showed a similar lack of success (Puk & Behm, 2003). When the elective course of Environmental Science was removed from the curriculum, the Ontario Ministry of Education encouraged the infusion or integration of EE in science and geography courses. Puk and Behm surveyed grades 9-12 Science and Geography teachers from all regions across Ontario and concluded that little EE was actually taking place in the classroom. Those who did implement EE did so through infusion (Puk & Behm, 2003). The teachers identified the following barriers to EE implementation: EE was not specified strongly in the curriculum, the curriculum was too crowded to accommodate the additional topic of EE, EE-related curriculum did not follow a progression through K-12, and there was a lack of content-specific knowledge (Puk & Behm, 2003). In another Ontario province-wide survey, elementary teachers described similar problems with EE implementation indicating factors such as: lack of
time, lack of resources, lack of teacher training, and lack of support from colleagues, administration, parents (Puk & Makin, 2006).

An additional challenge for EE implementation relates to its affinity to certain disciplines. Though EE implementation is recommended to take place in all disciplines, studies reported EE tends to be located in the science and social studies curricula (Eames et al., 2008; Simmons, 1989; Steele, 2011). Studies attributed four main reasons for this: most environment-related outcomes were found in these disciplines, most teachers felt EE was best suited to the science curriculum, most pre-service EE training took place in the science methodologies course, and that science teachers tend to be more familiar with EE strategies (Ham & Sewing, 1988; Simmons, 1989). Limiting EE to these two subject areas impedes integration into other subject areas and does not facilitate the interdisciplinary nature of EE (Simmons, 1989; Knapp, 2000; Steele, 2011).

The results from these studies suggest teachers face a variety of challenges in EE implementation, whether or not it is mandated in their respective education jurisdictions. This alludes to other factors that may influence EE implementation, and is explored further in my research. In all the studies, some degree of implementation took place, which in itself is significant especially in jurisdictions where it is not mandated. The next section outlines the benefits of including EE in education systems.

**Benefits of Environmental Education**

Aside from addressing awareness and understanding of the environment and related issues, and participating in their solutions, EE implementation has additional benefits. Practicing EE has significant influences in student achievement, engagement, and well-being.
**Student achievement.**

Investigations into schools that have committed to implementing EE content-knowledge, approaches, and use of the local environment have yielded significant findings. Those schools that use the *environment as an integrating context for learning* (EIC) model found consistent results in increased student achievement and engagement compared to students in traditional programs. Liebermann and Hoody (1998) did a nation-wide study on 40 elementary, middle, and high schools that used the EIC approach (i.e., interdisciplinary, collaborative, hands-on, student-centred, and included the local environment and community as an integrative context for learning). Through interviews, surveys, and document analysis, Liebermann and Hoody were able to show achievement in reading, writing, math, science, and social studies on standardized tests was more often higher when compared to students who attended traditional schools. Moreover, both students’ and teachers’ enthusiasm improved as well. Liebermann & Hoody (2000) performed a similar study on 150 schools in sixteen states over a 10-year period. The results were similar to their 1998 study: student achievement in all core subject areas and engagement improved in schools that followed the same EIC approach, a testament to the value of meaningful connections in students’ local environment and community.

Another research team found similar results. Bartosh, Tudor, Ferguson, and Taylor (2006) compared the results of standardized tests from students in 77 EIC schools in Washington State with those in traditional schools. Results demonstrated that 73 EIC schools outperformed traditional schools on standardized tests in at least one subject. Bartosh et al. were able to show significant differences in math, reading, writing, and listening on the statewide assessment, suggesting a pattern between student achievement and EE implementation.
Similar results were reported in schools practicing interdisciplinary or integrated approaches to learning. Beane (2006) studied middle school integrated programs in both the affective and academic domains in core subject areas such as science, social studies, math, and language arts. He found statistically significant differences in both national and state-wide tests, as well as program-based assessments (Beane, 2006).

Finally, Norman, Jennings, and Wahl (2006) performed a literature survey to determine if there was enough evidence to show a connection between environmental-focused education practices and student achievement. From their analysis of 24 key documents dated from 1990-2006, Norman et al. found a pattern where the following practices were linked to improved academic outcomes: integrated and interdisciplinary curriculum, using natural environments as a context for learning, hands-on and project-based learning, problem solving activities, connection to relevant issues, and student-centred teaching. Research suggested EE has a strong connection to student achievement. Whereas many of these studies focus specifically on achievement in tests, the outdoor component also provided specific benefits.

**Outdoor learning environments.**

The importance for students having outdoor learning experiences is integral for student engagement, citizenship, and well-being. Connecting students with their local culture and natural surroundings act as relevant building blocks for knowledge and understanding of the world, in addition to providing a meaningful context from which to base community participation and action (Beane, 1997; Smith, 2002; Sobel, 2004). Moreover, providing these experiences from an early age ensures continued benefits long after students graduate. Palmer’s (1999) survey of over 1259 environmental educators in nine countries showed that over half indicated that having early childhood experiences in nature was the single most important factor.
This relationship was especially significant for respondents from Australia, Canada, South Africa, and the U.K. (Palmer, 1999). Sobel (2004) summarized the benefits to outdoor learning experiences where hands-on, real-world learning “increases academic achievement, helps students develop stronger ties to their community, enhances students’ appreciation for the natural world, and creates a heightening commitment to serving as active, contributing citizens.” (p. 7). He also emphasized place-based education as more engaging by presenting situations where students solve current real-life problems, opposed to “solving theoretical problems of the future” (p. 105). Finally, and perhaps the most important benefit of providing outdoor experiences for students has been linked to health.

Maller, Townsend, Pryor, Brown and Leger (2005) reported significant connections between nature and health. They argued that the relatively recent human migration to urban settings and subsequent limited exposure to natural settings has influenced an emergence of and increase in physical and mental diseases (e.g., cancer, diabetes, depression). They found studies suggesting that reconnecting humans with natural settings could reverse and prevent such diseases by restoring our evolutionary adaptive relationship with the environment. Louv (2005) popularized similar findings and applied them to the children and learning. He argued the importance outdoor experiences have on the development and maintenance of children’s health and well-being.

Despite the benefits of student engagement, achievement, and health, outdoor learning experiences are not commonly provided in formal education settings. In BC, Caner (2009) conducted a review of outdoor learning activities and programs through a mixed method approach using surveys and interviews. He employed snowball sampling, beginning with some key contacts in the provincial specialists’ association, school principals, and outdoor learning
providers, and identifying more respondents through them. Of the 250 teachers and administrators that responded from 59 of the 60 school districts, 84% reported outdoor learning was important. However, most of these experiences were short in duration where 55% of the teachers took their students out for part of a day, for one to five days a year. Multi-day trips were rare: 61% of teachers never took their classes out for trips that were two days in a row. Finally, 28% of teachers never took their classes for one full day. Teachers also identified barriers: lack of funding (e.g., transportation costs), liability and risk factors, and lack of time in teacher’s schedules.

Outdoor learning in Ontario followed similar patterns. Puk and Makin (2006) surveyed teachers from all regions in Ontario and with 132 responses, found that only 11% took their students outdoors at least once a week, 81% took their students out at least one hour per month, and 61% did not take their students outdoors at all. Similar behavior was found in the Puk and Behm’s (2003) study of grades 9-12 Geography and Science teachers. Sixty-four percent of grade 9/10 teachers and 77% of grade 11/12 teachers took their students outside at least five hours per week, whereas 21% and 36% respectively did not take their students out at all (Puk & Behm, 2003). Though it would appear that there are more outdoor learning experiences provided for BC students, it is still not consistently available to all.

**Summary of Chapter 2**

Environmental education has a strong history shaped by international, national, and provincial organizations that support its interdisciplinary nature and role in changing the attitudes and actions of students to create a sustainable future for all. Many education systems have implemented EE including outdoor experiences, some showing more success than others, whether or not implementation is mandated. The challenges are well documented and often
similar whether or not implementation is taking place. The approaches used in EE, including those that provide outdoor learning experiences, have additional benefits, contributing to increased student achievement, engagement, health, and well-being. My study explored EE implementation in BC in the context of this literature. The findings enabled me to determine how implementation is taking place in BC and what supports and challenges teachers’ experienced during these efforts. In the next chapter, I present the methodology used to investigate how BC teachers incorporate EE into their practices.
Chapter 3: Methodology

In this chapter, I describe the purpose of my research study, its rationale, methodology, and research design, all of which informed my data collection, participant selection, and data analysis. I integrate issues of reliability and validity of the results throughout the chapter. Finally, I address the limitations and delimitations of my study in general.

Purpose of the Study and Rationale

The purpose of this study is to find out how BC teachers incorporate EE into their practice as well as the supports and challenges they experience. Due to the practical and applied nature of teaching, along with the variety of experiences and worldviews inherent in educators, I felt the pragmatist rationale most reflective of my research approach (Tashakkori & Teddlie, 2003). Pragmatism allows for an exploration of what is actually taking place in the research setting (i.e., the classroom and school environment) (Tashakkori & Teddlie, 2003). It acknowledges truth, meaning, and knowledge are tentative and changing; there may be more than one truth or reality (i.e., multiple realities or worldviews), and “knowing is both constructed and based on the reality of the world we live in” (Onwuegbuzie et al., 2009. p. 122; Tashakkori & Teddlie, 2003). Pragmatism also acknowledges the researcher’s values inform the direction and interpretation of the study (Tashakkori & Teddlie, 2003). As an educator, pragmatism allows me to interpret participants’ lived experiences and their perspectives in a manner that is of practical use to them and other educators (Tashakkori & Teddlie, 2003). Pragmatism also allows the research question to drive the choice of methodology: in this study, a mixed method approach combined both quantitative and qualitative research to offer a broader perspective on teaching (Tashakkori & Teddlie, 2003). In the next section, I describe my research methodology and research design.
Methodology and Research Design

To address the complex nature of teaching, I chose a methodology that would represent the multiple perspectives that influence pedagogy and a design that would be complementary. The mixed methods approach accommodates a greater diversity of teachers’ perspectives on their practices, the complexity and diversity of factors that influence their practices, as well as the possibility of both convergent and divergent views (Creswell & Plano Clark, 2011; Lingard, Albert & Levinson, 2008; Onwuegbuzie et al., 2009; Mason, 2006; Sosu, McWilliam & Gray, 2008; Tashakkori & Teddlie, 2003). My approach followed an “explanatory sequential design” (Creswell & Plano Clark, 2011, p. 71; McMillan & Schumacher, 2006) beginning with the collection and analysis of quantitative data followed by the collection and analysis of qualitative data. Specifically, I used surveys and interviews to address both my central research questions and sub-questions. The online survey allowed me to learn about teachers’ general attitudes and experiences in teaching EE and to gather basic demographic information about them. The interviews of select survey respondents then afforded me a more in-depth understanding of how they incorporated EE into their practice. I analyzed the survey data using descriptive and inferential statistics, and the interviews using grounded theory method. Figure 1 represents a model of my research methodology.
Figure 1. Model of research methodology.
Grounded theory method informed my research design, from data collection and analysis of both surveys and interviews (Charmaz, 2006; Onwuegbuzie et al., 2009; Tashakkori & Teddlie, 2003). Grounded theory is a systematic process of “simultaneous involvement in data collection and analysis” (Charmaz, 2006, p. 5), resulting in an explanatory theory of what is going on in a given social setting (Charmaz, 2006; Glaser & Strauss, 2008). As the grounded theory method is an iterative process that compares patterns and relationships within data, it generates a robust theory rather than a simple explanation or description (Charmaz, 2006; Glaser & Strauss, 2008; Morton, 2009). My central research question focused on how teachers incorporate EE into their practice, essentially asking them to describe a process in a formal teaching environment; thus, grounded theory was well suited for my study (Charmaz, 2006; Glaser & Strauss, 2008).

The pragmatist rationale accommodates both quantitative and qualitative methods employed in my research (Creswell, 2007). Pragmatism supports the post-positivist approach to quantitative data analysis, which advocates a more objective lens while acknowledging objectivity as merely an approximation of “the truth of reality” (Onwuegbuzie et al., 2009, p. 121). Similarly, pragmatism supports a constructivist approach, developing a grounded theory from the data that acknowledges the influences of the participants as well as the researcher on the final interpretation (Charmaz, 2006; Onwuegbuzie et al., 2009; Tashakkori & Teddlie, 2003). Finally, pragmatism suggests the notion that using both methods more effectively addresses my research questions, and allows for a more practical focus on the implications of my findings (Creswell, 2007). The following sections focus on data collection, participants, and data analysis of both surveys and interviews.
Collecting Data by Surveys

The online survey, based on my research questions, included both closed- and open-ended questions. Using the Tailor Design Method, I integrated key design features to improve survey participation, ensure the questions measured what they intended (i.e., were valid), and that they were consistently answered (i.e., were reliable) (Dillman, 2000). These features included a simple, user-friendly appearance, a variety of closed- and open-ended questions including ones that were optional, and a length that allowed completion in about 15 minutes. To further enhance validity and reliability, seven individuals from the EE-field, some with a survey development and analysis background, reviewed pre-online drafts of the survey.

Five additional individuals pilot tested the online version (Creswell & Plano Clark, 2011; McMillan & Schumacher, 2006; Scheuren, n.d.). This confirmed the survey could be completed within 15 minutes to avoid time being perceived as a barrier to participation (Dillman, 2000; Scheuren, n.d.). Feedback from the above individuals’ written responses, as well as from “cognitive interviews” (Dillman, 2000, p. 142), where individuals provided verbal thinking out loud feedback while simultaneously doing the online survey, further improved the online version. The survey and consent form are included in Appendix A.

The 14-page survey was published and distributed online from November 29, 2011 to January 31st, 2012, with invitations and reminders sent out prior and during this period. The initial deadline was extended to increase the number of responses. Primary distribution took place through six EE-related organizations, in addition to separate emails to individuals. The organizations included: The Environmental Educators Provincial Specialist Association (EEPSA), the Sierra Club of BC, the Columbia Basin Environmental Education Network (CBEEN), Wild BC, Walking the Talk (WTT), and the Vancouver Aquarium. These
organizations were chosen because of their focus in environmental education, their connection to teachers in BC, and their interest in my research project. Table 1 presents these organizations, the dates and modes of distribution, the number of contacts, and the number of responses.

Table 1

**Online Survey Distribution**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Date posted</th>
<th>Reminder(s)</th>
<th>Mode of distribution</th>
<th>Number of contacts</th>
<th>Completed responses</th>
<th>Incomplete responses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEPSA</td>
<td>Nov. 30</td>
<td>Dec. 19</td>
<td>•LISTSERV</td>
<td>363</td>
<td>39</td>
<td>13</td>
<td>52</td>
</tr>
<tr>
<td>Sierra Club</td>
<td>Dec. 5</td>
<td>None</td>
<td>•Distribution List</td>
<td>482</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>CBEEN</td>
<td>Nov. 29</td>
<td>None</td>
<td>•Member Database, •Newsletter •Website</td>
<td>235</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Wild BC</td>
<td>Nov. 30</td>
<td>None</td>
<td>•Wild BC Facilitator Database</td>
<td>55</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>WTT</td>
<td>Dec. 6</td>
<td>None</td>
<td>•Website •LISTSERV</td>
<td>916</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Vancouver Aquarium</td>
<td>Jan. 10</td>
<td>None</td>
<td>•eNewsletter</td>
<td>1800</td>
<td>22</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Other</td>
<td>Nov. 29</td>
<td>Dec. 6 Dec. 12 Dec. 19</td>
<td>•Email</td>
<td>21</td>
<td>15</td>
<td>4</td>
<td>19</td>
</tr>
</tbody>
</table>

**Participants.**

To best identify BC teachers who practiced EE, I used purposeful or non-probabilistic (i.e., not random) sampling (Creswell & Plano Clark, 2011; McMillan & Schumacher, 2006). Purposeful sampling enabled me to identify those who would be able to provide the best information related to my research questions (Charmaz, 2006; Creswell & Plano Clark, 2011; McMillan & Schumacher, 2006). The focus on formal classroom teachers enabled me to gain a better understanding on how they incorporate EE within the context of the formal education system. Their practices could then be shared with a wider teaching audience in similar contexts.

Of 136 total responses, 102 were complete, resulting in a 75% completion rate. In terms of the incomplete surveys, the results show that most respondents (i.e., 25) abandoned the survey
at three points: by the end of question two, three, and ten which focused on demographic questions, teaching practices, and teaching resources respectively. Table 2 provides a general description of the participants.

Table 2

*Environmental Education Survey Respondents*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>69%</td>
</tr>
<tr>
<td>Male</td>
<td>31%</td>
</tr>
<tr>
<td>Percentage of those between 30-39 years of age</td>
<td>37%</td>
</tr>
<tr>
<td>Average Years of Classroom Teaching Experience for K-7 Teachers</td>
<td>16.21 (SD=10.39)</td>
</tr>
<tr>
<td>Average Years of Classroom Teaching Experience for 8-12 Teachers</td>
<td>8.28 (SD=7.98)</td>
</tr>
<tr>
<td>Elementary Teachers</td>
<td>56%</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>44%</td>
</tr>
<tr>
<td>Graduate Degree Holders</td>
<td>45%</td>
</tr>
<tr>
<td>Percentage of BC School Districts Represented</td>
<td>50%</td>
</tr>
<tr>
<td>Average Number of Students in Elementary School (i.e., School Size)</td>
<td>319</td>
</tr>
<tr>
<td>Average Number of Students in Secondary School (i.e., School Size)</td>
<td>938</td>
</tr>
</tbody>
</table>

**Data Analysis.**

The results from the survey produced both quantitative and qualitative data. To begin analysis, I grouped all qualitative data from the open-ended questions into categories and coded them (McMillan & Schumacher, 2006). I then analyzed all data using descriptive statistics with Microsoft Excel, that is, the counts (i.e., frequencies) and percentages for each of the responses, to describe what is going on with the data (Trochim, 2006).

Inferential statistics enabled me to find out if there were relationships among certain data (Trochim, 2006). Responses that met the requirements for parametric data, (i.e., showed a normal distribution, had a homogeneity of variance within different groups, and were of interval or ratio in scale) were analyzed using analysis of variance (ANOVA) with the Statistical Package for Social Sciences (SPSS) software (McMillan & Schumacher, 2006; Trochim, 2006). This type of analysis tests for significant differences between the means to show if there are
differences between groups (McMillan & Schumacher, 2006; Trochim, 2006). In addition, I also analyzed responses that were non-parametric (i.e., did not meet the requirements for parametric data as above) with Microsoft Excel using a simple comparison of responses to identify general trends.

**Collecting Data By Interviews**

My interview questions followed the guidelines of grounded theory method and were based on my research questions (Charmaz, 2006; Morton, 2009; Strauss & Corbin, 1998). The questions consisted of two open-ended questions and six prompts. The interviews began by following up with the participants’ survey responses, as a way to begin with something familiar to put them at ease (Charmaz, 2006; Dilley, 2000; McMillan & Schumacher, 2006) and to allow them flexibility to expand on topics they identified as important (Leech, 2002). I then proceeded with my main question: “Tell me how you incorporate environmental education into your practice”, and followed up with prompts when necessary (Charmaz 2006; Morton, 2009). Following the guidelines of grounded theory method, the question was framed in a way that focused on process, and worded in an open-ended manner to allow respondents enough flexibility to freely describe their experiences while enabling me the opportunity to explore emergent ideas (Charmaz, 2006). The interview framework also included a series of prompts to assist me in facilitating the interview so I could better focus on the responses (Charmaz, 2006).

To improve validity and reliability, an individual who has a background in grounded theory analysis reviewed the draft interview, and another individual from the EE field pilot-tested it. This allowed me to practice interviewing and ensure my recording technology was functioning properly (McMillan & Schumacher, 2006). The interview framework and consent form are included in Appendix B.
Prior to the actual interview, I sent each of the interview participants an email that included the central research question. From February 22, 2012 to May 7, 2012, I conducted 12 interviews that lasted approximately 30 minutes each. I integrated key themes from each successive interview to explore possible patterns of emergent data, a process that is integral to grounded theory method (Charmaz 2006; Morton, 2009; Strauss & Corbin, 1998). All interviews took place over the phone, were recorded, and transcribed. After the initial transcription, I listened to the recorded interview twice to ensure accuracy of the data. Each transcription was then sent to the participant to check the accuracy of the document, thus improving the validity of their responses (Barriball & While, 1994; Creswell & Plano Clark, 2011).

Participants.

The initial interview pool consisted of survey respondents who indicated they could be contacted for an interview. Based on the survey results, I noticed significant differences in some of the responses between new (i.e., 5 or less years) and experienced (i.e., 10 or more years) teachers, as well as elementary (K-7) and secondary (8-12) teachers so I organized potential participants into four categories or cases. Using a quota system, I followed the same 2:1 ratio of females to males found in the survey responses to maintain consistency (McMillan & Schumacher, 2006) and selected teachers from a diversity of BC school districts (Creswell & Plano Clark, 2011; McMillan & Schumacher, 2006). According to the guidelines in grounded theory method, this initial sample was modified to identify participants who could best elaborate on key themes emerging from the data, a practice known as theoretical sampling (Charmaz, 2006; Glaser & Strauss, 2008; Morton, 2009). Table 3 provides a description of the interview participants, whose names I changed to pseudonyms.
Table 3

*Interview Participants by Case*

<table>
<thead>
<tr>
<th>Case</th>
<th>Name</th>
<th>School District</th>
<th>School Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Teachers (0-5 years)</td>
<td>A. Emmanuel L. Benfeito J. Li</td>
<td>Greater Victoria Delta Richmond</td>
<td>Public Independent (Non-denominational) Independent (Catholic)</td>
<td>Teacher on Call Current Current</td>
</tr>
<tr>
<td>Experienced Teachers (&gt;10 years)</td>
<td>H. Carleton J. Abel G. Whitfield</td>
<td>Greater Victoria Caribo-Chilcotin Surrey</td>
<td>Public Public Public</td>
<td>Current Retired Current Current</td>
</tr>
<tr>
<td>Elementary Teachers</td>
<td>K. LeVins P. King J. LeBlanc</td>
<td>Richmond Coast Mountains Surrey</td>
<td>Public Public Public</td>
<td>Current Current Current Current</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>G. McCabe A. Byrnes J. MacLennan</td>
<td>Saanich Greater Victoria Rocky Mountain</td>
<td>Public Public Public (French Immersion) Public</td>
<td>Current Current Maternity Leave</td>
</tr>
</tbody>
</table>

**Data Analysis.**

After each interview, I transcribed the data and identified major themes by creating codes from phrases and sentences (Charmaz, 2006; Strauss & Corbin, 1998). With aid of coding software ATLAS.ti, I followed the guidelines outlined by Charmaz (2006): keeping the codes short, moving quickly through the data, creating additional codes as needed (i.e., initial coding), and consolidating codes to explain larger segments of data (i.e., focused coding). Because the central research question focuses on process, I crafted the codes as gerunds to preserve actions for the analysis (Charmaz, 2006). As the code list grew, codes were compared with other codes as well as with the broader data set (Charmaz, 2006). This *constant comparison method* enabled me to “compare data with data to find similarities and differences” in the codes (Charmaz, 2006, p. 54). During the process of *coding* and *constant comparisons*, I recorded ideas (i.e., memos) to document my thoughts and ideas on emergent themes, patterns, and relationships. This enabled me to identify my assumptions and improve the validity of the data (Charmaz, 2006; Morton, 2009; Starks & Brown Trinidad, 2007).
This approach was repeated for each of the 12 interviews where some of the same codes were used, and additional codes were created to describe new themes. When the code list grew too large, I re-organized them with additional tags that represented significant themes related to the research questions: **Demographics, ELE, How, Supports & Barriers, What, and Why** (Charmaz, 2006; Strauss & Corbin, 1998). The process of coding and constant comparison was repeated until no new codes or categories emerged (i.e., the categories were saturated) (Bowen, 2008; Charmaz, 2006; Morton, 2009; Strauss & Corbin, 1998). After all the interviews were coded, I reviewed all the transcriptions once more to ensure consistency in how the codes were applied to the data and to further refine the codes. A complete list of codes with their categories can be found in Appendix C.

