UNEARTHING ENVIRONMENTAL EDUCATION:
A STUDY OF SIXTH GRADE CURRICULUM AND TEACHERS' EXPERIENCES IN
THE HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA

by

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ABSTRACT

In 2002, the United Nations declared 2005-2014 the Decade of Education for Sustainable Development and emphasized environmental education as a catalyst in creating positive change. This study examines the presence (or absence) of environmental education in the sixth grade of the Halifax Regional School Board in Nova Scotia. Content analysis was conducted to determine the environmental quality of three curricula – health education, science, and social studies. Semi-structured interviews were then conducted with a cohort of teachers to determine their conceptualizations of environmental education and implementation barriers. Results show the curricula have a strong reliance on knowledge-based learning and assign less importance to experiential learning and attitudes. With teachers, the data show that environmental education implementation depends highly on personal beliefs, especially due to its minor role in the curriculum. Furthermore, the lack of resources, training, and support from upper levels cause environmental education to be "important but not a priority".

LIST OF ABBREVIATIONS USED

EE	Environmental Education
ESD	Education for Sustainable Development
CMEC	Council of Ministers of Education, Canada
DESD	Decade of Education for Sustainable Development
HRM	Halifax Regional Municipality
HRSB	Halifax Regional School Board
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCED	World Commission on Environment and Development

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"We cannot win this battle to save species and environments without forging an emotional bond between ourselves and nature as well - for we will not fight to save what we do not love" – Stephen Jay Gould

PREFACE

Personally, I have been emotionally and physically connected to nature since I was a child. Growing up in rural New Brunswick, particularly exploring the forests and shores of the Bay of Fundy, established my fascination with nature and desire to protect the areas, plants, and animals I loved so dearly. This devotion has shaped who I have become and remains influential in all I do.

Perhaps a bit surprising is the route that has led me to this Master of Environmental Studies program. Almost equal to my love for the environment are my passions for English literature and elementary education. I completed a Bachelor of Arts, advanced major, in English at Mount Saint Vincent University, with the intention of continuing on to a Bachelor of Education focusing on the elementary grades. Yet I realized that I did not want to work just with children, but also with the environment. I want to help children and youth have similar experiences to mine and find their own love for nature. This led me to apply to the MES program and begin my studies on environmental education.

My Master's research combines my interests and focuses on formal environmental education at the elementary level, the sixth grade in particular. It is guided by my personal experiences in the educational sector and in nature, as well as my belief that environmental education needs to be incorporated into schools to demonstrate to both students and the general public that the environment is at the heart of humanity and more than a fragmented subject for study.

CHAPTER 1 - INTRODUCTION

1.1 INTRODUCTION

The Wisconsin Department of Natural Resources completed a wolf recovery plan and proposed reintroduction of the timber wolf in 1989. It became an active and thought-provoking environmental lesson for a class of elementary students in the state (Ramsey, Hungerford, and Volk, 1992). Learners moved beyond science knowledge through the natural history of the timber wolf and its ecological role, to investigative skills of identifying stakeholders and ascertaining their beliefs, values, and positions on the issue and finally concluding in a decision-making process on the part of the students. The case study was accomplished through student- created questionnaires and inviting participants to share their personal stories on the timber wolf to the class (Ramsey, Hungerford, and Volk, 1992). This large-scale project met curriculum objectives within science, language arts, mathematics, and social studies and helped students to understand the interdisciplinary nature of both education and the environment. In addition, the activities addressed knowledge, skills, values, and commitment to action, all of which are essential parts of environmental education. Such a method in educating students with regard to the environment is flexible, inquiry driven, student led, participatory, and encourages critical thinking, problem solving, and decision making. In essence, this is a perfect example of what scholars concur environmental education could and should be.

Traditional environmental education (EE) has origins in nature study, conservation education, and outdoor education (Moroye, 2009). Other related studies include ecological education; place-based education; eco-justice education; education for sustainability, and more recently, education for sustainable development (ESD). While these are important areas of study which do have roles within the broader ideology of EE, for the purposes of this research project the term EE is in keeping with the definitions of the Belgrade Charter and the Tbilisi Report. These two documents, from 1975 and 1977 respectively, laid the foundations for global understandings of EE. These reports state that EE emphasizes awareness, knowledge, skills, attitudes, values, motivations and

commitment towards both the natural environment and its related problems. The end goal is an ecologically literate and active society (UNESCO, 1975; UNESCO-UNEP, 1977).

EE is a well-researched subject, with national and international journals dedicated to its study (e.g. Canadian Journal of Environmental Education, Applied Environmental Education and Communication, and Environmental Education Research). Yet in spite of the extensive academic literature regarding education and the environment, research gaps persist (Hart and Nolan, 1999; Rickinson, 2001). Understudied areas are the perceptions of public school teachers on the topic of EE, as well as the existence and status of EE within school curricula. Paul Hart (2003), in *Teachers' thinking in environmental education: Consciousness and responsibility*, begins to addresses this gap by speaking with Canadian teachers who consciously prioritize EE in their lessons and classrooms. There is no doubt that Hart's work is indispensable to both researchers and teachers of EE; however, it is key to note that the teachers in Hart's study acknowledge that they purposely assign the environment a greater role within their classrooms. It is just as necessary to also speak with those teachers who do not primarily identify as environmental educators. This study attempts to address this research gap by engaging with ordinary teachers.

On a practical level, there is a need for study of formal EE within Nova Scotia specifically due to the increasing emphasis on formal environmental learning across Canada (CMEC, 2010). Almost twenty years ago the Nova Scotia Subcommittee of Environmental and Sustainable Development Education (1993) released a report on the status of, and recommended future for, environmental and sustainable development education in the province. This report investigated the elementary, secondary, and post-secondary educational levels, as well as briefly considering the province's industry sector. Awareness, understanding, and appreciation of the environment, as well as identification of environmental problems and possible solutions are pinpointed as defining the mission of environmental and sustainable development education within the province (Nova Scotia Round Table on Environment and Economy, 1993).

The recommendations put forth by the Subcommittee twenty years ago are both relevant but still not fully addressed today. For elementary education these recommendations are having environmental and sustainable development education in a

range of subjects; encouraging schools to make environmental and sustainable development education a school-based focus; providing intensive and sustained in-service training; establishing networks to share information and projects; identifying or developing resource materials and making them available to teachers; conducting research to identify ideal practices for environmental and sustainable development education; and assigning three sustainable development and EE specialists to the Department of Education curriculum division for a period of three years (1993). These recommendations reveal that for some time there has been a clear need for an increased and improved presence of the environment within the education system.

To provide a more contemporary context, in March 2010 the Department of Education partnered with the Nova Scotia Department of Environment, the Nova Scotia Environmental Network and SENSE: Sustainability Education in Nova Scotia for Everyone (formerly the Nova Scotia ESD working group) to host the first annual Green Roots Symposium. This symposium was dedicated to provincial EE and ESD. It was here that Marilyn Webster, the Department of Education's science consultant and the CMEC's ESD Coordinator for Nova Scotia, briefly described the Department's priorities and goals to integrate ESD into kindergarten to twelfth grade curricula, build ESD capacity through professional development and research, and secure ESD resources to support curricula. The exact means by which these goals would be achieved was not fully expressed at the symposium.

While there are currently no official requirements for the amount of EE integration into schools, the need to develop ecologically conscious societies through formal environmental learning, (and consequently the need for educational change to incorporate EE), has never been greater. Education plays a significant role in addressing these needs:

> Education is also the means for disseminating knowledge and developing skills, for bringing about desired changes in behaviours, values and lifestyles, and for promoting public support for the continuing and fundamental changes that will be required if humanity is to alter its course...Education, in short, is humanity's best hope and most effective means in the quest to achieve sustainable development. (UNESCO, 1997)

Education provides opportunities for understanding, exploring, and developing values towards the environment, all of which are essential for sustaining society. Yet despite the influential power that education holds over the environment and humanity's future, currently formal education on the natural world emphasizes theories over values, answers over questions, and technical efficiency over conscience (Orr, 2004). This method of education compounds environmental problems and it is not the type of education that will save humanity or the planet (Orr, 2004). Chet Bowers also points to the need for educational reform from a strong "sci-tech knowledge" basis to empowering students through direct experiences, values, new ideas, and community knowledge (1999). These critiques of formal education indicate that educational reform is necessary for bringing about environmental change and although there is not yet a consensus on how much EE integration is essential, any educational reform to include more EE, particularly direct nature experiences and developing values, is beneficial.

1.2 BRIEF STATEMENT OF THE PROBLEM

In *Last Child in the Woods: Saving Our Children from Nature Deficient Disorder* Richard Louv brings to light the growing apathy of children towards nature and the disastrous effects this indifference is having on childhood as well as the future of both humankind and the environment:

> For a new generation, nature is more abstraction than reality. Increasingly, nature is something to watch, to consume, to wear – to ignore...Reducing that deficit – healing the broken bond between our young and nature – is in our self-interest, not only because aesthetics or justice demands it, but also because our mental, physical, and spiritual health depends upon it. The health of the earth is at stake as well. How the young respond to nature, and how they raise their own children, will shape the configurations and conditions of our cities, homes – our daily lives. (2008, p. 2-3)

Nature-deficit disorder, a term coined by Louv himself, is a result of human alienation from nature (Louv, 2008). Symptoms of this disorder include diminished use of the senses, difficulty paying attention, and high rates of physical and emotional illnesses such as obesity and depression (Louv, 2008: Strife, 2009). A decline in physical and psychological connections with nature can be seen as detrimental to a child's ecological self and how he or she will identify with the environment as an adult: "what an individual

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experiences during childhood has dramatic implications for the rest of his or her life. Attitudes, values, dispositions, and skills acquired during childhood tend to be carried over into adulthood" (Wilson, 1996, p. 121). Outdoor experiences can remedy these negative situations and provide children with many cognitive, emotional, and physical benefits such as increased concentration and reduced stress (Strife, 2009). As a matter of fact, childhood experiences *in* nature notably affect lifelong environmental values and attitudes, thus demonstrating the importance of spending time in natural, relatively unspoiled environments (Strife, 2009; Chawla, 2006a; Chawla, 2006b; Wells, 2006).

The foundations of EE aim to alleviate the challenges posed by nature-deficit disorder by encouraging ecological awareness, knowledge, action, and attitudes (Tilbury, 1997; UNESCO, 1977). In particular, three main foci -- the head (knowledge), hands (skills), and heart (attitudes and values) -- are integral to the success of EE (Tilbury, 1997). These concepts are tied in with the different methods for EE, namely, education ABOUT the environment, education IN the environment, and education FOR the environment (Tilbury, 1997). Education ABOUT the environment is associated with targeting the head, or knowledge and awareness, and adopts a cognitive approach (Tilbury, 1997). It is a technique most commonly used in formal education programs. Education IN the environment, on the other hand, focuses on developing moral and ethical concerns, as well as personal values and commitment to the environment through contact with nature in a more open-ended style of teaching which targets the heart (Tilbury, 1997). Lastly, education FOR the environment develops responsibility and active participation through hands-on teaching and learning, particularly in regards to environmental problems (Tilbury, 1997).

While each of these three approaches – learning through the head, heart, and hands - is beneficial in helping youth reform their bond with nature, it is a combination of all three that best supports the goals and objectives of EE (NAAEE, 2000; Tilbury, 1997; UNESCO, 1992). However, education systems tend to place the greatest emphasis on knowledge. While an essential component, this approach alone is not reflective of effective EE and as a result will not thoroughly develop ecologically literate and motivated individuals (Littledyke, 2008; Tilbury, 1997). To truly combat nature deficit

disorder and have a person feel intellectually, emotionally and physically connected to the natural environment, all three approaches must be utilized (Tilbury, 1997).

Elementary education can offer unique EE opportunities through formal educational experiences (for example, science and social studies) and informal educational experiences (for example, composting and recycling), both of which are important for engaging students in environmental learning (Ahlberg, 2005). One approach that successfully incorporates knowledge, values, and skills is a case study format of a local environmental issue (Ramsey, Hungerford, and Volk, 1992), such as the one about wolves noted in the introduction. Primary and secondary sources are utilized as information sources and students build their research skills by seeking out additional sources. Personal experiences described by local community members potentially affect students' attitudes and values. Here, the teacher began with the natural history of the timber wolf and its ecological role, followed by students identifying the beliefs, values, and positions of the various stakeholders, creating a concept map on the issue, and developing a problem solving activity. In this case, the problem solving activity was a random survey of residents in northern counties about whether or not they supported the reintroduction of the timber wolf. Some participants were even invited into the classroom to share personal experiences. The students analyzed the responses and prepared a report for the Wisconsin Department of Natural Resources and local newspapers, creating change-agents via the dissemination strategies. This case study thus moved beyond science lessons on the ecological role of the timber wolf and into creative writing, math, social studies, and additional language arts targets. The students were able to be hands-on in their learning by designing and analyzing their survey, learning information on the ecological role and natural history of the timber wolf, and hearing personal, possibly heartfelt, experiences with the wolves.

An especially important component of effective formal EE is for educators to intellectually and emotionally engage with students on environmental concepts (Stevenson, 2007a). Teachers not only act as mediums for complex ideas and information, their relationships with the material and students are especially important for successful learning and developing interest in a subject (Lynch and Cicchetti, 1997). In particular, the student-teacher relationships formed in elementary grades are crucial in

terms of motivation, self-esteem, interest in learning, and engagement in school (Lynch and Cicchetti, 1997). The role of teachers goes beyond simple facts. Teachers are role-models for youth and a teacher's relationship with the material and students is important for successful learning and interest in a subject (Witmer, 2005; Fredriksen and Rhodes, 2004). The impact of student-teacher relationships should not be overlooked, as the transition to junior high school dramatically changes the dynamics of that bond. Students are less likely to develop meaningful connections with their junior high teachers due to the less personal environment of junior high, where larger classes and different teachers for different subjects (rather than one main teacher) is often the norm (Midgley, Feldlaufer, and Eccles, 1988). Due to the importance of educating young students for EE and the influence teachers have over student perceptions and learning, it is vital for EE researchers to undertake investigations that explore educators' perceptions of, and actions around, EE and to examine the curriculum documents influencing a teacher's lesson plans. This study investigates teachers' conceptualizations of EE in the sixth grade within the Halifax Regional School Board (HRSB) and the quantity and quality of EE within three sixth grade curriculum documents.

1.3 RESEARCH PURPOSE, QUESTION AND OBJECTIVES

This research has arisen out of the necessity for more investigations into teacher perceptions of EE and for understanding the presence of formal EE, the rising apathy towards nature and environmental problems (Pyle, 2003; Norgaard, 2006), and the developing presence of environmentally-focused education in the province of Nova Scotia.

The purpose of this study is to examine the extent of EE inclusion in three sixth grade curricula and how a cohort of sixth grade teachers in the HRSB conceptualize and perceive challenges to teaching EE. The specific objectives of this research are to:

1) Determine the quantity of environmental content and quality of three sixth grade curriculum documents expected to contain the greatest amount of environmental aspects (science, social studies, and health education).

2) Determine how a cohort of sixth grade educators within the HRSB conceptualize EE.

3) Identify key issues and challenges to teaching EE within the HRSB sixth grade classrooms.

The results will help to identify the challenges facing teacher implementation of EE within the HRSB, the current quality of EE within the curriculum documents and will lead to recommendations to enrich EE presence and prominence within the sixth grade.

1.4 LITERATURE REVIEW

1.4.1 Environmental Education and Education for Sustainable Development

It is necessary to differentiate between two interrelated terms: environmental education (EE) and education for sustainable development (ESD). The two share similarities in that each approach has a goal of a positive shift in society towards a more sustainable future and each approach also reinforces the power of education to help individuals bring about personal and social change (Ferreira, 2009). EE and ESD also each have a focus of educating the world's populace on environmental concerns and each is deemed more effective when education is given a local focus (for example, local environmental issues or native flora and fauna) and is culturally relevant (Mckeown and Hopkins, 2003). Furthermore, EE and ESD are alike in calling for a reorientation of formal education as well as increasing and improving public awareness (Mckeown and Hopkins, 2003). However, there are some differences that should be noted.

EE is described as education that works to develop a population that is aware and concerned for the natural environment, with an emphasis on knowledge, skills, attitudes, motivations, and commitments aimed towards solving current environmental problems and helping to prevent future troubles (UNESCO-UNEP, 1976). The focus on environment, without the explicit equality of the terms society, economy, and development, sets EE apart from ESD (Mckeown and Hopkins, 2003). However, EE does addresses social issues. The Intergovernmental Conference on Environmental Education stated that "environmental education must also help create an awareness of the economic, political and ecological interdependence of the modern world so as to enhance a spirit of

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responsibility and solidarity among nations" (1977, p. 12). Environmental problems are society's concern, and human history and education are bound up with the environment. ESD merely places a greater emphasis on society (including social development, human rights, and social justice) and economy (Mckeown and Hopkins, 2003).

ESD uses education as a means to achieve sustainability, including societal and economical concerns along with environmental (Mckeown and Hopkins, 2003). ESD was introduced in 1987 with the World Commission on Environment and Development report *Our Common Future* and was more fully shaped in the United Nation's Agenda 21, Chapter 36, as the primary program area, in the year 1992. This program aims to reorient education towards sustainable development. ESD emphasizes examining both the physical/biological and socio-economic environments, as well as human development, in all disciplines as a way to call attention to the connections among humans, their activities, and the natural environment (United Nations, 1992).

From these goals, ESD has four main thrusts that were identified in Agenda 21, Chapter 36 "Promoting Education, Public Awareness, and Training": (1) improving basic education (greater access and understanding of interconnections among society, economy, and environment); (2) reorienting education to include sustainable development (including more principles, skills, perspectives, and values to guide sustainable learning); (3) developing public awareness (for a more informed and contributing citizenry); and (4) training ((United Nations, 1992). ESD also has an overall intent to address the needs of both society and environment; finding a realistic balance of environmental protection and easing human suffering and reducing poverty (Mckeown and Hopkins, 2003). Of these four thrusts, EE also includes reorienting education, developing public understanding and awareness, and training. This is not to say that EE does not support improving basic education; however it is simply not a point of focus for EE (Mckeown and Hopkins, 2003). As well, ESD's emphasis on social development and justice, and seeking to balance quality of life and environment through sustainable development also set EE and ESD apart.

It is clear that the two approaches should not be considered in opposition to one another, but rather as working together to produce well rounded knowledge, skills, attitudes, and actions. As ESD becomes more prevalent in educational sectors worldwide

it is important to bear in mind that the compatibility of the two concepts denotes that aspects of EE will be present in contemporary ESD approaches and procedures and vice versa.

1.4.2 Types of Environmental Education

In addition to there being distinctions between EE and ESD, there are also distinctions within EE itself. There are three areas of EE: formal, non-formal, and in-formal (Canadian Environmental Grantmakers' Network, 2006). It is generally accepted that all three forms are needed to achieve effective EE within society (UNESCO-UNEP, 1977). Formal EE is associated with formal education including grade school, secondary and post-secondary education. This sort of EE tends to be highly structured and classroom-based (Taylor and Caldarelli, 2004). The integration of EE into traditional subjects, such as social studies and science, is becoming more commonplace (Council of Ministers of Education Canada, 2010). However, formal EE does not, and indeed should not be, need to be limited to a solitary, separate subject (CMEC, 2010).

Non-formal EE, on the other hand, involves educational opportunities outside of formal education. This includes, but is not limited to, educational programs run by non-government organizations, not-for-profit organizations, museums, national and provincial parks, zoos, and other such public or private organizations involving environmental concepts in a semi-structured manner. In the province of Nova Scotia, there are various non-formal EE groups, including Sustainability Education in Nova Scotia for Everyone (SENSE); the Young Naturalists Club of Nova Scotia; the Sierra Club of Canada – Atlantic Chapter; and Clean Nova Scotia.

Taylor and Caldarelli describe non-formal EE as "settings and methods that are considered non-traditional and where the learner controls the learning objectives, but not the means to accomplish them" (2004, p. 452). This particular type of EE is not tied to a specific age group or grade level, but rather the education of the general public; thus, it is often more adaptable and can change depending on the present audience (UNESCO-UNEP, 1977). Non-formal organizations will often collaborate with formal sector schools to achieve a well rounded exposure to EE (Palmer, 1998).

The third type of EE is informal, an approach that does not require prepared lesson plans. Instead, examples and messages are learned from parents or other family members, mentors, peers, governments, personal experiences, and various sources of media such as the internet, newspapers, radio, and television. Informal EE is an important part of EE, as personal experiences with nature, either alone or coupled with "lessons" from significant others, help to establish connections with the environment (Wells and Lekies, 2006; Louv, 2008). Additionally, how the general public perceives the value or success of EE, indeed the environment in general, is greatly affected by media portrayals. On the world stage, these forms of education are identified for their importance in developing an ecological consciousness, with a particular focus on formal environmental learning. The global forays into the role of formal EE/ESD are explored in the next section.

1.4.3 Global efforts in Environmental Education

The international history of declarations regarding EE is extensive. Each one tends to build upon the next, with a continuously strong reliance on education as a means for change. EE has been growing in importance and significance since its formal inception on the global stage in 1972 with the Stockholm Declaration. This Declaration was a result of the United Nations Conference of Human Environment, held in Stockholm. It was with this Declaration, particularly Principle 19, that environment and education came together: "Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension" (UNESCO, 1972, p. 5). This emphasis on environmental learning was further accentuated with the creation of a leading global environmental group, the United Nations Environmental Program (UNEP), which resulted from the conference (Rogers, 1996).

Table 1 summarizes the contributions of several noteworthy declarations and conferences; each pronouncement/conference is expanded upon in the ensuing paragraphs.

Table 1.1. International Declarations and Conferences in EE History

Year	Declaration	Major contributions to EE / Themes covered
1972	Stockholm Declaration	Principle 19 states that education in environmental matters is essential for enlightened opinions, responsible conduct, and protection of the environment.
1975	Belgrade Charter	Global agreement on the goal of EE: "To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones" UNESCO-UNEP, 1976, p.2
1977	Tbilisi Declaration	Advocate for EE to be integrated into whole system of formal education, at all levels. The goals, principles, and objectives of EE stated in the Belgrade Charter are reinforced.
1987	Moscow Declaration	An international strategy for action in, and characteristics of, EE for the 1990s. Also known as International Strategy for Action in the Field of Environmental Education and Training for the 1990s, developed from the UNESCO-UNEP International Congress on Environmental Education and Training.
1987	Brundtland Commission	Proposing concept of sustainable development and the promotion of education focusing on the environment and integration into other disciplines.
1992	Earth Summit – United Nations Conference on Environment and Development	Creation of action plan *Agenda 21*, with a section on education, Chapter 36. This chapter accentuates the importance of education, public awareness, and training, for EE and ESD.
1994	Chapter XI. Population, Development and education. International Conference on Population and Development	Finalizing a program of action for population and development and connecting the impacts of the population on the natural environment, human health, and education.
1996	International Commission on Education for the 21st Century	Re-affirms the fundamental role education has in personal and social development.

Table 1.1. continued

1997	Thessaloniki Declaration	Calls for reorienting education to include sustainability and referring to EE as "education for environment and sustainability" as well as EE. All subjects must include issues of sustainability; a greater emphasis on interdisciplinary education.
2002	United Nations World Summit on Sustainable Development	Summit addressed eradication of poverty, changing consumption/production patterns, natural resources basis, sustainable development, and the need for public awareness achieved through education.
2004	United Nations Decade of Education for Sustainable Development Declaration	Declaration on the part of the United Nations that the years 2005 to 2014 would be the Decade of Education for Sustainable Development. Emphasis on education to learn values, behaviour, and lifestyles required for a sustainable future.
2007	United Nations Decade of Education for Sustainable Development update	A progress report outlining the global success thus far and providing recommendations for difficulties encountered.
2009	Bonn Declaration	UNESCO world conference on ESD in Bonn, Germany. Lifelong learning and formal education are reaffirmed as ways to achieve more sustainable lifestyles.
2009	5th World Environmental Education Congress	The theme of "Earth our common home" drew the congress from 106 countries together to share and discuss the present and future EE.

It was UNESCO and the newly formed UNEP that planned the International Workshop on Environmental Education, building upon the emphasis on education from Stockholm. The 1975 Belgrade Charter: A Global Framework for Environmental Education provided the first global agreement on the goal of EE: "To develop a world population that is *aware of*, and concerned about, the environment and its associated problems, and which has the *knowledge*, *skills*, *attitudes*, *motivations* and *commitment* to work individually and collectively toward solutions of current problems and the prevention of new ones" (UNESCO-UNEP, 1976, p.2) (emphasis mine).

The eight guiding principles of EE expand upon the objectives in more detail:

1. EE should consider the environment in its totality – natural and man-made, ecological, political, economic, technological, social, legislative, cultural and esthetic [sic].

2. EE should be a continuous life-long process, both in-school and out-of-school.

3. EE should be interdisciplinary in its approach.

4. EE should emphasize active participation in preventing and solving environmental problems.

5. EE should examine major environmental issues from a world point of view, while paying due regard to regional differences.

6. EE should focus on current and future environmental situations.

7. EE should examine all development and growth from an environmental perspective.

8. EE should promote the value and necessity of local, national and international cooperation in the solution of environmental problems. (UNESCO-UNEP, 1976).

These are the objectives and guiding principles that laid the foundations for future EE declarations as well as formal and non-formal EE programs.

The EE principles are echoed and expanded within the Tbilisi Report, created from the first Intergovernmental Conference on Environmental Education held in 1977, in Tbilisi, Georgia (USSR). This conference focused on major environmental problems, the role of education in facing these problems, as well as efforts at the national and international levels for developing EE (UNESCO-UNEP, 1977). The conference

proceedings reinforced the important role that formal EE can play in helping to alleviate environmental problems and engaging people in positive environmental opportunities: "Environmental education should be integrated into the whole system of formal education at all levels to provide the necessary knowledge, understanding, values and skills needed by the general public and many occupational groups for their participation in devising solutions to environmental questions" (UNESCO-UNEP, 1977, p. 12).

The Tbilisi Report endorses the previously mentioned guiding principles of EE and adds five additional, expanded principles:

1. Enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;

2. Relate environmental sensitivity, knowledge, problem-solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's community in early years;

3. Help learners discover the symptoms and real causes of environmental problems;

4. Emphasize the complexity of environmental problems and thus need to develop critical thinking and problem solving skills;

5. Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first-hand experience (UNESCO-UNEP, 1977, p. 27)

Suggestions for the inclusion of EE within the formal sector are integrating EE into each subject; having the curricula for each subject developed by interdisciplinary teams; and having students study practical problems that are rooted in reality (UNESCO-UNEP, 1977). Integration of EE into all subjects is preferred in order to emphasize the interdisciplinary nature of the environment. The environment does not exist in isolation from human health, the economy, or a society's culture, and so it should not be taught as a disconnected topic (UNESCO-UNEP, 1977). Addressing it within current subjects also avoids the creation of another field of study with additional curriculum outcomes and time demands.

Ten years after the Tbilisi Report, the Moscow Declaration was developed in 1987 from the UNESCO-UNEP International Congress on Environmental Education and

Training. This Declaration, also known as the International Strategy for Action in the Field of Environmental Education and Training for the 1990s, reflects on the international work in EE since the Tbilisi conference and Report. Article 1 of the Declaration connects social, economic, and cultural factors within the origins of environmental problems and highlights education as a means for finding solutions to those problems. A great part of the Moscow Declaration focuses on an international strategy for action in, and characteristics of, EE and training for the 1990s. It effectively builds upon the ideals and guidelines of Tbilisi, with specific suggestions to improve EE in the 1990s. This includes refining EE to take into account economic, social and ecological realities to reflect the growing popularity of ESD. Perhaps some of the more significant actions are to exchange information on curriculum development, create a prototype curriculum and teaching aids, and promote curriculum evaluation. The promotion of both pre-service and in-service training in the subject of EE is also of high value.

Also in 1987 was the conclusion of the World Commission on Environment and Development (WCED), chaired by Prime Minister Brundtland of Norway. While this commission and its influential report are perhaps best known for proposing the concept of sustainable development, education has an important part to play in that concept. The report states that "education should focus on the environment and be integrated into other disciplines in the official curriculum at all levels in order to develop a feeling of responsibility toward the environment" (WCED, 1987, p. 136). This reinforces the power that education has in global and national situations, especially those pertaining to the environment and the human responsibility towards the earth.

The Earth Summit, a 1992 United Nations Conference on Environment and Development, was assembled to establish conservation strategies for creating a sustainable future. An important part of this summit is the action plan Agenda 21, which is an inclusive plan of action at the local, national, and global levels for more than 178 governments (UNCED, 1992). Of this plan, Chapter 36 in particular emphasizes the importance of education, public awareness, and training as a means of implementation and action for sustainability:

> Both formal and non-formal education are indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable

development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. (UNCED, 1992, section 36.3)

Also included in Chapter 36 are activities for countries and organizations to improve EE's success. One important activity is setting up training programs on the nature and methods of EE and developmental issues for pre-service and in-service teachers, administrators, and educational planners (UNCED, 1992). The objectives of these activities are incredibly important for the success of formal EE, due to the lack of guidance and instruction regarding the environment for educators and administrative staff (Hopkins and Mckeown, 2002).

The promotion of education, public awareness, and training of Agenda 21, Chapter 36, were emphasized and reinforced later in the same year during the World Congress for Education and Communication on Environment and Development, held in Toronto, Ontario. During this particular conference the principles of sustainability were viewed from an economic standpoint. The key themes of this conference included reducing impacts on the environment while still managing nature as capital; and utilizing education to meet the needs of sustainable development by training humans to optimize productivity through technical progress.

The International Conference on Population and Development was held in Cairo, Egypt in 1994, finalizing a Program of Action for population and development for the next twenty years. Unlike previous population and development conferences, this conference expanded to include patterns of production and consumption and the environment, reflecting on the connections among these issues. The findings of the conference consider how population expansion and economic development affect the natural environment. The development of natural resources for economic gain also requires an ecologically literate and aware society (United Nations, 1995).

The International Commission on Education for the 21st Century, chaired by Jacques Delors, former President of the European Commission and past Minister of Economics and Finance for France, culminated in the report *Learning: The Treasure Within*. This report re-affirms the fundamental role education can have in personal and social development. It also identifies education as one of the principal ways to cultivate a

balanced form of human development: "the truth is that all-out economic growth can no longer be viewed as the ideal way of reconciling material progress with equity, respect for the human condition and respect for the natural assets that we have a duty to hand on in good condition to future generations" (International Commission on Education for the 21st Century, 1996, p. 13). Education is supported as a lifelong endeavour which enables people to develop an awareness of themselves and their environment. Education is more than simply memorizing facts; it is hands-on learning and experiences, cultivating awareness, affecting emotions, attitudes and values, knowledge, and more (Barrett, 2006; Stevenson, 2007b).

In 1997, an international conference entitled Environment and Society: Education and Public Awareness for Sustainability was held in Thessaloniki, Greece. It was at this conference that governmental, intergovernmental, non-governmental organizations and civil society from 83 countries gathered and identified the achievements and failures of previous conferences and declarations. The most constructive and beneficial components of this conference to the global understanding of EE are the reiterations and recommendations that call attention to the importance of education:

> The reorientation of education as a whole towards sustainability involves all levels of formal, non-formal and informal education in all countries. The concept of sustainability encompasses not only environment but also poverty, population, health, food security, democracy, human rights and peace. Sustainability is, in the final analysis, a moral and ethical imperative in which cultural diversity and traditional knowledge need to be respected.
> Environmental education, as developed within the framework of the Tbilisi recommendations and as it has evolved since then, addressing the entire range of global issues included in Agenda 21 and the major UN Conferences, has also been dealt with as education for sustainability. This allows that it may also be referred to as education for environment and sustainability. (UNESCO, 1997, p.2)

Education in general has begun to evolve, integrating more concepts related to sustainability. EE has also undergone some changes: it has grown to include concepts of sustainability, yet it remains the same at its core as described by Tbilisi Report. It is important to note that the Thessaloniki Declaration also states that all subjects, even the humanities and the social sciences, must address the environment and its related issues. No longer should the environment be seen as an isolated or purely scientific area of interest.

In 2002, the United Nations World Summit on Sustainable Development, which took place in Johannesburg, South Africa, addressed, among other things, poverty eradication, changing unsustainable patterns of consumption and production, the natural resource base of economic and social development, sustainable development in a globalizing world, and detailed strategies for the eradication of poverty; changing unsustainable patterns of consumption and production; health and sustainable development; sustainable development for Africa; and protecting and managing the natural resource base of economic and social development. In order to tackle these issues, the United Nations ascertained that public awareness is achieved through education, particularly youth-centred education. Education is continually re-emphasized in many different situations, including health, desertification, and reduction of poverty. Furthermore, the values of Agenda 21 (education, public awareness, and training) were endorsed and the implementation of those values supported.

The continued importance of EE in today's society is accentuated through the United Nations Declaration that 2005 to 2014 would be the Decade of Education for Sustainable Development (UNDESD). The basic vision of the UNDESD is "a world where everyone has the opportunity to benefit from education and learn the values, behaviour and lifestyles required for a sustainable future and for positive social transformation" (UNESCO, 2004, p. 4). EE is a vital component in creating positive change and educating people on values, experiences, and behaviours that benefit the environment and in turn, society. The Decade extends beyond just the environment – it includes society and economy as well – which aligns the Declaration with the interdisciplinary nature of EE. In fact, it is stated that a potentially important goal of the Decade is to utilize the strengths of EE activities and programs with the integration of social, cultural and economic aspects (UNESCO, 2004). UNESCO's draft implementation plan for the Decade describes EE as "a well-established discipline which focuses on humankind's relationship with the natural environment and on ways to conserve and preserve it and properly steward its resources" (2004, p. 16). UNESCO's recognition of EE further emphasizes the importance and relevance of EE to the decade committed to environmental learning.

After the first two years of the Decade, a progress report was published outlining success at international levels, as well as recommendations to problems encountered thus far. Canada, unfortunately, is minimally acknowledged within the document, indicating a slower response than other countries, such as France and Finland. Both of these countries have created a National ESD Action Plan, website, and a National Committee and coordinating body on ESD (United Nations, 2007, p. 63).

An important part of this update report is the UNESCO Action Plan for DESD. Within this Action Plan are nine long-term thematic programs: (1) international leadership and advocacy of the DESD; (2) integrating ESD into basic education; (3) reorienting general secondary education for ESD; (4) integrating ESD into technical and vocational education and training; (5) integrating ESD into higher education; (6) teacher education for ESD; (7) mainstreaming cultural diversity and intercultural dialogue in ESD; (8) education for sustainable water management; and (9) education for sustainable ecosystems and livelihoods (United Nations, 2007, p. 15-16). The need for an action plan for ESD speaks to the current voids that exist in many different forms of education.

In the spring of 2009, participants gathered at the UNESCO World Conference on ESD, in Bonn Germany. Lifelong learning and formal education were reaffirmed as ways in which to achieve more sustainable lifestyles, with an emphasis on social and economic justice, food security, ecological integrity, and respect for all life forms (Bonn Declaration, 2009). The basis of ESD and the principles that underpin it, as stated in the Bonn Declaration, can also be found in EE: values of justice, equity, and responsibility; and principles that support sustainable living, human well-being, environmental protection and restoration, natural resource conservation, sustainable use of resources; and address unsustainable production and consumption practices (Bonn Declaration, 2009, p. 2).

Also in 2009 was the 5th World Environmental Education Congress, held in Montreal, Quebec. Interwoven throughout this Congress of 2,200 stakeholders from 106 countries were questions of defining and creating future fundamentals of EE (Jickling et al., 2010). These questions and discussions centred on the theme of "Earth our common home". The intent of these discussions was to initiate a gentle shift away from restructuring education for ESD and to bring EE to the forefront of environmental

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learning (Jickling et al., 2010). Instead of seeing EE as a subset of ESD, stakeholders at the Congress wished to examine an alternative that contextualizes the interrelated spheres of personal, social, and environmental relationships and development (Jickling et al., 2010). This demonstrates the advancement of EE as a form of education and social movement, as well as the response of EE to the current, widespread issues affecting the natural environment and humankind.

Regardless of the terminology amongst all the international documents spanning the last 40 years, the key purpose of these environmental-related education endeavours is to create a world of ecologically literate, critical thinkers who value and respect the interconnected spheres of the natural environment, the global and national economies, and our societies and cultures.

1.4.4 Environmental Education in Canada

At the national level, there are frameworks and policies that can help to shape provincial and territorial education programs. In 1988, in response to the Brundtland Report, a national Round Table on the Environment and the Economy was established. This Round Table recommended the creation of similar provincial/territorial round tables, as well as the formation of a Task Force on Education (Rogers, 1996; Council of Ministers of Education, Canada, 2010). From the national Round Table on the Environment and the Economy *The Green Plan* (1990) was published and called for a nation-wide EE program. The program that evolved from this appeal is a national not-for-profit, independent organization known as Learning for a Sustainable Future (Rogers, 1996). This organization was established in 1991 and is dedicated to the inclusion of ESD principles into education systems through partnerships with educators, students, parents, government, and communities.

In 2000, the Council of Ministers of Education, Canada released a report, *Education for Sustainability: The Status of Sustainable Development Education in Canada*, which was prepared by Manitoba Education and Training (Sustainable Development Initiative). This report provides a historical review of sustainable development, an inclusive view of progress for ESD in Canada, and presents a framework for future action (Council of Ministers of Education, Canada, 2000).

The years 2005 and 2006 witnessed collaboration among Learning for a Sustainable Future, Manitoba Education, and Environment Canada to promote the development of provincial/territorial ESD working groups. Also created was a national group, ESD Canada, which is an association of ESD experts and working groups that is hosted by Learning for a Sustainable Future (Council of Ministers of Education, Canada, 2010).

Three of the more recent nationwide documents are the Council of Ministers of Education Canada's *Learn Canada 2020* (2008), Environment Canada's *Framework for Environmental Learning and Sustainability in Canada* (2002), and the Council of Ministers of Education Canada's document *Background – Developing a Pan-Canadian ESD Framework for Collaboration and Action* (2010). These documents stress the importance of integrating environmentally focused learning in all levels of education, provide recommendations on how this integration can be achieved and offer support to educators in moving forward on sustainable education.

Learn Canada 2020 concentrates on enhancing Canada's education systems as a whole with a vision of developing "quality lifelong learning opportunities for all Canadians" (Council of Ministers of Education Canada, 2008, p. 1). Within this vision for lifelong learning are four pillars: (1) early childhood learning and development; (2) elementary to high school systems; (3) postsecondary education; and (4) adult learning and skills development. Further distributed among these four pillars are the eight activity areas: literacy; Aboriginal education; postsecondary capacity; international and national representation; official languages; learning assessment programs and performance indicators; education data and research strategy; and ESD (Council of Ministers of Education Canada, 2008).

The objective of the ESD activity area is to: "raise students' awareness and encourage them to become actively engaged in working for a sustainable society" (Council of Ministers of Education Canada, 2008). Such a broad objective leaves much room for interpretation, by both educators and Ministers of Education across the country. Although the activity area is labelled as ESD, the goals and objectives of EE, to improve knowledge, skills, and values and become active in protecting and benefiting the natural environment, correspond with the stated objective.

Environment Canada's *Framework for Environmental Learning and Sustainability in Canada* was presented to the 2002 World Summit on Sustainable Development in Johannesburg, South Africa. Throughout the document, there are discussions of who should be involved in environmental learning, why learning about environmental issues is important, and what the needs are for educating all Canadians. The vision statement draws greatly from the values espoused by EE:

> Canadians of all generations and from all sectors of society are given opportunities to engage in environmental learning and sustainability within and beyond the classroom walls where good questions can be asked and meaningful dialogue can take place. With increased awareness, knowledge, skills, attitudes, values, and motivation, Canadians can become more ecologically literate and act competently to build a sustainable future for humans and ecosystems. (Environment Canada's Framework for Environmental Learning and Sustainability in Canada, 2002, section 2.2)

The objectives and values of the framework are then supported with strategies and calls to action for implementation. This framework demonstrates a national mandate to support the goals of EE.

In 2010, the Council of Ministers of Education Canada released a background document for developing a national ESD framework for partnerships and action. The backgrounder for ESD acknowledges the interrelations of EE and ESD, and identifies the integration of subjects, experiential learning, and information analysis over information transfer (2010). This document highlights how environmentally focused learning is still attempting to gain ground in formal education and there is not yet any minimum requirement for EE (CMEC 2010).

In particular, the Education for Sustainable Development Working Group identified four priority areas for successful ESD in Canada, which mirror the goals of this research: 1) integration of sustainable-development concepts into curricula; 2) provision of ESD-related pre-service and in-service teacher education and support; 3) development of ESD-related teaching resources and materials; and 4) implementing and assessing ESD programs at school and school district/board/division levels (2010, p. 11-13). That these areas have become priorities demonstrates the growing significance of environmentally-related education in Canada and the timeliness of this research.

In addition to global and national efforts there have also been provincial initiatives to promote the inclusion of EE in the formal education system. Two provinces at the forefront of environmental learning are Manitoba and British Columbia. In Manitoba, for example, the Department of Education, Citizenship and Youth developed an *Education for Sustainability Action Plan 2004-2008* for both elementary and secondary classrooms (Farthing, 2005). Additionally, senior school administrators were provided ESD training in 2007, 2008, and 2009 from Ontario's York University's Sustainability and Education Academy (SEdA) (Council of Ministers of Education, Canada, 2010). SEdA has offered similar educational programs in Ontario in 2007 and 2008 and in Saskatchewan in 2011. In British Columbia endeavours in EE and ESD are supported by external partnerships, such as British Columbia Hydro, Destination Conservation and Green Learning, among others. The Ministry of Education has also created a *Sustainability Education Framework* (2008), which applies to all grade levels (Province of British Columbia, 2010). As well, the British Columbia 'Green Schools' website provides numerous resources for educators of all grades (Council of Ministers of Education, Canada, 2010).

Given Canada's current political climate, a brief discussion on neoliberalism is warranted. Neoliberalism, in general, has been described as a political economic theory proposing that human wellbeing can be achieved and advanced through the maximization of free trade (Harvey, 2007; Castree, 2010). The government's concern and focus tends to be on the quality and integrity of money, as well as the security of private property and markets through military defence, police, and juridical functions (Harvey, 2007). Significant power is given to corporations and people are "reconfigured as productive, economic entrepreneurs of their own lives" (Davies and Bansel, 2007, p. 248). Typically, neoliberalism is associated with conservative governments (although liberal parties can also be found to adopt neoliberal policies), cutting corporate taxes, and a reduction in public spending on health, education and the environment (Broadbent, 2009). Currently, Canada is federally governed by a majority Conservative government. This places EE into a complex situation. First, public schools can historically be seen as a place where mainstream, dominant beliefs are reflected and most likely reinforced (Stevenson, 2007b; Davies and Bansel, 2007). Thus, if the dominant beliefs are on consumption and marketplaces (Davies and Bansel, 2007), they are in conflict with EE's beliefs on

respecting the environment's natural resources and reducing individual/corporate consumption (Hart, 2003; Stevenson, 2007b). This disparity in morals may pose a difficulty for the full integration of EE. Second, the strong focus on finances, particularly the reduction in social spending, means that funding for public education could be greatly reduced. A result of less funding could be the marginalization or outright dismissal of "minor" branches of learning, such as the environment.

1.4.5 Significance of the sixth grade in intellectual and emotional development

Early adolescence is a time of establishing relationships and identity that will last a lifetime, as well as a time of transition: "When you consider all of the issues an adolescent faces on a daily basis with their mind, body, and emotions, it is easier to understand the added complication a change from elementary to middle school could make for a young person today" (San Antontio, 2004, quoted in Mueller, 2009). Sixth grade students are preparing to move from elementary school to junior high. This transition can be difficult (George and Alexander, 2003). In elementary school, teachers and students are able to form closer relationships through smaller classes and greater levels of interaction (Eccles, 1999). This enables teachers to have a better effect on how students approach subjects and retain interest (Witmer, 2005; Fredriksen and Rhodes, 2004). These familiar relationships shift in older grade levels, as students are expected to take on increased accountability for their academic performance and personal behaviours while simultaneously receiving less individual attention (Carter, Clark, Cushing, and Kennedy, 2005).

The structure of junior high, as opposed to that of elementary schools, reduces the opportunities for students and teachers to form close relationships in spite of the great need for leadership and direction from adults outside of a student's family (Eccles, 1999). In fact, the larger class sizes diminish a teacher's ability to know their students well and to develop a relationship of trust (Midgley, Feldlaufer, and Eccles, 1988). The important position that teachers play as role models for their students is lessened as classroom populations rise and teacher-student interactions narrow in focus to, predominately, academic and disciplinary matters (Eccles, 1999). Because of this diminished relationship and greater emphasis on academic performance, it is particularly important for EE to be

put into practice in elementary grades to ensure a strong foundation with students, before moving to more detailed and specialized topics in older grade levels.