The coding software allowed me to print out the entire *codebook*, which organized the data by tags, codes, and incidents (i.e., data used to support the codes) (Strauss and Corbin, 1998). By reviewing the codebook and comparing the tags and codes with my research questions, I identified *core codes* based on the number of respondents who contributed to it, and the number of incidents in the data. For example, the *having social responsibility* code had 28 incidents from all 12 respondents, indicating it was a core code. Referring to my memos and research questions, I organized the core codes into larger categories, and arranged them graphically to determine possible patterns and relationships. Through this process, I discovered strong patterns and relationships emerging from how participants defined EE, how they incorporated EE, and the supports and challenges they described.

To construct a grounded theory, I revisited the codes to determine is there was a central significant category that would relate other core categories to describe a “flow of causality” (Creswell, 2007, p. 192) to describe teachers’ behaviours. From this central category, I explored
possible causal conditions that affect this phenomenon, contexts in which it takes place, strategies of how the phenomenon is expressed, and the resultant consequences (Creswell, 2007, Strauss & Corbin, 1998). The results are presented in the next chapter.

**Addressing Limitations and Delimitations**

Limitations and delimitations affected my methods and data analysis. The limitations included factors outside my control that affected my research study. For the duration of my research, BC teachers underwent a limited job action that affected their participation in activities outside of the classroom. This likely affected the number of survey respondents and interview participants. I extended the survey deadline and had additional support of another organization that sent out survey invitations to its teacher database and offered an incentive to those who agreed to be interviewed. Another limitation was the capacity of all organizations to send out reminders as they could not always accommodate my requests.

The delimitations include choices I made to limit the scope of the study. I purposefully chose to study BC teachers who were already practicing EE under the current mandated K-12 curricula of the BC Ministry of Education. The findings of my study would thus be applicable to formal classroom teachers who are looking for strategies for EE infusion or integration, or ways to compare and contrast their experiences. The methodology and/or findings could also inform other education jurisdictions by providing a template for their own explorations.

During the course of my research, I modified the focus of my central research question to allow for a broader understanding of teachers’ practices. Initially, my central research question focused on how BC teachers use the ELE resources, and thus was reflected in my survey. After the survey was published online, I decided to broaden my central research question to address how BC teachers incorporate EE into their teaching practice. Thus, the ELE focus became one
of the sub-questions. As a result of this change, my survey questions did not strongly reflect my updated central research question. However, my interview question was designed to specifically address it. My final delimitation was changing the wording of one of my research questions. Initially, I asked teachers about what *barriers* they encountered, a term commonly used in the literature. However, as I interviewed teachers, I learned that despite the barriers, teachers were able to implement many of their EE practices. Thus I began using the term *challenges.*

**Summary of Chapter 3**

The research methodology was informed by a pragmatist rationale and used a mixed method design, with purposeful sampling of teachers who participated in the online survey and the interview. I used both descriptive and inferential statistics, as well as basic qualitative coding to analyze the closed and open-ended survey responses. I applied grounded theory method to design and analyze the interviews and transcriptions. In the next chapter, I present the results of my surveys and interviews.
Chapter 4: Results

In this chapter, I outline the results of my research. Following the explanatory sequential design of my mixed methods research, I present my results in the same sequence they were collected: beginning with the survey results, and followed by the interview results. To begin, I present my survey results as they reflect each of my research questions: How do BC teachers incorporate EE into their practice? What facilitates this process? What are the challenges? How do teachers use the ELE resources? A detailed listing of all survey responses is included in Appendix D.

Survey Results

**How BC teachers incorporate environmental education into their practice.**

My central research question was primarily addressed through one question in the survey (i.e., Question 3), and through interviews. From the survey, 90% of the respondents indicated that they either strongly agreed or agreed EE should be integrated within all subject areas. In contrast only 36% strongly agreed or agreed it should be taught as a stand-alone subject. In addition, 81% of respondents strongly agreed or agreed with the statement: I feel confident about integrating EE into my lesson plans. Finally, 95% expressed overwhelming agreement students should have outdoor educational experiences. Table 4 presents the survey responses.

Table 4

<table>
<thead>
<tr>
<th>How BC Teachers Feel About EE in Their Practice</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental education should be taught as a stand-alone subject.</td>
<td>18%</td>
<td>18%</td>
<td>25%</td>
<td>28%</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>Environmental education should be integrated in all subjects.</td>
<td>61%</td>
<td>29%</td>
<td>5%</td>
<td>2%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>I feel confident about integrating environmental education in my lesson plans.</td>
<td>47%</td>
<td>34%</td>
<td>9%</td>
<td>4%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>It's important my students have outdoor educational experiences.</td>
<td>82%</td>
<td>13%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>
A one-way ANOVA, $F(1, 82) = 7.304, MSE = 1.580, p = .008, \eta^2 = .078$ demonstrated statistically significant differences between K-7 teachers ($M = 3.32, SD = 1.42$) and 8-12 teachers ($M = 2.57, SD = 1.04$) in how they felt about EE being taught as a stand-alone subject, with 8-12 teachers more supportive of stand-alone subjects. There was also a significant difference ($F(1, 105) = 6.854, MSE = 1.447, p = 0.010, \eta^2 = .061$) between teachers with a graduate degree(s) and those without, in the level of confidence they felt in integrating EE into their lesson plans; those with a graduate degree expressed significantly more confidence.

**Practices that help teachers incorporate EE in their teaching.**

Respondents indicated their attitudes about various practices and identified ones that facilitated incorporation of EE into their teaching. I begin by discussing how they felt about supportive practices (i.e., attitudes), and then present an overview of all the practices they found supportive. Finally, I present a more in-depth overview of three specific practices that facilitated EE incorporation.

**Attitudes.**

Broadly speaking, respondents had relatively similar attitudes of agreement and disagreement regarding a variety of supports to their teaching practice. The responses are outlined in Table 5. Forty-eight percent of respondents felt they did not receive enough professional development whereas 52% felt that collaborative practices with colleagues was taking place in their schools.
Table 5

**Attitudes Regarding Supportive Teaching Practices**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have enough resources to teach environmental education in my classroom.</td>
<td>7%</td>
<td>34%</td>
<td>20%</td>
<td>25%</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>I receive enough professional development to integrate environmental education into my daily lessons.</td>
<td>10%</td>
<td>20%</td>
<td>17%</td>
<td>34%</td>
<td>14%</td>
<td>5%</td>
</tr>
<tr>
<td>In my school, teachers collaborate and share best practices.</td>
<td>11%</td>
<td>41%</td>
<td>16%</td>
<td>18%</td>
<td>3%</td>
<td>11%</td>
</tr>
<tr>
<td>I receive enough support from my school administrator(s).</td>
<td>10%</td>
<td>31%</td>
<td>23%</td>
<td>19%</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>In my school, teachers participate in decisions involving administrative policies and procedures.</td>
<td>6%</td>
<td>28%</td>
<td>21%</td>
<td>24%</td>
<td>7%</td>
<td>14%</td>
</tr>
</tbody>
</table>

There were three areas showing differences in attitudes between new and experienced teachers. A one-way ANOVA, $F(1, 102) = 8.705, p = .004$ demonstrated statistically significant differences between new ($M = 3.60, SD = 1.30$) and experienced teachers ($M = 2.80, SD = 1.24$) in how they felt about having enough resources to teach EE in the classroom; experienced teachers felt they had enough resources. ANOVA also demonstrated a significant difference between new ($M = 4.00, SD = 1.29$) and experienced teachers ($M = 3.09, SD = 1.35$) in how they felt about receiving enough professional development to integrate EE into their daily lessons; experienced teachers felt like they had enough. Finally, ANOVA $F(1, 102) = 4.433, p = .038$ demonstrated significant differences in how new ($M = 3.50, SD = 1.48$) and experienced teachers ($M = 2.86, SD = 1.36$) felt about receiving enough support from their school administrators; experienced teachers felt they had enough.

Differences were also found between respondents with a B.A. degree and those with a B.Sc. degree. A one-way ANOVA, $F(1, 65) = 4.221, p = .044$ showed statistically significant differences between those with a B.A. degree ($M = 3.22, SD = 1.36$) and those with a B.Sc. degree ($M = 2.57, SD = 1.19$) in how they felt about receiving enough support from their school administrators; those with a B.A. felt they received enough. In addition, ANOVA $F(1, 65) = 9.059, p = .004$ demonstrated a significant difference in how those with a B.A. degree ($M = 3.86,$
$SD = 1.27$) thought teachers participated in decisions involving administrative policies and procedures, compared to those with a B.Sc. degree ($M = 2.83, SD = 1.53$); those with a B.Sc. felt they participated in decisions. The next section reviews overall teaching practices that facilitate incorporation of EE.

**Overall teaching practice.**

Figure 2 shows the practices respondents identified as facilitating incorporation of EE into their teaching practice. They indicated that access to resources (81%), professional development (79%), background knowledge in EE (78%), collaboration with other teachers (76%), and support from an EE organization (65%) were the most helpful practices.

![Figure 2. Practices that help respondents incorporate EE.](image-url)

Additional comparisons were made with non-parametric data comparing university degrees, programs of study, years of teaching experience, and elementary and secondary teachers. Those with a B.A. degree identified receiving support from their school districts as well as the ELE resource as being more helpful in incorporating EE into their teaching practice,
compared to those with a B.Sc. degree. Respondents with a graduate degree also tended to identify the ELE resources as helpful, compared to those with none.

Respondents who completed an elementary program of study in university indicated that support from parents, the school district, and environmental organizations enabled them to incorporate EE into their teaching practice. Respondents also identified access to resources as being helpful, whereas those with a secondary program of study in university indicated collaboration with teacher leads and department heads as most helpful.

The most significant trends occurred with respondents who had more than 10 years of teaching experience versus those with five or fewer years of teaching experience. They identified access to resources, using the ELE resources, and having good background knowledge in EE as practices that helped them incorporate EE into their teaching. Respondents also indicated collaboration with other teachers, as well as support from school administration, the school districts, parents, and environmental organizations, as helpful. Appendix E shows how the various kinds of support compare with various respondent groupings.

When asked specifically about where respondents find EE resources, 70% identified EE related organizations as the most significant resource providers. They also found resources online (61%), from colleagues (44%), through professional development workshops (42%), and through professional associations requiring memberships (40%). Figure 3 shows where respondents reported finding general EE resources.
Respondents reported a high participation in professional development activities such as attending workshops, seminars, lecture series, and conferences related to EE or sustainability education. Table 6 shows how they responded. The mostly frequently listed workshops and conferences were organized by: EEPSA (25%), Wild BC (11%), The Canadian Network of Environmental Education and Communication (EECOM) (9%), Get Outdoors (9%), and Project Wild (6%).
Table 6

*Respondents’ Attendance in Professional Development*

<table>
<thead>
<tr>
<th>Attendance Description</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending no workshops, seminars, conferences</td>
<td>7%</td>
</tr>
<tr>
<td>Attending 1 workshop, seminar, or lecture series</td>
<td>20%</td>
</tr>
<tr>
<td>Attending 2-5 workshops, seminars, or lecture series</td>
<td>19%</td>
</tr>
<tr>
<td>Attending 5-10 workshops, seminars, or lecture series</td>
<td>17%</td>
</tr>
<tr>
<td>Attending &gt;10 workshops, seminars, or lecture series</td>
<td>22%</td>
</tr>
<tr>
<td>Attending 1 conference</td>
<td>11%</td>
</tr>
<tr>
<td>Attending 2-5 conferences</td>
<td>16%</td>
</tr>
<tr>
<td>Attending 5-10 conferences</td>
<td>1%</td>
</tr>
<tr>
<td>Attending &gt;10 conferences</td>
<td>7%</td>
</tr>
<tr>
<td>Respondents who indicated they facilitated the workshop, seminar, series, or conference</td>
<td>11%</td>
</tr>
</tbody>
</table>

Respondents also held a variety of professional memberships, indicating EEPSA (65%), EECOM (25%), The Columbia Basin Environmental Education Network (CBEEN) (17%), The North American Association for Environmental Education (NAAEE) (13%), and the BC Science Teachers’ Association (BCScTA) (11%) as the top organizations. Figure 4 shows respondents’ memberships with one or more professional organizations.
Challenges that teachers report in incorporating environmental education.

Respondents reported a number of challenges that hindered EE being incorporated into their teaching practice. I begin by discussing respondents’ attitudes, and then present an overview of the challenges they identified in their survey responses.

Attitudes.

Respondents indicated similar attitudes of agreement and disagreement regarding supports and challenges to their teaching practice as outlined in Table 5. The majority (62%) indicated that there were not enough learning outcomes in the K-12 curriculum about the environment and sustainability. Table 7 represents their survey responses.
Table 7

*Attitudes Regarding Barriers to Teaching Practices*

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>In BC, there are enough learning outcomes in the K-12 curriculum about the environment and sustainability.</td>
<td>4%</td>
<td>14%</td>
<td>14%</td>
<td>48%</td>
<td>14%</td>
<td>7%</td>
</tr>
</tbody>
</table>

A one-way ANOVA, $F(1, 82) = 4.400, p = .039$ demonstrated statistically significant differences between K-7 ($M = 3.40, SD = 1.35$) and 8-12 teachers ($M = 3.95, SD = .91$) in how they felt about BC having enough learning outcomes in the K-12 curriculum about the environment and sustainability; 8-12 teachers felt they had enough. The next section reviews challenges reported by educators that hinder the incorporation of EE.

**Overall teaching practice.**

Figure 5 shows the barriers respondents identified as hindering the incorporation of EE into their teaching practice. They reported feeling constrained by the timetable (56%), limited ability to get out the classroom (54%), adequate time for course planning or preparation (49%), access to resources for lesson planning and activities (35%). They also cited a lack of cooperation with other teachers (31%) as an additional factor. Despite the majority indicating one or more barriers, 4% of respondents emphatically expressed they felt no barriers to incorporating EE into their teaching practice.
Figure 5. Barriers that hindered EE incorporation.

Additional comparisons were made with non-parametric data comparing university degrees, programs of study, years of teaching experience, and elementary and secondary teachers. Those with a B.A. indicated EE did not relate to the curriculum they teach and were unsure of how to integrate it into the curriculum. They also admitted they had a lack of background knowledge in EE, whereas, those with a B.Sc. indicated lack of pre-service training in EE as well as a lack of support from professional or community organizations. Respondents who did not have a graduate degree cited more challenges than their graduate degree holding counterparts. They felt EE did not relate to the curriculum they teach, and were unsure of how to integrate it. They also admitted a lack of background knowledge in EE as well as a lack of support from professional or community organizations.

Respondents who completed an elementary program of study in university indicated more challenges, compared to their secondary counterparts. They reported lack of in-service training in EE, lack of resources for lesson planning and activities, in addition to feeling unsure
of how to integrate EE into the curriculum. In terms of school setting, they indicated lack of cooperation with other teachers, support from school administrators and professional community organizations, as well as a limited ability to get out of the classroom. Respondents who completed a secondary program of study in university indicated EE did not relate to the curriculum they teach.

Those with more than 10 years of teaching reported more challenges compared with those with five or fewer years of teaching experience. The more experienced teachers reported being constrained by the timetable, time for course planning and preparation, and in their ability to get out of the classroom. Respondents also reported a lack of cooperation with other teachers, as well as a lack of support from school administrators and the Ministry of Education as further challenges to incorporating EE into their teaching practice. In addition, they reported EE did not relate to the curriculum they teach, and indicated a lack of available resources for lessons planning and activities.

Kindergarten to grade 7 teachers identified a number of additional barriers including lack of: pre- and in-service training in EE, background knowledge in EE, and access to resources for lesson planning and activities. They also reported feeling more unsure of how to integrate EE into the curriculum, and their limited ability to get out of the classroom. In contrast, 8-12 teachers identified timetable constraints, and a perceived lack of support from the Ministry of Education as barriers. They also reported feeling EE does not relate to the curriculum they teach. Refer to Appendix E for more detailed information.

**How the ELE resources support teachers.**

The ELE resources include an interdisciplinary guide, curriculum maps, and professional development videos and workshops. The ELE resources were authored and developed by key
environmental educators in BC, produced by the BC Ministry of Education, and distributed primarily through the BC Ministry of Education and EEPSA. Sixty-four percent of the survey respondents indicated they were aware of these resources. They found out about them primarily through professional associations requiring memberships (57%), professional development activities such as workshops, seminars, and conferences (34%), from university courses (34%), and through other EE-related organizations (32%). Figure 6 summarizes their survey responses.

**Figure 6. How survey respondents found out about the ELE.**

In the survey, those who indicated they were aware of the ELE answered a specific set of questions related to the ELE (i.e., Questions 5-9). Of those who were aware, 54% of the respondents reported they used the ELE in their teaching practice to design lesson plans (58%), to apply an interdisciplinary approach to their teaching practice (58%), and to justify EE in their practice (55%). Figure 7 summarizes their survey responses.
Of the four components of the ELE resource, respondents indicated the interdisciplinary guide as most helpful to their teaching practice (74%), followed by the curriculum maps (58%), the workshops (26%), and the videos (24%). When asked to explain how the ELE resources helped their teaching practice, respondents wrote that the resources helped them understand the theory of environmental learning (36%), understand how to integrate EE into different subjects (24%), and how to justify their teaching approach (20%). They also used it for professional development – either personally or with colleagues (20%). A one-way ANOVA was conducted with questions three and six, as well as three and nine, resulting in no significant differences between new, experienced, K-7, and 8-12 teachers.

Additional comparisons were made comparing those who use the ELE with those who do not. There were no differences between either group with respect to practices that facilitate incorporation of EE, which university degrees they had, programs of study during teacher education, and the grades they were currently teaching. Teachers who use the ELE tended to have more professional memberships, especially with EECOM, NAAEE, and CBEEN, than
those who did not. See Appendix F for more information. Respondents who do not use the ELE tended to indicate more strongly a lack of resources for lesson planning and activities, and lack of support from professional or community organizations. They also seemed unsure of how to integrate and relate EE into the curriculum.

Summary of Survey Results

Survey respondents thought EE should be integrated into all subject areas, felt confident in doing so, and thought it should include an outdoor component. The most effective supports that helped respondents incorporate EE included: having access to resources and professional development, having a good background knowledge in EE, collaborating with other teachers, and having support from EE-related organizations. Respondents greatest challenges included: timetable constraints, limited ability to get out the classroom, lack of time for course planning or preparation, lack of resources for lesson planning and activities, and lack of cooperation with other teachers. In terms of the ELE resources, most respondents were aware of them, but just over half were using them. Those who used the resources, did so to design lesson plans, to apply an interdisciplinary approach to their teaching, and to justify their practice. Interview participants elaborated on many of these themes. The next section focuses on the interview results.
Interview Results

My mixed methods research included surveys and interviews. In the previous section, I outlined my survey results. In this section, I present the interview results as a narrative of my research questions. I begin by discussing how participants defined EE, using their collective understanding to set the context for how I interpreted their interviews. Next, I address my research questions and the most significant themes that emerged from the interviews: how teachers incorporate EE into their practice, factors that influence how they incorporate EE, and the supports and challenges they experience. Finally, I integrate both survey and interview results to corroborate themes and patterns.

Defining EE.

When asked to define EE, many participants responded with a multi-part definition that included the how, the why, and the where. Secondary science teacher, J. Li defined EE as follows:

I think it comes in three parts. The first part is to bring students to an awareness that the environment is something that…that is there. It exists. It works a certain way in terms of the food chains, food pyramids, the interactions between the animals, abiotic and biotic components. Just learning and appreciating that is really the first step. The second step is getting them to realize that they too are a part of it. And that what they choose to do can influence the balance of our environment. The third part is to get them to take part in it somehow, to take part in the nurturing, and the gardening, and the caring for...the responsible actions behind it, I think. Those three components take a lot of time to build but are very essential. So you can’t just teach those two things and not practice it in the end.
In terms of how teachers practiced EE, the main themes included hands-on and issues-based activities. Participants described the importance of learning how the environment works and how everything is connected. They also expressed the why, where themes such as stewardship and responsibility were presented as action-based activities. Finally, they explained the where: participants emphasized the importance of being outside as part of EE. Although defining EE was not one of my research questions, it set a context for understanding the perspectives of the participants and influenced how I interpreted their responses to my central research question: how do teachers incorporate EE into their practice?

**How teachers incorporate environmental education into their practice.**

All participants reported a variety of EE related activities and methods used in their teaching practice. As teachers described how they practiced EE, I determined which approach (e.g., infusion) best matched their practice. As a whole, their approaches fit into the following three categories: *infusion* (i.e., the incorporation of EE into the regular curriculum), *integration* (i.e., organizing the curriculum around EE-related themes) and *interdisciplinary* (relating an EE theme to one or more disciplines). The next section focuses on all three approaches using examples from the participants’ practices.

**Infusion.**

Infusion involves the incorporation of EE to the regular curriculum. Both elementary and secondary teachers shared examples of how EE complements their school activities and courses.

*School activities and events.*

K. Levins was an elementary teacher in the Richmond School District, where he leads a grade 5 class in a variety of school activities and events. Over the years his students have participated in garbage audits, beverage recycling, composting, salmonid rearing, and a *Walk to
School campaign. What is unique about his approach is that any funds raised through activities such as recycling or the sale of compost are used to pay for tools for programs such as gardening as well as costs associated with class field trips to places like Burns Bog and the local landfill. He explained: “Each of the programs sort of loop back on each other.” He also used “field trip prizes” as an incentive for other classes to partake in these environmental programs.

Grade 7 Science and Grade 8 Social Studies.

A. Byrnes was a middle school French Immersion teacher in Greater Victoria School District who described examples of how he infused EE into his Science and Social Studies courses and created opportunities to take his students outside. He linked the science topic ecosystems to a project where students build a terrarium to learn how to manage its components. He also extended the learning outside the classroom for hands-on science experiments. For Social Studies, he focused on the interplay between culture and the environment. He began the school year by taking his classes out to Bear Beach for an overnight trip, so they could experience the environment firsthand. He explained his rationale for EE:

I think it’s hugely important for the kids to develop a personal relationship with the natural world. That’s why I take them out at the beginning of the year. That’s why I try to get them outside as much as possible, even if its just this little grassy corner of our school ground. If they do get that connection to a place they care about, they will start to understand better. Then they will want to protect it and spend more time in it and that will create a healthier society.

Science 10 and Chemistry 11 & 12.

J. Li was a Science Teacher at an independent Christian School in Richmond who infused EE in her Science 10 and Chemistry 11 and 12 courses. For the grade 10 Ecosystems unit, her
students wrote a proposal for a sustainable terrestrial or aquatic biosphere, and chose native species that can live in it symbiotically. Last year’s proposals resulting in the creation of a class aquarium and tied in sustainability issues such as how what goes down the drain affects these organisms and ecosystems. In a climate change unit, her students calculated their individual carbon footprints and audited their garbage, compost, and recycling. In Chemistry class, her students learned about plastics during the organic chemistry unit, and their effects on the environment. She connected Le Châtelier’s Principle to how human activity has altered the balance of gases in the environment. During the electrochemistry unit, students explored alternate energy sources. J. Li wove the ethic of stewardship throughout her science courses and helped organize a science fair that included a category on environmental sustainability. She described how teaching in a Christian school influenced her practice: “A lot of [Christianity] lies in stewardship and how we are going to be good stewards and good citizens on this Earth.”

Home Economics.

A. Emmanuel was a Teacher-on-Call for both the Greater Victoria and Saanich School Districts. As a teacher-on-call for the past year and a half, she said she rarely came across a lesson plan that included EE. Given the short-term assignments and the limited interaction with the teachers she is replacing, she had little opportunity to influence the lesson plan overtly. However, as EE is part of her perspective, she naturally wove it into discussions in whatever subject she taught. In her last assignment, she spent a lot of time in the Home Economics classroom and linked that subject to the bigger picture of agricultural practices, food processing, and nutrition. She described her practice:

I definitely include environmental education. I mean its something that happens naturally for me whether I plan it or not because my experience is really from an
environmental perspective in a lot of ways. I just am naturally trying to bring these things up in a discussion.

Integration.

Those who practiced integration, where the environment was the central theme through which curricula are organized, did so through units, courses, and programs. Examples ranged from environmental-themed units in the primary grades, to school-wide programs for students in grades 4-12.

Theme-based learning.

J. LeBlanc was a primary teacher in the Surrey School District. Each year, she built an environmental unit such as deforestation, endangered animals, and recycling and spent a significant amount of time teaching it. Topics were tied to the BC Ministry of Education prescribed learning outcomes (i.e. learning standards) in a given grade and were influenced by her students’ interest. To build a unit, she used an integrated or interdisciplinary approach by combining at least three prescribed learning outcomes from separate disciplines such as social studies and science. She used a variety of teaching methods including discussions, field trips, and hosting speakers from organizations such as the Sierra Club and Wild BC, while also relying on arts-based learning to support environmental themes, such as classroom plays and literature. She explained: “I do a lot of literature, and I collect a lot of beautiful books that tend to tell stories that have an environmental theme in them. I believe that sometimes stories are more memorable.”

Experiential Education.

L. Benfeito worked as an environmental educator in an independent school in Surrey and coordinated annual outdoor trips that are mandatory for all the school’s grades 4-12 students.
Building from the BC curriculum, she created experiences that take the learning outside the school environment, explaining: “The whole idea of experiential education is that it is something you can’t really learn by studying or doing a project.” The program was in its 10th year and included overnight stays and weeklong excursions in a variety of outdoor settings. This past school year, the grade 9 students did a four-day canoe trip in Voyageur canoes along the lower Fraser River where they learned about the fur trade firsthand by retracing part of the historic fur trade route, employed navigation skills, read star charts they made during a workshop at Simon Fraser University, and explored local First Nations cultural sites. As the journey transitioned from the pristine waterways of Harrison Lake to the industry of Lower Mainland, her students also learned the implications of development. She explained the benefits of EE:

I guess my aim is for teachers to see what we do during this week away is actually enriching the curriculum that [students’] learned and reinforcing it and maybe bringing a new angle on what they are learning or looking at.

**Stand-alone courses**

Although BC offers a limited amount of EE-related courses (e.g., Sustainable Resources 11, Social Justice 12), BC teachers have the opportunity to create their own locally developed course that can be authorized by their school district and approved by the Ministry of Education. Once it is approved, it is available to any BC teacher with the permission of their school district (S. Smith, personal communication, December 9, 2011). These Board Authority Authorized (BAA) courses count for elective credits toward graduation. Three of the teachers interviewed delivered BAA courses that focused specifically on EE.

H. Carleton from the Greater Victoria School District created the Environment & Sustainability 11 Course. Her school has offered it since 2007 and it has become part of an
Independent Directed Studies (IDS) course (i.e., a for-credit course designed by students requiring a teacher-sponsor) that integrates action-based projects from other programs. G. McCabe from Saanich School District created the Sustainable Development 11/12 course in 2008 inspired by a discussion he had with his students about how they can make a difference in the world:

We were having a conversation, and at the end of the class, one of my kids just said, “Mr. McCabe, what’s the point of this? Why are we even bothering about learning this stuff? There are so many problems in the world and we can’t do anything about it.”

G. McCabe has since moved on to another school and continues to integrate his course in his new interdisciplinary program. Another teacher, J. MacLennan at the Rocky Mountain School District adopted her school’s BAA outdoor courses in grades 9, 10, and 11-12 combined, which focus on both outdoor activities and EE. Because the focus of the curriculum is EE, she commented: “I have a really easy time of tying in environmental education into what I teach.”

**Interdisciplinary education.**

As part of an interdisciplinary teaching team, G. McCabe created a project-based program focusing on global challenges. With his team, they teach traditional courses in grades 11 and 12 as *super courses*, combining PLOs and weaving in field studies and a speaker series. The first year intakes will participate in an interdisciplinary mix of Biology 11, Earth Science 11, and Global Studies 11. The second year intakes will study BC First Nations 12, Geography 12, Global Studies 12, and Sustainability 12 (which is a locally developed course derived from the BC Ministry of Education Sustainability Course Content Framework). All students are required to create a culminating project in the form of a documentary that links their actions to their community. He described the importance of making connections for the students:
I think right now the problem is the way [students] are taught. They have socials class, they have law class, they have biology class. They don’t get a lot of big picture thinking. For a lot of people, they can’t see an issue in context so it’s really hard for anyone to grasp it. I think by seeing these things by looking at the connections between different subjects is makes it a little bit easier for these kids to wrap their heads around it.

**Combining approaches.**

A few teachers described settings where they practiced infusion as well as integration, including stand-alone courses. This next example highlights a district-wide program that focused on leadership and combined core courses, electives and community action-based projects. The Greater Victoria School District offers a district-wide Flexible Studies - Leadership in Learning Program. H. Carleton is a high school science teacher who teaches some of the core courses in the program that included English, Math, Social Studies, Science, and Planning. She infused EE into her Science 9 and 10 Earth science, chemistry and ecology units, and developed *Planning for the Planet* modules for the Planning course that other teachers also use. Students who take her Planning course also must complete a project, which can be a journal-response item or an action-project based on renewable energy. In addition to the core courses in the Flexible Studies program, students must complete a minimum of 20 hours of community service each of the four years. Students often choose from projects such as the monthly Recycle Depot, the Courtyard Garden, or Garry Oak Ecosystem Reclamation. There were about 300 students registered in this District Program.

H. Carleton also led three other courses. The first is the BAA Environment & Sustainability Course, which used to be offered over lunch, but is now a partially IDS course, which is Ministry-approved for credit. The second one is a Leadership Course where students
participated in projects under the *Green Group Umbrella*, which include any of the above-mentioned community projects or additional ones such as the School Recycling Program, Freestore Program, or the Backyard Chicken Program. Each year 100-200 students participated in this Leadership Course. Finally, she offered other IDS options based on students’ interest: the Salad Bar, the School Garden, and the Recycling Program. Six students started a local organic seasonal salad bar where they prepared and served food at school, and completed their work experience at a local farm. Three of these students will mentor the following cohort and expand their project to include harvesting and preserving produce and herbs from the school garden. One student managed the school garden, which included planning, composting and soil testing. The third project involved students who managed the schools internal recycling program. Figure 8 is a representation of these combined approaches.
H. Carleton summarized how these programs influence school culture:

What all these things have in common in my mind is that they are just an eclectic collection of opportunities to get involved in EE in so many different ways. So that if you are not the kid that is the “green kid”, there’s still so many other places to dip your foot in the water and learn about it. It’s become part of the culture of the school, right?

Participants from both elementary and secondary backgrounds cited examples of how they incorporated EE, including teaching stand-alone courses in EE, infusing EE into other courses, and integrating EE in their practice. No matter what approach or combination of approaches they used, they were influenced by a complexity of factors that are described in the next section.

Factors that influence how teachers incorporate EE.

Throughout the process of constant-comparison analysis, central themes related to the reasons why teachers incorporated EE emerged, which was especially salient as my research
questions did not specifically focus on this aspect. Whether teachers infused or integrated EE or offered stand-alone courses, the following four factors were common to all: personal motivation, teaching philosophy, pedagogy, and where the learning took place. The following section describes each of these and discusses possible relationships.

**Personal motivation.**

Participants expressed their personal motivation to teach EE in a variety of ways, with three major themes emerging: social responsibility, values, and passion. The strongest theme was one of social responsibility. Five participants described being motivated to make the world a better place, to make a difference and to conserve what we have for the next generation (J. Abel, A. Emmanuel, P. King, K. Levins, G. McCabe). A. Emmanuel asserted: “I think we have a responsibility as individuals to make sure that a healthy and sustainable environment is here in another 30 to 50 or 100 years for our children and grandchildren. Just like it is right now.” J. LeBlanc continued with the same sentiment: “I care about the future of my students. I care about what their lives will be like when they grow up.”

Five participants also described EE as being a core value, part of who they are and a way of life (J. Abel, A. Byrnes, H. Carleton, J. LeBlanc, K. Levins). Three mentioned that EE naturally supporting their actions as a role model for students (J. Abel, A. Byrnes, K. Levins). J. LeBlanc identified this as part of her perspective from an early age: “So I first became interested when I was in elementary school. And I think because I was exposed at an age when I was so idealistic, it has stuck with me as being a core value.” K. Levins explained how he has become increasingly become transparent with his values: “I think it’s important to practice what I preach.” Finally the word “passion” came up a number of times as teachers described the reasons they bring EE into their teaching. H. Carleton stated this so eloquently: “It’s something I
can get my heart and soul behind”. The personal motivation of the participants thus influenced their teaching philosophy as a way of expressing their ethic of responsibility, values, and passion through their teaching practice.

**Philosophy.**

Participants identified their philosophy in terms of guiding principles for their teaching. From the interviews, the strongest themes that emerged included creating meaningful connections, using student-centered approaches, and instilling a sense of responsibility.

**Meaningful connections.**

Seven participants strongly identified “making meaningful connections” as central to their teaching philosophy (J. Abel, H. Carleton, A. Emmanuel, J. LeBlanc, K. Levins, J. MacLennan, G. McCabe). Middle school teacher, J. Abel posited: “The philosophy is that everything you teach has to be meaningful, and it can only be meaningful if it’s tied together and it’s tied to life. Nothing in isolation is really meaningful.” J. MacLennan shared the same sentiment: “Typically, my base philosophy in EE is that you’ve got to provide experiences in the natural world and connection for kids to actually care about the environment in relationship to whatever the topic happens to be.”

Six expressed how this philosophy has become part of their worldview so that it would be naturally woven into their practice (J. Abel, H. Carleton, A. Emmanuel, J. LeBlanc, K. Levins, J. MacLennan). Secondary teacher, H. Carleton, explained: “A green course or an environmental sustainability course is still considered an elective course, an extra. Even though, in my mind it should be core. I’ve respected it in my philosophy of it being core and leading into everything.” She continued: “We all live on our Earth and you can’t take our Earth out of anything that we do. It is in everything we do.” Three participants felt that environmental connections provided a
context for learning, making the teaching more relevant to students’ lives, and thereby increasing their interest in learning (J. Abel, J. MacLennan, G. McCabe).

Participants described a variety of ways they created these connections in their practice. H. Carleton used food and food security as a central theme in her Planning course unit, as an IDS course, in action-based projects where students work in the school garden, in the school salad bar program, and in work placements outside the school in local organic restaurants and farms. She stated simply: “I’m focusing on food security right now because we all have to eat”. She also had 300 students take part in the school’s monthly Recycling Depot where they saw firsthand the amount of waste they created and learned how diverting waste can have a significant effect on what is sent to the landfill. She believed that making those relevant connections in context was a powerful teaching tool.

G. Whitfield saw the high school science co-op program as an effective way to make meaningful connections for his students. As part of the program, students participated outside the school in work placements, choosing areas of interest they would like to explore. He explained: “They go out on these work placements and watch babies being born or see people with kidney disease or help operate on a cat. They get a bigger picture on what its all about”. Students learned about these processes in the classroom and, after their work placement were better able to contextualize their learning.

P. King, who lives in the resource-based town of Terrace, created meaningful experiences for students. From hands-on activities where students mine the chocolate chips from cookies, to discussions about the history of ghost-towns, to field trips to the local mine, she saw value in making these experiences real for the students:
It makes it real for the kids. It needs to be something they can relate to, something in their own area, something they can see. They know that a lot of their friends’ families have moved away because they don’t have jobs anymore because the logging has been cut back so drastically. Through these experiences, students contextualized the value of stewardship and conservation. She concluded: “I think that kids need to be aware that these are not renewable resources. We have to conserve and recycle so we don’t use them up.”

Student-centered.

Participants expressed their student-centered philosophy through topics, projects, courses and/or school programs based on student choice. Some modified curriculum or topics based on student interest, or taught them in a way that related to the students or made it more engaging. K. Levins reflected: “Increasingly, having the kids involved in the process of where they want to go in terms of their learning, makes a huge difference.”

Three teachers included culminating action-based projects based on students’ choice of topic, whereas others offered elective courses and programs with an outdoor or sustainability theme (H. Carleton, G. McCabe, G. Whitfield). H. Carleton recently began offering IDS to allow students to design their own for-credit course of study based on their interest. The idea of student-centered learning was also expressed as a way to motivate students and engage their interest. She also described the importance of students’ motivation as these students often did not need the credit from this course to graduate. This attitude was also shared by P. King, whose grade 5 students were motivated to do action-based projects: “When they are 10 and 11 they are so open. They just soak everything up. They want to do this. They want to make the world a
better place. They want to do things.” G. McCabe described similar experiences with his high school students:

The cool thing about working with high school students is that they are enthusiastic and optimistic. They are actually powerful forces and that’s one of the reason I do like working with these guys. Once they get going, they accomplish a lot. A lot of them are doing cool things, and hopefully 10 or 20 years from now they’ll be continuing along these lines.

Responsibility.

The ethic of responsibility encompassed both an inward and an outward expression. G. Whitfield described programs that instilled a work ethic such as a high school science co-op where student had to apply for placements in their community and manage their internship. Others described how students raised money to pay for their field trips through year-long fundraising, or by their collective efforts to recycle or make and sell compost (P. King, K. Levins). K. Levins explained: “I actually don’t charge for field trips. My kids work for them. In doing so, they reap the benefits of their hard work.”

Responsibility was also fostered through stewardship activities aimed toward nature, animals, and people. Participants described students’ participation in beach cleanups as well as school garden planting, maintenance, and harvesting. J. Li stated: “The skill of learning to garden or learning to grow something or learning to take care of something is so essential for us to live and to grow and develop responsibly.”

In terms of animal stewardship, two participants had their students partake in programs where students raised salmon in the classroom and then released them into the wild (K. Levins, P. King). P. King regularly organized her class to participate in a program to adopt endangered
animals. This ethic was also directed towards people. Some students learned the value of teamwork during camping excursions, whereas others focused on fundraising for charities (L. Benfeito, J. Li). L. Benfeito summarized the essence of her EE program: “I guess I would hope that it’s some learning they take home and they almost internalize it.” Participants’ teaching philosophies included strong themes in creating meaningful connections in the curriculum, student-centered activities, and instilling an ethic of responsibility. All of these factors related to how and where they taught.

**Pedagogy.**

Both motivation and philosophy influenced participants’ pedagogy and where teaching took place. This next section describes the key areas of pedagogy (i.e., teaching strategies) and examples of how they were expressed in the learning environment. Participants cited a variety of strategies when they were asked to define EE: arts-based, camping, debate, field trips, literature, issue-based, plays, project-based, role-play, speakers, special events, watching films. The three strongest themes that emerged from the interviews were: issue-based discussions, hands-on activities, and action-based projects.

**Issue-based discussions.**

Six participants identified issues-based discussions as a common teaching strategy, feeling that environmental issues were important contexts for discussion because of their ramifications. Whether the issues were local, provincial or global in nature, the teachers were attracted to their complex and possibly controversial nature. J. LeBlanc elaborated:

I think it’s a complexity that I kind of like, the fact that environmental issues have different sides to a perspective. And so as an environmental educator, it’s finding that balance between bias and information. Because I don’t want to be teaching my students
that cutting down trees is always a bad thing to do. I want my students to ideally think critically about that.

Both elementary and secondary teachers emphasized the skills of thinking creatively and critically. Both groups identified complex issues such as water pollution, deforestation, garbage, food security, and bottled water. K. Levins explained:

And these increasingly are going to be issues of climate change, environmental degradation, and the Northern Gateway pipeline and everything else that they need to engage with. They need to engage with early so they have the skills to be able to do it later when they have more of a voice.

*Hands-on activities.*

Participants described the terms: hands-on learning, project-based learning, and experiential learning synonymously, so I present them all as *hands-on learning.* Two participants included the hands-on approach as part of their teaching philosophy and characterized it as an approach that worked best for them (K. Levins, J. MacLennan). G. Whitfield, a high school science teacher explained:

Well, to me, science is doing stuff. Its kind of fun to write notes for while and watch a video on it, but its way more fun to get your hands dirty and see the nutty things that happen and try to figure out why. Does anyone actually know the answer or is it something brand new? That’s how I look at it. EE to me is like science education.

Indoor activities ranged from the simple to the complex: from cookie mining to building solar panels, wind turbines, and robots. Outdoor activities included doing transects, planting gardens, and releasing salmonids into a stream. Some of the hands-on activities also related to
action-based projects that inspired students’ sense of agency, which is discussed in the next section.

*Action-based projects.*

Five participants identified action-based projects as central to EE, fostering students’ abilities to create change within themselves and to lead change inside the school setting and beyond (H. Carleton, K. Levins, J. MacLennan, G. McCabe), while nurturing a sense of hopefulness. (A. Byrnes, K. Levins, G. McCabe). H. Carleton claimed: “I think leadership and mentoring skills are really important. Because that’s when they leave the school environment, its likely to take them forward and do something more with them.” Interwoven throughout was the idea of making a difference and giving back to the community (H. Carleton, P. King, J. Li).

Such projects take place in both elementary and secondary school settings. Grade 5 teacher K. Levins engaged his class of “29 problem solvers” to reduce lunchtime waste and design a school wide campaign to encourage walking to school. H. Carleton’s students led the school’s Backyard Chicken Program where they raised egg-laying chickens and managed their adoptions into the community. She explained the benefits of action-based projects:

> The power, I think, in EE is the action stuff, the actual physical projects. Get down and do something. Get involved in the community and make a difference. And while they are making a difference, you can have those conversations that connect it to more cognitive learning.

Participants highlighted student-action programs that have a direct effect on the natural world. J. MacLennan elaborated on why she has her students participate in action-based projects:
I think a big part of my passion for the natural world and the importance I see in having a
generation of people that are conscious about the connectivity between our actions and
how they actually affect the natural world that supports and allows all of us to live.

These projects included programs and field trips that raise awareness of garbage through audits,
reusing, recycling and composting and connecting them to landfill use (J. Abel, L. Benfeito, K.
Levins). The next section elaborates on where EE takes place.

Place.

EE occurred in and out of the classroom, but many participants expressed a preference for outside activities, whether on the school grounds or beyond. Three participants mentioned that taking students outside was an effective way to engage students’ interest (L. Benfeito, A.
Byrnes, J. LeBlanc, J. Li). A. Byrnes joked: “I never have someone say, ‘no we don’t want to go outside. We want to stay inside and read the textbook’.” Three teachers emphasized the importance of being outside and connecting with nature (A. Byrnes, A. Emmanuel, J. LeBlanc).

J. LeBlanc noted: “I think those experiences in nature can really hit home for a kid.” Four only had to venture as far as their school garden, nearby greenbelt or local park where testing soil, identifying native plants, releasing salmonids, and planting trees took place (H. Carleton, P.
King, J. MacLennan, G. Whitfield). L. Benfeito explained: “For me, EE can be something as simple as taking the students for a walk in the forest for a half an hour.” Even campaigns to walk to school got students outside and made them more familiar with their own communities (P. King, K. Levins).