Teachers play an essential role in the critical time of development taking place during later elementary grades (Mueller, 2009; Witmer, 2005; Fredriksen and Rhodes, 2004). A teacher's relationship with the material and students is especially important for successful learning and interest in a subject (Witmer, 2005; Fredriksen and Rhodes, 2004). Thus, an especially important part of EE is for educators to intellectually and emotionally engage with students on environmental concepts (Stevenson, 2007a). The student-teacher relationship formed in elementary grades, particularly later grades, is crucial in terms of motivation, self-esteem, interest in learning, and engagement in school (Lynch and Cicchetti, 1997). Furthermore, early adolescence is a time of cognitive change, as children are increasingly able to:

> "think abstractly, consider the hypothetical as well as the real, consider multiple dimensions of a problem at the same time, and reflect on themselves and on complicated problems. There is also a steady increase in the sophistication of children's information-processing and learning skills, their knowledge of different subjects, [and] their ability to apply their knowledge to new learning situations." (Eccles, 1999, p. 38)

David Hutchison, chair of the Department of Teacher Education at Brock University, emphasizes the development of intellectual and emotional skills during adolescence, as well as the development of a child's "working theory" of the world (1998). Such a progression in critical thinking, expansion of knowledge, and development of new skills marks an important time in a child's maturity. This development, which occurs during the later elementary grades and transition to junior high, in conjunction with the close relationships students and teachers have during elementary school, makes the sixth grade an appropriate time to introduce more complex and intricate subjects, such as the environment. As such, the focus of this study is to determine how sixth grade teachers perceive and approach EE as educators, as well as how the provincial curricula includes (or excludes) EE. The methodological approach taken is outlined in the next section.

1.5 RESEARCH METHODS

To achieve the first objective of this research, to determine the quantity of environmental content and quality of three sixth grade curriculum documents expected to

contain the greatest amount of environmental aspects (science, social studies, and health education), content analysis of these documents was conducted.

Content analysis is a technique in both qualitative and quantitative research that involves gathering and analyzing the content of text (Neuman, 2000). The content can be words, meanings, pictures, symbols, ideas, and themes; essentially any message that can be communicated through the mediums of text, both written and visual (Neuman, 2000). Content analysis allows the researcher to compare content across texts and reveal veiled aspects of the content (Neuman, 2000). Measurements are conducted within units of analysis. A unit may be a word, phrase, theme, etc. These units are often measured for frequency, direction (e.g. positive and negative), intensity (power of message in a direction), and space (the amount of space allocated to a message) (Neuman, 2000). The frequency of a term is coupled with manifest coding or latent coding. The former type of coding focusing on the surface content (e.g. the number of times a word appears), and the latter seeking the underlying, implicit meaning in a text (White and Marsh, 2006; Neuman, 2000). As well, a constant comparison approach to data analysis was utilized (White and Marsh, 2006; Glaser and Strauss, 1967). This approach continually refines relationships and categories as the analysis is conducted; as more outcomes are analyzed and new findings emerge, previously analyzed outcomes may be revisited for comparison (White and Marsh, 2006).

Content analysis begins with a question, has the researcher decide on the units of analysis, and, in qualitative research, the purposive sampling of documents to be investigated (White and Marsh, 2006; Neuman, 2000). For this first research objective, the focal question was: to what extent do the stated sixth grade curriculum outcomes incorporate the fundamental pillars of EE?

Following this, units of analysis were required. To determine the quantity, any outcome that made explicit mention of the terms environment, conservation, citizenship, human lifestyles, responsibilities, the earth, or the earth's inhabitants, was included. The terms citizenship, human lifestyles, and responsibilities were included in accordance with the EE objectives of attitudes, skills, and participation. Lifestyle choices, including citizenship and responsibility, are connected by what is valued and what actions are taken based on those values. As stated previously, there is no ideal or minimum amount of EE

for a curriculum; as environmentally focused learning is still attempting to gain ground in formal education (Council of Ministers of Education, 2010). Therefore, determining the quantity of outcomes related to the environment was carried out to ensure that all outcomes related to the environment in these subjects were further analyzed for their relevancy to EE principles and objectives (described below).

Once the quantity of outcomes related to EE were established, these outcomes would then be analyzed to determine the quality of that EE content. *A priori* codes were developed as a result of an extensive literature review focused on the specifications of what constitutes EE. The resulting codes are based upon the fundamental pillars of EE: attitudes and values; knowledge and awareness; and skills and hands-on actions (UNESCO-UNEP, 1977). The curriculum documents of science, social studies, and health education were analyzed using eight principles adapted from the Tbilisi Report which were deemed most applicable to elementary education:

1. Considering the environment in its totality (e.g.: technological, social, political, etc).
2. Being interdisciplinary in approach for a balanced perspective.
3. Connecting environmental sensitivity, knowledge, problem-solving skills, and values to every age, with emphasis on sensitivity in the early years.
4. Empowering/enabling learners to have an active role in their learning experiences.
5. Incorporating local, national, regional, and international points of view for environmental issues and the importance of co-operation for problem solving.
6. Emphasizing complexity of environmental issues and the importance of critical thinking.
7. Explicitly considering the environment in development and growth.
8. Utilizing diverse learning environments and approaches. (UNESCO-UNEP, 1976, p. 2; UNESCO, 1977, p. 26-27)

Also forming the basis for analysis are UNESCO's five objectives of EE. These work towards achieving an active, ecologically literate society that is cognisant of, and capable to address, environmental issues, while also being emotionally connected to, and concerned for, the environment:

1. Awareness: to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.

2. Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

3. Attitudes: to help social groups and individuals acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.

4. Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.

5. Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working towards the resolution of environmental problems. (UNESCO-UNEP, 1976, p. 2; UNESCO, 1977, p. 26-27).

These principles and objectives were used in comparison with specific curriculum outcomes to examine the quality of that existence. For example, does the outcome emphasis the acquisition of knowledge, the development of skills, attitudes, or awareness, and/or does it promote active student participation in learning and problem solving? This is then taken further to determine if the outcome in question is in keeping with one or more of the eight principles, where a principle(s) is appropriate. For example, does the outcome incorporate multiple view points? Or, does the outcome take an interdisciplinary view? Or, does the outcome encourage sensitivity towards an environmental issue? If an outcome, within the selected outcomes, does include at least one of these principles and/or objectives, its EE quality can be seen as greater than the outcomes not containing any of the principles/objectives. As such, the greater the inclusion of these principles and objectives, the greater potential there is for achieving the goals of EE and more substantial presence of EE in formal education outcomes. Of the five EE objectives, knowledge, skills and attitudes were selected for analysis; awareness and participation were not. Awareness was not included as its targets, namely understanding and sensitivity, can be achieved through both knowledge and attitudes: sensitivity towards environmental issues can be gained through feelings of concern and awareness of environmental problems can be attained through understanding the environment and its associated problems. As well, school curriculums (e.g. Nova Scotia's curricula) tend to emphasize skills, knowledge, and attitudes as the areas of learning, not awareness, and so

it was unlikely that it would be identified as distinct from knowledge and attitudes. The decision to not include participation was made based on the understanding that it is the four previous objectives that lead to participation in environmental matters.

As this is qualitative research, documents for investigation were purposively chosen. Science, social studies, and health education were selected, due to the understanding that these three addressed the environment the most out of all sixth grade subjects. The CMEC's pan-Canadian ESD framework notes that in Nova Scotia, environment related outcomes tend to be more focused in the subjects of science, social studies, English language arts, health education, and technology education (CMEC, 2010). In the sixth grade, technology education is not an independent subject with its own curriculum and so it was not included in this research. A review of the English language arts specific curriculum outcomes ruled out the inclusion of the subject due to a lack of outcomes explicitly related to the environment. A full list of the specific curriculum outcomes for science, social studies and health education is provided at the end of this thesis (see Appendix A: Specific curriculum outcomes).

The curriculum guides, *Social Studies 6: World Cultures* (2010); *Atlantic Canada Science Curriculum: Grade 6* (2008); *Health Education Grades 4-6* (2003); *Learning Outcomes Framework* (2011), were accessed through the Nova Scotia Department of Education website's "Document Depot". Here, curriculum documents and related texts (such as time strategies and resources) are available for either electronic download as PDFs or for ordering via mail.

To address the second objective of this study, determining how a cohort of sixth grade teachers perceive challenges to EE, qualitative, semi-structured interviews with a cohort of sixth grade teachers were carried out. Prior to undertaking participant recruitment and data collection, ethical approval was required from both Dalhousie University's Social Sciences and Humanities Research Ethics Board and the HRSB's Research Committee. For Dalhousie University's ethical approval, a project description, consent processes and forms, analysis of risk for participants, and confidentiality and anonymity assessments were submitted by the investigator (a copy of the University's ethical approval is included in Appendix B: Dalhousie ethics approval).

In order to obtain ethical approval from the HRSB, the investigator completed an application provided by the School Board, a letter of explanation for teachers, the interview script, a detailed explanation of the theoretical framework behind the research, methods for data collection and analysis and a copy of ethical approval from Dalhousie University (a copy of the HRSB letter of approval for research is included in Appendix C: HRSB ethics approval).

Face-to-face, or, when preferred, telephone interviews were conducted with a cohort of 18 sixth grade teachers. To recruit participants, individual teachers were contacted through email addresses provided on the HRSB website. In cases where the contact information for individual teachers was unavailable, school principals were contacted and asked to identify possible participants and to pass on the information to their teachers (see the letter of information is included in Appendix D: Letter of explanation for teachers). In addition, snowball sampling techniques were used to recruit additional respondents (Palys, 1992) by asking participants to identify other teachers who could participate in the study or by having a participant freely suggest a colleague. This method of participant recruitment does pose the possibility of self selection bias, in that the participants may have a previous interest in, or knowledge of, the environment and environmental education. Participants were not questioned as to their reasons for participating, although some were given voluntarily and did not indicate an inclination towards environmental education. Furthermore, as this is not a representative sample of teachers within the HRSB or the province of Nova Scotia, the results of these interviews cannot be generalized.

The interviews were semi-structured and open-ended. Twenty-one questions were posed to participants, ranging from personal experiences in nature and EE, to classroom practices and context regarding the subject, and the approach of the provincial Department of Education on EE. Each of these twenty-one questions had additional probes to delve further when appropriate. A copy of the interview questions and details is included in Appendix E: Interview script. The open-ended nature of the questions allowed for a more personal and in-depth encounters with the teachers, thus enhancing the understanding of their perceptions (Whiting, 2008). Interviews were conducted from April 2010 to December 2010, omitting the months of June-August as teachers were

unavailable during this period. On average interviews lasted forty minutes, and in all cases were audio recorded with participants consent.

Data from the interviews were transcribed and participants were invited to review their transcript, if they had selected to do so on their consent form (see Appendices F: Interview consent form and G: Direct quotation consent form). Following transcription, the data were thematically analyzed using NVivo 9™ software which allowed for qualitative data management to ascertain themes and patterns (Creswell, 2007; Aronson, 1994). Analyses included a comparison of the teachers' responses to scholarly ideas; their beliefs on what constitutes EE; the atmosphere of HRSB's elementary education regarding EE; and *a posterior* analysis of challenges to implementation. The key terms that emerged from the coding are: environmental knowledge, awareness, actions, attitudes, values, apathy, personal environmental values, professional environmental values, ESD, nature, being outside, ideals and concerns (in terms of teaching EE), environmental past (experiences, education), parents, educational value of EE, role models, students and EE, curriculum outcomes, curriculum content, finances, opportunities for implementation (examples from participants). These codes were categorized into themes: defining EE, personal and professional values on the subject, challenges and barriers to implementation, and situating EE within a sixth grade classroom.

The two data sets are complementary; for example, the challenges faced by teachers include the specific curriculum outcomes analyzed in science, social studies, and health education, as well as the time and resources dictated by the curriculum documents. The curriculum shapes what the teachers cover in class; however the teachers also manipulate the curriculum to fit their individual classroom needs. Together, the results from the two objectives help to achieve the third objective of this study, that is to identify the key issues and challenges to teaching EE within a sixth grade classroom, in the HRSB. A commentary about what teachers are looking for, and think of, in terms of EE, and at the same time what exists in their curriculum is included in chapter 4.

1.6 CONTRIBUTIONS

This research makes theoretical and substantive contributions. First, the findings of this research contribute to the academic study of formal EE. Second, the emerging sector of EE in the province of Nova Scotia necessitates investigation into where EE is and where it could go. Specifically, this research addresses the literature gaps regarding elementary teacher perceptions and values regarding EE, and the content and quality of EE within sixth grade curriculum documents and makes recommendations to improve current EE existence in the HRSB and Nova Scotia. Areas of EE requiring further research are also identified.

1.7 STRUCTURE OF THESIS

This thesis is organized into four chapters. Chapters 2 and 3 are each presented as independent manuscripts, each with their own abstract, introduction, methods, results, discussion, conclusion, and references. These two chapters have been written for publication in two academic journals, specifically Chapter 2 has been prepared for submission to the *Journal of Environmental Education* and Chapter 3 has been prepared for submission to the *Canadian Journal of Environmental Education*. Chapter 2 focuses on an analysis of provincial curriculum documents in use in sixth grade classrooms across Nova Scotia. The documents under analysis for inclusion of EE are health education, science, and social studies. Chapter 3 focuses on understanding how a cohort of sixth grade teachers in the HRSB perceives EE and barriers to the subject within their individual classrooms. Lastly, Chapter 4 is a general conclusion that joins the two separate papers together, discusses the contributions of the thesis to theory and practice regarding EE, highlights areas for further study, and suggests recommendations to incorporate more EE in both the three provincial curriculum documents and to work with teachers to improve their own experiences with the subject.

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CHAPTER 2

PRESENT, ABSENT, OR TARDY? A STUDY OF ENVIRONMENTAL EDUCATION IN NOVA SCOTIA'S SIXTH GRADE CURRICULUM[1]

Abstract: This study investigates the presence and status of environmental education principles, as well as factors for encouraging positive environmental behaviour in students, within three sixth grade curricula in Nova Scotia, Canada: science, social studies, and health education. The results of the research show a strong reliance on knowledge-based connections to the environment and less importance shown to experiential learning, attitudes and values. The results also reveal a significant decline in the time and resources allotted to environmentally focused education of these subjects. The effect is a diminished and marginalized environmental education presence in sixth grade education of Nova Scotia within the context of the Decade of Education for Sustainable Development.

2.1 INTRODUCTION

Environmental education (EE), in its various forms and combinations, has been growing in importance and significance since its formal introduction to the global community in 1972 with the Stockholm Declaration. Since this date, numerous charters and declarations have further defined and developed the concept of EE and the framework that surrounds it. Presently, there is a global emphasis on education for sustainable development, or ESD, and its role in educating ecologically literate citizens; this is most evident through the United Nations Decade of Education for Sustainable Development (2005 – 2014). While the literature shows some differences between the two concepts, EE is not in competition with ESD; rather, the two are complementary (Mckeown and Hopkins, 2003). Both EE and ESD can, and often do, work in tandem to raise public awareness and bring about positive environmental and in some cases social change.

In Canada there are various initiatives meant to improve the status of EE nationwide. For example, *Learn Canada 2020*, a framework developed by the Council of

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Ministers of Education Canada (CMEC), aims to provide all Canadians with quality, life-long learning opportunities, including ESD. Environment Canada's *Framework for Environmental Learning and Sustainability in Canada*, also underlines the importance, for all Canadians, of learning about, for, and in the environment. Another important CMEC document is *Background – Developing a Pan-Canadian ESD Framework for Collaboration and Action* (2010). This document, in particular, acknowledges the interrelations of EE and ESD, identifies the integration of subjects, and provides the provincial/territorial contexts for ESD.

In Nova Scotia, EE has historically been included in some subject curricula (mainly science) and teaching suggestion documents dating back to the 1940s. This inclusion was a part of the now defunct, yet once greatly influential, *Journal of Education*. The influence of this journal, first published in 1866, lay in its role as a provincial guide for educators before official, separate subject curriculums came into being in the 1950s (Personal communication, Lynn Duquette, Librarian at Department of Education, June 21st, 2011). The Journal of Education was specific to Nova Scotia and also contained updates to the teachers' "Handbook to the Course of Study", another document setting out what teachers were to cover in different grade levels (Personal communication, Lynn Duquette, Librarian at Department of Education, June 24th, 2011). Informally, EE in the province has been thriving, with such groups as Clean Nova Scotia and the Sierra Club of Canada – Atlantic Chapter visiting elementary and secondary schools to speak with students on environmental issues and what actions students can take. These programs target a wide variety of age groups, with a large focus on elementary age students as the target audience. Given the importance of developing sensitivity towards the environment during the younger years (Wilson, 1996; Kalinowski, 1991), the focus on EE in the elementary grades is crucial.

Limited scholarship exists that investigates the status of EE within elementary education curricula in general. Research in this area tends to focus more on policy and practice gaps (See, for example, Grace and Sharp, 2000; Barraza, Duque-Aristizabal, and Rebolledo, 2003; Stevenson, 2007) or influences on a teacher incorporating EE (e.g. Ernst, 2009; Moseley, Huss and Utley, 2010; Tan and Pedretti, 2010). These are worthy areas of study; however it is important to know what exactly educators are expected to

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teach and how the curriculum (a government document not necessarily designed by classroom teachers) addresses environmental behaviours, knowledge, attitudes, and experiences.

Given the national and provincial endeavours at integrating EE/ESD into the school system, it is crucial to investigate the current presence (or lack thereof) of EE within curriculum documents, and what value placed upon it by curriculum developers. Through content analysis of three curricula, this research provides insight into the quantity and quality of EE within Nova Scotia's sixth grade curricula for science, social studies, and health education, as well as making suggestions for improving the ongoing integration of EE.

2.2 BACKGROUND

The sixth grade is an important year in terms of transition; physically in terms of approaching the move from elementary to junior high, as well as mentally and emotionally as students begin to enter into adolescence (San Antontio, 2004, quoted in Mueller, 2009). In elementary school, teachers and students are able to form closer relationships through smaller classes and greater levels of interaction. This enables teachers to have a better effect on how students approach subjects (Witmer, 2005; Fredriksen and Rhodes, 2004). This time is also a period of cognitive progress; children are increasingly able to think critically and theoretically, reflect on multiple perspectives, enhance their knowledge of different subjects and relate their knowledge to new learning situations (Eccles, 1999). This progression of thought, expansion of knowledge, and development of new skills shows the sixth grade to be an appropriate time to introduce more complex environmental topics and discussion (Littledyke, 2004).

It is important to note here that EE and ESD are alike in calling for a reorientation of formal education as well as an increase and improvement concerning public awareness of environmental issues and actions to take (Mckeown and Hopkins, 2003). ESD uses education as a means to achieve environmental, economical, and social sustainability (Mckeown and Hopkins, 2003). This type of education emphasizes investigating the connections among physical/biological, socio-economic environments, and human actions and development, in all disciplines (United Nations, 1992). EE works to develop a

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population that is aware of, and concerned for, the natural environment. The emphasis is placed on knowledge, skills, attitudes, motivations, and actions aimed towards solving current environmental problems and helping to prevent future troubles (UNESCO-UNEP, 1976).

In traditional grade school education, the environment is primarily marginalized to a few subjects, such as science and geography, and fragmented into unconnected pieces (Ross, 2007). This fragmentation is created for the purposes of acquiring knowledge yet works against the understanding of the environment a holistic totality (Ross, 2007). Moreover, traditional empirical-analytical curriculum perspectives rely heavily on knowledge-based lessons, as opposed to critical thinking, active learner participation, and applied, hands-on experience (Stevenson, 1993). To successfully achieve the knowledge-based, or factual, outcomes, the environment is generally separated into generalized parts (Ross, 2007). However, this action of splitting the environment into "manageable" bits without any sense of the whole de-values the significance of the natural environment (Ross, 2007).

Furthermore, from the lens of EE, this reliance on knowledge more so than attitudes or hands-on experiences weakens positive environmental behaviours (Littledyke, 2008). To achieve ecological literacy, equal weight must be given to hands-on experiences, heart-felt attitudes, proactive behaviours, and indeed, knowledge (UNESCO, 1977; NAAEE, 2000). As Ross (2007) points out, it is important not to let the "necessity" of learning the systems of the environment eclipse equally important aspects such as values and out-of-doors experiences.

While EE differs from traditional subjects, it can fit within the outcomes of these subjects. In England, EE was developed into the national curriculum as a cross-curricular theme in 1990 (Chatzifotiou, 2006). Other scholars (Jensen, 2004; Ross, 2007; Moroye, 2009) also advocate for taking EE beyond natural science subjects: into the humanities to ensure desirable changes for the future and action empowered students and into health education to inform and empower students to the connections between health and environmental problems, such as air pollution and asthma. Embracing the environment as an integrating theme within all educational subjects has been found to significantly improve student performances in reading, writing, math, science, and social studies

(Lieberman and Hoody, 1998, quoted in Morrone, 2001). Furthermore, environmental education is inherent in all subjects and facets of education: "All education is environmental education. By what is included or excluded, students are taught that they are part of or apart from the natural world" (Orr, 2004, p. 12). Although there are not yet any official requirements or suggested minimums for EE in formal education due to its secondary position to other subjects (CMEC, 2010), the need to develop ecologically conscious societies through formal environmental learning has never been greater (UNESCO, 1997, 2004). Education is continually identified as the key to positive environmental change and the continuation of society in a sustainable way (UNCED, 1992; UNESCO, 1997, 2004).

Science education, perhaps the most "natural" subject for EE, is not without its imperfections. In spite of the inclusion of environmentally related concepts in a typical science curriculum, the environment becomes objectified in terms of natural resources and students are alienated from experiencing nature even as they study it (Littledyke, 2008). While this is problematic, the environment is still generally included in all science curricula worldwide, albeit often in a less than desirable state for environmental educators.

The role of the environment in human health cannot be overlooked. The severity of society's impact on environmental health and the repercussions onto human health such as the lack of access to clean drinking water contributed to the development of formal EE in Sweden (Breiting and Wickenberg, 2010). Arguably, it may be that one of the most important reasons for the integration of environment and health education are the health concerns facing today's youth, such as asthma, allergies, and obesity, to name a few (Brown, 2004; Morrone, 2001). As well, the combination environment and health provides students with real world relevance and integrates multiple disciplines (e.g. biology, chemistry, mathematics, technology, language arts), thus adding interdisciplinary and depth to student learning (Dereski et, al, 2002). The pairing of health and environment in a student's education (kindergarten to grade twelve) helps youth to recognize harmful incidents and empowers the students to become informed citizens who engage with public health issues (Brown, 2004; Morrone, 2001).

EE also has its place within other subjects, such as social studies. In Scotland, the environment is integrated into social studies for students aged five to fourteen (approximately kindergarten to the ninth grade) through study of the consequences of human resource use and environmental conservation (Ross, 2007). What's more, social studies explores cultural history and values, which also have important roles in EE (Moroye, 2009; Blumstein and Saylan, 2007; Gruenewald and Manteaw, 2007). EE is not merely ecological knowledge – it is history, politics, technology, culture, health, empowerment, participation, values, society, and economy.