High school community service and work placements took students to local farms and even the Coast Guard (H. Carleton, G. Whitfield). Field trips to local landfills, mines, and watersheds helped three teachers place curriculum into context (P. King, K. Levins, J.
MacLennan). One participant incorporated field studies twice a week in the program calendar (G. McCabe) whereas another taught three outdoor courses, which took place primarily in the outdoors (J. MacLennan). Teachers also led camping activities with their classes, from overnights at Bear Beach to week-long camping trips at the Sea to Sky Outdoor School, as a way to bring students closer to nature, give them another context for learning and teamwork, engage different skills sets of students, and for the sheer joy of being outside (L. Benfeito, A. Byrnes, G. Whitfield). G. Whitfield exclaimed: “Its important to get out there and just enjoy our fantastic province!”

**Supports and challenges.**

Participants described a variety of examples of how they incorporated EE into their practice, whether it took place inside the classroom, or beyond the setting of the school. Through their personal and professional journeys, they also identified a number of supports both within the school environment and in the broader community that enabled their practices, as well as the challenges. Within the school environment, themes of school culture, administration, teachers, and curriculum emerged. Within the community, themes including place, people, and resources emerged. I compare both positive and negative attributes for each of these themes.

**School culture.**

Because the school is a dynamic community of educators and support staff, there is natural synergy in how administration and teachers influence the school culture. Seven participants framed their school culture in the sense that particular programs, courses, and activities were unique to their school (L. Benfeito, H. Carleton, P. King, J. MacLennan, G. McCabe, G. Whitfield) or district (H. Carleton, G. Whitfield). Examples ranged from top-down influences on culture (i.e., by mandate) or from bottom-up (i.e., through course and program
One school expressed their culture by defining their approach to learning as experiential, and requiring mandatory participation in all outdoor excursions: “The whole idea of experiential education it is that something you can’t really learn by just studying or doing projects” (L. Benfeito). In another example, H. Carleton drew a picture of a vast and interconnected district and school offering of EE programs and activities as a significant influence of her school culture. G. McCabe noticed overwhelming support for his EE initiatives: “I think if you go ahead and come up with these ideas, I found that overwhelmingly people have been supportive of these types of initiatives.”

In contrast, some aspects of school culture also challenged participants. Three teachers described the formidable amount of paperwork and planning required for offsite field trips (L. Benfeito, J. Li, J. MacLennan), although that did not keep them inside. Another teacher described being overwhelmed by all the change initiatives taking place in his school (K. Levins). Finally, one teacher pointed out the prioritizing of core subject areas in his inner city school, at the expense of EE-related programs (A. Byrnes).

**Administration.**

Participants found administrative support from a variety of levels ranging from the Ministry of Education, their district, and the school itself. G. McCabe thought the current BC Ministry of Education emphasis on 21st Century Skills supported his new interdisciplinary program. K. Levins found district level interest and support in the behavior-change campaigns he initiated in his school. In fact, he had two district staff accompany him to a social marketing workshop. Finally, six participants thought their school administration supportive of their programs and activities (J. Abel, A. Byrnes, K. Levins, J. Li, J. MacLennan, G. McCabe). K. Levins described the role of effective administrators: “It’s them recognizing that their teachers
have passions, and then help enable those passions rather than putting roadblocks in front of them.”

Conversely, some participants identified challenges with administration. A. Byrnes was disappointed the BC Ministry of Education Plan did not explicitly address the environment. K. Levins pointed out that the current conflict between government and the teacher’s union did not promote a healthy teaching and learning environment. J. Abel’s experiences encompassed the full gamut: where one principal was supportive of her team teaching and interdisciplinary approach, another at a different school was aggressively critical of it.

**Colleagues.**

Most participants reported receiving support from their colleagues, having an effective working relationship with them, and sharing similar teaching philosophies. Three participants described the support they received in teaching their courses or doing school activities (L. Benfeito, A. Byrnes, J. MacLennan). A. Byrnes described his current situation: “I’m very lucky that I’ve got colleagues and administration that are very supportive of what I do.” Five participants reported a mutual sharing of EE-related resources among their staff (A. Byrnes, H. Carleton, P. King, J. LeBlanc, K. Levins). A. Byrnes explained how his influence extends beyond his students:

I’ve been trying to act as an example for my colleagues as well, trying to be a resource person for them. And some people who are doing a unit on the environment or resources ask me what I do that works well. So I try to be there for them…I have done a couple pro-D days and at two different schools on EE, or parts of pro-D days…When there are events or activities happening like Earth Day or Earth Hour, I’ll send out resources to all our staff and say “check out all these links”. So hopefully that will encourage people.
Six participants also described how well they work with their colleagues. They shared a variety of situations ranging from cooperation with other primary teachers (J. Abel, J. LeBlanc), to team-teaching (J. Abel, G. Whitfield), to project-based collaboration (J. LeBlanc, J. Li) to the camaraderie they felt in their small departments (J. Li). J. Abel described her experience as a primary school teacher: “The primary teachers all worked together, that is just the way it was.”

Participants also felt that having similar teaching philosophies was important for their practice (J. Abel, P. King, J. Li). J. Li described the combined effect of being part of a small department and sharing the same vision:

I do find that there’s a lot of camaraderie at our school because we share similar beliefs. Our science department only consists of four teachers so I work closely with the biology teacher-especially in the area of EE, learning about living things. And then I plan to work closely with the foods teacher next year, with her garden. Our food teacher has been working closely with our woodworking teacher in actually building the garden. So the woodworking students have brought in cedar plants to build the garden planters. The administration has been very supportive of it. And so, I would say that all the teachers at our particular campus are on board and united and all have the same vision, which is really encouraging as a teacher.

Though most participants felt the support from their colleagues, some described instances where they felt isolated. J. LeBlanc described herself as the only teacher building environmental-themed units and that she had limited opportunity to collaborate. A. Byrnes expressed a similar sentiment in wondering why his colleagues don’t integrate EE more: “I feel like I’m one of the few and I wish I could be one of the many.” School culture, administration and teaching staff had a coordinated influence on an individual teachers’ practice. For these
participants, the positives outweighed the negatives. The next section focuses on how curriculum supported or challenged how teachers incorporate EE into their practice.

Curriculum.

Participants identified both supports and challenges in the area of curriculum including exams, linking both to time constraints. Participants used the terms curriculum and prescribed learning outcomes (PLOs) synonymously, and I have followed suit except where I present examinations and time as part of the broader topic of curriculum.

Prescribed learning outcomes.

Some teachers saw opportunity in the mandated prescribed learning outcomes and identified certain grades (i.e., grades 4 and 5) as being more amenable to EE connections (P. King, J. LeBlanc). J. Abel felt that the middle school curriculum lent itself well to integration. G. McCabe described a similar situation in high school where the PLOs in social studies are broad enough to allow EE integration: “I don’t get too tied up by PLOs. I look at them and almost always cover them inadvertently during the course.” J. MacLennan also found it easy to connect EE to the curriculum: “That’s where I find it actually isn’t that hard to link to any curriculum because [the connections] exist. Everything basically comes back to what humans have done to the planet or something the planet is doing naturally.” H. Carleton went beyond the PLOs and developed IDS courses that focused on EE and connecting students to action-based projects: “That’s been a big boon to offer a credit course for them to work on these key components at the school and help pick some areas that they wanted to research and get involved with as well.”

However, many more participants felt challenged by the curriculum. Most of the comments referred to the PLOs themselves. J. LeBlanc felt there were not enough PLOs that
explicitly addressed environment and sustainability, and that she was forced to “interpret” them to make it fit into her environmental-themed units. She also expressed challenges in integrating them across her science units:

They splattered PLOs in all sorts of science. We are looking at space, and now we are supposed to be looking at First Nations creation stories because there are PLOs thrown in there for First Nations. Well it’s really hard to give that the coverage it needs, because the focus of your unit is the solar system and now all of sudden I’m doing something that’s besides that.

Despite G. McCabe’s impression of the PLOs as being broad, he found they did not focus on important issues or encourage bigger picture thinking: “All these issues that they are going to face when these kids come out of school right now are totally ignored in the curriculum.”

Similarly, G. Whitfield found the biology curriculum too focused on memorizing content and missing the process: “We are really struggling right now in science especially biology as its all memorizing. You memorize all 27 parts of the earthworm. But now how do I test you? And make it more process oriented verses knowledge or fact?”

In terms of the whole curriculum, EE-related courses or topics were still not common. From the perspective of a substitute teacher who works in a variety of schools, A. Emmanuel rarely found EE themes or activities in her lesson plans and concluded that it must not be a priority in the curriculum. H. Carleton noted green courses are still considered electives, and courses such as science or math are considered core so have higher priority in the timetable. She proposed: “Environmental education is far reaching. It should be the overriding theme of everything because our planet and our existence on it is everything.”
Examinations.

Teachers recounted supports and challenges as they related to provincial exams. They found increased opportunity to incorporate EE when the provincial exam was removed from the course, as was the case with Social Studies 10 (G. McCabe), or when the final results were only worth 20% of their mark in Social Studies 11 versus 40% in Social Studies 12.

Otherwise, most teachers found challenges with the process of assessment. Beginning with assessment design, J. Abel noted the increased amount of time it took to design and mark a middle school integrated test, even though she preferred this approach because it was more meaningful. G. Whitfield found the same issue in his senior science classes. He was challenged with the idea of how to keep experiential learning in science while having enough time to prepare his students for the Science 10 provincial exam. At the same time, he looked to the provincial exams to guide his teaching practice:

But with the loss of the provincial exam for the grade 12s, what are you going to do?

Who knows? I mean, who knows if you are teaching the right stuff? There’s no external judging of that. I’m not saying that I will always be teaching the right stuff but it’s hard to say how does a kid at our school compare himself to a kid at another school? How does the university compare them for entrance?

Another teacher cited exam pressures at the elementary school level with the Foundations Skills Assessment, a provincial assessment for grades 4 and 7 students. K. Levins noticed a distinct increase in the amount of time he had in his grade 5 class to dedicate to EE activities compared to when he taught other grades: “I don’t feel the pressures of FSA in grade 4 or grade 7 and having taught both of those, I know what sort of pressures are added on.”
Time.

Finally, teachers felt challenged to find enough time to fit EE into their practice. Some teachers noticed either the time it takes to plan and schedule field trips in and of themselves, (J. Li, J. MacLennan, G. McCabe) or in conjunction with the demands of senior course curriculum (i.e., Chemistry 11 and 12, Geography 12, Social Studies 11) (L. Benfeito, J. Li, J. MacLennan). In addition, timetable pressures were also a factor in being able to accommodate “valuable immersive experiences” within a class period (A. Byrnes). H. Carleton cited similar pressures in timetabling single elective courses, especially during lunchtime. For his high school’s interdisciplinary program, G. McCabe identified the need to factor in time for teachers to collaborate as well as a design to accommodate offsite field studies which are integral to the program: “It’s taken a lot of creative timetabling and the principal has met with us for hours just trying to work on all these logistical things.”

Where participants identified overwhelming support within their school through culture, administration and their colleagues, they described a number of challenges with the curriculum. They talked about the pressure to focus on prescribed learning outcomes and examinations as well as the time constraints on an already full curriculum, and the additional time needed to accommodate an interdisciplinary approach. The final themes of community and resources emerged as ones that were primarily supportive for teachers. The next section explores how community provides support to teachers in the form of places, people, workshops, conferences, print and online resources, including the ELE guide.

Community.

From the perspective of community as place, participants identified the location of their school, interactions with local community, and supports from their local community as helpful
for their EE practice. P. King ensured her students developed an awareness of their community by doing field trips and giving slide shows on historical aspects of nearby towns: “I think its really important when you live in a resource-based place like Terrace that the kids understand more about that.” J. MacLennan took advantage of her small community and the easy access to the outdoors, as well as to community based projects that her students partake in: “I’m in Kimberly which is a small community. It’s quite easy here to get into different areas in the community. We can pretty much walk into different types of forests right outside the school.” Other teachers forged alliances with their community through their schools’ community service and coop workplace requirements. H. Carleton’s students volunteered their time at monthly community-wide recycling depots, as well as at community farms and local organic restaurants. G. Whitfield’s students did their work placements indoors and outdoors, from local hospitals to local parks.

Support also came in other forms where community organizations assisted the school on special projects. J. Li’s school benefited from a visit from a university student from the Food & Nutrition Program who inspired them to begin a school garden. This project also attracted support from a local seed business. G. McCabe’s interdisciplinary program attracted the support of the local university that recognized the attributes of this approach, and offered to provide interdisciplinary teacher training as well as and granting special accommodation to its graduates.

People and organizations.

Participants’ EE practices and programs also drew from the expertise and resources provided by community organizations. Three recounted the role pre-service (J. Abel, J. MacLennan, G. Whitfield) training provided them in terms of content knowledge and pedagogical methodology in integration, interdisciplinary, and outdoor education approaches;
while another three recognized the role in-service continued to provide for them (L. Benfeito, P. King, K. Levins).

Non-profit organizations provided significant support to these teachers. Six participants identified a number of BC based non-profit organizations that offered programs, workshops, and resources (L. Benfeito, A. Byrnes, P. King, K. Levins, J. Li, J. MacLennan) including Canadian Parks and Wilderness Society (CPAWS), Department of Fisheries and Oceans’ Salmonid Program, Earth Education Program, Earthkeepers, Lynn Valley Nature Park, Metro Vancouver, Mining Association of BC, Releaf, Richmond Nature Park, Science World, Salmon Habitat Restoration Project (SHaRP), Sierra Club of BC, Surrey’s Natural Areas Partnership (SNAP), Surrey’s Waste Action Program (SWAP for 5), The Vancouver Aquarium, WildBC, and Wildsight. J. MacLennan described how these organizations assisted her:

Often you can go to those organizations and they’ll have something you can leaf through and use their program or have someone come in and help you teach and then you can utilize what happened through those programs to expand on when it’s just you and your students.

L. Benfeito also identified outdoor school facilities including the Sea to Sky Outdoor School at Camp Elphinstone on the Sunshine Coast, which were integral to her schools’ experiential education program.

Print and online resources.

Participants referred to a variety of print and online resources to support their EE practice. Overwhelmingly, they went online to find support materials. Some simply googled a topic of interest (L. Benfeito, P. King, J. MacLennan), whereas others went to specific organizations such as Nutrients for Life (H. Carleton), Science World (J. Li), The Sierra Club (L.
Benfeito), and The Vancouver Aquarium (J. Li) to access and download online resources. L. Benfeito exclaimed: “There’s lots of great websites online! I’ve often accessed things from different environmental organizations.” Two participants also mentioned the role BC Green Games provided in terms of encouraging students to showcase their environmental-themed projects online (H. Carleton, K. Levins, J. Li). Other participants identified specific print resources such as books that inspired their teaching philosophy (K. Levins), or their students (J. LeBlanc), or that offered specific content such as field guides (A. Byrnes, G. Whitfield). One teacher mentioned the design of a social studies textbook that accommodated an interdisciplinary approach that complemented her practice (J. Abel).

*Environmental Learning and Experience guide.*

The ELE guide is a resource developed specifically for BC kindergarten to grade 12 teachers. It was published in 2007 and is distributed through workshops, CDs and primarily online through the BC Ministry of Education as well as EEPSA. Six of the twelve participants were not aware of this document (J. Abel, A. Emmanuel, P. King, J. LeBlanc, J. Li, G. Whitfield), whereas others were aware of it and used it to either justify their EE practice or design their programs and courses (L. Benfeito, A. Byrnes, H. Carleton, K. Levins, J. MacLennan, G. McCabe).

Three teachers described the resource as useful in justifying their integrated teaching approach, doing action-based projects, or going on field trips (A. Byrnes, K. Levins, J. MacLennan). J. MacLennan explained: “I see it as a supporting document in being able to teach environmental education in all curriculum in BC.” A. Byrnes shared the same sentiment:

I don’t really refer to it. But I looked at it and said, “It’s all good stuff.” This is what I do for the most part. I don’t think there is anything I disagree with that’s in there, so it’s
a good document to reinforce what I do and it will be there if anyone asked why I integrate EE into French Language Arts or anything like that. I can use the document to back it up. It helps justify it.

J. LeBlanc reviewed the document prior to the interview and summarized it as being useful background information for those interested in EE. Although G. McCabe had not used it to design or plan previous courses, he mentioned his teacher team was more familiar with it and that it would be helpful in designing their new interdisciplinary program. H. Carleton fully embraced the document and used it create modules for her Environment & Sustainability course:

It helped me create my curriculum. It helped me make sure I had aspects of all those components with the modules I created. To make sure that it would be well-rounded, I wanted that course to be a survey course. I wanted to cover all aspects so it was a jumping-off point for students.

Two teachers became aware of the document through the interview and a recent workshop and planned to use it in their teaching practice (L. Benfeito, A. Emmanuel). In contrast, three other teachers did not find the document particularly helpful to their practice. Though K. Levins was aware of the document, he said he would do what he is currently doing regardless. J. MacLennan found it didn’t help her with the practical aspects of teaching: “I don’t find it gives me what I’m going to teach or how I should do it.” J. LeBlanc expressed similar sentiments in that it wasn’t something that would help her “do, teach, and evaluate”: “It just means that it’s not in a format that you can translate easily into the classroom.”

To summarize, participants found abundant resources in their community that supported their EE practice: whether it was a nearby park, a university, or a non-profit organization. Overwhelmingly, they accessed print resources online, and only half were aware of the ELE
resource, with only a few using it to plan or justify their practice. Figure 9 represents a model of how I analyzed my interview results

**Figure 9.** Model of analysis of interview results.

**Summary of Interview Results**

Figure 9 illustrates how participants’ definition of EE informed how they incorporated EE into their practice: by infusion, integration, and interdisciplinary approaches. The factors that influenced these approaches included personal motivation, which affected participants’ teaching philosophy, which then influenced the dynamic between pedagogy and place. Supports assisted
incorporating EE, whereas challenges detracted from it, though not enough to deter it. Common factors in each included the role of school culture, administration, colleagues, and curriculum. In addition, community (i.e., places, organizations, and resources) supported participants’ EE practices. The next section presents the integrated results of my mixed method study, combining the findings from both the surveys and interviews.

Integrated Results

In this final section, I present the integrated results of my mixed method study. Using this methodology allowed me to gain a deeper understanding of the complexity of teachers’ practices, gaining insight from general attitudes and experience expressed through the surveys, as well as a more in-depth perspective through the interviews. Comparing and contrasting both quantitative and qualitative results enabled me to identify key patterns, emergent themes, and gaps in the overall research study that provided salient points for discussion. The integrated results follow the sequence of my central research question and sub-questions: How do BC teachers incorporate EE into their practice? What facilitates this process? What are the challenges? How do teachers use the ELE resources?

**How teachers incorporate EE into their practice.**

The survey and interviews results showed that teachers incorporated EE into most grades and subjects using three major approaches, that their philosophy strongly influenced their pedagogical practices, and that the outdoors play a significant role in their practice of EE. The survey results showed that 90% of respondents thought EE should be incorporated into the curriculum, whereas 36% thought it should be a stand-alone course. There was also a statistically significant difference where K-7 teachers agreed with the former, whereas 8-12 teachers agreed with the latter. The interview results complemented these findings: Most
participants incorporated EE through infusion and integration, a small group taught stand-alone courses in EE, and only one used an interdisciplinary approach. Whereas both elementary and secondary teachers incorporated EE through infusion and integration, only secondary teachers taught stand-alone courses and used interdisciplinary approaches. Some combined infusion and integration, and three teachers also incorporated stand-alone courses with this combination.

The survey also showed that 81% of respondents reported feeling confident about integrating EE into their lesson plans. Again, the interview results complement these findings as participants described using all three approaches from grades 1 to 12 in a variety of courses. At the elementary school level, participants referenced the following courses: Science, Social Studies, Math, Language Arts, Health and Career Education. At the secondary school level, they referenced: Biology 11-12, Chemistry 11-12, ESL 10, Home Economics, Geography 12, Planning 10, Science 9-10, Social Studies 8-11, as well as three BAA courses that focused specifically on EE.

Both elementary and secondary teacher participants identified a sense of social responsibility, values, and passion toward students and the environment which influenced their teaching philosophy. Their philosophy was then translated into teaching practices that instilled a sense of responsibility in their students, allowed for student-centred approaches, and drew meaningful connections with the curriculum and the students’ lives. These practices included issue-based discussions, hands-on activities, and action-based projects.

Although many of these practices took place inside the school, respondents and participants identified the outdoors as key to EE. Ninety-five percent of survey respondents thought it was important for their students to have outdoor experiences. Interview participants expressed a similar emphasis through their definition of EE, as well as through their teaching
practice. *Being outside* included a wide spectrum of locations and activities, from walking in a nearby greenspace, keeping a school garden, going on field trips, and camping. Depending on the activity, these outdoor experiences complemented the curriculum and connected students to their community as well as to nature.

**Supports for EE.**

The survey and interview results showed how the school environment and the broader community helped teachers incorporate EE into their practices. Survey results showed that 41% of respondents felt they had enough support from their school administrators, with statistically significant differences between new and experienced teachers; experienced teachers felt they had enough support. Similarly, almost half of the interview participants identified receiving strong support from their administrators, but there were no differences between new and experienced teachers.

The survey respondents also identified their colleagues as important supports. Although 76% of the respondents identified collaboration as helpful, only 52% felt their colleagues collaborated and shared best practices. Forty-four percent also looked to their colleagues for resources. The interview responses demonstrated slightly different results: Most participants reported receiving support from their colleagues, sharing a similar philosophy with them, having a collaborative relationship with them, and sharing their EE expertise with them. Only two respondents described instances where they felt isolated, though they continued with their EE practices.

Other supports were expressed in terms of professional development and resources, the former often a source for the latter. Although 79% of survey respondents identified professional development as helpful for their EE practice, only 30% reported receiving enough, with
statistically significant differences between new and experienced teachers; experienced teachers said they received enough. Seventy-eight percent of survey respondents also indicated the importance having background knowledge in EE. Although the interview responses did not strongly emphasize either of these points, they identified pre-service and in-service training in integration and EE or outdoor education as important influences in their practice.

Eighty-one percent of survey respondents listed *using resources* as the most helpful way of supporting their EE teaching practice, although only 41% felt there were enough. In both instances, there were statistically significant differences between new and experienced teachers, favouring experienced teachers. Most interview participants also referred to a variety of print and online resources to support their practice with no one reporting any shortage.

In both surveys and interviews, teachers indicated they found their resources through EE organizations, online, and through colleagues. Seventy percent found their resources through general EE-related organizations, 61% found them online, and 44% found them through colleagues. Forty-two percent of participants reporting finding their resources at professional development workshops, particularly those organized by EEPSA, WildBC, EECOM, Get Outdoors, and Project Wild. Forty percent also looked to membership-based professional associations such as EEPSA, EECOM, CBEEN, NAAEE, and BCScTA to provide resources.

The interview’s responses indicated an even broader connection to resources, including green spaces and places in their communities, as well as non-profit organizations, online, and print resources. In their community, participants cited local green spaces as places to take their students for walks, hands-on activities, and/or field trips. They also identified places including universities, hospitals, and local farms as resources to support learning such as special
programming, work placements, and volunteer activities. In addition, most participants accessed non-profit organizations for personnel, programs, and print-related resources.

In fact, both surveys and interviews showed non-profit organizations play a significant role in assisting teachers in incorporating EE into their practice. Sixty-five percent of survey respondents identified EE organizations as helpful, have attended their workshops, and/or hold a membership with those requiring them. Similarly, interview participants also cited how non-profit organizations provided programs, workshops, and resources and named 16 local, regional, provincial, and national organizations, with local and regional ones being more numerous.

**Challenges.**

Both survey and interview results demonstrated a variety of challenges to teachers’ EE practices. Fifty-six percent of survey respondents felt constrained by the timetable, and 49% identified lack time for course planning or preparation. Although this was also the case with the interview participants, the instances were fewer: Three teachers noted the timetable constraints with respect to offering a single EE course or accommodating field studies; three teachers described the need for additional time to collaborate and plan for integrated or interdisciplinary learning.

Learning outcomes in the curriculum was referenced in both sets of results. Sixty-two percent of survey respondents felt there were not enough environmental- and sustainability-related outcomes, with a statistically significant difference between elementary and secondary teachers; 8-12 teachers felt they had enough. Interview participants voiced similar concerns, noting that there was not enough PLOs, many of the PLOs were not conducive to integration, that the PLOs focused too much on memorization and not enough on bigger picture thinking, and EE was not considered core curriculum.
In addition, 54% percent of survey respondents described a limited ability to get out of the classroom. Although interview participants did not express this sentiment as such, they alluded to the overwhelming amount of the paperwork required to leave the school grounds, the cost of transportation, and the lack of time to leave the classroom due to the curriculum load. Finally, participants identified provincial examinations (e.g., FSA, Social Studies 11) challenging in that much of the course focus would be exam preparation. One teacher noted the length of time it took to mark an integrated assessment.

**How the Environmental Learning and Experience resources are used by teachers.**

The ELE was one of the resources used by both survey respondents and interview participants. Sixty-four of the survey respondents were aware of the ELE and 54% of these teachers use them, whereas only 50% of the interviews participants were aware and only one actively used it, with three others planning to use it now that they are aware of it. Through a close-ended checklist type survey question, the 54% of survey respondents who use the ELE reported using it to design lesson plans (58%), apply interdisciplinary approaches (58%), and justify EE in their practice (55%). Through an open-ended survey question, they reported using the ELE to understand the theory (36%), learn how to integrate EE (24%), justify their teaching approach (20%), and for professional development purposes (20%). Similar proportions were reflected in the interviews: Four participants used the ELE to design their lesson plans, and three used it to justify EE in their practice. Three participants found the ELE unhelpful to their practice for the following reasons: they would be integrating EE regardless, they found the resource design impractical, and that it did not easily support implementation and evaluation.

Overwhelmingly, survey respondents found the ELE through professional associations that require memberships (57%) as well as other EE related organizations (32%). In addition,
34% found these resources through professional development activities, and 34% through university courses. Though this theme was weaker in the interviews, those who shared this information found the resources through similar venues: online, through professional development workshops, and from colleagues.

**Summary of Chapter 4**

By integrating both survey and interview results, a stronger pattern of themes emerge for each of the four research questions. Results demonstrated that teachers employed either or both infusion and integration of EE in most grades and many subject areas. Stand-alone courses (a form of integration), and interdisciplinary approaches were exclusive to high school teachers. Regardless of approach, teacher beliefs and philosophy played strong role in how and where they taught EE, the outdoors being integral to their practices. Both administration and colleagues played an important role in supporting teachers’ EE practices. Outside the school, the community also had a role in providing professional development and resources to teachers, especially non-profit EE-related organizations. Teachers cited challenges primarily within the curriculum (i.e., PLOs) as well as time for course planning, collaboration, and scheduling. Finally, though the ELE resource helped teachers to design interdisciplinary lessons and to justify their practice, it was not considered to be a practical resource for implementation. Following grounded theory method, a comparison of these results with the literature offer an additional way to corroborate data, and identify gaps in either the results or the literature. The next chapter extends the literature review from Chapter 2 and compares my results with the literature, following the sequence of my research questions.
Chapter 5: Discussion

In this chapter, I interpret and discuss my research findings, compare them with the literature, and present my theoretical models. As mentioned in Chapter 2, I conducted most of my literature review after I analyzed my results to minimize researcher bias and to reflect the emergent themes from the data as suggested by grounded theory methodology. Results from the surveys and interviews presented strong themes in how EE is defined and implemented, where EE takes place, the rationale for EE implementation, and the supports and challenges educators encounter in their EE practice. From these themes, I conducted a literature review to confirm similar patterns in other research, to identify any contradictions in research findings, to describe gaps that may be addressed in my research or that still need to be addressed in future research, and to support my theoretical models of teacher and student engagement, as well as EE programming (Creswell, 2007).

Summary of Research Findings

My findings indicate teachers incorporate EE in a variety of subjects from grades 1-12. They used infusion, integration, and interdisciplinary approaches, and identified issue-based discussions, hands-on activities, and action-based projects as specific pedagogical practices. Teachers also reported that the outdoor component was integral to EE. Further, their approaches and practices were strongly informed by their personal beliefs and philosophy. Teachers’ beliefs included an ecological worldview, which emphasizes connections, a sense of social responsibility, and a deep concern for their students and their future. Teachers’ philosophies involved the importance of making meaningful connections to the curriculum, the value of instilling a sense of responsibility in their students, and the efficacy of using student centered approaches. The strongest instructional supports included resources, professional development,
and collegial support; the challenges included lack of time, limitations in the structure and content of curriculum, and a perceived inability to get out of the classroom setting. The observed congruence among teachers’ understanding of EE, their beliefs, philosophical stance, and the specific pedagogies they employed implied strong teacher and student engagement. The results also demonstrated a relationship where the more a teacher was able to modify the school curricula and infrastructure to focus on EE, and collaborate with colleagues and the community, the more the course or program was likely to become part of the school culture.

**Defining EE.**

In explaining a working definition for EE, interview participants expressed a multifaceted understanding of EE: as a body of knowledge, a way of teaching (pedagogy), a reason for teaching (rationale), and place for teaching (outside). Their understanding of EE is reflective of Stapp’s (1969) seminal definition, the summative definition proposed by Lucas (1972) where EE is about the environment, for the environment, and in the environment, as well as the four goals proposed by Hungerford, Peyton and Wilke in 1983 (Stapp, 1969, Disinger, 1983; Hungerford, Peyton & Wilke, 1983; Lucas 1972). The strength of the participants’ definitions demonstrate a sophisticated understanding of EE, linking knowledge with responsibility and action, along with nurturing a sense of place. Although each teacher had a unique or personal way of defining EE, she or he consistently expressed explanations that are reflective of the complex and comprehensive nature of EE. The lack of consistency in how EE is defined in the literature has been considered both a weakness and a strength (Jickling, 1997; Hart, 2003; Saylan & Blumstein, 2011). Some feel that lack of a clear definition presents a risk to establishing EE as a legitimate topic in the curriculum (Knapp, 2000; Saylan & Blumstein, 2011), whereas others find the dynamic process of defining EE encourages teachers to make more meaningful connections
to their practice (Jickling, 1997; Hart, 2003). In the case of the interview respondents, their EE definitions strongly align with how they approach implementation, which is discussed in the next section.

**Environmental Education Implementation**

**Implementation approaches and instructional practices.**

Results from both the surveys and interviews demonstrated that most teachers thought EE should be included into the curriculum, felt a confidence in doing so, and did so via infusion, integration, or interdisciplinary approaches. Specific pedagogies relied primarily on practices such as: issue-based discussions, hands-on activities, and action-based projects. Both elementary and secondary teachers expressed confidence in integrating EE, despite the fact it seems that the structure of elementary schools would enable more integration. Secondary teachers had an additional opportunity to integrate EE as stand-alone courses (i.e., BAA and IDS).

Studies in the US showed teachers who were implementing EE relied on similar approaches and practices with those found in my study (Lane, 2006; NAAEE, 2000). The US nation-wide NAAEE survey for K-12 teachers demonstrated that most respondents included EE topics in their teaching by incorporating EE into the regular curriculum, teaching an EE-specific course, and combining both strategies. Specific pedagogies were also similar to those identified in this study including: discussion, hands-on activities, problem-solving activities, and field trips. Lane’s (2006) investigation of Wisconsin teachers also identified practices such as issue-based discussions, as well as taking students outdoors. In both studies, infusion was the most common approach, with no specific mention of integrated or interdisciplinary approaches. Either the questions were not asked, or the practices were not occurring. Participants in my study not only successfully implemented EE, but also expressed a strong rationale for EE.
Rationale for Environmental Education Implementation

In my study, teachers voiced a strong rationale and philosophy for EE, which was expressed through their practice. The congruence of their rationale, philosophy and practice implied teachers themselves were strongly engaged, and when coupled with their practices, set in motion a positive feedback loop of student engagement.

Teacher engagement.

Participants’ rationale for including EE emphasized connections and relationships, a strong sense of social responsibility, a deep concern for their students and their future, and a core value that informed their worldview. All of these factors are driven by teachers’ passion for the environment. Their rationale informed their teaching philosophy which centered around making meaningful connections to the curriculum, instilling a sense of responsibility in their students, and using student centered approaches. Eames et al. (2008) found similar results in New Zealand schools, reflecting a strong teacher passion toward EE, and emphasizing education about the environment while encouraging students’ care and respect for the environment. My research further connected teachers’ rationale and philosophy to their pedagogies, which included issue-based discussions, hands-on activities, action-based projects, and outdoor experiences. These results demonstrated a strong congruence among teachers’ rationale for EE, philosophy, and specific pedagogical practices, linking teacher’s worldviews to their practices (Stevenson, 2007). This congruence elicited a positive feedback loop between teacher and student engagement.

Hart’s (2003) study demonstrated how teachers’ “deeply embedded beliefs and values” (p. 157) were expressed through EE. He explored why teachers in Canada, Australia, and UK included EE in their practice, and found that the teachers in his study exhibited an ecocentric worldview, where an environmental ethic was “an extension of personal-social ethics” (p. 199).
Similar to the teachers in my study, they cared deeply for their students and future generations. Through their EE philosophy, they made meaningful and relevant connections with the curriculum, used student-centered approaches, and prepared students to become responsible citizens. Their practices extended from their philosophy and included hands-on learning, environmental action-based projects, and appreciation of the outdoors. Teachers in Hart’s study believed EE practices improved students learning experiences. Regardless of mandate or policy, Hart concluded EE occurs in schools as a result of the “personal commitment of teachers who turn their personal theories into practical professional actions in the classrooms, schools, and communities” (p. xiii). The results in his study are consistent with my own findings, adding further credibility to the patterns emerging from my analysis.

Schweisfurth (2006) documented similar findings in her study relating teacher engagement with curriculum. In her case study, she explored how Ontario teachers integrated a global citizenship unit in a Civics course that was core to the curriculum. She reported teachers found ample opportunities to develop this unit in ways that aligned with their personal philosophy, resulting in a more innovative and action-oriented course compared to that of teachers who did not share similar philosophies and approaches. These studies affirm that when teachers are able to align their beliefs and philosophy with their practices, they become engaged.

Teacher engagement elicits additional benefits. Engaged teachers act as powerful role models in terms of having a strong sense of who they are, how they live in the world, and their role as teachers. Teachers participating in my study admitted to being role models: “If you are not modeling responsibility for the environment, then your teaching is hollow. It can’t be a ‘do as I say’, it has to be ‘do as I do’. I feel really strongly about that” (J. Abel). Students see firsthand how teachers challenge their own assumptions and become more aware of their
choices. As teachers embody these changes, students learn engagement and passion continue to be expressed into adulthood. Engaged teachers believed they influenced student engagement.

**Student engagement.**

Although my study did not measure student engagement directly, teachers’ inclusion of student-choice in themes, projects, courses, programs, and leadership activities, along with their description of students’ participation, suggested that their students were engaged in learning. Figure 10 illustrates a model of how teachers’ rationale drove their philosophy, and influenced their practices resulting in positive feedback loop of teacher and student engagement.

![Figure 10. Model of teacher identity driving positive feedback loop of engagement.](image)

The practice of meaningful learning through interdisciplinary or integrative action-based practices has been suggested since the Tbilisi Declaration was first published in 1977, where it stated students should “be actively involved at all levels in working toward resolution of environmental problems” (UNESCO, 1978, p. 27). Students can become more engaged when they experience meaningful connections across the disciplines, and participate in action-based
learning that encourages responsible citizenship (Barrett, Hart, Nolan, & Sammel, 2005; Simmons, 2001). Moreover, their participation in community-based action-based projects may improve the agency students feel in addressing environmental problems. Instead of being overwhelmed into apathy and hopelessness, they can become motivated by collective action (Lertzman, 2008; Saylan & Blumstein, 2011).

Palmer (1988) described similar patterns of engagement when teachers teach in a manner that honors “their own deepest values rather than in ways that conform to the institutional norm” (p. 171). Palmer argued that when a significant central theme, in this case, EE, becomes the centre of learning, it inspires both the ethical and the intellectual aspects of learning, resulting in increased student engagement. Furthermore, the human brain is more able to process information through meaningful connections rather than having to make sense out of isolated information out of context (Bransford, Brown & Cocking, 2000). Thus, significant environmental themes serve as meaningful learning contexts that increase student engagement, improve learning, and offer the important benefit of teaching students how to live responsibly in the world. In terms of teaching practices, Palmer proposed that “good teaching comes from identity, not technique” (p. 63), but that techniques could be natural expressions of identify.

Previously discussed in Chapter 2, Liebermann & Hoody’s (1998) study on American schools that used the environment as a context for learning (EIC) model demonstrated improved students achievement as well as increased engagement for both teachers and students. Further, they reported increased enthusiasm toward teaching when teachers implemented interdisciplinary, collaborative, hands-on, student-centred approaches utilizing the local environment and community. Students that participated in the same study: “…became enthusiastic, self-motivated learners” (p. 2), suggesting a positive feedback loop between
teachers and students. My research also suggests teachers’ rationale is at the centre of engagement for themselves and the students, resulting in a positive feedback loop that benefits all. The next section will focus on where EE practices take place, with respect to grade levels, subject areas, and physical locations.

**Where Environmental Education Takes Place**

My findings demonstrated EE can take place in most grades from K-12 and in subject areas, especially in science and social studies, in addition to the outdoor environment. There is a long history of support for multi-aged integrated and interdisciplinary approaches to EE, from the 1977 Tbilisi Declaration to the 2007 BC Ministry of Education ELE Guide (BCTF, 1972; BC Ministry of Education, 1995; BC Ministry of Education, 2007; UNESCO, 1975; 1977; 1992). These approaches have been considered the best way to achieve a comprehensive and holistic understanding of EE (Simmons, 1989). Despite the varying degrees of implementation, my research confirms EE can take place in all grades and in most subject areas, and especially in science and social studies (Puk & Makin, 2006; Simmons, 1989; Steele, 2011). However, participants in my study were able to demonstrate connections with EE beyond science and social studies and so did not experience the perceived barriers expressed by teachers in other studies (Simmons, 1989).

**Outdoor learning environments.**

Although many of EE practices take place inside the classroom and within the school grounds, survey respondents and interview participants unanimously identified the *outdoor* experience as an integral component of EE. Participants voiced strong support and action in this area, citing the importance of connecting students to their local environment, creating meaningful learning experiences for them, and providing an opportunity for students to enjoy the
beauty of being in nature. Teachers included the outdoor component within their definition in EE and were able to accommodate these experiences for the students, despite the perceived barriers expressed in getting out of the classroom, a strong testament to how much they valued the importance of children being outside.

Benefits documented in the literature are significant and include increased student engagement and achievement, along with improved health and well-being (Beane, 1997; Louv, 2005; Smith, 2002; Sobel, 2004). Yet the use of outdoor learning environments is not commonly provided in formal education settings, including those in BC (Caner, 2009; Puk & Behm, 2003; Puk & Behm, 2006). Given the importance and the benefits of these experiences, those in the education system should consider ways of addressing this gap. The method by which the participants in my study provided outdoor learning experiences serves a useful guide for best (and possible) practices.

Supports for Environmental Education Practices

Results indicated a number of supports that facilitated EE implementation, with resources, professional development and colleagues described as the most significant. Resources provided the strongest support for teachers and encompassed materials, people, and places. Teachers identified professional development and background knowledge as especially helpful. In general, they accessed resources through EE-related organizations, online, and through colleagues, and felt there was not enough. Additionally, local green spaces and places in the community played acted as an important resource. Finally, non-profit organizations provided people, places, professional development, and material resources for teachers. The diversity of supports used by teachers contributed to a dynamic learning environment. Most striking was the role non-profit organizations played in supporting teachers’ EE practices. Though it is important
to recognize teachers were contacted to participate in this study through some of the organizations, they listed many more that were not associated with this study.

In jurisdictions with non-mandated implementation, studies affirmed similar results (Eames et al., 2008; Robertson, 2007). The results from Robertson’s (2007) BC wide survey also identified the following factors that supported their EE implementation: support from resources, background knowledge, their colleagues, and administration. In New Zealand, Eames et al. (2008) found that supportive practices included effective leadership, pro-active professional development, whole school participation, and links with outside environmental organizations. In my study, the support of colleagues factored strongly in both surveys and interviews. The most effective relationship was characterized as ones where they shared similar philosophies, expertise, resources, and were collaborative in nature. However, the degree of support from school administration had mixed reaction, where about half of the teachers in the study identified it as helpful, or having enough.

Other studies have highlighted the importance of administrative support. For example, Hart (2003) found administrator support to be critical in the success of EE practices and school programs in his multi-jurisdictional study. Ernst’s (2009) investigation on the influences of public middle school teachers’ use of EE confirmed these findings, with the role of administrative support identified as critical for the implementation of EE. Norman, Jennings and Wohl’s (2006) literature survey also identified similar factors as important supports for implementing EE: administrative and community support, collaborative planning with colleagues, and the role of professional development and training.
Challenges

The challenges identified in my study included timetabling, time, curriculum, limited ability to get out of the classroom, and exams. Robertson (2007) found similar results in his study with BC teachers: low collegial support, lack of time in an already crowded curriculum, lack of fit in curriculum, focus on exams, and lack of resources.

Barriers identified in other jurisdictions were similar: lack of time, lack of resources, an already overcrowded curriculum, lack of teacher training for EE content and pedagogical approaches, influence of the more prestigious subjects with specific outcomes that could be measured by examination, the required examinations for specific academic pathways (i.e. from high school to university), and lack of support from colleagues, administration, parents (Eames et al., 2008; Ham & Sewing, 1988; Puk & Behm, 2003; Puk & Makin, 2006; Yueh & Barker, 2011). What is different in my study is that they teachers were committed to EE, and although they identified similar barriers, they not only were able to implement EE, but some created extensive EE programming that aligned with their philosophy, despite the barriers. Hart & Nolan (1999) suggested that the knowledge of the barriers to EE have been known for a long time and education systems need to move forward. The responses in my study caused me to re-identify the barriers as challenges. I found a relationship among challenges, supports and EE course/program continuation; thus the challenges served as important factors in enabling more EE implementation.

Assertion: A Theory for Environmental Education Programming

A synthesis of findings from the various components of my study demonstrates that teachers employ three broad approaches to teaching EE: infusion, integration, and interdisciplinary approaches. To construct a grounded theory, I analyzed the relationships
between these approaches and explored significant themes that may influence them. According to Charmaz (2006), constructing grounded theory is a “conceptual analysis of patterned relationships” (p. 81) emergent from the data. Through memos and diagramming, I propose the following assertion: The more a teacher modifies the school curricula and infrastructure, and collaborates with colleagues and the community to accommodate EE, the more the course or program was likely to become embedded within the school culture. The relationship with supports, challenges, EE programming for each of the three broad approaches are summarized as follows:

In this study, infusion was the most commonly reported approach. Interview participants described infusion in the broadest number of grades and subjects: grade 5 activities and events; Biology 11 and 12, Chemistry 11 and 12; ESL 10; Geography 12; Home Economics; Planning 10; Science 7, 9, 10; Social Studies 8-11. They were able to infuse EE into their grades and subjects with minimal support from their colleagues and administration, and without altering the unit, course, or school timetable. The practice of infusion was entirely dependent on the teachers; if the teacher was not teaching that course or grade, infusion might not have occurred. For example, J. LeBlanc, was confident about integrating EE units for her grades 1-3 classes, but did not see it happening beyond her classroom:

It’s not something that every teacher is doing, and the classroom unit is not something that is easy to collaborate with other people about…In terms of having common values shared with the school, district, and community, I don’t really see that happening at the level that makes this kind of practice easy.

However, even if there is only one teacher practicing EE in a school, they still have an important role in EE implementation. Hart (2003) surmised teachers “own beliefs, motivation,
and experience are what drives their practice. Perhaps environmental education exists as much because of personal practice theory as anything else” (p. 25).

Integration was also a common approach, appearing in a number of grades and subject areas: as theme-based units in grades 1-3, and 5, as a school wide outdoor experiential program in grades 4-12, as a Biology 11-12 Coop Program, as Board Authority/Authorized courses in grades 11-12, and as Independent Directed Studies in grades 11-12. To integrate EE, teachers were required to manipulate learning outcomes to create units, or design entire courses or programs focusing on EE. To accomplish this, they required increased interaction and support with their colleagues and administration, and in some cases the parents and community, especially to accommodate timetable changes and travel outside the school grounds. Integration relied on the individual teacher, but with school-wide programs, enlisted the cooperation of others. Thus, courses and programs were more likely to continue without that particular teacher (e.g., Project Discover, Science Co-op, BAA Outdoor courses). L. Benfeito spoke about the challenges of getting more teachers to see the benefits of the EE experiences provided through students’ participation in Project Discover: “I think slowly there’s a bit of an understanding growing about how we can try to incorporate the curriculum and trying to do things that are outside the classroom.”