In fact, the definition of social studies as described by the *Foundation for the Atlantic Canada Social Studies Curriculum* document explains that: "The social studies curriculum integrates concepts, processes, and ways of thinking drawn from the diverse disciplines of the humanities, social sciences, and pure sciences" (1998, p. 2). This integration of different disciplines is reflected in the units, general curriculum outcomes, and aims of sixth grade social studies in Nova Scotia. The aims of sixth grade social studies are to integrate disciplines as described above (including geography, history, economics, political science, sociology, and the pure sciences), as well as provide a multidisciplinary lens through which to view issues from personal, provincial, national and global perspectives (Nova Scotia Department of Education, 2010).

2.3 NOVA SCOTIA CONTEXT

Located on the eastern coast of Canada, Nova Scotia is bounded by the Atlantic Ocean, the Bay of Fundy, and the Gulf of Saint Lawrence (for a map of Nova Scotia, and a map pinpointing Nova Scotia's location in Canada, see Figure 2.1, below). The province includes what is known as the mainland peninsula and two islands, Cape Breton Island and Sable Island. Nova Scotia has a population of approximately 940,000 (Statistics Canada, 2009). The provincial capital is Halifax. The Halifax Regional Municipality (HRM) is located on the mainland, with a population of nearly 400,000 (Statistics Canada, 2007).

Figure 2.1. Map of Nova Scotia, Canada-Maps.org, 2006-2010

Additionally, many environmental groups in Nova Scotia have headquarters in the HRM (Table 2.1).

Table 2.1. Environmental organizations in the HRM.

Name of organization	Year established
Ecology Action Centre	1971
Environmental Health Association of Nova Scotia	1985
Clean Nova Scotia	1988
Nature Nova Scotia (Federation of Nova Scotia Naturalists)	1990
Nova Scotia Environmental Network	1991
Evergreen – Learning Grounds	1991
Nova Scotia Nature Trust	1994
Sierra Club of Canada – Atlantic Chapter	2001
World Wildlife Fund	2001
Canadian Parks and Wilderness Society (CPAWS) – Nova Scotia Chapter	2003
Nova Scotia Environmental Education Caucus	2003
Young Naturalists Club – Halifax	2005
SENSE: Sustainability Education in Nova Scotia for Everyone	2006

Within the Nova Scotia school system for both elementary and secondary, there are different curriculum hierarchies. The first level is the specific curriculum outcomes. These are to be covered daily by teachers and achieved by students. The type and number of outcomes depends on each subject and builds upon previous grades. The second level of outcomes is known as the key-stage learning outcomes. These are milestones for students to achieve at the completion of grades three, six, nine, and twelve in each

subject. The third level of outcomes is the general curriculum outcomes. These frame the previous two levels with a set of broad foundational outcomes and appear in each subject. The fourth level of outcomes is the Essential Graduation Learnings. These describe the knowledge, skills, and attitudes in six key areas that students are expected to reach by graduation from high school (Atlantic Provinces Education Foundation, 1996; 1998; 1998; 1999). The key-stage outcomes, general outcomes, and essential graduation learnings all influence the specific curriculum outcomes.

There are additional documents that influence the curricula of Nova Scotia, including: *Foundation for the Atlantic Canada Social Studies Curriculum* (Atlantic Provinces Education Foundation, 1999); *Foundation for the Atlantic Canada Science Curriculum* (Atlantic Provinces Education Foundation, 1998), *Foundation for Active, Healthy Living: Physical and Health Education Curriculum* (Atlantic Provinces Education Foundation, 1998), and *Pan-Canadian Common Framework of Science Learning Outcomes K to 12* (Council of Ministers of Education Canada, 1997). The three foundation documents describe the subject key-stage curriculum outcomes, general curriculum outcomes, and the Essential Graduate Learnings across the four Atlantic Provinces (Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and New Brunswick). The documents ensure that these four provinces have the same curricula foundations for subjects; it is the specific curriculum outcomes that differ in each province. These three types of outcomes influence the particulars of the specific curriculum outcomes for each province. The *Pan-Canadian Common Framework of Science Learning Outcomes K to 12* directly impacts the science specific curriculum outcomes. The outcomes in Nova Scotia are duplicates of the outcomes in the *Common Framework* and this is explained in the sixth grade science curriculum.

2.4 RESEARCH METHODS

This paper is part of a larger study that examines various aspects of environmental education in the sixth grade in the Halifax Regional School Board. This portion of the study is a content analysis of three English language curricula: science; social studies; and, health education. Curriculum, in this case, refers to the documents that teachers use as the basis for their lesson plans, student assessments, and, most importantly, what

specific outcomes teachers are expected to cover. The curriculum analyzed in this study were *Social Studies 6: World Cultures* (2010); *Atlantic Canada Science Curriculum: Grade 6* (2008); *Health Education Grades 4-6* (2003); *Learning Outcomes Framework* (2011). These documents were chosen because they addressed the environment to the greatest extent out of all sixth grade subjects (CMEC, 2010).

Content analysis was used to review the curriculum. Content analysis is a technique used in both qualitative and quantitative research that involves gathering an analyzing the content of text (Neuman, 2000). Content analysis allows a researcher to compare content across texts and reveal veiled aspects of the content (Neuman, 2000). Measurements are conducted within units of analysis. A unit may be a word, phrase, theme, etc. These units are often measured for frequency, direction (e.g. positive and negative), intensity (power of message in a direction), and space (the amount of space allocated to a message) (Neuman, 2000). The frequency of a term is coupled with manifest coding or latent coding. The former type of coding focusing on the surface content (e.g. the number of times a word appears), and the latter seeking the underlying, implicit meaning in a text (White and Marsh, 2006; Neuman, 2000). As well, a constant comparison approach to data analysis was utilized (White and Marsh, 2006; Glaser and Strauss, 1967). This approach continually refines relationships and categories as the analysis is conducted; as more outcomes are analyzed and new findings emerge, previously analyzed outcomes may be revisited for comparison (White and Marsh, 2006).

Qualitative content analysis begins with the researcher asking a question, making informed choices about the units for analysis, and finally followed by the purposive sampling of documents to be investigated (White and Marsh, 2006; Neuman, 2000). For this study, the focal question was: to what extent do the selected sixth grade curriculum outcomes incorporate the fundamental pillars of EE?

To determine the quantity, any outcome that made explicit mention of the terms environment, conservation, citizenship, human lifestyles, responsibilities, the earth, or the earth's inhabitants was included. Determining the quantity of outcomes related to the environment was carried out to ensure that all outcomes related to the environment in these subjects were further analyzed for their relevancy to EE principles and objectives (described below). There is no ideal or minimum amount of EE for a curriculum; as

environmentally focused learning is still attempting to develop in formal education (Council of Ministers of Education, 2010). Consequently, it is the content of that is of greater concern for this study, rather than the number of outcomes. For example, all of the science outcomes could be related to EE, yet only focusing on the acquisition of knowledge which would not be conducive to the goals of EE.

The list of outcomes related to EE were then qualitatively analyzed for their coverage of the fundamental pillars of EE and the objectives of EE using *a priori* codes that provided the basis for the qualitative analysis. Specifically, the outcomes were analyzed with the guiding principles of EE:

1. Considering the environment in its totality (e.g.: technological, social, political, etc).
2. Being interdisciplinary in approach for a balanced perspective.
3. Connecting environmental sensitivity, knowledge, problem-solving skills, and values to every age, with emphasis on sensitivity in the early years.
4. Empowering/enabling learners to have an active role in their learning experiences.
5. Incorporating local, national, regional, and international points of view for environmental issues and the importance of co-operation for problem solving.
6. Emphasizing complexity of environmental issues and the importance of critical thinking.
7. Explicitly considering the environment in development and growth.
8. Utilizing diverse learning environments and approaches. (UNESCO-UNEP, 1976, p. 2; UNESCO, 1977, p. 26-27)

Also forming the basis for analysis are UNESCO's five objectives of EE. These work towards achieving an active, ecologically literate society that is cognisant of, and capable to address, environmental issues, while also being emotionally connected to, and concerned for, the environment:

1. Awareness: to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.

2. Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

3. Attitudes: to help social groups and individuals acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.

4. Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.

5. Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working towards the resolution of environmental problems. (UNESCO-UNEP, 1976, p. 2; UNESCO, 1977, p. 26-27).

These principles and objectives were used in comparison with specific curriculum outcomes to examine the quality of that existence. For example, does the outcome emphasis the acquisition of knowledge, the development of skills, attitudes, or awareness, and/or does it promote active student participation in learning and problem solving? This is then taken further to determine if the outcome in question is in keeping with one or more of the eight principles, where a principle(s) is appropriate. For example, does the outcome incorporate multiple view points? Or, does the outcome take an interdisciplinary view? Or, does the outcome encourage sensitivity towards an environmental issue? If an outcome does include at least one of these principles and/or objectives, its EE quality can be seen as greater than the outcomes not containing any of the principles/objectives. As such, the greater the inclusion of these principles and objectives, the greater potential there is for achieving the goals of EE and more substantial presence of EE in formal education outcomes. Finally, the qualitative analysis allowed for each EE-related outcome to be categorization in terms of its coverage of knowledge, skills, and/or attitudes related to EE. For the five EE objectives, knowledge, skills and attitudes were selected for analysis; awareness and participation were not. Awareness was not included as its targets, namely understanding and sensitivity, can be achieved through both knowledge and attitudes: sensitivity towards environmental issues can be gained through feelings of concern and awareness of environmental problems can be attained through understanding the environment and its associated problems. As well, school curriculums (e.g. Nova Scotia's curricula) tend to emphasize skills, knowledge, and attitudes as the areas of learning, not awareness, and so it was unlikely that it would be identified as distinct from knowledge and attitudes. The decision to not include participation was made based on the

understanding that it is the four previous objectives that lead to participation in environmental matters.

The documents chosen for investigation were limited to curriculum documents in science, social studies, and health education. This was informed by the CMEC's pan-Canadian ESD framework which notes that in Nova Scotia, environment related outcomes tend to be more focused in the subjects of science, social studies, English language arts, health education, and technology education (CMEC, 2010). In the sixth grade, technology education is not an independent subject with its own curriculum and so it was not included in this research. An initial review of the English language arts specific curriculum outcomes ruled out the inclusion of the subject due to a lack of outcomes explicitly related to the environment. A full list of the specific curriculum outcomes for science, social studies and health education is provided at the end of this thesis (see Appendix A: Specific curriculum outcomes).

Foundation for the Atlantic Canada Social Studies Curriculum (APEF, 1999); *Foundation for the Atlantic Canada Science Curriculum* (APEF, 1998),   *Foundation for Active, Healthy Living: Physical and Health Education Curriculum* (APEF, 1998), and *Pan-Canadian Common Framework of Science Learning Outcomes K to 12* (CMEC, 1997) were not analyzed in the same manner as the specific curriculum outcomes; rather they were reviewed when necessary to determine the backgrounds to the specific curriculum outcomes. The Atlantic Provinces Education Foundation documents were accessed through the Department of Education's library in Halifax, Nova Scotia and the Council of Ministers of Education Canada document was made available, on loan, by the provincial science consultant Marilyn Webster.

2.5 RESULTS AND DISCUSSION

Table 2.2 reveals the results of the quantitative analysis. Social studies has 4 outcomes related to EE, science has 7, and health for 2003 had 5 while the health curriculum for 2011 has none. It is interesting to note that only one of the outcomes actually cover the skills, knowledge and attitudes which are considered essential to have in combination for effective EE. An example from social studies is the following outcome: "Students will be expected to take age-appropriate actions to demonstrate an understanding of

responsibilities as global citizens" (Nova Scotia Department of Education, 2010, p. 27). The expectations for this outcome are broken down into three specific statements: "explain the rights and responsibilities of being a global citizen *[a knowledge target]*; support a position on a local/national/international issue after considering various perspectives *[an attitude target]*; and plan and take age-appropriate actions to address local/national/international problems or issues *[a skill target]*" (Nova Scotia Department of Education, 2010, p. 27, italics mine). This outcome has the potential to address local, national and international environmental concerns and opportunities, and to do so in a way that includes knowledge, targets attitudes/values, and encourages students to develop skills and take action.

Table 2.2. Categorization of EE related outcomes in Sixth Grade Curricula

	Social Studies	Science	Health
Knowledge	1	7	2
Skills		1	1
Attitudes			
Knowledge and Skills	1	3	
Knowledge and Attitudes	1	1	1
Skills and Attitudes		1	1
Knowledge, Attitudes, and Skills	1		
TOTAL	**4/ 17**	**13/ 32**	**5/ 40**

In sixth grade science, there are 13 outcomes out of 32 that address the environment in some capacity. Many of these outcomes are knowledge based. When an attitude is addressed, this is considered to be separate from the specific attitude outcomes for science grades four, five and six (For science, the attitude outcomes are spread out over the grades of four, five, and six. It is difficult to ascertain which attitude outcomes are purposely intended for the sixth grade, as they are not grade specific). There is some overlap in terms of the target categories. Three outcomes have the potential to target both knowledge and skills, one outcome targets both skills and attitudes, and one outcome

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emphasizes both knowledge and attitudes. The remaining seven outcomes all focus on knowledge.

The situation of sixth grade health education presents a unique challenge to this research, as well as an individual teacher's ability to integrate EE. There are three new units for 2011: healthy community, healthy relationships, and healthy self. There is no explicit integration of the environment, merely the potential in two specific curriculum outcomes. For that reason, Table 2.2 shows the breakdown of only the 2003 curriculum outcomes that are related to the environment. This curriculum is still in use in classrooms until the new curriculum is fully complete and ready for release. Within the four units of the 2003 curriculum, there are approximately five outcomes related to the environment. Two outcomes specifically target knowledge, one emphasizes skills alone, one targets knowledge and attitudes, and another both skills and attitudes. An example of a knowledge target is the following curriculum outcome: "Students will be expected to identify ways in which individuals, communities, and countries co-operate to protect and maintain environmental health" (Nova Scotia Department of Education, 2003, p. 17).

The results of the study show that for each subject, outcomes related to EE tended to be focused on environmental knowledge rather than a mix of knowledge, skills and attitudes. This following considers these findings within the context of the fundamental pillars and the objectives of EE.

2.6.1 Science

The sixth grade science curriculum currently in use for Nova Scotia's public schools was created in 2008 and is largely based on the *Pan-Canadian Common Framework of Science Learning Outcomes K to 12* (1997) and the *Foundation for the Atlantic Canada Science Curriculum* (1998). According to the Pan-Canadian document, "scientific literacy is an evolving combination of the science-related attitudes, skills, and knowledge students need to develop inquiry, problem-solving, and decision-making abilities, to become lifelong learners, and to maintain a sense of wonder about the world around them" (CMEC, 1997, p. 4). However, there is a discrepancy in how this vision is to be achieved. Currently, there are four foundations of science education in Canada, which are science, technology, society, and the environment (STSE); skills; knowledge;

and attitudes. STSE focuses on students developing an understanding of the nature and relationships of science and technology, and the social and environmental contexts of science and technology (CMEC, 1997). The skills foundation centres on inquiries, problem solving, communication, and making informed decisions (CMEC, 1997). Knowledge is the understanding of life science, physical science, and Earth and space (CMEC, 1997). Lastly, the attitudes foundation encourages students to develop attitudes that support responsible scientific and technological knowledge and skills that will benefit self, society and the environment (CMEC, 1997).

These four areas are seen as crucial in achieving scientific literacy (CMEC, 1997), yet only three are actually included in the specific curriculum outcomes; attitudes are not incorporated. Instead, scientific attitudes outcomes are spread out over three years – grades four, five, and six – with no specific outcomes for any grade. This creates concerns with addressing individual attitudes, a key goal of EE. In fact, in an outdoor/EE program attitudes are considered to be a major emphasis at all grade levels, with knowledge, skills, awareness, and participation fluctuating depending on the intellectual development of each grade level (Kalinowski, 1991).

It is repeatedly stated in the science general curriculum outcomes, which frame the specific curriculum outcomes, that students will understand the relationships among the environment, science and technology; and that students will develop responsible attitudes towards the environment during the application and acquisition of science and technology (Nova Scotia Department of Education, 2008). This framework of understanding, attitudes, and connections appears to work within the five objectives of EE. Therefore, it would be ideal that the specific outcomes target EE principles as a way of achieving the goals. This sense of acting as stewards of the earth is complemented with the aim that scientific literacy will help students "maintain a sense of wonder about the world around them" (Nova Scotia Department of Education, 2008, p.1). This gives the impression of a well-rounded curriculum in terms of addressing the value of the environment.

The units of sixth grade science, electricity, flight, space, and diversity of life, derive their specific curriculum outcomes from those in the *Pan-Canadian Common Framework of Science Learning Outcomes K to 12*. However, a critical examination of

those outcomes addressing the environment tells a different story. In each of the four units, all of the knowledge-based outcomes from the Pan-Canadian document are incorporated. Skills and STSE outcomes, however, are another story. In the units of flight and space, there are significant reductions in the number of skill outcomes; and in each subject (except for electricity, which is entirely inclusive) at least three STSE outcomes are omitted. This calls into question the choices for which outcomes are selected and reveals a deficiency in hands-on activities that can empower students and achieve the EE goal of problem-solving skills. For instance, a STSE outcome in the diversity of life unit expects students to "describe how personal actions help conserve natural resources and protect the environment in their region" (CMEC, 1997, p. 158), however it is not included in the Nova Scotia curriculum.

Thirteen out of the thirty-two outcomes explicitly include the environment. When this is broken down further by unit, the amount of EE becomes more complicated.

Table 2.3 Sixth grade science outcomes breakdown

Unit	Total number of outcomes	Number of outcomes related to EE
Electricity	9	2
Flight	7	1
Earth and Space	8	2
Diversity of Life	8	8

Of these thirteen outcomes, the majority are knowledge related. This emphasis on knowledge conflicts with the development of an individual's ecological self, and the principles of EE. It is not the quantity that necessarily reflects the importance given to the study of the environment. In fact, there is no gold standard for what constitutes appropriate EE. Nonetheless, what the number of outcomes does reveal are the opportunities for including and improving EE.

The consumption and conservation portion of the electricity unit for the sixth grade contains little specifics on how energy conservation benefits the environment: "Students should discuss the advantages to the environment of using less energy. Students could investigate how the demining of a river affects a local environment or how fossil fuel energy sources contribute to greenhouse gases" (Nova Scotia Department of Education, 2008, p.36). This is in direct contrast to the curriculum outcomes which state definite expectations, for example: "Students *will* be expected to describe how our actions could lead to reducing electrical energy consumption in our environment" (Nova Scotia

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Department of Education, 2008, p. 36, italics mine). The "should" and "could" stated above provide the potential for discussion and investigation. While this is beneficial for allowing a teacher more freedom in how the outcome is accomplished, it also takes away from mandating opportunities for emphasizing the complexity of environmental issues, connecting environmental knowledge, values, and problem solving, as well as considering the issue through an ESD lens, all of which are EE principles.

In the unit on flight, an outcome requires that students "identify characteristics and adaptations from living things that have led to flight designs" (Nova Scotia Department of Education, 2008, p.14). This provides an ideal opportunity to discuss biomimicry, a discipline that studies nature and imitates designs or processes to help solve human problems or develop new technologies (Hargroves and Smith, 2006; Reed, 2003). This would target the EE principles of considering the environment in its totality and utilizing diverse learning approaches. However, there is no discussion required, or suggested, on the subject.

The diversity of life unit, presumably the most in line with EE's principles and expectations, also has predominately knowledge-based outcomes. Much of the outcomes stress identification and classification of characteristics pertaining to animals, plants, and microorganisms. There is no specific call for an emphasis on local species, nor is there consideration given to appreciating and experiencing the local diversity of life, a principle of EE. While some may argue that appreciation falls under attitudes, that is problematic. Attitudes are not covered in a single grade level, yet there is no given reason why an outcome on stewardship cannot be included on a yearly basis to emphasize the value in developing and retaining a sense of responsibility towards the planet. This is especially important given that stewardship is the sole attitude outcome that reflects on the environment and our value system (Nova Scotia Department of Education, 2008).

There are opportunities to improve the amount of environmental content and the quality of the existing science outcomes. For example, in the unit on flight, students are expected to "describe examples of technological design between aircraft and spacecraft and their influence on our lives" (Nova Scotia Department of Education, 2008, p. 14). A discussion on the ecological footprint of aircrafts and spacecrafts, and the possible impacts of those footprints on human health and society could be included. This type of

discussion would cover the EE principles of considering the environment in its totality, emphasizing the complexities of environmental issues and be interdisciplinary by drawing connections across science, health, and social studies. The outcomes that require classification of vertebrates, invertebrates, and micro-organisms could strongly focus on local species and provide opportunities for experiential learning and observation of the creatures being studied. This would be in keeping with EE principles of developing local environmental knowledge, which is particularly appropriate at a young age (Kalinowski, 1991).

2.6.2 Health Education

A recent change has shifted the focus of sixth grade health education. Previously, the 2003 curriculum emphasized the (1) body's growth and development, (2) strategies for healthy living, (3) values and practices for healthy living, and (4) strategies for positive personal development and healthy relationships. Within these four general areas there were five outcomes that could potentially be related to the environment, and within that five, one outcome that explicitly addressed environmental health. As of February 2011, the Nova Scotia Department of Education released a new set of specific curriculum outcomes for sixth grade health education was released. These new outcomes centre on the following: (1) healthy self, (2) healthy relationships, and (3) healthy community. These new specific curriculum outcomes, fifteen in total, do not address the environment in any capacity. The amendments to health education were conducted for grades primary to nine and were carried out to support the provincial government's goal of healthier students through a greater emphasis on nutrition, safety, addiction prevention, mental health, anti-bullying, and healthy sexuality (Nova Scotia Department of Education, 2005).

The absence of the environment in any explicit form, particularly within the area of healthy community, is surprising. Arguably, the following specific curriculum outcome from the health education unit on healthy communities could include the environment. The outcome states that students will be expected to: "identify responsibilities of global citizenship and take age-appropriate action to address a global health issue" (Nova Scotia Department of Education, 2011, p. 167). This outcome has the potential to address the following EE principles: empowering/enabling student learners to

have an active role in their education, combining social studies citizenship goals with health, examining local, national, and global points of view on a subject, and considering the complexity of the environment and its problems. This, however, is dependent upon how the outcome is approached and it is difficult to determine how a teacher may interpret this outcome and use it within their classroom in regards to EE.