H. Carleton combined both infusion and integrated approaches, using infusion for core courses, integration of units, BAA and IDS courses, and connecting both with community action-based projects required for school and district programs. Her grades 9-12 students engaged in EE through their District-wide Flexible Studies in Leadership and Learning Program, the school-wide Leadership Program, BAA, and IDS courses, all of which drew from a common core of action-based projects (see Figure 8). Although she was integral in creating and connecting units,
courses, programs, and action-based projects, she purposefully included succession planning via student leadership and mentoring and shared her expertise and resources with other teachers (in her school, district, and other districts), thus contributing to the program’s sustainability. The support of colleagues, administration, parents, and community was integral to the success of this combined approach. The timetable posed significant challenges so the BAA course was initially offered during lunchtime, then as an IDS course students could complete in their own time. Because so many people were involved in a variety of courses (both core and elective), programs, and projects, there is an increased chance that they will continue if the original teacher left the school. H. Carleton explained the importance of connecting school programs: “What I try really hard to do is connect the curriculum so if I was to leave, it would hopefully carry on”. A few months into the following school year, she reported that many of her programs are now embedded in the school and community. Instead of expanding her EE programs, she and her students are sharing their model with other schools and community partners, a testament to the success of the district and school’s leadership program, and the EE programming becoming the cultural norm.

The school-wide interdisciplinary program for grades 11 and 12 students involved the combination of eight courses over two years. This program required an entire redesign of these eight courses into two super courses, containing both core and elective courses. In addition, the program included a guest speaker series, field studies, and a culminating action-based project. The super courses are team taught by four teachers. Significant cooperation on the part of the team teachers was required for the design and development of this interdisciplinary program. The principal was integral to supporting the changes in the timetable required to accommodate this approach. In addition, community support from the superintendent, a local university, and
the parents, helped ensure the programs successful launch. G. McCabe, one of the four teachers who designed this interdisciplinary program explained: “The course itself will be sustainable so if one of us decides to leave in the next few years, it can be passed along so its not just another course that dies”. The amount of time and number of people invested in this program would likely call for a teacher replacement, instead of a program closure, should a teacher leave the school. Furthermore, it is likely that such innovative programs would attract like-minded educators. The supports and challenges in these three broad approaches influence EE programming. Table 8 summarizes the supports and challenges that influence the likelihood of EE becoming part of the school culture, which is discussed in the next section.

**Table 8**

*Supports and Challenges by Approach, and how they Influence EE Programs*

<table>
<thead>
<tr>
<th>Approach</th>
<th>Supports</th>
<th>Challenges</th>
<th>EE Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infusion</td>
<td>Need at least one teacher.</td>
<td>Minimal.</td>
<td>If teacher leaves, there is no EE taking place.</td>
</tr>
<tr>
<td>Integration</td>
<td>Need one teacher or more. Administration is more involved.</td>
<td>Need to modify or design a unit, course, or program. May need to change timetable.</td>
<td>If teacher leaves, she or he would likely be replaced, and the programs might not continue.</td>
</tr>
<tr>
<td>Combined</td>
<td>Need more than one teacher.</td>
<td>Need to modify or design a unit, course, or program. May need to change timetable.</td>
<td>If teacher leaves, she or he would likely be replaced, or some of the integrated programs might continue.</td>
</tr>
<tr>
<td>Interdisciplinary</td>
<td>Need more than one teacher. Administration is involved. Community is involved.</td>
<td>Need to modify or design course, or program. Need to change timetable. Need to modify assessments.</td>
<td>If teacher leaves, she or he would likely be replaced, and program would continue.</td>
</tr>
</tbody>
</table>

**Relationship among supports, challenges, and EE programs.**

Whether teachers practiced infusion, integration or interdisciplinary approaches, they showed a strong congruence of their beliefs with their philosophy and expressed it through specific pedagogical practices (e.g., issue-based discussion, hands-on approaches, action-based projects). EE programming became increasingly embedded into the school culture as it moved
in the direction from the least disruptive approach (i.e., infusion) that rely upon few infrastructure changes (e.g., courses, timetable, examinations) and at least the passion of one individual teacher, toward ones that demand more infrastructure changes, and support from more members of the school community.

Infusion may be the easiest way to incorporate EE in the current education system. As an approach, infusion is the most accessible to teachers in all grades and subject areas, requires minimal professional development, and may reflect where teachers are at in terms of the amount of time, energy, or vision they have in modifying the curriculum or school structure. Resource providers may consider developing specific resources to support this group of educators. Integration, combinations, and interdisciplinary approaches require more changes to units, courses, and timetables, and also more support and collaboration with colleagues, administration, and the community. Such whole-school approaches, where students, teachers, staff, administration and parents are involved in EE programs, can contribute to a program’s continuity. Eames et al. (2008) recognized the importance whole school approaches played in the success of New Zealand’s EnviroProgramme. They noticed patterns in schools with embedded EE programs: these schools tended to prioritize professional development for their staff, focus on building student leadership and responsibility, and used a whole-school approach, where more than one or two people sustain the programs. Many of these attributes were present in the combination and interdisciplinary approaches in my findings.

Eames et al. (2008) concluded their study at around the time the New Zealand curriculum was incorporating competencies to focus on higher level thinking skills. They suggested that additional transformational changes would be required to effectively accommodate EE philosophy and practices. The idea of EE as/for transformational change has broader
implications for the education system (UNESCO, 1978). Though the participants in my study found ways to incorporate EE practices in the formal school system, they identified challenges similar to teachers in other jurisdictions. The interdisciplinary approach, long recommended for EE, was described by only one participant; implying the challenges outweigh the supports for many teachers. When taking into account the scalability of EE philosophy and practices, these challenges offer insight into the formal education system, including both the infrastructure as well as the fundamental role of education.

**How EE challenges the current formal education system.**

The approaches and practices utilized by the research participants honour the philosophy of EE but seem to be at odds with the current design of the school system, which may not be optimizing teacher and student engagement. The logistical challenges of timetabling and getting children outside, the constraints of curriculum and examinations and the design of optimal learning environments were identified in my study and similar studies and offer important insight. Hart (2003) described similar challenges where schools are seen as authoritative and discipline-centred, and emphasize the “passive assimilation and reproduction of knowledge” (p. 24). He explained that current teaching practices rely heavily on “routines and memorization, abstractions divorced from lived experience, by boring lessons, excessive regulation and rules, overstressing grades, too much mindless activity, indoors, where students pursue careers instead of callings” (p. 25). None of these practices are conducive to the kind of creative and critical thinking and problem solving required of EE (Hart, 2003).

Stevenson (2007) also characterized current education systems designed as discipline-based subjects taught by individual teachers via transmission, where students are passive receivers of prescribed content containing unrelated facts that rely on memorization and
theoretical and future problem solving. For these reasons, he asserted that in order for EE to take place, the fundamental role of the school would need to be transformed. Stevenson (2007) described the historical role of school as one that focused on literacy and maintaining the status quo. He argued the current role of school expanded to credentialing through assessments, both of which are at odds with the transformative vision of EE: interdisciplinary, collaborative, co-constructed, student-centered approaches to learning, where students critically think about the cultural assumptions that guide how they live in the world, and problem-solve current and relevant issues.

Teacher engagement also provides insight into the efficacy of the education system. The congruence of beliefs, philosophy, and practices experienced by my participants implied strong teacher engagement, and as a result, strong student engagement. Hart (2003) explained how teachers’ belief systems, whether or not they are aware of them, have a strong influence in shaping learning environments: “Teachers bring their worldviews (i.e. ideas, assumptions, beliefs and values) into their practice, whether or not it reflects the dominant cultural paradigm or an ecological worldview” (Hart, 2003, p. 49). Those who follow an ecological worldview not only act as important role models, but also practice in a more effective manner. Hart (2003) described the role of teaching as “translating social values (and environmental values) into concrete educational practices rather than merely the transmission of knowledge.” (Hart, 2003, p. xvi). The teachers in my study exhibited such a role.

Stevenson (2007) also identified the role teachers’ belief system plays in education transformation. If belief drives the practice, then personal exploration of beliefs and understanding of the underlying assumptions that inform the design of our current education system needs to be part of the discussion if whole school paradigm shift is to take place.
Hart (2010) expanded on the importance of critical discourse on personal worldviews in addition to the role of schools in teacher education as the basis for education reform.

Fullan (2003a) also described strong links between teachers “passion, purpose and capacity” (p. 5) with “student engagement and learning” (p. 5), emphasizing the interaction of both. He places this powerful dynamic as the heart of school reform (Fullan, 2003b). Hart (2010) claimed EE’s dual ability to invigorate discussion on both rationale and practice has significant influence on education transformation: “Environmental education, by its very nature, challenges its traditional education provision to engage educational issues that, like environmental issues, are political, contested, and involve deep philosophical struggles with positioning arguments (p. 157).

Though Hart (2003, 2010), Stevenson (2007) and Fullan (2003b) called for system-wide transformation, the teaching practices of the 12 teachers in my study demonstrate that such innovations can take place even in the current system, with considerable effort. Beane (1997) suggested that making changes within the current system is more feasible than trying to change the whole system. Perhaps there is a middle ground: The results of my study demonstrate teachers are already implementing innovative approaches in the current education system, and are able to realize the broader goals of EE that are currently written in BC Mandate for the School System (e.g., critical thinking, exercising responsibilities, active participation in democratic institutions) (British Columbia Ministry of Education, 1989). In effect, they are role models for innovative and effective teaching practices. Their challenges identify what must be addressed to accommodate potential larger scale changes within the province of BC. The
measure of both teacher and student engagement serve as powerful indicators of an effective school system.

**Summary of Chapter 5**

The act of defining EE was a powerful indicator of how participants in my study implemented EE. Their innovative practices and approaches were congruent with their rationale and philosophy, a dynamic that has been identified with environmental educators in other jurisdictions. The outdoor component was both integral to their practice, and received strong support in the literature, although outdoor learning does not seem to as common a practice in other jurisdictions. Participants faced similar supports and barriers as those cited in the literature, but managed to transcend the *challenges* and implement innovative approaches.

Their approaches went beyond the infusion and integrated approaches that were more commonly described in the literature, to include combined and interdisciplinary approaches. The participants’ practices were expressed as a model that may be helpful in addressing this gap, showing the necessary supports and identifying which challenges need to be overcome to create more sustainable EE programs. Whereas EE philosophy and practice challenge current education paradigms, they also pave the way to education transformation. If one is to assume this handful of teachers is a reflection of a larger community of like-minded educators, then perhaps this transformation is already underway.

However, if rationale and philosophy are the drivers to these innovations, then developing a broader cultural understanding of EE within the general public and especially with educators is fundamental to change. This would entail a rich discussion of the role of education and schools, along with identifying our personal and cultural assumptions that shape the design
of education systems and influence how educators practice. The final chapter presents additional implications to my findings, along with recommendations and suggestions for further research.
Chapter 6: Conclusion, Implications and Recommendations

This final thesis chapter begins with the summary of the entire study, then summarizes the conclusions, implications, as well as recommendations for those in the education community. I complete this report of my study with suggestions for further research.

Summary of Entire Study

Since the 1977 Tbilisi Declaration, proponents of environmental education have suggested an interdisciplinary approach to teaching, where environmental topics are found in different subject areas in all grades. The British Columbia Ministry of Education supports this approach through a suggested framework of how environmental learning can be incorporated across the disciplines. In addition, the BC curriculum includes related required learning outcomes throughout the K-12 curricula. Using a mixed method design, I investigated the practices and experiences of environmental educators in BC, what supports and barriers they experience, as well as how they are using the Ministry Framework. I invited K-12 environmental educators to participate in an online survey, and a select group of respondents to elaborate on their practices through interviews. I applied grounded theory method to develop models and a plausible theory of how teachers incorporated environmental education in their practice. The results demonstrated teachers relied on infusion, integration, and interdisciplinary approaches in most grades and many subject areas of the BC curricula. Teachers also identified the practice of bringing their students outdoors as integral to EE. They exhibited a congruence with their rationale, philosophy, and specific pedagogical practices, which contributed to strong teacher and student engagement. The results also demonstrated a relationship where the more that a teacher was able to modify the school curricula and infrastructure to focus on EE, and collaborate with colleagues and the community to accommodate EE, the more the course or
program was likely to become embedded within the school culture. The research findings indicated how these experiences of environmental educators can serve as a model for education transformations by identifying challenges, support systems, and innovative practices.

**Conclusions and Implications**

There are three main conclusions with related implications regarding how teachers incorporate EE into their practice.

1. **Teachers confidently incorporated EE into their practices in many elementary and secondary school subjects.** The following four statements relate to and expand on this conclusion:
   
   a. *Teachers were strongly in favour of incorporating EE into the curriculum and felt confident in doing so.*
   
   b. *They relied on infusion, integration, and interdisciplinary approaches.*
   
   c. *Teachers incorporated EE into many subject areas, in both elementary and secondary school settings.*
   
   d. *Teachers identified outdoor experiences as integral to their EE practice.*

My research targeted a select group of teachers who were affiliated with EE-related organizations, suggesting they were already strongly committed to EE. The participants described approaches that fit into these three broad categories. While the literature identifies *infusion* as the most common approach to EE (Lane, 2006), the teachers in my study were also able to apply integrated and interdisciplinary approaches, and in most subjects and grades. Thus, environmental educators can act as important role models for demonstrating possible EE practices for other educators including those in other subject areas who are looking to apply innovative approaches.
Despite the fact that the interdisciplinary approach has been recommended since Tbilisi and encouraged in BC, it was the most rare approach in this study. This approach presents the most challenges with curricula and school infrastructure and requires more support from colleagues and administrators to be successfully implemented, whether on a worldwide or province-wide basis. Ministries of Education, school districts, and schools have an important role in shaping learning environments to accommodate this approach. Similarly, teacher training institutions and other organizations have a role in providing professional development and resources to support interdisciplinary approaches, especially in secondary schools.

Teachers in this study also strongly identified the outdoor experience as part of their EE practice. Their reasons included nurturing an ethic of responsibility and awareness of place, as well as enjoying the beauty of natural environments. The literature strongly supports students’ interaction with the outdoors, outlining a myriad of benefits ranging from improved learning and engagement to development of students’ health and well-being (Liebermann & Hoody, 1998, 2000; Louv, 2005; Palmer, 1999; Smith, 2002; Sobel, 2004). However, the outdoor learning environment is not a universal experience for students in the BC education system, and districts and schools have not made this practice more accessible to teachers (e.g., bureaucracy of paperwork, cost of transportation). The BC Ministry of Education and school districts have an important role in ensuring all students have access to outdoor learning experiences. In addition, teacher training institutions and other organizations have a role in providing professional development and resources for pre- and in-service teachers to support outdoor learning.

2. Teachers exhibited a congruence with their rationale, philosophy, and specific pedagogical practices, resulting in strong teacher and student
**engagement.** The following three statements relate to and expand on this conclusion:

a. *Teachers’ rationale included an ecological worldview, which emphasized connections to the environment, a sense of social responsibility, and a deep concern for the future of their students.*

b. *Teachers’ philosophy involved making meaningful connections to the curriculum, instilling a sense of responsibility in their students, and using student-centered approaches.*

c. *Specific pedagogical practices included issue-based discussions, hands-on activities, and action-based projects.*

Although investigating teachers’ rationale was not central to my research study, it was strongly expressed in teachers’ responses, and related themes emerged from the data. The alignment of teachers’ rationale and philosophy with their practices suggested a strong teacher identity and engagement. Teachers’ inclusion of student-centred activities suggested the potential for strong student engagement. Thus, a positive feedback loop emerged between teacher and student engagement.

This feedback loop could signify the importance in the discussion and development of teacher identity for environmental educators as well as those who teach other subject areas. Hart (2003) expanded on the relationship between beliefs and practice: “Changes in practice occurs only when teachers become conscious of the personal practice theories implicit in their practice and are able to reflect critically about them. These are the constructs, beliefs, and principles that guide teachers’ practical work” (p. 196). Moreover, if environmental educators can invoke such engagement despite EE not being a core subject, then the congruence of their rationale,
philosophy, and practices may be of great interest to all in the education system. The strength of teachers’ purpose transcends the barriers they face in the current education system. Teacher training institutions, school districts, administration, and other organizations have a significant role in developing and identify teachers’ identify during pre- and in-service professional development and team-building activities.

3. The results demonstrate a relationship where the more a teacher was able to modify the school curricula and infrastructure, and collaborate with colleagues and the community, the more the course or program was likely to become embedded within a school culture. The following three statements relate to and expand on this conclusion:

a. The strongest supports included resources, professional development, and colleagues.

b. Teachers used the ELE guide to design lesson plans, apply interdisciplinary approaches, and to justify their teaching practice.

c. Challenges included timetable constraints, lack of time for planning and collaboration, inability to get out the classroom, and the structure and content of curriculum.

Teachers drew on a variety of supports to assist them with their EE practice. Their engagement of EE-related organizations emphasized the critical role these organizations have in supporting EE in BC. These organizations could design resources specifically for integrated and interdisciplinary approaches, and provide professional development necessary to support these practices. Organizations can also expand and design programs to provide outdoor learning experiences that connect students to their community. Research suggests programs that focus on
local issues, hands-on projects, and action-based projects may be most engaging and empowering for students (Liebermann & Hoody, 1998, 2000; Palmer, 1999; Smith, 2002; Sobel, 2004).

Teachers also identified colleagues as key areas of support in terms of shared philosophy and collaboration. There is a role for administrators and department heads to develop a common sense of purpose in schools and departments, as well as communities of practice so even individual teachers can find support in the larger education community (Yueh, 2007). Administrators also need to be aware of what motivates their teaching staff, and find ways to encourage and acknowledge their practices.

A school culture is a reflection of teacher relationships with colleagues and administration, as well as other staff members and the community. Culture plays a significant role in supporting innovative teachers’ practices. Whether a single teacher is infusing EE into his or her courses, or a group of teachers collaborate and team-teach interdisciplinary courses, school culture sets a tone in support of a variety of perspectives and approaches to education. In BC, both public and independent schools can offer specialized learning environments for an entire school, or a variety of programs or courses to suit different approaches to learning. In addition, both settings allow teachers to design Board Authority Authorized and Independent Directed Studies that accommodate the perspective of the student, teacher, school, and/or district.

Curricular resources, including the ELE, also supported teachers’ EE practices. The ELE was developed specifically to assist BC teachers with EE, but had mixed reviews. Just over half of the teachers found the ELE helpful in applying interdisciplinary approaches, planning lessons, and justifying their practices. The idea of having to justify teaching practices has implications for the professional autonomy of teachers as well as the importance of teaching non-core
subjects. How teachers accessed these resources also has implications for future resource
distribution. Teachers reported accessing Ministry resources from organizations other than the
Ministry of Education. The Ministry could review their communication strategy (e.g.,
distribution lists, role and design of website) and/or partner with relevant teacher training
institutions and organizations to distribute important documents.

Finally, teachers identified a number of challenges to incorporating EE into their practice.
The more teachers wanted to incorporate EE approaches and practices, the more the that courses
and programs needed to be modified, and more challenges needed to be overcome. Put another
way, it would seem that the more teachers wanted to optimally engage students in innovative
learning environments, the more the structure of the curriculum and school system needed to
change, the more people were needed for support and collaboration, and the more embedded the
changes became in the school culture. The supports and challenges provide important insights
into what is required to change practices, approaches, and even entire education systems.

**Recommendations for Practice**

Based on the research findings, I make the following recommendations to those who are
involved in promoting EE within the education system:

a. Showcase the practices of exemplary environmental educators. Use interactive
   web technologies to share best practices across the province, engaging the
   feedback from all stakeholders in the education system, including students.

b. Provide professional development and resources designed to assist with each of
   the three broad approaches to EE (i.e., infusion, integration, interdisciplinary), as
   well as incorporating outdoor and experiential learning experiences.

c. Design curricula to specifically address outdoor learning.
d. Reduce the amount of paperwork and/or bureaucracy needed to take students outside.

e. Provide adequate professional development to support teacher (ecological) identity for pre- and in-service teachers.

f. Develop a common vision or mission for EE in K-12 schools and departments. Support communities of practice internal and external to the school.

g. Partner with relevant stakeholders to design and distribute resources so they reflect the needs of, and are accessed by formal and informal educators.

h. Design EE curricula, learning environments, and resources to optimally engage teachers and students indoors and outdoors (e.g., meaningful, hands-on, action-based).

i. Design assessments to reflect meaningful and applied learning.

j. Allow for more flexibility in timetabling, course design, and course and program choice.

k. Assist teachers with the interpretation of curricula and optimization of learning environments, through professional development (e.g., pre-service education, workshops, websites).

**Suggestions for Future Research**

There are a number of opportunities to extend this particular study to explore related questions. Following grounded theory method, the application of my models would be required to test my theories. I would apply my model of teacher and student engagement to the field to see if it reflects what is actually going on in schools. I would do the same with my model of changing school culture. The results would either support or refute my grounded theory
analyses. Ideally, I would contact interview participants and their students, and follow up with surveys and interviews designed for this purpose. To determine the amount of and nature of EE taking place in BC, I would apply similar research methods to a randomly selected sample of teachers in BC. Findings could then be more representative of BC teachers.

Since teacher identity played such a significant role with environmental educators in this study, I would be interested in finding out if a similar phenomenon occurred with teachers in other subject areas, both core (language arts, social studies, science) and non-core (EE, music, art). To extend this further, I would also want to explore which factors seem to be the strongest predictors of successful EE implementation (e.g., teachers’ worldviews, resources, professional development, communities of practice, redesigning curriculum, applying new approaches, revising the role of school).

**Final Thoughts**

Understanding the challenges of passionate teachers who are successful in implementing a non-core subject in a manner that engages both themselves and their students presents tremendous insight into the design of learning environments and the role of school. Teachers’ success in implementing increasingly embedded EE-programming have much to offer the broader education community.

The challenges environmental educators face point to key areas that hinder large-scale change to our education system more generally. How do current timetable structures accommodate innovative teaching approaches (e.g., teacher collaboration needed for interdisciplinary teaching) and practices (e.g., hands-on projects that take place outside)? How do subject/disciplinary curricula connect big ideas across the disciplines and enable integrative teaching? How does the curriculum get interpreted? How do assessments reflect the meaningful
real-life connections students make through issue-based discussions and action-based projects? How can the integrated approach of elementary classroom and the customized programming (e.g., BAA courses and IDS) in secondary schools become more scalable? In summary, how does the design of curricula and learning environments optimize student engagement? These questions suggest a critical role for those who design learning environments and influence the role of the school, namely the Ministry of Education, the school districts, and educators.

The three main conclusions provide insights into how to re-vision an educational system that accommodates and fosters more engaging and innovative teaching practices. My research concludes at a time when jurisdictions across the world are looking at different ways to approach education in the 21st century. The vision described in the Tbilisi Declaration may not have been attainable for many public schools systems (Knapp, 2000), but perhaps this is more a reflection of the role and design of school systems, as opposed to lack of large-scale success of environmental educators: “By its very nature, environmental education can make a powerful contribution to the renovation of the educational process” (UNESCO, 1978, p. 24). The approaches and practices of environmental educators lead the way in innovation, serve as a model of what is possible, and identify the challenges would need to be addressed to accommodate large-scale changes. Those who practice environmental education exhibit a strong passion and identity, and create learning experiences that provide engaging and meaningful contexts for students that teach them how they are connected to each other, their community, and the world (Capra, 1996; Hart, 2003; Sobel, 2004). These educators can be important role models as we transition from our current education system into one that facilitates improved teacher engagement and creates learning environments that optimize student engagement. Given the significance of the challenges we face now and into the future, perhaps the fundamental goal of
21st century learning involves re-visioning education systems to engage students meaningful contexts that contribute to current and future well-being of themselves, other people, other life forms, and the natural systems that sustain all of us.
References


British Columbia Round Table on the Environment and the Economy. (March 1993). *Towards sustainability: Learning for change.* Victoria, Canada: Round Table.


Jickling, B. (1997). If environmental education is to make sense for teachers, we had better rethink how we define it. *Canadian Journal of Environmental Education, 2*, 86-103.


change information. In S. C. Moser & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 64-80). UK: Cambridge University Press.


Appendices

Appendix A: Online Survey

Environmental Education Survey

Integrating Environmental Education into the BC Classroom

You are invited to participate in a 10-15 minute online survey about your experience integrating environmental education into your classroom.

My name is Connie Cirkony and this survey is part of my thesis for a Master of Arts in Environmental Education and Communication at Royal Roads University. My thesis explores how BC K-12 teachers integrate environmental education into their practice.

All data and documentation will be kept confidential and stored in a secure locked cabinet in my home; online information will be password protected. Your anonymity is assured and any of your comments used in my thesis will be under a pseudonym. A copy of the final thesis will be housed at Royal Roads University and publicly accessible. The report will also be made available to the participants in this study.

Your participation is completely voluntary and you are free to withdraw at any time without explanation and with no negative consequences to you.

If you have any questions about my credentials or the online survey, please contact Dr. David Zandvliet, Simon Fraser University Professor, at ~ or ~.

This survey will close on Tuesday, January 31, 2012.

Checking the box below indicates your informed consent.

Yes, I give my informed consent.

1. Please indicate gender.
   Female
   Male

2. Please indicate age range.
   Under 30
   30-39
   40-49
   50-59
   60 and over

Environmental Education

This series of questions relate to how you integrate environmental education (e.g., environmental learning, education for sustainable development, sustainability education) into your teaching practice. Environmental education may be "described as a way of understanding environments, and how humans influence these environments" (Environmental Learning and Experience: An Interdisciplinary Guide, 2007, p. 7).
3. Indicate how you feel about each of the following statements (strongly agree, agree, neutral, disagree, strongly disagree, don’t know):
Environmental education should be addressed in school.
Environmental education should be taught as a subject.
Environmental education should be integrated in all subjects.
In BC, there are enough learning outcomes in the K-12 curriculum about the environment and sustainability.
I have enough resources to teach environmental education in my classroom.
I have received enough professional development to integrate environmental education into my daily lessons.
I received enough support from my school administrator(s).
In my school, teachers collaborate and share best practices.
In my school, teachers participate in decisions involving administrative policies and procedures.
I feel confident about integrating environmental education in my lesson plans.
It’s important my students have educational experiences outside the classroom.

The Environmental Learning and Experience Interdisciplinary Guide was designed to assist teachers in integrating environmental concepts in the classroom. Related resources include Curriculum Maps, Videos, and Professional Development Workshops. The following questions refer to these resources.

4. Before doing this survey, were you aware of the ‘Environmental Learning and Experience’ guide and/or resources?
Yes
No (If no, skip to 10)

5. How did you find out about the ELE? Check all that apply.
BC Ministry of Education
Colleague
Online
Environmental Education related organizations (e.g., Sierra Club BC, Wild BC, etc.)
Professional Associations requiring membership (e.g., EEPSA, EECOM, CBEEN, etc.)
Professional development workshop/seminar/conference
School or district administrator
School’s Green Team
University course(s)
Other, please specify: _____

6. Do you use the ELE in your teaching practice?
Yes
No (If no, skip to 10)

7. Describe how you use the ELE resources. Check all that apply.
I use it to justify field trips
I use it to justify environmental education in my practice
I use it to design my lesson plans
I use it to design more community-based action projects
I use it to apply an interdisciplinary approach to my teaching practice
I use it to identify resources for my classroom
Other, please specify: _____

8. Which part(s) of the ELE resources are most helpful to your teaching practice? Check all that apply.
The interdisciplinary guide
The curriculum maps
The video
The professional development workshop

9. Explain how these resources helpful to your teaching practice (or not). _____
10. Indicate where you find general environmental education resources (i.e., other than the ELE). Check all that apply.
BC Ministry of Education
Colleague
District Administrator
In my school
Online ____
Environmental Education related organizations (e.g., Sierra Club BC, Wild BC, etc.)
Professional Associations requiring membership (e.g., EEPSA, EECOM, CBEEN, etc.)
Professional development workshop/seminarconference
School administration
School’s Green Team
University course(s)
Other, please specify: _____

11. Are you aware of your School District’s Carbon Neutral Action Reports?
Yes
No

12. Check all the practices that help you integration environmental education into your teaching practice.
Attending professional development workshops
Collaborating with other teachers
Collaborating with teacher leads/department heads
Having access to resources
Having a good background knowledge in environmental education.
Receiving support from school district
Receiving support from school administration
Receiving support from an environmental organization
Receiving support from parents
Using the ELE resources
Other, please specify: _____

13. Check all the barriers you face that hinder integration of environmental education into your teaching practice.
Constrained by timetable
Does not relate to curriculum I teach
Difficult to assess
Lack of time for course planning and/or preparation
Lack of resources for lesson planning and activities
Lack of background knowledge in environmental education
Lack of pre-service training in environmental education
Lack of in-service training in environmental education
Lack of cooperation with other teachers
Lack of support from school administrators
Lack of support from professional or community organizations
Lack of support from the Ministry of Education
Limited ability to get out of the classroom
Unsure how to integrate into the curriculum
Teaching Background

14. Indicate any degree(s) or equivalent training.
   B. A.
   B. Ed.
   B. Human Kinetics
   B. Sc.
   B. Fine Arts
   P.D.P.
   Master’s Degree
   Doctoral Degree
   Other, please specify: _____

15. List any university course name and/or course description you took that relates to environmental education or sustainability: _____

16. Check your program of study during your teaching education program.
   Elementary Education
   Middle School Education
   Secondary Education
   Other, please specify: _____

17. List any environmental education or sustainability-related professional development workshops and/or seminars you have participated in: _____

18. Check all current professional memberships.
   Canadian Network for Environmental Education and Communication (EECOM)
   Environmental Educators Provincial Specialists Association (EEPSA)
   Intermediate Teachers Provincial Specialists Association
   North American Association for Environmental Education (NAAEE)
   Primary Teachers Provincial Specialists Association
   Science Educators Provincial Specialists Association
   Social Studies Provincial Specialists Association
   Technology Educators Provincial Specialists Association
   The Columbia Basin Environmental Education Network (CBEEN)
   Other, please specify: _____

19. How many years have you been teaching or have you taught K-12? _____

20. Indicate which grade(s) you usually teach. Check all that apply.
   Kindergarten
   Grade 1
   Grade 2
   Grade 3
   Grade 4
   Grade 5
   Grade 6
   Grade 7
   Grade 8
   Grade 9
   Grade 10
   Grade 11
   Grade 12
   Other, please specify: _____
21. Check the statement that best describes your current teaching situation.
I am currently teaching
I am not currently teaching
I am a TOC
Other, please specify: ____

22. Which grade(s) are you currently teaching? ____

23. Check all the subject areas that you are currently teaching.
   Arts Education (e.g., art, drama, music, etc.)
   Applied Skills (e.g., business education, home economics, technology education, etc.)
   English Language Arts (e.g., English, communications, writing, etc.)
   International Languages (e.g., French, Spanish, Japanese, etc.)
   French Immersion
   Math
   Physical Education
   Science
   Social Studies
   Other, please specify: ____

24. Select your current school district (or the one you spend most your time in).
   Abbotsford (SD34)
   Alberni (SD70)
   Arrow Lakes (SD10)
   Boundary (SD51)
   Bulkley Valley (SD54)
   Burnaby (SD41)
   Campbell River (SD72)
   Cariboo-Chilcotin (SD27)
   Central Coast (SD49)
   Central Okanagan (SD23)
   Chilliwack (SD33)
   Coast Mountains (SD82)
   Comox Valley (SD71)
   Conseil scolaire francophone (SD93)
   Coquitlam (SD43)
   Cowichan Valley (SD79)
   Delta (SD37)
   Fort Nelson (SD81)
   Fraser-Cascade (SD78)
   Gold Trail (SD74)
   Greater Victoria (SD61)
   Gulf Islands (SD64)
   Haida Gwaii/Queen Charlotte (SD50)
   Kamloops/Thompson (SD73)
   Kootenay Lake (SD08)
   Kootenay-Columbia (SD20)
   Langley (SD35)
   Maple Ridge-Pitt Meadows (SD42)
   Mission (SD75)
   Nanaimo-Ladysmith (SD68)
   Nechako Lakes (SD91)
   New Westminster (SD40)
   Nicola-Similkameen (SD58)
   Nisga'a (SD92)
   North Okanagan-Shuswap (SD83)
North Vancouver (SD44)
Okanagan Similkameen (SD53)
Okanagan Skaha (SD67)
Peace River North (SD60)
Peace River South (SD59)
Powell River (SD47)
Prince George (SD57)
Prince Rupert (SD52)
Qualicum-Parksville (SD69)
Quesnel (SD28)
Revelstoke (SD19)
Richmond (SD38)
Rocky Mountain (SD06)
Saanich (SD63)
Sea to Sky (SD48)
Sooke (SD62)
Southeast Kootenay (SD05)
Stikine (SD87)
Sunshine Coast (SD46)
Surrey (SD36)
Vancouver (SD39)
Vancouver Island North (SD85)
Vancouver Island West (SD84)
Vernon (SD22)
West Vancouver (SD45)

25. Describe your school setting. Check all that apply.
Public school
Independent school
Online School
Band School
Other, please specify: _____

26. Indicate the approximate number of students in your school. _____

In order to increase my understanding of how BC educators integrate environmental education into their teaching practices, I would like to conduct interviews. If you are willing to participate in a 30 minute interview (by telephone, Skype, or in person), please leave your name, email address, and contact number below.

Name:
Email Address:
Number:

Thank you for taking the time to complete this survey.
Appendix B: Interview Consent Form and Framework

Interview Informed Consent Participation Agreement

Dear Interviewee:

Thank you for agreeing to participate in this 30-60 minute interview about your experience incorporating environmental education into your teaching practice.

This interview follows up on the online survey you completed and is part of my thesis that I have undertaken as part of a Master of Arts in Environmental Education and Communication at Royal Roads University.

Interviews will be recorded with a digital device and then transcribed. A copy of your transcription will be sent to you for verification. All data and documentation will be kept confidential and stored in a secure locked cabinet in the researcher’s home; online information will be password protected. Your anonymity is assured and any of your comments used in my thesis will be under a pseudonym.

A copy of the final research report will be housed at Royal Roads University and publicly assessable. The report will also be made available to the participants in this study.

You participation is completely voluntary and you are free to withdraw at any time without explanation and with no negative consequences to you.

If you have any questions about my credentials or this interview, please contact Dr. David Zandvliet, Simon Fraser University Professor, at ~.

By signing this agreement, you give free and informed consent to participate in this interview and any follow up consultation for the duration of this research project.

Thank you for your participation.

Connie Cirkony

___________________________________
First and last name of participant: (Please Print)

___________________________________
Signature: _______________________________________________________________

Date: __________________________
Interview Framework

Name: ___________________________ Date: ____________

Introduction

As you know, I am researching how teachers integrate environmental education into their practice. I’ve sent you a copy of your survey responses, is there anything you wanted to expand on?

Research Question

Tell me how you incorporate environmental education into your practice (insertion, infusion, integration).

Checklist of Prompts

Define EE

Why do EE

Facilitates EE

Barriers to EE

ELE Resources

Anything Else
### Appendix C: Code Categories and Number of Incidents

<table>
<thead>
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<th>Category</th>
<th>Code</th>
<th>Number of incidents in text</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Dem</td>
<td>Experienced teacher</td>
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<tr>
<td>Dem</td>
<td>High school teacher</td>
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<td>Dem</td>
<td>New teacher</td>
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<td>Awareness LACK</td>
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<tr>
<td>ELE</td>
<td>Describing how to use it JUSTIFY</td>
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<tr>
<td>ELE</td>
<td>Describing how to use it PLAN</td>
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<tr>
<td>How</td>
<td>Being a role model</td>
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<tr>
<td>How</td>
<td>Being creative</td>
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<tr>
<td>How</td>
<td>Being outside</td>
<td>28</td>
</tr>
<tr>
<td>How</td>
<td>Communicating sustainability initiatives</td>
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</tr>
<tr>
<td>How</td>
<td>Connecting actions with effects on the environment</td>
<td>34</td>
</tr>
<tr>
<td>How</td>
<td>Connecting school programs</td>
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<tr>
<td>How</td>
<td>Connecting students to their community</td>
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<tr>
<td>How</td>
<td>Connecting students to their community OUTSIDE</td>
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<tr>
<td>How</td>
<td>Connecting students to their community RESOURCES</td>
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<td>How</td>
<td>Creating EE programming</td>
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<tr>
<td>How</td>
<td>Creating meaningful experiences for students</td>
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<td>How</td>
<td>Discussing complex issues</td>
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<td>How</td>
<td>Doing project based learning</td>
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<td>How</td>
<td>Giving students choice in topics</td>
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<td>Identifying outside classroom EE activities</td>
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<td>How</td>
<td>Identifying student leadership</td>
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<td>How</td>
<td>Incorporating EE INFUSE</td>
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<td>Incorporating EE INTEGRATE</td>
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<td>How</td>
<td>Learning about the local environment</td>
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<td>How</td>
<td>Linking to curriculum GENERAL</td>
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<td>How</td>
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<td>Offering BAA courses</td>
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<td>Supports &amp; Barriers</td>
<td>Describing effect of school culture/environment CULTURE</td>
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<td>Describing experiences as a TOC</td>
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<tr>
<td>Supports &amp; Barriers</td>
<td>Describing relationships with administration</td>
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<tr>
<td>Supports &amp; Barriers</td>
<td>Describing relationships with community</td>
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<td></td>
<td>Describing relationships with other teachers NEGATIVE</td>
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<tr>
<td></td>
<td>Describing relationships with other teachers POSITIVE</td>
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<tr>
<td></td>
<td>Identify EE resources ONLINE/PRINT</td>
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<td>Identify EE resources PEOPLE/ORGS</td>
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<td></td>
<td>Identifying barriers</td>
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<td></td>
<td>Identifying barriers CURRICULUM</td>
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<td>Identifying barriers EXAMS</td>
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<tr>
<td></td>
<td>Identifying barriers TIME</td>
<td>17</td>
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<td>Identifying role of school EE champions</td>
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<td>Identifying supports of EE CURRICULUM</td>
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<td></td>
<td>Lacking awareness of EE curriculum policy</td>
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<td></td>
<td>Schools with EE or OE programming</td>
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<td></td>
<td>Studying EE in university</td>
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<td></td>
<td>Working previously in outdoor ed filed</td>
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<td>Defining EE</td>
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<td>Why</td>
<td>Changing behaviours</td>
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<td>Being dependent on the environment</td>
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<td>Why</td>
<td>Being part of a global system</td>
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<td>Describing health and benefits of being outside</td>
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<td>Engaging students interest</td>
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<td>Giving students sense of personal agency</td>
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<td>Why</td>
<td>Having social responsibility</td>
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</table>
Appendix D: Survey Responses

### Questions

1. Please indicate gender:
   - Female: 90 (69%)
   - Male: 40 (31%)

2. Please indicate age range:
   - Under 30: 19 (15%)
   - 30-39: 48 (37%)
   - 40-49: 19 (15%)
   - 50-59: 27 (21%)
   - 60 and over: 17 (13%)

3. Indicate how you feel about each of the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Don't Know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental education should be addressed in school.</td>
<td>108 (92%)</td>
<td>95 (82%)</td>
<td>54 (47%)</td>
<td>13 (11%)</td>
<td>12 (10%)</td>
<td>12 (10%)</td>
<td>117</td>
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<tr>
<td>Environmental education should be taught as a stand-alone subject.</td>
<td>21 (18%)</td>
<td>25 (21%)</td>
<td>29 (25%)</td>
<td>32 (28%)</td>
<td>12 (10%)</td>
<td>11 (10%)</td>
<td>116</td>
</tr>
<tr>
<td>Environmental education should be integrated in all subjects.</td>
<td>71 (61%)</td>
<td>34 (29%)</td>
<td>8 (7%)</td>
<td>2 (2%)</td>
<td>5 (4%)</td>
<td>0 (0%)</td>
<td>116</td>
</tr>
<tr>
<td>In BC, there are enough learning outcomes in the K-12 curriculum about the environment and sustainability</td>
<td>5 (4%)</td>
<td>16 (14%)</td>
<td>16 (14%)</td>
<td>56 (48%)</td>
<td>16 (14%)</td>
<td>8 (7%)</td>
<td>117</td>
</tr>
<tr>
<td>I have enough resources to teach environmental education in my classroom.</td>
<td>8 (7%)</td>
<td>40 (34%)</td>
<td>23 (20%)</td>
<td>29 (25%)</td>
<td>10 (9%)</td>
<td>6 (5%)</td>
<td>116</td>
</tr>
<tr>
<td>I receive enough professional development to integrate environmental education into my daily lessons.</td>
<td>12 (10%)</td>
<td>23 (20%)</td>
<td>20 (17%)</td>
<td>39 (34%)</td>
<td>16 (14%)</td>
<td>6 (5%)</td>
<td>116</td>
</tr>
<tr>
<td>I receive enough support from my school administrator(s).</td>
<td>12 (10%)</td>
<td>36 (31%)</td>
<td>27 (23%)</td>
<td>22 (19%)</td>
<td>6 (5%)</td>
<td>12 (10%)</td>
<td>115</td>
</tr>
<tr>
<td>In my school, teachers collaborate and share best practices.</td>
<td>13 (11%)</td>
<td>47 (41%)</td>
<td>18 (16%)</td>
<td>23 (20%)</td>
<td>6 (5%)</td>
<td>13 (11%)</td>
<td>116</td>
</tr>
<tr>
<td>In my school, teachers participate in decisions involving administrative policies and procedures</td>
<td>7 (6%)</td>
<td>33 (28%)</td>
<td>24 (21%)</td>
<td>28 (24%)</td>
<td>8 (7%)</td>
<td>16 (14%)</td>
<td>116</td>
</tr>
<tr>
<td>It’s important my students have outdoor educational experiences.</td>
<td>54 (47%)</td>
<td>40 (34%)</td>
<td>19 (16%)</td>
<td>5 (4%)</td>
<td>2 (2%)</td>
<td>5 (4%)</td>
<td>116</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Before doing this survey, were you aware of the “Environmental Learning and Experience” guide and/or resources?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>41</td>
<td>116</td>
</tr>
</tbody>
</table>

5. How did you find out about the ELE? Check all that apply.

<table>
<thead>
<tr>
<th>Source</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Ministry of Education</td>
<td>19</td>
<td>30</td>
<td>49</td>
</tr>
<tr>
<td>Colleague</td>
<td>19</td>
<td>20</td>
<td>39</td>
</tr>
<tr>
<td>Online</td>
<td>14</td>
<td>17</td>
<td>31</td>
</tr>
<tr>
<td>Environmental Education related organizations (e.g. Sierra Club BC, Wild BC, etc.)</td>
<td>24</td>
<td>32</td>
<td>56</td>
</tr>
<tr>
<td>Professional Associations requiring membership (e.g. EEPSA, EECOM, CBEEN, etc.)</td>
<td>42</td>
<td>57</td>
<td>99</td>
</tr>
<tr>
<td>Professional development workshops/seminar/conference</td>
<td>25</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>School or district administrator</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>School’s Green Team</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>University course(s)</td>
<td>23</td>
<td>34</td>
<td>57</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>41</td>
<td>116</td>
</tr>
</tbody>
</table>

6. Do you use the ELE in your teaching practice?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>35</td>
<td>76</td>
</tr>
</tbody>
</table>

7. Describe how you use the ELE resources. Check all that apply.

<table>
<thead>
<tr>
<th>How you use the ELE resources</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use it to justify field trips</td>
<td>12</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td>I use it to justify educational instruction in my practice</td>
<td>21</td>
<td>55</td>
<td>76</td>
</tr>
<tr>
<td>I use it to design my lesson plans</td>
<td>22</td>
<td>58</td>
<td>80</td>
</tr>
<tr>
<td>I use it to design more community-based action projects</td>
<td>14</td>
<td>37</td>
<td>51</td>
</tr>
<tr>
<td>I use it to apply an interdisciplinary approach to my teaching practice</td>
<td>22</td>
<td>58</td>
<td>80</td>
</tr>
<tr>
<td>I use it to identify resources for my classroom</td>
<td>7</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>35</td>
<td>76</td>
</tr>
</tbody>
</table>

8. Which part(s) of the ELE resource(s) are most helpful to your teaching practice? Check all that apply.

<table>
<thead>
<tr>
<th>Part(s) of the ELE resource(s)</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interdisciplinary grade</td>
<td>26</td>
<td>74</td>
<td>100</td>
</tr>
<tr>
<td>The curriculum maps</td>
<td>22</td>
<td>58</td>
<td>80</td>
</tr>
<tr>
<td>The videos</td>
<td>9</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>The professional development workshop</td>
<td>10</td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>35</td>
<td>76</td>
</tr>
</tbody>
</table>

9. Explain how these resources are helpful to your teaching practice (or not).

<table>
<thead>
<tr>
<th>Help me to understand the theory of environmental learning</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help me to understand how to integrate environmental education into different subjects</td>
<td>6</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>Help to justify my teaching approach</td>
<td>5</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Use it for professional development (personal and/or with colleagues)</td>
<td>5</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>28</td>
<td>45</td>
</tr>
</tbody>
</table>

10. Indicate where you find general environmental education resources (i.e. other than the ELE). Check all that apply.

<table>
<thead>
<tr>
<th>Source</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Ministry of Education</td>
<td>32</td>
<td>29</td>
<td>61</td>
</tr>
<tr>
<td>Colleague</td>
<td>49</td>
<td>44</td>
<td>93</td>
</tr>
<tr>
<td>District administrator</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>In my school</td>
<td>24</td>
<td>22</td>
<td>46</td>
</tr>
<tr>
<td>Online</td>
<td>88</td>
<td>61</td>
<td>149</td>
</tr>
<tr>
<td>Environmental Education related organizations (e.g. Sierra Club BC, Wild BC, etc.)</td>
<td>78</td>
<td>70</td>
<td>148</td>
</tr>
<tr>
<td>Professional Associations requiring memberships (e.g. EEPSA, EECOM, CBEEN, etc.)</td>
<td>44</td>
<td>40</td>
<td>84</td>
</tr>
<tr>
<td>Professional development workshops(s)</td>
<td>47</td>
<td>42</td>
<td>90</td>
</tr>
<tr>
<td>School’s Green Team</td>
<td>11</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>School administrators</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>University course(s)</td>
<td>40</td>
<td>36</td>
<td>76</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>70</td>
<td>178</td>
</tr>
</tbody>
</table>

11. Are you aware of your School District’s Carbon Neutral Action Reports?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>33</td>
<td>69</td>
</tr>
</tbody>
</table>

12. Check all the practices that help you integrate environmental education into your teaching practice.

<table>
<thead>
<tr>
<th>Practice</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending professional development workshops</td>
<td>86</td>
<td>79</td>
<td>165</td>
</tr>
<tr>
<td>Collaborating with other teachers</td>
<td>83</td>
<td>76</td>
<td>159</td>
</tr>
<tr>
<td>Collaborating with teacher leads/department leads</td>
<td>30</td>
<td>28</td>
<td>58</td>
</tr>
<tr>
<td>Having access to resources</td>
<td>88</td>
<td>83</td>
<td>171</td>
</tr>
<tr>
<td>Having a good background knowledge in environmental education</td>
<td>85</td>
<td>78</td>
<td>163</td>
</tr>
<tr>
<td>Receiving support from school district</td>
<td>36</td>
<td>33</td>
<td>69</td>
</tr>
<tr>
<td>Receiving support from school administration</td>
<td>32</td>
<td>48</td>
<td>70</td>
</tr>
<tr>
<td>Receiving support from an environmental organization</td>
<td>71</td>
<td>65</td>
<td>136</td>
</tr>
<tr>
<td>Receiving support from parents</td>
<td>82</td>
<td>48</td>
<td>130</td>
</tr>
<tr>
<td>Using the ELE resources</td>
<td>24</td>
<td>22</td>
<td>46</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
<td>123</td>
<td>279</td>
</tr>
</tbody>
</table>
13. Check all the barriers you face that hinder integration of environmental education into your teaching practice.