The recent changes to health education have diminished what little opportunity existed for EE in sixth grade health education. The previous outcomes addressed the environment in a minimalistic way; of the five outcomes, only one outcome was unambiguous in its target of environmental health and addressing of the EE principles of multiple viewpoints, interdisciplinary connections, and the environment in its entirety: "identify ways in which individuals, communities, and countries co-operate to protect and maintain environmental health" (Nova Scotia Department of Education, 2003, p. 17). The remaining four outcomes had the potential to include the environment, but this depended on the teacher or classroom. For example, the outcome "students will be expected to examine the role of the media in shaping and reinforcing lifestyle values and practices" (Nova Scotia Department of Education, 2003, p. 17) had the capability to address the EE principles of critical thinking of how the media portrays choices that benefit the environment and the individual (such as eating locally or organically), empowering learners to question "trendy" views, and connecting environmental knowledge, values, and problem solving skills with lifestyle choices.

It is undeniable that there are opportunities for improving the quantity and quality of health outcomes related to the environment. Given that there are now no outcomes that address the environment, there can only be room for improvement. For example, the outcome "Students will be expected to identify responsibilities of global citizenship and take age-appropriate action to address a global health issue" (Nova Scotia Department of Education, 2011, p. 167) may also include the environment, or environmental health, such as issues of water quality and accessibility or the use of pesticides or bio-solids on crops for human consumption; however without these being explicitly stated their inclusion depends on the teacher. The incorporation of these concepts would help to empower students and enable them to take on research and action, thus achieving a principle of EE.

The integration of EE principles and objectives into health education makes sense within the current context of sixth grade health education in Nova Scotia as it moves beyond the simple acquisition of knowledge over a more balanced program of knowledge, values, and experiences. Particularly where the environment is involved, an extreme quantity of knowledge at the expense of ideals and practicality can lead young students to anxiety and action-paralysis (Jensen, 2004). Conversely, when students are involved in deciding what to learn and how, they are more likely to advocate for individual and societal change (Jensen, 2004).

The loss of the environment from health education outcomes is felt in more ways than one. Human physical and emotional health, the health of ecosystems, flora and fauna, and the wellbeing of civil society are all vital parts of environmental health education. Incorporating all of these aspects and interrelationships goes beyond current traditional ways of studying only physical health as influenced by environmental health. Such expansion of traditional health education requires the integration of EE and also strengthens the subject matter itself. It is essential that these connections be recognized and appreciated in order for health education to better (or in the case of the new outcomes begin to) integrate EE.

2.6.3 Social Studies

The aims of sixth grade social studies are to integrate disciplines, for example geography, history, economics, and political science, as well as provide students with a multidisciplinary lens through which to view issues from local, provincial, national and global perspectives (Nova Scotia Department of Education, 2010). This interdisciplinary approach is further expanded through the six general curriculum outcomes, which draw from a wide variety of topical areas: (1) citizenship, power, and governance; (2) culture and diversity; (3) individuals, societies, and economic decisions; (4) interdependence; (5) people, place, and environment; and (6) time, continuity, and change. These broad themes all have some connection to the environment, be it recognizing the interdependence among society, economy, and environment, or appreciating the relationships between attributes of place and cultural values (Nova Scotia Department of Education, 2010). The specific units of the social studies curriculum, six in total, have a sum of seventeen

specific curriculum outcomes. Four of these are explicit in their inclusion of the environment. However, the number of outcomes that specifically address the environment are only a small piece of the puzzle. How they address the environment and incorporate components of the goals and objectives reveals the quality of EE in place.

The outcomes that are related to the environment are as follows: "Compare climate and vegetation in different types of physical regions of the world" (Outcome 6.2.1); "Assess the relationship between culture and environment in a selected cultural region" (Outcome 6.2.2); "Compare the use of resources and sustainability practices between Canada and a selected country" (Outcome 6.2.3); and "Take age-appropriate actions to demonstrate an understanding of responsibilities as global citizens" (Outcome 6.5.2).

The first three outcomes comprise the three outcomes of Unit Two, Environment and Culture. Upon closer inspection of these three statements, and the delineations that accompany each (found in Appendix A: Specific Curriculum Outcomes), the primary focus and aims of these outcomes is knowledge. Some research and analysis are required, which can be identified as both a skill and a means of empowering students in their learning. Absent are attitudes, awareness, values and active participation. Given that outcomes are meant to describe "what students are expected to know, be able to do, and value by the end of the year" (Nova Scotia Department of Education, 2010, p. 24) it is discouraging that the only outcomes specifically pertaining to environment and culture do not sufficiently address attitudes, values, or promote active participation in environmental issues of sustainability or connections between nature and local culture. For example, a local case study could be used at the initiative of the teacher. However, the choice to include the environment in a lesson plan that does not already address it strongly depends on the personal beliefs and values of the teacher (Spence, et. al, under review).

One area of social studies in which addressing the environment, particularly through the principles of ESD, would be expected is Unit Three: Some Elements of Culture, which explores how economic systems relate to cultures. The economy and the environment are intertwined, particularly in a country such as Canada that relies strongly on the exploitation of its natural resources. Unit Five: World Issues also provides opportunities for including the environment from a humanities perspective: the fourth

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outcome states that "students will be expected to take age-appropriate actions to demonstrate an understanding of responsibilities as global citizens" (Nova Scotia Department of Education, 2010, p. 27). The basis of this outcome is further reflected in the Essential Graduate Learnings for Citizenship: "students are expected to learn how to assess social, cultural, economic, and environmental interdependence in local and global contexts" (Atlantic Provinces Education Foundation, 1996, p. 8). As expressed in the graduate learning statement, an expectation of global citizenship is an understanding of the environment and its place within social, cultural, and economic domains. Thus, students should be introduced to their responsibility towards the environment as citizens, examine issues from a variety of perspectives, include ESD in their learning, and be encouraged to assume ownership of, and take action on, local environmental issues.

Currently there is a disparity in the specific curriculum outcome expectations and realities for environmental learning. In spite of the indications that social studies is an interdisciplinary subject, and the fact that EE itself is interdisciplinary, the outcomes related to the environment are inadequate in how they address it. Furthermore, the lack of outcomes related to the environment in the different units, as well as throughout social studies as a whole, demonstrates that this sixth grade curriculum could be improved. This disparity is further demonstrated when the principles underlying the curriculum are compared with the outcomes of that same subject. For example, social studies has six underlying principles, some of which are:

> *Active* social studies encourages students to assume increasing responsibility for managing their own learning.
> *Integrative* social studies crosses disciplinary borders to explore issues and events, while using and reinforcing information, communication, technology integration, and application skills. This approach facilitates the study of the physical and cultural environment by making appropriate, meaningful, and evident connections to the human disciplines and to the concepts of time, space, continuity, and change.
> *Issues-based* social studies considers the cultural embeddedness [sic] of ethical dimensions of issues, and addresses controversial topics. It encourages consideration of opposing points of view, respect for well supported positions, sensitivity to cultural similarities and differences, and a commitment to social responsibility and action. (Nova Scotia Department of Education, 2010, p. 14)

These three principles are in direct accord with some of the principles of EE, described in the introduction, such as interdisciplinarity, active participation, and examination of

environmental issues from a variety of viewpoints. In spite of this, the majority of the seventeen specific curriculum outcomes either emphasize knowledge-based expectations or are ambiguous in their explanation. Based on the information in the textbook for this subject, *Culture Quest: Exploring World Cultures* (2006), there is a strong emphasis on vegetation (a knowledge target), culture and the environment (values and knowledge targets), and resources and conservation (values and knowledge targets). These textbook chapters consider the environment from different perspectives, incorporate multiple points of view, reflect on the relationship between the environment and development, and impart knowledge, some values, and awareness of environmental issues. This demonstrates an attempt to achieve a balance in environmental perspectives (cultural versus economic) and optimistically, that is what is conveyed to students. However, it should be noted that these three chapters are addressed solely through Unit Two: Environment and Culture, and the other thirteen chapters do not truly address the environment, thus limiting student exposure to these connections.

2.7 CONCLUSIONS

The findings of the content analysis demonstrate an overall marginalisation of EE, particularly quality EE. This is demonstrated by the scarcity of hands-on and attitudes-based outcomes within the science curriculum, the minimal consideration of the environment in its different forms in the social studies curriculum, as well as the complete elimination of environment-related outcomes in health education. The quantity of outcomes related to EE is more difficult for determining the marginalization of EE. Currently, there is no minimum requirement, as environmental learning is still gaining ground in Canada (CMEC, 2010). As such, it is the content of an EE related outcome that is of more concern for this discussion, rather than the number of outcomes. For example, all of the science outcomes could be related to EE, yet only focusing on the acquisition of knowledge which would not be conducive to the goals of EE.

Although science is the "traditional" subject for environmental content, it falls far short of the principles of EE. The overemphasis on knowledge detracts from the other pillars of EE, namely experiential, hands-on learning, attitudes and values, and positive environmental behaviour stemming from a combination of the three areas. Health

education's elimination of explicit environmental content with the new curriculum outcomes necessitates the exclusion of EE within health education. Thus, EE is only included in science and social studies. Furthermore, it is important to note that the time devoted to these two subjects combined results in a mere 15.4% of each school week. Such a brief amount of time, especially in comparison to language arts and mathematics which take up more than 50% of each week and each day, further reveals the insignificant position and status EE has in the sixth grade.

The prominence of knowledge-based learning also presents a challenge in terms of cultivating and encouraging positive environmental behaviours among youth. While knowledge has undeniable importance in understanding environmental benefits, concerns, and possible solutions, the affective domain is also important. Currently, attitudes and experiential learning are both in short supply in terms of curriculum outcomes and suggestions for teaching. Without an emotional connection to nature, positive environmental behaviours may be less likely to occur, be reinforced, or increase.

With these challenges in mind, it is important to note that curriculum documents can move towards achieving the principles and goals of EE emphasized in this study. For example, it is possible to integrate hands-on experiences, utilize diverse learning environments, and draw on local knowledge, simply through mandating that classes venture outdoors more often. Greater links among specific curriculum outcomes will also work towards emphasizing the interdisciplinary nature of the environment and consideration of the environment in its totality. These changes could be achieved through the Department of Education overhauling these areas of the curricula.

The findings of this study ultimately contribute to the scholarly knowledge on sixth grade curriculum documents, particular to Nova Scotia and the subject of EE. Such knowledge is important for understanding what students learn in terms of formal EE and what teachers are required to teach. This research also contributes to the understanding of the quality and quantity of EE within the specific sixth grade subjects of social studies, science, and health education, as well as recommendations as to how formal EE can be improved and increased. Overall, this research contributes to the growing scholarly recognition of the importance of formal education curriculum for integrating EE and the budding enthusiasm for environmental-related education in schools.

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CHAPTER 3

SIXTH GRADE TEACHERS AND ENVIRONMENTAL EDUCATION: BELIEFS, BARRIERS, AND BRIDGING THE GAPS IN NOVA SCOTIA[1]

Abstract:

The Council of Ministers of Education, Canada established a national Education for Sustainable Development Working Group to support environmental education (EE) across the country. The increasing importance of formal EE underscores the role teachers play in student development of knowledge, attitudes and actions in many subjects, including the environment. This study explores how a cohort of sixth grade teachers in Nova Scotia conceptualize EE and perceive challenges to teaching EE. Data were collected through semi-structured interviews investigating teacher perceptions of EE, its presence and treatment in their classrooms and any inconsistencies between the provincial Department of Education and EE. Results support previous research that integrating EE into a classroom depends primarily on individual beliefs and that a lack of financial and curricular resources, education and support cause EE to be marginalized. These results also show five challenges to EE unique to this study and point to areas of EE research that require further investigation.

Keywords: environmental education, elementary education, pedagogy, teacher education

3.1 INTRODUCTION

The underlying goal of environmental education (EE) is to create ecologically literate and responsible citizens (Mckeown and Hopkins, 2003; Jickling et. al, 2010; UNESCO, 1976; UNESCO-UNEP, 1977). EE emphasizes awareness, knowledge, skills, attitudes, values, motivations and commitment, towards both the natural environment and its related problems. EE is more than perfunctory activities on Earth Day or simplistic activities that do not explore larger questions related to the environment, society, and individuals; rather, EE means education that is about, in, and for the environment (Tilbury, 1997). Education about the environment includes knowledge, awareness and critical thinking. Education in the environment develops personal values and commitment to the environment through contact with nature. Education for the environment develops responsibility and active participation through hands-on teaching and learning. To many,

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EE is considered essential in order for humanity to live sustainably on the planet (Orr, 2004; Louv, 2008; Hart, 2003). However, current educational systems have been criticized for not effectively integrating EE into classrooms (Puk and Makin, 2006; Chatzifotiou, 2005; Hart, 2003). The result has been a global movement to reorient education toward environmental issues (UNESCO, 2004, 2007; CMEC, 2010).

This global movement to reorient education points to the significant role education plays in addressing the need for ecologically conscious societies:

> Education is also the means for disseminating knowledge and developing skills, for bringing about desired changes in behaviours, values and lifestyles, and for promoting public support for the continuing and fundamental changes that will be required if humanity is to alter its course...Education, in short, is humanity's best hope and most effective means in the quest to achieve sustainable development. (UNESCO, 1997)

Despite the influential power that education has over the environment and humanity's future, there are currently no official requirements for the amount of EE integration into schools. The current EE that does exist emphasizes theories over values, answers over questions, and technical efficiency over conscience (Orr, 2004). This method of education compounds environmental problems and it is not the type of education that will save humanity or the planet (Orr, 2004). As a result, even small amounts of educational reform to more thoroughly and properly integrate EE, particularly direct nature experiences and developing values, would be beneficial.

In Canada, there have been national reports put forward from both the federal government and intergovernmental organizations which are geared at improving the position of environmental learning in the country: *Learn Canada 2020* (2008), *Environment Canada's Framework for Environmental Learning and Sustainability in Canada* (2002), and most recently, *Backgrounder - Developing a Pan-Canadian ESD Framework for Collaboration and Action* (2010). There have also been provincial initiatives to promote the inclusion of EE in the formal education system. Three provinces that are leading the way for formal EE are Ontario, British Columbia and Manitoba. In Ontario, EE expectations have been embedded into the curricula for all grades and subjects, where appropriate (Council of Ministers of Education Canada, 2010). For Ontario's teachers, summer workshops on EE and training for the integration of EE

are available as professional development opportunities (Council of Ministers of Education Canada, 2010). In British Columbia, the Ministry of Education has released an EE resource for teachers entitled *Environmental learning and experience: An interdisciplinary guide for teachers* (2007), which promotes an integrated approach to EE. In Manitoba, an ESD working group has been established, which facilitates and supports the coordination, development, and implementation of ESD policies, curricula, resources, and teacher education (Metz et al, 2010).

While advancements are being made in Ontario, British Columbia and Manitoba, not all other provinces/territories are up to speed. Nova Scotia is one example where formal environmental learning is not in a similar position as the three leading provinces. The purpose of this study is to explore how a cohort of sixth grade teachers within a Nova Scotia school board conceptualize EE and what challenges they perceive for its implementation. In 1993, the Nova Scotia Round Table on Environment and Economy released a report on environmental sustainable development education in Nova Scotia. This report proposed revisions to the elementary curricula of science and health to incorporate environmental topics and link these topics to other subjects, such as social studies, art, language arts, and math (1993). Recently, the Nova Scotia Department of Education partnered with the Department of the Environment and local environmental groups to host an EE/ESD symposium called "Green Roots" in 2010 and 2011. This symposium is dedicated to forging links between all levels of education and the environment in the province.

Previous studies have examined how students in Nova Scotia classrooms think about EE (e.g. Draper, 2005; Koller, 2003; Rogers, 1996; Swales, 1994) and compared Nova Scotia's EE to that of other countries (e.g. Cunningham, 2003); however, an exhaustive search of the literature has not revealed any published or peer-reviewed research regarding Nova Scotia teachers' understanding of and attitudes toward EE. This gap in the literature is particularly important since teachers can greatly impact the degree to which EE is covered in the classroom and their knowledge of and comfort with the subject influences that coverage (Moseley, Huss and Utley, 2010). Teachers play an essential role in a student's development, especially during early adolescence. A teacher's relationship with the material and students is especially important for successful learning

and interest in a subject (Witmer, 2005; Fredriksen and Rhodes, 2004). Thus, an especially important part of EE is for educators to intellectually and emotionally engage with students on environmental concepts (Stevenson, 2007).

In elementary school, teachers and students are able to form closer relationships through smaller classes and greater levels of interaction. For example, the Halifax Regional School Board website asserts that elementary classes are approximately in the >20 student range, whereas junior high classes generally 25 students per class. Furthermore, in this school board elementary schools (grade primary to six) cannot have more than 300 students and junior highs (grades seven to nine) can have up to 500 students. This close relationship makes it possible for teachers to better instil interest in subjects. These relationships shift in older grade levels, as students are expected to take on increased accountability for their academic performance and personal behaviours while simultaneously receiving less individual attention (Carter, Clark, Cushing, and Kennedy, 2005; Fredriksen and Rhodes, 2004). Furthermore, early adolescence is a time of cognitive change. During this time, children are increasingly able to take into account multiple points of view, contemplate hypothetical and real issues, think critically and abstractly, reflect on themselves and the issues at hand, and apply these new skills and knowledge to various learning situations (Eccles, 1999; Hutchison, 1998). Such a progression in critical thinking, expansion of knowledge, and development of new skills marks an important time in a child's maturity. This development makes the sixth grade an appropriate time to introduce more complex and intricate subjects, such as the environment.

This paper is part of a larger study that examines various aspects of EE in the sixth grade in the Halifax Regional School Board (HRSB). Each paper from the study provides insights and suggests recommendations for the future of EE in both the HRSB and Nova Scotia. This paper explores how a cohort of 18 sixth grade teachers in the HRSB in Nova Scotia conceptualize and perceive challenges to teaching EE.

To fully understand the inspirations, impacts and influences regarding teachers and EE, it is necessary to explore several issues: the personal and professional values teachers hold towards the environment; the educational value and suitability of EE to a formal classroom setting; and the greatest challenges facing educators.

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3.2.1 Defining environmental education

The Belgrade Charter asserted that the goal of EE is "to develop a world population that is aware of, and concerned about, the environment and its associated problems" (UNESCO-UNEP, 1976). This goal was accompanied by objectives that target awareness, knowledge, skills, attitudes, values, motivations and commitment. This goal for EE later expanded in the 1977 Tbilisi Report:

> to foster clear awareness of, and concern for, economic, social, political and ecological interdependence in urban and rural areas; to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and to create new patterns of behaviour of individuals, groups and society as a whole towards the environment. (UNESCO-UNEP, 1977)

The ultimate goal for EE is to create an ecologically conscious, literate, and active society.

In a recent interview, Annette Gough, an education/EE professor who helped bring about EE to Australia in the 1970s and 80s, described how the legacy of early characterizations of EE carry on in current definitions: "people talk about EE being about behaviour change, that people need to act differently for the environment but also that depth of understanding that we need of ecological concepts but also economic, social, political, that there's not simple solutions" (Tasar, 2009, p. 190). Gough's comments call attention to the interdisciplinary nature of EE and the emphasis on behavioural change.

Pillars of EE

The foundations of EE are attitudes and values; knowledge and awareness; and skills and hands-on actions, with behaviour reflecting positive environmental philosophies (UNESCO-UNEP, 1977). In particular, three main foci are typically targeted: the head (knowledge), hands (skills), and heart (attitudes and values) (Tilbury, 1997). These concepts are tied in with the different methods for EE, namely, education ABOUT the environment, education IN the environment, and education FOR the environment (Tilbury, 1997). Education ABOUT the environment is associated with

targeting the head, or knowledge and awareness, and adopts a cognitive approach (Tilbury, 1997). Education IN the environment, on the other hand, focuses on developing moral and ethical concerns, as well as personal values and commitment to the environment through contact with nature in a more open-ended style of teaching, which targets the heart (Tilbury, 1997). Lastly, education FOR the environment develops responsibility and active participation through hands-on teaching and learning, particularly in regards to environmental problems (Tilbury, 1997).

3.2.2 Environmental education and teachers

The integration of EE into a classroom is often highly dependent on the personal and professional beliefs and ideals of the teacher (e.g. Tan and Pedretti, 2010; Cotton, 2006; Grace and Sharp, 2000; Shuman and Ham, 1997). Some of the more obvious influences on a teacher's propensity to bring EE into his/her classroom include personal history, education, and professional experiences in the education sector (Ernst, 2009; Shuman and Ham, 1997). For example, in one survey of teachers, "personal responsibility for the environment" was given a very high rating (average 4.6/5 on an attitude score) – the highest scoring of all components of EE (Grace and Sharp, 2000, p. 337). This demonstrates the significant role that personal values and beliefs play in a teacher's approach to EE.

Shuman and Ham (1997) strove to understand why and how some teachers are able to overcome barriers to teaching EE. Their research points to five areas of influence on an individual's environmental commitment. These are, in order of significance, experience outdoors with a youth-oriented program or parent's love of nature; frequent contact with nature; parental influence; influence of teachers; and the influence of nature-oriented books (Shuman and Ham, 1997). Additionally, Shuman and Ham created a Model of Environmental Education Commitment which proposes that life experience constructs may have a direct relationship to the development of beliefs that underlie a teacher's attitudes toward teaching EE (Shuman and Ham, 1997). The model also predicts that the stronger the commitment, the more likely that a teacher will overcome barriers and teach EE (Shuman and Ham, 1997).

Teacher beliefs are also relevant to how teachers affect their students' own beliefs, attitudes, and engage students in environmental action (Cotton, 2006). Although some teachers may not wish to intentionally sway their students or impart their own points of view on a controversial subject like the environment (Grace and Sharp, 2000), what and how a teacher chooses to teach can be reflective of a teacher's underlying attitudes. Education itself is not a neutral process – the curricula contain topical and administrative influences and teachers hold their own individual world views that affect their thoughts and actions (Hart, 2003).

Teacher education programs in particular act as both a challenge and an opportunity for EE by affecting a teacher's professional values and ideals. These programs educate new teachers, update the knowledge and skills of in-service teachers, and offer professional development (Hopkins et al., 2005). There are challenges pre-service teachers face in these programs, such as being caught between what they believe they should be and value and what other professionals tell them should be and value (Sinner, 2010; Phelan et.al, 2006). This challenge is further complicated in that teacher education instructors and pre-service student teachers each have their own beliefs, influences, and interpretations of classes, and these may be in contrast to each other (Grierson, 2010). In an autobiographical account of her experiences as a teacher educator, Grierson admits the difficulty to accept or support conceptions of instruction that were out of line with her own (2010).