- Constrained by timetable
- Does not relate to curriculum I teach
- Difficult to assess
- Lack of time for course planning and/or preparation
- Lack of resources for lesson planning and activities
- Lack of background knowledge in environmental education
- Lack of pre-service training in environmental education
- Lack of in-service training in environmental education
- Lack of cooperation with other teachers
- Lack of support from school administrators
- Lack of support from professional or community organizations
- Lack of support from the Ministry of Education
- Limited ability to get out of the classroom
- Unsure how to integrate into the curriculum
- Other, please specify:

<table>
<thead>
<tr>
<th>Question</th>
<th>Count</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constrained by timetable</td>
<td>61</td>
<td>56%</td>
</tr>
<tr>
<td>Does not relate to curriculum I teach</td>
<td>15</td>
<td>14%</td>
</tr>
<tr>
<td>Difficult to assess</td>
<td>17</td>
<td>16%</td>
</tr>
<tr>
<td>Lack of time for course planning and/or preparation</td>
<td>37</td>
<td>33%</td>
</tr>
<tr>
<td>Lack of resources for lesson planning and activities</td>
<td>30</td>
<td>35%</td>
</tr>
<tr>
<td>Lack of background knowledge in environmental education</td>
<td>17</td>
<td>16%</td>
</tr>
<tr>
<td>Lack of pre-service training in environmental education</td>
<td>20</td>
<td>19%</td>
</tr>
<tr>
<td>Lack of in-service training in environmental education</td>
<td>26</td>
<td>24%</td>
</tr>
<tr>
<td>Lack of cooperation with other teachers</td>
<td>35</td>
<td>32%</td>
</tr>
<tr>
<td>Lack of support from school administrators</td>
<td>30</td>
<td>28%</td>
</tr>
<tr>
<td>Lack of support from professional or community organizations</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>Lack of support from the Ministry of Education</td>
<td>23</td>
<td>21%</td>
</tr>
<tr>
<td>Limited ability to get out of the classroom</td>
<td>58</td>
<td>54%</td>
</tr>
<tr>
<td>Unsure how to integrate into the curriculum</td>
<td>7</td>
<td>6%</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td>29</td>
<td>27%</td>
</tr>
<tr>
<td>Funding</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>None</td>
<td>4</td>
<td>4%</td>
</tr>
</tbody>
</table>

14. Indicate any degree(s) or equivalent training.

- B. A.                                                                  | 37    | 35%        |
- B. Ed.                                                                 | 63    | 59%        |
- B. Human Kinetics                                                      | 3     | 3%         |
- B.Sc.                                                                  | 31    | 29%        |
- B.Fine Arts                                                            | 0     | 0%         |
- P.D.P.                                                                 | 18    | 17%        |
- Master's Degree                                                        | 46    | 43%        |
- Doctoral Degree                                                        | 2     | 2%         |
| Other, please specify:                                                 | 26    | 26%        |

15. List any university course name and/or course description you took that relates to environmental education or sustainability.

- Programs                                                               | 37    | 47%        |
- Coursework                                                             | 31    | 39%        |
- Workshops                                                              | 4     | 5%         |
- Other                                                                  | 7     | 9%         |

16. Check your program of study during your teacher education program.

- Elementary Education                                                   | 50    | 47%        |
- Middle School Education                                                | 10    | 9%         |
- Secondary Education                                                    | 36    | 34%        |
| Other, please specify:                                                 | 10    | 9%         |

17. List any environmental education or sustainability-related professional development workshops and/or seminars you have participated in.

- Attending no workshops, seminars, conferences                         | 6     | 7%         |
- Attending 1 workshop, seminar, or series                             | 16    | 20%        |
- Attending 2-5 workshops, seminars, or series                          | 15    | 19%        |
- Attending 6-10 workshops, seminars, or series                         | 14    | 17%        |
- Attending >10 workshops, seminars, or series                          | 18    | 22%        |
- Attending 1 conference                                                | 9     | 11%        |
- Attending 2-5 conferences                                              | 13    | 16%        |
- Attending 6-10 conferences                                             | 1     | 1%         |
- Attending >10 conferences                                              | 6     | 7%         |
- Most frequently listed conferences & workshops:
  - EEPSA                                                                 | 20    | 25%        |
  - Wild BC                                                               | 9     | 11%        |
  - EECOM                                                                 | 8     | 9%         |
  - Get Outdoors                                                          | 5     | 6%         |
  - Project Wild                                                          | 5     | 6%         |
  - Respondents who indicated they facilitated the workshop, seminar, series, or conference | 9 | 11% |

18. Check all current professional memberships.

- Canadian Network for Environmental Education and Communication (EECOM)  | 18    | 25%        |
- Environmental Educators Provincial Specialists Association (EEPSA)     | 46    | 65%        |
- Intermediate Teachers Provincial Specialists Association               | 4     | 6%         |
- North American Association for Environmental Education (NAAEE)         | 9     | 13%        |
- Primary Teachers Provincial Specialists Association                     | 6     | 8%         |
- Science Educators Provincial Specialists Association                   | 8     | 11%        |
- Social Studies Provincial Specialists Association                       | 2     | 3%         |
- Technology Educators Provincial Specialists Association                | 0     | 0%         |
- The Columbia Basin Environmental Education Network (CBEEEN)             | 12    | 17%        |
- National Science Teachers Association                                  | 2     | 3%         |
- Association of Experiential Education                                  | 3     | 4%         |
- None                                                                   | 5     | 4%         |
| Other, please specify:                                                 | 10    | 14%        |

19. How many years have you been teaching or have you taught K-12?

- 0-5 years                                                             | 30    | 29%        |
- 6-10                                                                  | 23    | 22%        |
- 11-15                                                                 | 19    | 18%        |
- 16-20                                                                 | 11    | 11%        |
- 21-25                                                                 | 7     | 7%         |
- 26-30                                                                 | 5     | 5%         |
- 31-35                                                                 | 6     | 6%         |
- 36-40                                                                 | 3     | 3%         |

20. Indicate which grade(s) you usually teach? Check all that apply.

- K-7                                                                    | 40    | 57%        |
- 6-12                                                                   | 40    | 38%        |
| Other                                                                   | 5     | 5%         |
21. Check the statement that best describes your current teaching situation.
   I am currently teaching 70 67%
   I am not currently teaching 8 8%
   I am a TOC 10 10%
   Other, please specify: 17 16%

22. Which grade(s) are you currently teaching?
   K-7 47 49%
   8-12 37 39%
   Adult Education 1 1%
   Instructor at University 4 4%
   Teacher on Call 1 1%
   None/Not Applicable 6 6%

23. Check all the subject areas that you are currently teaching.
   Arts Education (e.g., art, drama, music, etc.) 41 43%
   Applied Skills (e.g., business education, home economics, technology education, etc.) 20 21%
   English Language Arts (e.g., English, communications, writing, etc.) 44 46%
   International Languages (e.g., French, Spanish, Japanese, etc.) 13 13%
   French Immersion 14 15%
   Math 45 45%
   Physical Education 44 46%
   Science 64 67%
   Social Studies 52 54%
   Other, please specify: 36 38%
   Outdoor Education 8 8%
   Environmental Education 7 7%

24. Select your current school district (or the one you spend most your time in).
   Abbotsford (SD34) 2 2%
   Arrow Lakes (SD10) 1 1%
   Boundary (SD51) 1 1%
   Burnaby (SD41) 4 4%
   Campbell River (SD72) 1 1%
   Cariboo-Chilcotin (SD27) 1 1%
   Central Coast (SD49) 1 1%
   Central Okanagan (SD23) 2 2%
   Chilliwack (SD33) 3 3%
   Coast Mountains (SD12) 1 1%
   Comox Valley (SD71) 1 1%
   Coquitlam (SD43) 3 3%
   Cowichan Valley (SD79) 1 1%
   Delta (SD37) 1 1%
   Greater Victoria (SD61) 9 9%
   Haida Gwaii/Queen Charlotte (SD50) 1 1%
   Kootenay Lake (SD08) 1 1%
   Maple Ridge-Pitt Meadows (SD42) 1 1%
   New Westminster (SD46) 1 1%
   North Okanagan-Shuswap (SD83) 1 1%
   North Vancouver (SD44) 5 5%
   Powell River (SD47) 3 3%
   Revelstoke (SD19) 1 1%
   Richmond (SD38) 4 4%
   Rocky Mountain (SD66) 3 3%
   Saanich (SD63) 4 4%
   Southeast Kootenay (SD85) 1 1%
   Surrey (SD36) 8 8%
   Vancouver (SD39) 19 20%
   West Vancouver (SD45) 3 3%
   Not applicable 8 8%

25. Describe your school setting. Check all that apply.
   Public school 73 76%
   Independent school 11 11%
   Online School 0 0%
   Band School 0 0%
   Other, please specify: 15 16%

26. Indicate the approximate number of students in your school.
   0-100 12 13%
   101-200 12 13%
   201-500 14 15%
   501-1000 12 13%
   1001-1500 15 16%
   1501-2000 10 11%
   2001-3000 5 5%
   3001-5000 5 5%
   5001-7500 3 3%
   >7501 8 8%

END OF SURVEY.
Appendix E: Comparison of Survey Responses

12. Check all the practices that help you integrate environmental education into your teaching practice.

<table>
<thead>
<tr>
<th>Response</th>
<th>B.A.</th>
<th>B.Sc.</th>
<th>Graduate Degree</th>
<th>No Graduate Degree</th>
<th>Elementary Program</th>
<th>Secondary Program</th>
<th>New Teacher (0-5 years)</th>
<th>Experienced Teacher (&gt;10 years)</th>
<th>Elementary Teacher (K-2)</th>
<th>Secondary Teacher (K-12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending professional development workshops</td>
<td>54%</td>
<td>46%</td>
<td>47%</td>
<td>53%</td>
<td>59%</td>
<td>41%</td>
<td>37%</td>
<td>63%</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>Collaborating with other teachers</td>
<td>51%</td>
<td>49%</td>
<td>47%</td>
<td>53%</td>
<td>55%</td>
<td>45%</td>
<td>37%</td>
<td>63%</td>
<td>55%</td>
<td>45%</td>
</tr>
<tr>
<td>Collaborating with teacher leads/department heads</td>
<td>43%</td>
<td>57%</td>
<td>50%</td>
<td>50%</td>
<td>36%</td>
<td>64%</td>
<td>41%</td>
<td>59%</td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>Having access to resources</td>
<td>53%</td>
<td>47%</td>
<td>45%</td>
<td>55%</td>
<td>61%</td>
<td>39%</td>
<td>37%</td>
<td>63%</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>Having a good background knowledge in environmental education</td>
<td>49%</td>
<td>51%</td>
<td>47%</td>
<td>53%</td>
<td>59%</td>
<td>41%</td>
<td>37%</td>
<td>63%</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>Receiving support from school district</td>
<td>67%</td>
<td>33%</td>
<td>56%</td>
<td>44%</td>
<td>62%</td>
<td>38%</td>
<td>32%</td>
<td>68%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Receiving support from school administration</td>
<td>52%</td>
<td>48%</td>
<td>51%</td>
<td>49%</td>
<td>57%</td>
<td>43%</td>
<td>36%</td>
<td>64%</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>Receiving support from an environmental organization</td>
<td>56%</td>
<td>44%</td>
<td>43%</td>
<td>57%</td>
<td>64%</td>
<td>36%</td>
<td>34%</td>
<td>66%</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>Receiving support from parents</td>
<td>48%</td>
<td>52%</td>
<td>41%</td>
<td>59%</td>
<td>70%</td>
<td>30%</td>
<td>35%</td>
<td>65%</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>Using the ELE resources</td>
<td>65%</td>
<td>35%</td>
<td>70%</td>
<td>30%</td>
<td>55%</td>
<td>45%</td>
<td>39%</td>
<td>61%</td>
<td>53%</td>
<td>47%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>56%</td>
<td>44%</td>
<td>59%</td>
<td>41%</td>
<td>60%</td>
<td>31%</td>
<td>13%</td>
<td>87%</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>

13. Check all the barriers you face that hinder integration of environmental education into your teaching practice.

<table>
<thead>
<tr>
<th>Response</th>
<th>B.A.</th>
<th>B.Sc.</th>
<th>Graduate Degree</th>
<th>No Graduate Degree</th>
<th>Elementary Program</th>
<th>Secondary Program</th>
<th>New Teacher (0-5 years)</th>
<th>Experienced Teacher (&gt;10 years)</th>
<th>Elementary Teacher (K-2)</th>
<th>Secondary Teacher (K-12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constrained by timetable</td>
<td>52%</td>
<td>48%</td>
<td>46%</td>
<td>54%</td>
<td>56%</td>
<td>44%</td>
<td>38%</td>
<td>62%</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>Does not relate to curriculum I teach</td>
<td>80%</td>
<td>20%</td>
<td>36%</td>
<td>64%</td>
<td>30%</td>
<td>70%</td>
<td>40%</td>
<td>60%</td>
<td>36%</td>
<td>64%</td>
</tr>
<tr>
<td>Difficult to assess</td>
<td>45%</td>
<td>55%</td>
<td>41%</td>
<td>59%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>Lack of time for course planning and/or preparation</td>
<td>46%</td>
<td>54%</td>
<td>46%</td>
<td>54%</td>
<td>52%</td>
<td>48%</td>
<td>34%</td>
<td>66%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Lack of resources for lesson planning and activities</td>
<td>42%</td>
<td>58%</td>
<td>49%</td>
<td>51%</td>
<td>61%</td>
<td>39%</td>
<td>34%</td>
<td>66%</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Lack of background knowledge in environmental education</td>
<td>67%</td>
<td>33%</td>
<td>35%</td>
<td>65%</td>
<td>46%</td>
<td>54%</td>
<td>41%</td>
<td>59%</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>Lack of pre-service training in environmental education</td>
<td>40%</td>
<td>60%</td>
<td>45%</td>
<td>55%</td>
<td>75%</td>
<td>25%</td>
<td>47%</td>
<td>53%</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>Lack of in-service training in environmental education</td>
<td>44%</td>
<td>56%</td>
<td>42%</td>
<td>58%</td>
<td>65%</td>
<td>35%</td>
<td>43%</td>
<td>57%</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>Lack of cooperation with other teachers</td>
<td>53%</td>
<td>47%</td>
<td>59%</td>
<td>41%</td>
<td>67%</td>
<td>33%</td>
<td>40%</td>
<td>60%</td>
<td>42%</td>
<td>58%</td>
</tr>
<tr>
<td>Lack of support from school administrators</td>
<td>58%</td>
<td>42%</td>
<td>50%</td>
<td>50%</td>
<td>70%</td>
<td>30%</td>
<td>27%</td>
<td>73%</td>
<td>58%</td>
<td>42%</td>
</tr>
<tr>
<td>Lack of support from professional or community organizations</td>
<td>20%</td>
<td>80%</td>
<td>38%</td>
<td>63%</td>
<td>60%</td>
<td>40%</td>
<td>57%</td>
<td>43%</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>Lack of support from the Ministry of Education</td>
<td>50%</td>
<td>50%</td>
<td>59%</td>
<td>41%</td>
<td>53%</td>
<td>47%</td>
<td>29%</td>
<td>71%</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Limited ability to get out of the classroom</td>
<td>54%</td>
<td>46%</td>
<td>40%</td>
<td>60%</td>
<td>61%</td>
<td>39%</td>
<td>39%</td>
<td>61%</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Unsure how to integrate into the curriculum</td>
<td>100%</td>
<td>0%</td>
<td>29%</td>
<td>71%</td>
<td>83%</td>
<td>17%</td>
<td>43%</td>
<td>57%</td>
<td>86%</td>
<td>14%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>45%</td>
<td>55%</td>
<td>63%</td>
<td>38%</td>
<td>58%</td>
<td>42%</td>
<td>28%</td>
<td>72%</td>
<td>65%</td>
<td>35%</td>
</tr>
</tbody>
</table>
Appendix F: Comparison of Survey Responses

6. Do you use the ELE in your teaching practice?

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>54%</td>
</tr>
<tr>
<td>No</td>
<td>46%</td>
</tr>
</tbody>
</table>

12. Check all the practices that help you integrate environmental education into your teaching practice.

<table>
<thead>
<tr>
<th>Practice</th>
<th>Uses ELE</th>
<th>Does not use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending professional development workshops</td>
<td>53%</td>
<td>47%</td>
</tr>
<tr>
<td>Collaborating with other teachers</td>
<td>51%</td>
<td>49%</td>
</tr>
<tr>
<td>Collaborating with teacher leads/department heads</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>Having access to resources</td>
<td>53%</td>
<td>47%</td>
</tr>
<tr>
<td>Having a good background knowledge in environmental education</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>Receiving support from school district</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Receiving support from school administration</td>
<td>49%</td>
<td>48%</td>
</tr>
<tr>
<td>Receiving support from an environmental organization</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>Receiving support from parents</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Using the ELE resources</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td>73%</td>
<td>27%</td>
</tr>
</tbody>
</table>

13. Check all the barriers you face that hinder integration of environmental education into your teaching practice.

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Uses ELE</th>
<th>Does not use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constrained by timetable</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>Does not relate to curriculum I teach</td>
<td>38%</td>
<td>63%</td>
</tr>
<tr>
<td>Difficult to assess</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>Lack of time for course planning and/or preparation</td>
<td>42%</td>
<td>58%</td>
</tr>
<tr>
<td>Lack of resources for lesson planning and activities</td>
<td>28%</td>
<td>72%</td>
</tr>
<tr>
<td>Lack of background knowledge in environmental education</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Lack of pre-service training in environmental education</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Lack of in-service training in environmental education</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Lack of cooperation with other teachers</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>Lack of support from school administrators</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Lack of support from professional or community organizations</td>
<td>29%</td>
<td>71%</td>
</tr>
<tr>
<td>Lack of support from the Ministry of Education</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>Limited ability to get out of the classroom</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>Unsure how to integrate into the curriculum</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Other, please specify:</td>
<td>41%</td>
<td>59%</td>
</tr>
</tbody>
</table>

14. Indicate any degree(s) or equivalent training.

<table>
<thead>
<tr>
<th>Degree</th>
<th>Uses ELE</th>
<th>Does not use</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A.</td>
<td>58%</td>
<td>42%</td>
</tr>
<tr>
<td>B.Sc.</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>58%</td>
<td>42%</td>
</tr>
<tr>
<td>No Graduate Degree</td>
<td>52%</td>
<td>48%</td>
</tr>
</tbody>
</table>
16. Check your program of study during your teacher education program.
Elementary Education 54% 46%
Secondary Education 56% 44%

18. Check all current professional memberships.
Canadian Network for Environmental Education and Communication (EECOM) 67% 33%
Environmental Educators Provincial Specialists Association (EEPSA) 56% 44%
Intermediate Teachers Provincial Specialists Association 0% 100%
North American Association for Environmental Education (NAAEE) 78% 22%
Primary Teachers Provincial Specialists Association 50% 50%
Science Educators Provincial Specialists Association 100% 0%
Social Studies Provincial Specialists Association 0% 100%
Technology Educators Provincial Specialists Association 0% 0%
The Columbia Basin Environmental Education Network (CBEEN) 67% 33%
National Science Teachers Association 50% 50%
Association of Experiential Education 0% 100%
None 0% 100%
Other, please specify: 38% 62%

22. Which grade(s) are you currently teaching?
K to 7 48% 52%
8 to 12 43% 57%