Teacher education programs are in a critical position to promote environmentally-centred education due to their impact on both present and future teachers, including those who may go on to work in other educational roles. Charles Hopkins, (UNESCO Chair on Reorienting Teacher Education to Address Sustainability), Rosalyn Mckeown, (UNESCO Secretariat on Reorienting Teacher Education to Address Sustainability) and the International Network of Teacher-Education Institutions argue that educators must be deeply involved in the restructuring of in-service/pre-service teacher programs through developing the content, pedagogy, evaluation and research supporting ESD (2005). In short, teacher education programs must address the current "hole" in environmental learning guidance to ensure that teachers are prepared for teaching EE and ESD.

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In their study on the limited success of EE in primary schools, Cutter-Mackenzie and Smith (2003) discerned that of the twenty-six elementary teachers interviewed, less than a quarter indicated they had some form of in-service training in EE. Additionally, more than 40 percent of participants stated that their knowledge of EE concepts, theories, and teaching approaches was "low" to "very low" (Cutter-Mackenzie and Smith, 2003). This low level of EE understanding and/or training for teachers demonstrates the need for teacher education programs to address EE in order to encourage the successful integration of EE into schools.

How teacher education programs address critical reflection and social critiques has a direct impact on whether or not changes will occur in the public education system, as these programs directly impact future teachers (Powers, 2004). Due to the fact that EE challenges traditional boundaries, and education tends to be dependent on the interests of those in power, teachers are placed in a difficult position as educators (Hart, 2010). If their educational program does not prepare them to meet EE's questions and to confront conventional beliefs, then both teachers and EE are impacted:

> Environmental education poses problems for teachers who do not have either the content or the pedagogical background that is at the same time interdisciplinary, outdoors-oriented, community-oriented, problem/inquiry-oriented, and action-oriented, and often in service of local environment-related social issues that may be critically-oriented to local politics. (Hart, 2010, p. 157)

As a result, teachers must have proper education and training, as well as support from their school boards and educational departments that furthers that training, in critical reflection, research, action skills, decision making, and more.

3.2.3 Elementary environmental education

Starting at a young age

It is important to begin educating and engaging people about, for, and in the environment at a young age to ensure the continuation of that commitment and interest in adulthood (Wilson, 1996). The concept that EE is a lifelong learning process is expressed in many EE declarations and reports (e.g. Tbilisi Report, 1977; UNCED, 1992; Environment Canada, 2002; CMEC, 2008, 2010; UNESCO, 2009). Undeniably, elementary education (generally primary to sixth) can offer unique opportunities for EE through formal subjects, such as science, health education, physical education and social

studies, to name some of the leading subjects in environmental content (CMEC, 2010); and through informal, school-related activities, such as school gardens, classroom composting and recycling, and school-wide challenges of trash-free lunches. Such educational experiences are important for engaging students in environmental learning. Furthermore, children in the elementary grades can demonstrate considerable growth in understanding environmental related concepts and issues. For example second graders may view animals as subservient organisms whereas by the fifth or sixth grade, students tend to recognize an animal's autonomy and feelings, as well as understanding basic ecological principles and having a greater appreciation of nature and its significance (Evans et al., 2007).

Cross curricular

There are many ways in which the environment can be introduced across subjects. For example, a case study format in which students carry out self-directed research of a local environmental issue could comprise outcomes from science (ecological knowledge), social studies (social and environmental history of the issue), and language arts (reading and writing) (Ramsey, Hungerford, and Volk, 1992). Such a method for educating students is reflects excellent standards for EE by being flexible, inquiry-driven, participatory, and encouraging critical thinking, problem solving, and decision making (Ramsey, Hungerford and Volk, 1992; Ministry of Education, Ontario, 2008; NAAEE, 2010). These processes are crucial to student success in the sixth grade curricula of science and social studies in Nova Scotia (Nova Scotia Department of Education, 2008, 2010). EE can thus be seen as complementing diverse subject goals by sharing similar processes of critical thinking, problem solving, and decision making.

In England, EE has been adapted into the national curriculum as a cross-curricular theme since 1990 (Chatzifotiou, 2006). Other scholars (Jensen, 2004; Ross, 2007; Moroye, 2009) also advocate for taking EE beyond traditional science-based subjects and into the humanities, as well as health and physical education. Embracing the environment as an integrating theme within all educational subjects has been found to significantly improve student performances in reading, writing, math, science, and social studies (Bartosh et. al, 2006; Lieberman and Hoody, 1998, quoted in Morrone, 2001). In fact, the Council of Ministers of Education, Canada, advocate and support the integration

of EE and ESD into all school subjects at all grade levels, thus demonstrating the interdisciplinary nature of EE (CMEC, 2010).

3.2.4 Challenges

Integrating EE into the classroom is a challenging venture. Funding cuts, insufficient preparation time, lack of support and training, overcrowded curriculum and inadequate resources are often cited as the top barriers (Russell, Bell and Fawcett, 2000; Puk and Makin, 2006; Tan and Pedretti 2010). As well, curricula and educational policies are typically produced by individuals outside of the classroom and without the proper time and support needed for teachers to implement approaches with full understanding (Hart, 2003). These obstacles often cause EE to be treated as a simple "add-on" and given less consideration than a core subject (Russell, Bell and Fawcett, 2000).

Puk and Makin (2006) conducted a survey of Ontario teachers to determine the level of ecological consciousness in schools and pinpoint challenges towards implementing ecological literacy lessons. The number one challenge cited by their study participants was a combination of time constraints and the curriculum. Without the topic being explicitly required by the curriculum, there was not enough time in the classroom day to include environmental learning (Puk and Makin, 2006). In fact, 80 percent of respondents said they did not teach EE daily. The other top challenges from their study, in order of importance, were a lack of resources (particularly hands-on resources); a lack of teacher training (not being knowledgeable or comfortable with the environment); and a lack of support (from the principal, school board or parents).

These findings are further supported and confirmed by Tan and Pedretti in their mixed methods study of EE status in Ontario schools. A survey and interviews were carried out and revealed, again, the top challenges facing the implementation of EE are an overcrowded curriculum, a lack of curriculum resources, disconnections between the curriculum and ministry of education expectations, and the low priority given to EE by parents, administrators the Department of Education (Tan and Pedretti, 2010). In addition to these challenges, participants in this research also noted limited access to/use of the outdoors, apathy on the part of teachers and students, and inability to adopt socio-political actions on environmental issues (Tan and Pedretti, 2010).

The goal of this research is to explore how a cohort of Nova Scotian teachers conceptualize EE and the barriers they perceive to the inclusion of EE. Specifically, the values teachers hold towards the environment and EE, the educational value and suitability of EE to a formal classroom setting and the greatest challenges they experience are explored.

3.3 STUDY CONTEXT

Grade primary is also known as kindergarten in other provinces/territories. Some public schools are a mixture of elementary and junior high, consisting of grades primary to nine. The HRSB was formed in 1996 through the amalgamation of three individual school boards, those of Halifax, Dartmouth, Bedford and Halifax County. The HRSB is the Atlantic region's largest school board, with approximately 51,000 students (roughly 25,000 are in the elementary grades) and nearly 3,500 teachers and school administrators. Currently, within the HRSB's public school population, there are one hundred and thirty seven schools, ninety-four of which have at least one grade six teacher. There are eight school districts in total (see Figure 3.1 for a map of the school districts).
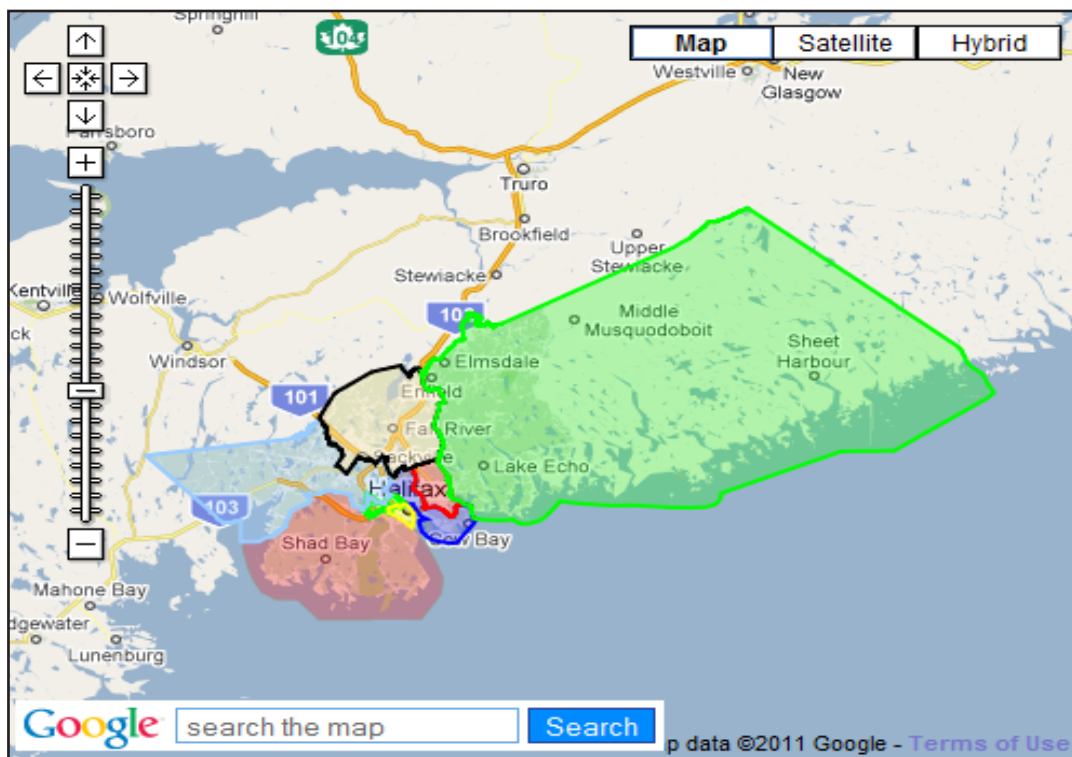
Figure 3.1 The eight school districts of the HRSB, Google maps 2011

Within the HRSB, there are fifteen feeder school families (feeder school families being the family of elementary, middle/junior high, and high schools in one area that feed into each other). The study participants represented 12 of the 15 feeder school families. As there is more than one elementary school in each of these feeder school families, participant confidentiality remains intact.

3.4 RESEARCH METHODS

An initial sampling frame for the study was developed using web searches for sixth grade teachers on individual school websites available from the HRSB. If teachers and/or their contact information were not available, the principal for the school was contacted and asked to forward information about the study to the school's sixth grade teachers. Snowball sampling techniques were also used where individuals who showed interest in participating were asked to suggest others who might be willing to participate. Using this mixture of techniques, 130 sixth grade teachers were contacted. A total of 18 teachers responded positively, 10 declined, and the rest did not respond. Any teacher who expressed an interest in the study and agreed to an interview was given the opportunity to participate, thus ensuring that no one was purposely excluded. The final participant group was made up of eight male and ten female teachers. Six were from rural schools and twelve were from urban schools. Six of the participants had been teaching for less than five years and twelve participants for five or more years. Three participants had some form of environmental background, ranging from involvement in environmental projects, volunteering, education, or previous employment.

These methods of participant recruitment, internet recruitment and snowball sampling, do pose the possibility of self selection bias, in that the participants may have a previous interest in, or knowledge of, the environment and environmental education. Participants were not questioned as to their reasons for participating, although some were given voluntarily and did not indicate an inclination towards environmental education. Furthermore, as this is not a representative sample of teachers within the HRSB or the province of Nova Scotia, the results of these interviews cannot be generalized across the school board or province. The results explore the experiences and understandings of a cohort of educators in this region.

Semi-structured, open-ended, digitally recorded interviews were conducted with a cohort of eighteen sixth grade teachers within the HRSB[1]. Wherever possible, these interviews were conducted face-to-face; however, five were conducted via telephone, as this was the stated preference for these participants. While anonymity was not a criterion for this research, confidentiality was ensured as all participants were assigned a pseudonym and no identifying information concerning them or their schools are revealed.

The semi-structured style of interviewing was selected to permit a more detailed exploration of responses than would be possible with a survey (Whiting, 2008). During the interview, participants were asked to reflect on their understandings of what constitutes EE, their perceptions regarding the importance of the field; what resources they feel are needed to support EE, and what challenges they face within their classroom. Participants were also asked about where they believed EE best fit into the curriculum and how supportive their schools, school board, and Department of Education were towards EE. The open-ended nature of the questions allowed for a more personal and in-depth encounters with the teachers, thus enhancing the understanding of their perceptions (Whiting, 2008).

Interviews were conducted from April 2010 to the middle of December, 2010. Interviews were transcribed verbatim and, to confirm accuracy, transcriptions of interviews were returned to those teachers who indicated they wished to review the conversation. Following this, data were thematically analyzed and coded using NVivo 9 (a software for qualitative data management). Themes were identified to gain a better understanding of the status of EE within the HRSB (Attride-Stirling, 2001). The supervisory team provided feedback on interview questions, recruitment methods and counsel on coding. Randomly selected interviews were also reviewed by the supervisory team to ensure critical engagement with the data. Analyses included identification of how teachers within this region understand and approach EE both professionally, as well as personally, and *a posterior* analysis of challenges to implementation. The codes were developed from participant responses and included: actions, apathy, concerns, environmental knowledge, environmental past, ESD, ideals, interest, nature/being outside,

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[1] Prior to undertaking participant requirement and data collection, ethical review was required from both Dalhousie University's Social Sciences and Humanities Research Ethics Board and the HRSB's Research Committee.

outcomes, parents, personal, professional, values, role models, students, support, opportunities, and challenges. From the codes emerged the following categories: personal and professional environmental values, the educational value of EE, challenges in implementation and the current existence of EE in these classrooms. These themes were then classified into four themes: definition and influences, values and their influences; the current status of EE; and the complex relationships between EE and the formal education systems. A cross tabulation of demographic information with participant responses did not reveal any significant differences among male/female teachers, rural/urban teachers, or experienced/inexperienced teachers.

This research adopts a thematic analysis/grounded approach to analysis. Unlike traditional grounded theory which aims to develop a theory correlating to the categories that emerge from the coded data (Strauss and Corbin, 1990, 1994; Creswell, 2007), the thematic analysis/grounded approach seeks not to create a theory of Nova Scotian teacher perceptions of EE but to explore what a group of teachers think (Attride-Stirling, 2001; Fereday and Muir-Cochrane, 2006; Boyatzis, 1998). Given the number of teachers within the HRSB (approximately 3,000), it would be impractical to attempt to generalize these results across all educators, or to conduct a study including all educators within a limited data collection period. Instead, this work seeks to form a greater understanding of how a cohort of presumably interested educators conceptualize and perceive opportunities and challenges to teaching EE.

3.5 RESULTS

This section takes the categories that arose from coding (personal and professional environmental values, the educational value of EE, challenges/opportunities in implementation and the current existence of EE in these classrooms), and places them into focused themes: definitions of EE; personal and professional values surrounding EE; EE's place within the classroom; and key challenges to including EE.

What is environmental education?

Teachers were first asked to reflect on what the term "environmental education" suggests to them and how they would define it. Responses ranged from superficial definitions that brush the surface of EE, "I think outside, I think wildlife, natural

resources, climate, temperature, weather" (Cathryn), while others were more in-depth and well-rounded:

> I would think of it in terms of having students stop and think about all of the ways our lives impact on our environment, and how we take a lot of stuff for granted. Because we live in the city and we don't even realize the energies and all the resources that we use...how we affect our environment as humans living in the city, even in places where we don't see; our things that are made in other countries and the effects on that environment. And because in grade six I think they are really starting to feel more aware, you can really have that conversation. (Cassandra)

The key words from each response are depicted below in a word cloud (Figure 3.2). This word cloud was generated using the website http://www.wordle.net/. Content is placed into a textbox which then creates a word cloud, or "wordle", that assigns the greatest distinction to the words that appear most frequently. The larger the word appears, the more often it was stated by participants. The prominence of the three R's (reduce, reuse, recycle) demonstrates a cursory reflection on EE overall. The diminished appearance, or complete absence, of terms relating to attitudes, behaviours, experiences, and action contrasts with scholarly and global definitions of EE.

Figure 3.2 Word cloud of teacher definitions of EE

Then participants were given a brief explanation of the three pillars of EE (knowledge, attitudes and values, and hands-on experiences - also known as skills) and an example of what teaching within that pillar might entail. Participants were then asked which pillar(s) of EE (they could also select a combination) they felt most appropriate for

the sixth grade. The single pillar selected most often was the "attitudes and values" pillar: six participants chose attitudes and values alone as their number one preference. Seven participants chose a combination of all three pillars, which again demonstrates the significance of attitudes and values. One participant chose knowledge as the most appropriate for the sixth grade; two participants chose skills; and two participants chose a combination of attitudes/values and skills as most fitting (see Figure 3.3).
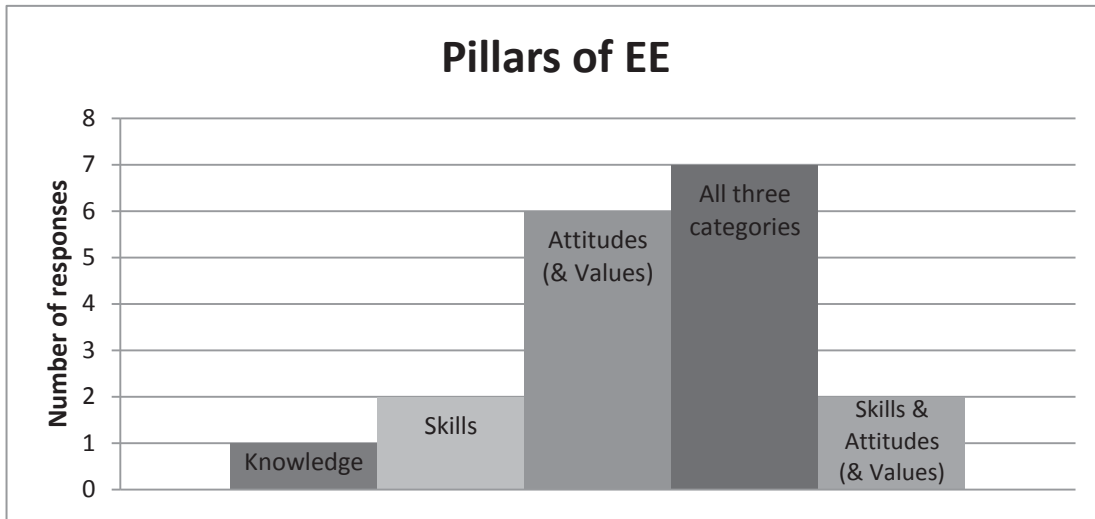

Figure 3.3 Participants' choices for pillars of EE

Even when the combinations of choices are taken into account, attitudes and values remains the single highest rated choice. Attitudes and values are the greatest indicator of pro-environmental behaviours for youth; the more positive the attitude, the greater the supporting actions (Meinhold and Malkus, 2005). This influence is reflected in participant Adrienne's response:

> I think probably the heart would be most important, the attitudes. Because this is the time when their attitudes are being really formed and their attitudes are changing a lot. So I think it is a good opportunity...I think that the attitudes about environmental science are most important, 'cause that will make them think twice about what their actions are and how they should engage with the world.

Personal and professional values

Participants were asked to reflect on any experience (at any age) they had with nature in which they felt a connection, and if such experiences were a) important for students; and b) possible to recreate through schools. The participants' meaningful

experiences in nature varied from solitary walks on the beach, hands-on gardening, camping and fishing trips, outings with parents or grandparents and exploring the woods and with friends as a child. Many participants stated that their own experiences could be recreated through the education system:

> I think it is [important and possible], in allowing the kids to be more in tune with nature in their everyday activities, being able to go out and explore... They don't realize that they're also learning about things as they're out there, they just think it's fun to get out of this classroom, but getting them out of the classroom and actually out into the environment, and into these experiences, I think is what is needed. Because they need to actually see and touch and experience these things to make their own connections with it, instead of just standing up in the front of the classroom and telling them about it. (Janelle)

These personal experiences and subsequent values have an influence on the professional choices participants made in how a topic is taught:

> If it's a belief system that you hold then you are more willing to incorporate it as an interwoven, integral part of your curriculum, but if you don't have that belief system, you're not going to incorporate it. So there again is the whole emotional versus education. (Laura)

Furthermore, what and how something is valued is demonstrated in the amount of time, focus, and energy that teachers dedicate to it:

> Often times what you don't teach says a lot and teaches more than what you do teach...I think it makes a lot of sense that you have to, when you're going to talk about environmental education, you don't just have to talk the talk you have to walk the walk. You have to lead by example, so there are certain things that you can do just in the way that you run your classroom, that you are yourself, to make sure that you are constantly modelling what it means to be environmentally conscious. (Christopher)

In addition to personal experiences, teacher education programs can have profound impacts on an educator's professional values and actions in his or her classroom. In these programs, pre-service teachers gain knowledge and practical experience in classroom management, learners with exceptionalities, educational history and philosophies and curriculum content (Faculty of Education, MSVU, 2010-2011). Secondary topics, such as the environment, tend to exist as optional, elective courses. Only three participants of this study stated that they had received any instruction on the environment or how to teach the environment to their students. Five indicated that there had been some minor inclusion of

environmental topics, predominately within science classes. This leaves ten participants with no recollection of professional instruction on EE.

Situating environmental education

The current position, and success, of EE in the classroom depends on educator perceptions of age appropriateness, cross curricular opportunities in the face of limited environmental specific curriculum outcomes, and how EE is addressed. Thirteen participants felt that EE should begin, in age appropriate ways, at grade primary:

> I don't see why we can't start from the very beginning. Our curriculum is considered a spiral curriculum so you touch on it each year, and you add more, add more, add more, so you build on what they know. So I don't see why it wouldn't be beneficial to start from the very beginning (Penny).

Three participants felt that EE should commence in a later elementary grade, specifically the fourth grade. One participant felt that EE could begin in primary but was best suited to the fourth grade. Three participants were not asked this question due to time constraints on the interview.

Several participants positively noted the current integration of environmental concepts into science and social studies: "I think the way they've got it right now is working. Before it used to be in our science, and now it's in our social studies; I think so long as it is included somewhere, then you're still responsible to teach it" (Rowan). However, sixteen participants also stated that EE works well as an interdisciplinary subject and should be integrated into all sixth grade subjects:

> I think it would be best if it was integrated with other subjects. Just to give it a little more depth and hopefully give it a little more meaning, within those other contexts, rather than having it just be about itself...And it would just give it that extra meaning to the kids, that extra layer of depth that would help them kind of create that meaning, that attitudes, values. (Nathan)

While this shows the participants' needs and wants on the implementation of EE, it does not show their actions. Having said that, it should be noted that teachers lack full autonomy over their classrooms. Their lesson plans and activities, while chosen and manipulated by them, are ultimately influenced by principals, school boards, and the Department of Education: "If there isn't a lot of emphasis on this as part of the curriculum, then we won't address it" (Laura).

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Key challenges

The challenges to incorporating EE into the classroom identified by participants were time, resources, curriculum outcomes, finances, knowledge (of environmental concepts) and five "other" challenges (Figure 3.4). These "other" challenges included a lack of access to nature, little to no hands-on experience opportunities, too much information available on the environment, a lack of interconnected thinking in schools making it difficult to properly teach EE, and a lack of willingness to change on the part of those in charge. These will be considered in greater detail in the discussion section. Many participants identified one challenge, however there was some overlap: three participants cited both time and outcomes as equally challenging, two chose time and resources as challenges, two chose finances and resources as challenges, and one participant chose outcomes and resources as equally challenging.

The most frequently cited challenges were resources, time, and curriculum outcomes. This is in keeping with previous scholarly studies on challenges to environmentally-focused education (e.g. Tan and Pedretti, 2010; Puk and Makin, 2006). Participants described a number of reasons why curriculum outcomes pose barriers to integrating EE: the sheer number of outcomes to cover in a given subject, the broad attributes of the outcomes and the out of date references and resources that teachers may be forced to use: "to fit them [outcomes] in so that you're covering them properly is a big challenge, because you can often fit things in, but then you may feel as though you're cutting them short" (Janelle).

The time allotted for each subject and the day-to-day schedule is developed by the Department of Education. The instructional time for grades four to six is a minimum of five hours per day, which may or may not include recess (Nova Scotia Department of Education, 2002). English classrooms dedicate more than 50 percent of their daily/weekly schedules to language arts and mathematics. Specifically for science and social studies, the time allotted for each subject is 110 minutes per week (Nova Scotia Department of Education, 2002). The limited instructional time is noted by participants as a challenge to EE: "Time is a challenge to everything. I mean it is wonderful that in grade six, like I was saying, they get band and they get all these other perks to going to a city school, but it is time... I just feel like I never see them... I mean teachers have a huge pressure to get all

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the outcomes covered, whereas it should be less outcomes and more in-depth exploration of them" (Karen).

Participants were divided on whether resources, such as textbooks and activities included in the curriculum, posed a challenge to EE: "Not much is available at all, other than what the teacher themselves is able to pull off an internet and basically go over in a classroom, that's as far as it goes" (Alexander), versus "[the science curriculum] has what we need to teach and there's also some resources, we can get our hands-on stuff just by asking someone in HRSB or our colleagues, so as far as resources, I don't think there's a lack of them, you can get your hands-on them very easily" (George).
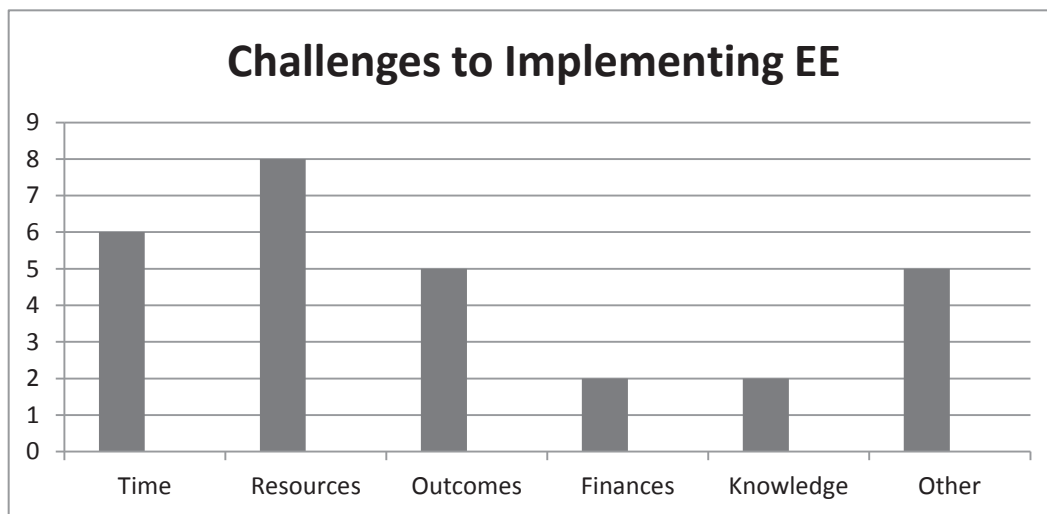
Figure 3.4 Participant challenges to implementing EE

3.6 DISCUSSION

Given the importance of teachers' personal and professional values regarding EE and the environment in terms of implementation and integration, reflections on participant definitions and beliefs of EE, its place in the classroom and the challenges to EE are needed. These components are essential in coming to a greater understanding of how EE is perceived in a formal setting and through this reflection contemporary EE concerns are brought to the forefront.

Defining EE

The teachers' definitions of what constitutes EE reveal several things. One of the most important is that the education system, whether it is the teacher education programs

or the school system in which they teach, lacks in-depth understanding of EE. The dependency on the three R's (reduce, reuse, recycle) and the tendency to regard the environment more as a resource base (demonstrated in Figure 3.2) is a far cry from the Belgrade Charter (1976) and Tbilisi Report (1977) definitions of awareness, attitudes, values, skills, knowledge and commitment to action. Furthermore, participant emphasis was greatest on the concept of "recycling", which traditionally comes last after reducing and reusing. This may be a reflection of how current public education reflects predominant mainstream societal values of consumerism and capitalism (Stevenson, 2007). While some participants expressed more in-depth and rich understandings of what EE means, there were fewer instances of this type of understanding. Participant definitions are not "wrong"; rather they point to rifts among educational programs and services and the scholars and global declarations who advocate for the inclusion of EE.

The key terms that are emphasized are in contrast to participant responses on the most suitable pillar for EE in the sixth grade, knowledge (head), skills (hands), or attitude/values (heart): "I think probably the heart would be most important. 'Cause that will make them think twice about what their actions are and how they should engage with the world" (Adrienne). When these responses are contrasted with participant definitions of EE, disconnections and possible misunderstandings appear. Participants, for the most part, defined EE with little to no mention of attitudes, values, or even actions. Instead, the emphasis was more on information transfer or environmental facts. This reveals a mixed understanding as to what EE truly concerns (social and personal change for the benefit of the environment) and presents a current barrier to overcome in terms of effectively teaching EE.

Teachers who do not have a great passion for the environment and/or EE are less likely to seek out professional development or research the topic for themselves. If EE is to be successfully integrated into the formal school system, teachers need to be well-informed in the goals, principles and activities of EE. This type of training for other subjects often begins in the teacher education programs.

Teacher education programs are highly influential on an educator's knowledge, lesson planning techniques and what is valued in a classroom (Hopkins et al., 2005). Educating and training teachers for the integration of EE should take place in an

environment such as this. Yet few participants in this study felt confident that their program provided adequate EE knowledge and skills. This creates a problem for teachers utilizing EE, as they may have not been properly trained or educated. Furthermore, when considering the definitions of EE provided for this research, questions arise as to what else is influencing perceptions of EE, as well as how to connect with teachers and move from a superficial view of EE to a more advanced understanding.

EE Values

In congruence with earlier studies, the results suggest that the personal beliefs of an educator are highly important when educating students about, for, and in the environment. Personal and professional values result from separate factors, including individual childhood experiences, teacher training education, and the expectations of school boards and educational departments; however these values are often interconnected. Shuman and Ham (1997) pointed to experiences outdoors as a youth and the influence of parents and teachers and their own love of nature, as having powerful impacts on a teacher's likelihood to teach EE. The effect of outdoor experiences is echoed in participant responses, for example Janelle refers to the forest as her "Disneyland". The adventures she had outdoors, and the inherent lessons she gained from those adventures, inspired her to provide her own students with similar experiences. These personal values can be impossible to separate from one's teaching philosophy and actions. Participants noted that a teacher's personal values will often creep into their lesson plans and classroom activities. For example, one interviewee noted:

> I wouldn't be a teacher if I didn't want to have some influence over the future of kids. You know, I guess all of us as teachers, we're trying to impart some part of us, *[pause]* I mean it's not just math. We're trying to get some certain part of us, the things you think are good about yourself or good that you know - you are trying to pass those onto your students. (Andrew)

This quotation reveals the interplay between personal and professional values. On a professional, educator level, Andrew recognizes that certain things must be taught, like math. On a personal level, teaching is also about so much more than subject matter. It is about passing on values, responsibility, and other positive qualities onto students. However, another participant noted that there is a delicate balance to be struck between the two values: "I try to instil activism in them [students] as well; not to stand back and

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do nothing, but again not to push them to do it either" (George). Teachers should aspire to reach and maintain that balance of inspiring and informing their students without exerting excessive influence.

That only three participants of this study stated that they had received a suitable amount of instruction on the environment reveals inadequacies within teacher education programs. Furthermore, as teacher education programs can have profound impacts on an educator's professional values and actions in a classroom, the absence of EE from an education program can imply that it is not important, that it is not something to value in education. This becomes reinforced with the marginalization of EE within the curricula (Spence, et al., under review). Given the substantial time constraints on teachers, whether or not something is valued by the teacher can influence whether or not it is included and to what extent. Although these teachers were not questioned as to their reasons for participating in this study (a limitation), it can be hypothesized that they are more interested in EE or environmental issues than their colleagues who did not respond.

Unlike the participants in Deborah Cotton's research (2006), who claimed that they sought neutrality in their lessons, participants in this study acknowledge and accept the inherent dispositions teachers bring to their lessons. This is particularly important for EE in that if teachers are interested in or committed to the environment, they may be more likely to incorporate it into the lessons. However the reverse is also true; if a teacher is not interested in the environment, then it may not be addressed in the classroom. A classroom is not without its bias, indeed no learning is: "Learning environments cannot be considered neutral. They tend to have either a repressive effect or the ability to strengthen learning and progressive initiatives to make a change in society...In this sense, no educational policy can be restricted solely to educational issues" (Belanger, 2003, p. 81).

EE and its place in the classroom

The manner and method of incorporating EE into a classroom is just as important and influential as the reasons a teacher has for integration. This goes beyond basic knowledge of environmental systems to the types of activities and resources used, and the personal opinions that infuse the teacher's professional actions. Modeling positive environmental behaviour is not values free, yet neither does it, or should it, coerce students into one mode of thinking. Teachers will impart some aspect of themselves as a

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person and an educator to their students, especially since effective EE requires the inclusion of attitudes and the heart (Tilbury, 1997).

Regarding the foundational pillars of EE, knowledge, skills, and attitudes/values, it is interesting that only one participant felt that knowledge was best suited for grade six (Figure 3.3). Given that much of the curriculum that addresses the environment relies upon knowledge-based outcomes (Spence et al, under review), that participants chose attitudes and values overall could be reflective of a desire to shift the current educational focus. This overall emphasis on values also reflects the desire by participants to impart more than knowledge to their students and the important role values play in education.

In terms of when to start formal EE, several participants felt that EE worked well in all grade levels and so could begin in grade primary. This confirms the importance of formally educating youth in EE as well as the need to start at a young age. The responses also support the inclusion of EE within the sixth grade as well, in a more complex and detailed manner: "You know I don't really see it as being any different from anything else. Primary could be very concrete, very hands-on, working towards something that is more abstract, maybe that third pillar. By the time they get to this level, attitudes and values could be something that they could achieve or talk about and discuss" (Nathan). It seems that to these participants, it is not so much a matter of whether or not to EE included, but how it is included to best serve the students.

While some participants positively noted the current inclusion of the environment in the subjects of science and social studies, the majority of respondents expressed a desire to have EE integrated into all subjects. That these teachers would like to include EE more in their lessons and are willing to try is encouraging for future possibilities to integrate EE: "Now I mean the message could be interwoven with all kinds of stuff, which probably would be a best bet there, to sort of have... a cross-curricular unit where it would address math, English, you know writing, science, and the topic would be environmental science. And then we could go from there. That would be fun to try; I would be willing to try something like that" (Laura). As well, the majority of participants felt that increasing the amount of time spent outdoors, experiencing nature in hands-on, emotional ways as their ideal way for incorporating EE.

Yet in spite of the interest, these responses also demonstrate that there are few, if any, attempts to incorporate EE into subjects other than those dictated by the curriculum. Participants are willing to try including EE content and activities, but many have not yet done so. Those who did offer examples of including EE tended to express a more heartfelt attachment to the environment: "it's always been kind of my family's always preached 'be good to the environment, because if you're not good to it then it's not going to be good to us'" (Janelle). Those who had been teaching longer than five years had more teaching experiences to draw upon: "I think when it comes to the environment, I'm always a provider of opportunities to supplement our curriculum with any outside agencies that are looking to become involved... There's a lot of neat initiatives that schools have to either go looking for or respond to, and if the administration is on board, there are endless things you can do for the environment, in the run of a year" (George).

(Dis)connections between education and the environment

The integration of EE activities in Nova Scotia classrooms depends on the will of teachers, the School Board and the Department of Education. Teachers' responses to questions regarding the Department of Education's position on EE were greatly varied. Answers ranged from believing the position to be nonexistent, positive, and not a priority. These variations reveal a lack of connection between teachers and the Department of Education. Particularly concerning is that six participants were unsure of the Department's position. As the Department of Education is in charge of creating curriculum documents, outcomes and providing resources, the Department's position on the environment and EE may need more transparency.

The challenges to implementing formal EE identified by participants reveals another disconnection among teachers and the Department of Education. The most frequently cited challenges are a lack of time for going beyond what the curriculum includes (and accomplishing the current curriculum goals), a lack of resources for EE, and the absence of EE from current curriculum outcomes (see figure 3.4). While having only six participants state outright that time is a challenge may not make it seem like a "great" challenge, given the small number of participants in this study it is still of interest that six out of eighteen were in agreement on time posing a challenge. Furthermore, out of all the challenges described, time is included in the top three, second only to resources.

Thus, in spite of the low numbers for the three top challenges, they are in fact the greatest challenges cited in this study. Furthermore, these three challenges are all related to the curriculum documents developed by the Department of Education. While these issues may just be the "nature of the beast" in terms of curriculum, the fact that the documents are so problematic with teachers demonstrates the division between the expectations of the Department of Education and the reality facing teachers. The lack of outcomes pertaining to the environment shows a division between the Department and EE.

These three main hurdles facing teachers as they attempt, or consider, implementing EE into their classrooms corroborate with the results of previous studies on EE and teachers (Tan and Pedretti, 2010; Puk and Makin, 2006). It is clear that time, resources, and the commitment of the curriculum are the prominent, wide-ranging challenges. It can, perhaps, be argued that any topic on the educational system's periphery will face these three challenges to implementation. What is unique to this study, then, are the five "other" challenges cited by participants. These were a lack of access to nature; little to no hands-on experience opportunities; too much information available on the environment; a lack of interconnected thinking in schools making it difficult to properly teach EE and a lack of willingness to change on the part of those in charge.

The lack of access to nature and the little to no opportunities for hands-on experience tend to go hand in hand. Teachers are often faced with limited control over out of school ventures or even access to local natural environments:

> It would be nice to be able to get into the environment more and we don't have a whole lot of freedom to do that, at schools, because we have to spend so much time on math and language arts, and you know there's a time to learn, this is as much time you're allotted for science and social studies... I think, connections that I think that we made as people, young people, to the environment, had a lot to do with the fact that we go to be in the environment, and experience it and it makes it really real. (Sybil)

The expectation for students to accomplish or achieve the specific curriculum outcomes is mirrored in the expectation that teachers cover each specific curriculum outcome in the time available. This leads to a diminished presence of other important study areas, such as experiential learning in nature. As well, some schools simply do not have an outdoor environment that is conducive to learning. The result of this inability to access nature is, as Sybil states, a lost connection to the environment. That this has been noted by

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participants as a challenge reveals the depth to which they desire to take their teaching and their own environmental values. It is difficult to ascertain participants' true actions towards EE given the barriers to its implementation; however the dialogues conducted seem to reveal that given greater opportunities to experience nature and include EE, these participants would take action.

That the vast amount of information available about the environment, and choosing what is the "best", poses a challenge and can be seen as a signifier of a need for more EE training in teacher education programs. Teachers need to be aware of what is considered the "best" EE in their province/territory and develop the critical thinking skills to determine the "best" for their own classrooms. This also points to an understudied area of EE – what information is best suited for audiences and educators with limited amounts of time? The suitability of pre-packaged information from global or national organizations is debatable (Russell, Bell, and Fawcett, 2000) and does not necessarily constitute the best information for a specific province, such as Nova Scotia.

The lack of interconnected thinking in schools as a challenge to EE suggests a larger issue within the school system itself. Although the curriculum in Nova Scotia is considered a "spiral" curriculum that builds upon itself each year the importance of having students connect ideas was lost to tests and curriculum that favours factual knowledge over deeper understanding:

> [the students] wish for me to just tell them the facts that are going to be on the test, and I'm sort of going... I actually need you to understand, to explain to me why this is an important cycle, and why if one thing goes wrong in the cycle, why everything goes wrong. (Patrick)

This particular barrier points to disconnections and complexities within the school system as a whole. While it is beyond the scope of EE itself, EE is engrained within the issue due to environmental learning being predominately held in the subject of science (the subject under scrutiny in the quote above), and science lessons tending to break down information into more manageable parts (Ross, 2007). Furthermore, EE advocates for an interdisciplinary method of study and multiple viewpoints for environmental ideas and issues (UNESCO-UNEP, 1977), which places EE at odds with a school system that does not necessarily interconnect concepts and learning.

The lack of willingness to change directly speaks to the Department of Education and the need this participant felt for schools to address contemporary, prominent issues:

> We're very stuck with the main stream, we're going to teach certain things and we have to adapt with the times. And whoever makes those decisions...maybe they are willing, I don't know, to me it seems like there's not a willingness to change right now. (Alexander)

Alexander's commentary on the "willingness of certain entities to want to adapt their curriculum" reflects a separation between teachers and those at the Department of Education. That this particular challenge is present in spite of the existence of a Council of Ministers of Education, Canada ESD Coordinator within the Department of Education (Mrs. Marilyn Webster), further indicates a need for greater communication and understanding between teachers and the Department of Education. If the curriculum is changing, if there is a willingness to change on the part of the Department, it is not accurately communicated to all teachers.

This challenge also points to the Department of Education being a significant barrier to EE. Barriers of time, resources, outcomes, finances, guidance, school policies on outdoor access, and curriculum links and adaptation all fall within the realm of the Department. This demonstrates that the Department is directly (e.g. outcomes, time) and indirectly (curriculum links, school policies) impeding the proper implementation of EE.

Ultimately, all of these challenges discussed are related to the provincial education system rather than the components of EE. This signifies the need for greater inclusion and understanding of EE at the school board level, the department level, and within teacher education programs.

3.7 CONCLUSIONS

This study demonstrates a desire amongst this group of elementary teachers for better integration, and an increase in existing examples, of EE in their classrooms. Their desire is influenced by a number of factors, especially personal experiences throughout their lives and during childhood. This emphasizes the need for EE experiences, for example, hands-on, heartfelt activities that work towards the goal of positive environmental behaviour. Furthermore, the role model position in which teachers are placed, coupled with the explicit and implicit values and ideals teachers bring to their

classrooms, positions teachers as important sources for developing students' environmental perceptions and actions.

In spite of an interest in EE, the majority of teachers interviewed identified their greatest challenges to EE as connected to their classroom curriculum. Time, resources, and curriculum outcomes were the three challenges most frequently cited. These barriers, coupled with a lack of regular guidance on the subject, illustrate disconnections within the education system. The Nova Scotia Department of Education has yet to fully support EE and teachers' interests in EE through curriculum outcomes that incorporate EE, improved resources and additional time or greater links across curricula to better utilize time and further integrate EE.

The findings indicate that there is a burgeoning interest in EE coupled with a desire to efficiently integrate the subject and improve available resources. The challenges identified by participants are not related to the goals and principles of EE itself, but rather the current governing education system. These understandings point towards the barriers between teachers and school boards/education department as one of the greatest hurdles for EE in Nova Scotia.

This research provides important and previously undocumented insights into the perceptions of a cohort of teachers in Nova Scotia concerning EE, as well as the challenges they face in trying to implement EE. These results can be utilized to form partnerships between provincial EE groups and schools to the benefit of teachers and students, and to attempt to alleviate the cited challenges. In terms of academic theory on the integration of EE into formal classrooms, this study plays a part in developing the limited scholarly research on the subject of formal EE in Nova Scotia and Canada. Expanding from this study, further research that examines teacher perceptions of EE across all the school boards of Nova Scotia will provide a well rounded investigation into the provincial status of EE. Individual school and school board administrators' perspectives should also be explored to determine the approaches to EE at the executive level and how they may affect classroom teachers.

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CHAPTER 4 - CONCLUSIONS

4.1 SUMMARY OF RESEARCH

This research aimed to gain a better understanding of *the degree to which environmental education (EE) is included in the Nova Scotia sixth grade curriculum and how a group of current sixth grade teachers in the Halifax Regional School Board (HRSB) conceptualize, and perceive challenges to, teaching EE.* Three objectives supported the main purposes of this research. The first objective was to determine the environmental content and quality of three curriculum documents said to contain the greatest amount of environmental aspects. This was achieved through content analysis of science, social studies and health education and comparison to eight principles and three objectives of EE (described in the methods section of Chapter 2, pages 47-51). The second objective was to determine how a cohort of sixth grade educators within the HRSB conceptualizes EE. This was accomplished through open-ended, semi-structured interviews with a cohort of 18 sixth grade teachers in the HRSB. The third objective was to identify key issues to teaching EE within the HRSB sixth grade classrooms and put forward recommendations for improvement. This objective was achieved by comparing the results of the previous two objectives and pinpointing the greatest and shared difficulties to implementing EE in a classroom.

This chapter offers a brief overview of the major findings of the research, provides recommendations to enrich EE presence and prominence within the sixth grade curriculum, and offers reflections on the challenges of the study, its contributions to theory and practice, and future research that may derive from this work.

Overview of significant findings

Eight key findings emerged from this study. These are summarized in a list below and expanded upon in the following paragraphs.

1. Specific curriculum outcomes for sixth grade science are predominately focused on knowledge, rather than attitudes and hands-on experiences.

2. The new health education outcomes for 2011 do not include the environment in any capacity.

3. Social studies takes the greatest interdisciplinary approach to EE; however it also emphasizes knowledge over attitudes and hands-on experiences.

4. Teachers' definitions of EE reveal a lack of in-depth knowledge of EE as understood by global experts and described in international declarations.

5. A teacher's personal beliefs greatly impact how, what, and why they teach EE.

6. The majority of participants stated that the environment should be integrated into all sixth grade subjects, taught in every grade level, and revealed the importance values play in EE/education, thus demonstrating the importance of including EE in the classroom.

7. The disconnect between teachers and the HRSB/Department of Education on classroom EE raises many challenges to implementing EE (time, outcomes and resources being the top three cited).

8. The key issues facing successful EE in the HRSB are the education and training of school teachers, collaboration with environmental groups in the HRM, and the quality of the environment within curriculum outcomes.

FINDING 1: SCIENCE

While science is the "traditional" subject for environmental content, it falls short in its inclusion of EE that moves beyond simply knowledge and delves into attitudes, values, and experiential learning. Despite science having the greatest quantity of outcomes related to the environment of the three subjects analyzed (13 in total), the majority of these outcomes are knowledge-based. The overemphasis on knowledge detracts from the other pillars of EE, namely experiential, hands-on learning, attitudes and values, and positive environmental behaviour. This curriculum is an example of how quantity does not guarantee quality.

Particularly where the environment is involved, knowledge at the expense of attitudes and practical skills/actions has been found to lead to anxiety and action-paralysis (Jensen, 2004). Furthermore, the lack of focus on the local environment and student interaction within that environment detaches students from what they are studying and impedes forming connections between the natural environment and topics in the classroom.

The specific curriculum outcomes for health education have recently been revised and a draft of these outcomes released in February, 2011. These new outcomes for the sixth grade eliminate the explicit environmental content that existed in the 2003 outcomes. Taking this change into account, health is no longer considered a subject that supports EE. However, there are two outcomes in which EE concepts could be included: "Students are expected to identify responsibilities of global citizenship and take age-appropriate action to address a global health issue" and "Students will be expected to recognize the signs and symptoms of major depressive disorder and attention deficit/hyperactive disorders" (Nova Scotia Department of Education, 2011, p. 167-168). Educating students on the effects air, water, and soil pollution have on human health and suitable actions to take, as well as the positive impact that experiences in nature have on depression and attention deficit/hyperactive disorders, have the potential to achieve each of these outcomes respectively.

Until the new health education curriculum is completed, teachers are expected to either teach the 2003 curriculum outcomes or to teach the 2011 outcomes without a supporting document. In the case of teaching the 2003 outcomes, there are approximately five outcomes that are related to EE concepts, with one directly referencing the environment: "Students will be expected to identify ways in which individuals, communities, and countries co-operate to protect and maintain environmental health" (Nova Scotia Department of Education, 2003, p. 17). This health education curriculum has a slightly more balanced amount of knowledge, skills, and attitude outcomes than the developing curriculum; however there is still a great emphasis on knowledge.

FINDING 3: SOCIAL STUDIES

The sixth grade social studies curriculum has four outcomes out of 17 that explicitly include the environment. Again, it is knowledge that makes up the bulk of these outcomes. All four are predominately knowledge based, with the inclusion (or possible inclusion) of either skills or attitudes (see Table 2.2., Categorization of EE related outcomes in Sixth Grade Curricula, Chapter 2, page 52).

Of the three subjects analyzed, social studies takes the greatest interdisciplinary view. The aims of sixth grade social studies are to integrate disciplines (geography, history, economics, political science, sociology, humanities, social sciences and pure sciences), as well as provide a multidisciplinary lens through which to view issues from personal, provincial, national and global perspectives (Nova Scotia Department of Education, 2010). Furthermore, the general curriculum outcomes that help to shape the specific curriculum outcomes taught in class, all have some connection to the environment, be it recognizing the interdependence among society, economy, and the environment, or appreciating the relationships between attributes of place and cultural values.

The lack of official requirements for the amount of EE integration into schools poses difficulties for evaluation and recommendations. However, the need to develop ecologically conscious societies through education, (and consequently the need for educational change to incorporate EE), supersedes the lack of requirements. Education provides opportunities for understanding, exploring, and developing values towards the environment, all of which are essential for sustaining society. Current educational methods and outcomes described above compound environmental problems by not addressing knowledge, skills, and attitudes equally; this is not the type of education that will save humanity or the planet (Orr, 2004). Thus, any educational reform to include more EE, particularly direct nature experiences and developing values, is beneficial to both society and the environment.

FINDING 4: DEFINING EE

Participants spoke of the classroom emphasis on the three Rs: reduce, reuse, recycle, however the order is often reversed with a greater spotlight on recycling. Following these, the other primary definitions of EE focused on the human impact on and in nature. This includes such terms as resource use, energy, pollution, science, carbon, protection sustainable and responsibility (see Figure 3.2, Word cloud of teachers' definitions of EE, Chapter 3, page 82) These areas are important for EE, yet also far from the positive environmental attitudes and behaviours, hands-on skills and experiences and actions called for in the Belgrade Charter and Tbilisi Report (UNESCO-UNEP, 1976;

1977). Participant definitions indicate disconnects among educational programs and services and the scholars and global declarations who advocate for the inclusion of EE.

This discrepancy in understandings of EE is further accentuated when participant definitions are compared with their responses to the most appropriate/important pillar of EE for sixth grade students. It is not knowledge that appears the victor, but rather attitudes and values (Figure 3.3, "Participant choices for pillars of EE", Chapter 3, page 83). These teachers appear to have a grasp of the overall concept of EE; however, there were misunderstandings of what exactly EE is, and how to teach it.

Teacher education programs are highly influential on an educator's knowledge, lesson planning techniques and what is valued in a classroom (Hopkins et al., 2005). Yet few participants in this study felt confident that their program provided adequate EE knowledge and skills. This creates a problem for teachers utilizing EE, as they may have not been properly trained or educated, as well as raising questions on how to connect with teachers and move from a superficial view of EE to a more thorough understanding. In essence, teacher education programs need to transform their curriculum to better integrate EE as well.

FINDING 5: VALUES

Earlier research (e.g. Shuman and Ham, 1997) has pointed to experiences outdoors as a youth and the influence of parents and teachers and their own love of nature as having powerful impacts on a teacher's likelihood to teach EE. To a large extent, participants' personal values towards the environment have also been shaped by their early experiences with nature. In this study, their experiences in nature varied from solitary walks on the beach, camping and fishing trips, to outings with parents or grandparents. These personal experiences, as well as reflections on them, had an effect on this cohort's teaching styles and professional attitudes towards EE.

The inclusion or exclusion of EE within teacher education programs also played an important role in developing a teacher's professional values towards the environment. Secondary topics, like the environment, tend to exist as optional, elective courses. Only three participants of this study stated that they had received specific instruction on the

environment or how to teach the environment to their students. This suggests a weak state of EE in teacher education that may be carried into classrooms.

FINDING 6: EE AND ITS PLACE IN THE CLASSROOM

The integration of EE in the classroom depends on teacher perceptions of age appropriateness, cross curricular opportunities in the face of limited environmental specific curriculum outcomes, and how EE is addressed. A majority of participants claimed that EE should begin in kindergarten and continue in every grade level, provided it is accompanied with age-appropriate lessons.

Many participants noted the current integration of environmental concepts into some outcomes for science and social studies. While this inclusion of environmental concepts beyond just science was seen as positive, almost all of the participants also stated that because EE works well as an interdisciplinary subject, it could be integrated into all sixth grade subjects. This desire to see EE included in all sixth grade subjects demonstrates participants' hope for the implementation of EE; it does not necessarily mean that participants themselves are currently integrating EE into everything they teach or that they will carry out that integration individually. Their lesson plans and activities, while chosen and manipulated by teachers, are ultimately influenced by principals, school boards, and the Department of Education, and are bounded by the specific curriculum outcomes.

Participants were asked which pillar of EE they felt was most appropriate for the sixth grade: knowledge, attitudes and values, or hands-on experiences, also known as skills. The majority of teachers chose all three categories. The second top choice was attitudes and values. Where the pillars are chosen individually, attitudes and values are the number one choice, followed by skills, and then knowledge. This conflicts with the findings of the curriculum analysis, where knowledge is given the greatest emphasis. It also signifies the important role that teaches' believe values play in formal education and EE itself.

FINDING 7: CHALLENGES

The integration of EE depends both on what teachers are doing in the Nova Scotia classroom and what the Department of Education includes in its curriculum, resources,

and guidance. Teachers' responses to questions regarding the Department of Education's position on EE were greatly varied: two participants saw the position as nonexistent; six were unsure of the department's position; four participants felt that the position is positive; and six felt that the department does not make the environment a priority. This suggests a lack of communication between teachers and the Department of Education.

The challenges to teaching and integrating EE identified by teachers are directly and indirectly connected to the Department (Figure 3.4, "Greatest participant challenges to implementing EE", Chapter 3, page 87). The three greatest challenges are classroom time (the distribution of which is decided by the Department), resources (provided by the Department), and outcomes (created by the Department).

Other challenges mentioned were having too much information on the environment, lack of access to nature and hands-on experiences, a lack of interconnected thinking in schools and a lack of willingness to change of those in charge. These challenges, much like the greatest three discussed above, ultimately relate back to professional development, teacher education programs, and the Department of Education in general.

FINDING 8: KEY ISSUES AND BARRIERS

The study revealed several key issues and barriers facing EE within the HRSB. The key issues surrounding the current state and future of EE are the education and training of school teachers regarding the subject; the support given to other subjects such as mathematics and language arts that do not yet include EE related outcomes; and enhancing the status of the environment within curriculum outcomes, subjects and teaching strategies. The challenges include inadequate, and often anthropocentric, portrayals of the environment in curriculum outcomes; an uncertain relationship between teacher expectations and Department of Education expectations; and a marginalization of the environment in terms of specific curriculum outcomes, time devotion, and resources.

In order to become an ecologically literate person with behaviours and actions that work to the benefit of the environment (the ultimate goals of EE), an individual should have experiences in the three mainstays of EE – knowledge, attitudes/values, and skills/hands-on activities. Currently, the science, social studies, and health education

curricula do not fully address these three foundations. The emphasis on knowledge over skills and attitudes leaves teachers in a difficult position should they try and include EE within the current system. The lack of access to outdoors, few (if any) field trips, and the need for resources such as guest speakers, school gardens, or information, are contributing barriers to hands-on and attitude focused activities. Unless changes, both major and minor, are made to the curricula, teachers will continue to face difficulties in implementing EE and conceivably pass over the subject. This will result in the continued marginalization of EE within the formal school system in Nova Scotia (or HRSB).

4.2 COMPARISONS WITH EXISTING RESEARCH STUDIES

Results from this study have implications for the wider body of scholarly EE research. In this section, the results of this study will be discussed in light of existing research on EE in Canada. Studies that explore teacher beliefs concerning EE are limited; however, those that do exist largely reflect the same findings as this study. Tan and Pedretti (2010) investigated teacher beliefs and practices regarding EE and identified challenges to implementing EE in Ontario. Here, the researchers found that the greatest challenges to incorporating EE were an overcrowded curriculum, disengaged outcomes, lack of adequate curriculum resources, and a low priority for EE in the school department. Accessing and using the outdoors in general was also cited as a challenge. Teachers participating in this Nova Scotia study also cited an overloaded and disconnected curriculum, a lack of time, a shortage of adequate resources, and inability to go outdoors. The Nova Scotia results also reflect those found in a mail-out survey to Ontario teachers (Puk and Makin, 2006). Here, a majority of respondents stated that they were not satisfied with the amount of ecological connections in their curriculum guidelines and that more time teaching for ecological literacy was needed. In fact, the absence of ecological literacy from the Ontario curriculum was cited as the primary challenge for teachers. Further challenges were once again, a lack of resources, lack of training, and lack of support. Puk and Makin (2006) also refer to the absence of ecological consciousness in Ontario's elementary curriculum, with minor integration of "watered down" environmental topics into science classes that are taught indoors, away from nature. Nova Scotia's sixth grade science is similar with minimal outdoor activities and knowledge-

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based outcomes relating to the environment. There is no mandated amount of outdoor time for Nova Scotia's elementary classes and it was noted by participants that outdoor class time could be as little as twice a month in the spring and fall months, with less time spent outdoors in the winter. However, the amount ultimately depends upon the individual teacher and the principal of the school. Teachers in each study agreed that they are, in one way or another, supporters of environmental issues and education. Teachers in each study also expressed frustration with the lack of political and policy action regarding the environment and felt that the environment was given a low priority by administrators, school boards and departments of education.

Deborah Cotton's research into teacher beliefs on EE in the United Kingdom has strikingly different results (Cotton, 2006). Participants felt that they should avoid influencing students' attitudes or imposing a pro-environmental agenda. Cotton states that these findings are actually at odds with much of the literature on EE. Cotton's results may be an anomaly in EE research, as this study's findings are consistent with previous Canadian research.

While teacher beliefs and their perceptions of challenges to EE are present in academic literature, the amount of current scholarly research on curriculum documents and their ties to EE is quite minimal. Investigations into specific curriculum outcomes in particular are lacking. This research provides a new perspective on the quantity and quality of EE concepts as integrated into the Nova Scotia's sixth grade curricula. Nova Scotia's curricula have not been previously researched in this regard, and so this study provides new insights into the provincial education system's prioritization of the environment and its related issues. In terms of research on subjects other than science and geography as places for EE, given that participants in this study contended that EE should be incorporated into other subjects than science, this study reflects the research of Jensen (2004) and Brown (2004). These scholars argued that the humanities and health subjects are suitable areas in which to include environmental study. Furthermore, the findings on the curriculum outcomes, with their strong reliance on the acquisition of environmental knowledge over values, attitudes, and hands-on experiences, coincides with previous work on the fragmentation of the environment in schools and the loss of holistic, interdisciplinary study (Ross, 2007).

4.3 STUDY RECOMMENDATIONS

Results from this study have potential implications for the development of
stronger EE integration in the HRSB and potentially in the entire province via the
curricula. Recommendations based on the results are summarized in a list below and
expanded upon in the ensuing paragraphs.

Curriculum

1. The science curriculum should incorporate more hands-on activities, focus on
    local species for study, and incorporate more attitude outcomes into the
    specific curriculum outcomes.

2. At least two of the 2011 curriculum outcomes for health education could be
    revised to incorporate the environment in a variety of targets (knowledge,
    values, and skills), as discussed in findings 2.

3. For social studies, at least five outcomes could be adapted to include the
    environment, and are outlined in table 4.1. *Revising the social studies
    curriculum for EE.*

4. The time allocated for subjects could be modified to indirectly allow more
    time for science and social studies through greater connections among EE
    related outcomes.

5. The integration of EE into all sixth grade subjects and their curriculum
    outcomes and guides.

Teacher Education

6. The Department of Education could provide teachers with opportunities to
    improve their environmental knowledge, experiences, and values. This could
    be through personal development days; providing connections to local
    environmental groups; and requiring that teachers requesting certification in
    the province of Nova Scotia successfully complete an EE training and
    teaching course, such as Project Wet or Project WILD. These programs are
    available through the provincial Department of Natural Resources and are
    further explained below.

<u>Funding</u>

7. Additional funding for field trips to natural settings, outdoor experiential activities, and/or outdoor classrooms or school site green spaces for classes to use could provide teachers and students with the desired outdoor experiences.

<u>Partnerships</u>

8. Lastly, partnerships could be formed between local environmental groups and the Department of Education and school boards. These partnerships could encourage and develop teacher interaction with these groups for resources, guest speakers and possible workshops for teacher education. These recommendations are explained in greater detail in the following sections.

CURRICULUM

The current curriculum within the three subjects of science, health education, and social studies, when compared to the eight principles of EE (UNESCO-UNEP, 1976; 1977) are ineffective in their coverage of EE concepts. Overall, every subject in the sixth grade should integrate the environment and concepts of EE; greater amounts of integration of EE; and outcomes related to the environment must expand beyond solely knowledge and into experiential, attitudes, and values. This is in accordance with the Council of Ministers of Education, Canada's pan-Canadian ESD Framework for Collaboration and Action, which aims to integrate ESD learning into all curricula, at all grade levels (2010). In spite of this call for nationwide increases in the outcomes that address environmental learning, this research did not uncover any standards for the "perfect" integration of EE. Given the marginalization of the environment in current curricula, additions would be an improvement.

The support given to environmental learning in other provinces, such as Ontario and Manitoba, has led to great advancements in EE/ESD. This support derives from the Council of Ministers of Education, Canada, ESD working groups in the provinces, ESD coordinators within Departments of Education, and NGOs (CMEC, 2010). As a result, Manitoba has embedded ESD in the K-12 curriculum and provides workshops to educators (in-service and pre-service) on an ongoing basis (CMEC, 2010). Ontario has inserted EE into all grades and subjects of the Ontario curriculum and ensured that EE

standards are applied, as well as integrating EE into training for new teachers (CMEC, 2010).

In the subject of science, the curriculum could incorporate more hands-on activities to avoid a dominance of knowledge-based outcomes. Particularly, given that current outcomes emphasize learning to identify plant and animal species, as well as studying the Earth's cycles on seasons and tides, experiential learning in the outdoors could be included in the curriculum. This would provide students with a different learning environment, potentially engages hands-on skills, and encourages the study of, and interaction with, local species. Additionally, given the importance of developing sensitivity towards the environment during the younger years (Kalinowski, 1991; UNESCO, 1977), attitude outcomes could be more predominant in the curriculum. Having attitude outcomes especially for the sixth grade could facilitate the development of greater environmental empathy.

More in-depth class discussion on curriculum related matters, such as the environmental impacts of renewable and non-renewable electricity, the impacts of air and space craft on human health, environmental health, and human disturbances on ecosystems and their inhabitants, could help students to understand more than the facts on these issues. This would address EE principles of taking interdisciplinary views, considering the environment in its totality, taking into account the local environment, and targeting the objectives of awareness, knowledge, attitudes and skills.

In the subject of health, at least two of the 2011 curriculum outcomes could be revised to incorporate the environment in a variety of targets (knowledge, values, and skills). These revisions would enhance health education by empowering students with the knowledge of the effects of spending time in nature on disposition and mental health, and the impact of environmental pollution on human health and the health of communities. Specifically, the current health outcomes could incorporate the impacts of the environment on human physical and mental health, and the human impact on the environment. This circular cycle of health could also be acknowledged and incorporated into the existing curriculum.

In the subject of social studies, at least five outcomes could be adapted to include the environment in varying capacities:

Table 4.1 *Revising the social studies curriculum for EE.*

Current curriculum outcome(s)	Suggestions to improve EE content
Unit Three: Some Elements of Culture Outcome: "students will be expected to explain how traditions relate to culture in a selected cultural region" Outcome: "students will be expected to explain how economic systems relate to cultures"	Both of these outcomes are in the social studies unit on elements of culture. Each can both include discussions and research on the environment – as a physical and spiritual force that shapes cultures, and as natural resources that support many global economies, including Canada's. This also helps to address concepts of ESD.
Unit Four: Expressions of Culture Outcome: "students will be expected to analyze how the arts reflect beliefs and values in a selected cultural region"	This outcome could provide students the opportunity to learn about local Aboriginal reflections on their connection with nature (for example, stories on the creation of the world and the region of Nova Scotia).
Unit Five: World Issues Outcome: "students will be expected to analyze the effects of the distribution of wealth around the world"	This outcome could include the environment in how areas of lower economic status often face greater environmental destruction and pollution, as well as the exploitation of environments for greater material gain around the world and the divisions that arise.

The social, political, and historical aspects of the environment also need to be taken into account throughout the social studies curriculum. Outcomes related to the environment need to be spread out among all six units, as opposed to being predominately relegated to a single unit. The suggestions could be included in the delineations following each outcome (See Appendix A: Specific curriculum outcomes for current descriptions) or could be included in the teaching strategies columns within the social studies curriculum document. How teachers achieve the explicit, demanded outcome depends on the individual.

Time constraints are an overarching barrier for all components of education. Nevertheless, there are ways in which using class time in different, efficient ways could provide more effective and less marginalized opportunities for EE. Given that science and social studies comprise only 15.4 percent of each elementary week, greater connections between their specific curriculum outcomes and the outcomes of subjects like mathematics and language arts (which are given more than 50 percent of each week) could use the same amount of time to cover more outcomes. Additionally, students would be taught with a more interdisciplinary view as they drew connections amongst language arts, social studies, and the environment.

While study regarding the environment is currently within science, social studies and health education, with the CMEC also identifying language arts and technology education as two other integrative subjects (2010), EE could be included in every sixth grade subject in a variety of ways. Visual arts can promote the recycling of materials to create art, or utilizing artistic expression to communicate emotions towards the environment and difficulties it faces. Music classes could allow students to explore nature's music (for example, song birds) in local settings. Physical education could involve outdoor activities to connect students with their local environment. Mathematics could involve problem solving questions on population increases, declines, graphing the changes, and (this could also lead to students exploring the causes of population changes in a science-based lesson). French, much like language arts, could include reading environmentally themed books and short stories or creative writing on local environmental concerns and what students love about the environment.

TEACHER EDUCATION

Teacher education programs within the province of Nova Scotia, as well as personal development days, conferences, and workshops for practicing teachers, are particular areas where EE could be prioritized. The pan-Canadian ESD Framework identifies the support and training of teachers as one of the key challenges for integrating ESD (2010). Based on the perspectives of participants and the strategies for teaching and learning listed in the curricula, two key recommendations are proposed. First, the Department of Education could provide teachers with opportunities to improve their own environmental knowledge, experiences, and values. This can be accomplished through personal development days, an ideal opportunity for learning about ESD (Council of Ministers of Education, Canada, 2010); providing contact information and connections to local environmental groups; and requiring that teachers requesting certification in the province of Nova Scotia successfully complete an EE training and teaching course. Courses such as Project Wet and Project WILD are available through the provincial Department of Natural Resources. Project Wet is a workshop that focuses on water education, for example, water conservation, water quality, and aquatic species to name a few. Participants take part in hands on activities and receive resource materials. Project

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WILD is a similar workshop that focuses on wildlife conservation and responsible actions towards wildlife and natural resources.

Second, the Department of Education and the HRSB could offer annual or bi-annual EE workshops and training programs for existing teachers to stay well-informed of current debates and strategies for preparing relevant classroom materials. This would help support the pan-Canadian ESD Framework's priority on developing ESD-related teaching materials and resources (2010).

FUNDING

Although there are currently financial constraints upon individual school boards and schools, as well as the Department of Education, additional funding for field trips to natural settings, outdoor experiential activities, and/or outdoor classrooms or school site green spaces for classes to use could provide teachers and students with the desired outdoor experiences. External funding can be provided through grant applications, for example Evergreen, an environmental not-for-profit organization, has partnered with Toyota to establish Toyota Evergreen Learning Grounds. Schools apply for financial grants to help with the building of outdoor classrooms. Ducks Unlimited Canada partners with schools near local wetlands (or those interested in creating a wetland) to protect the wetland and provide the school with a unique outdoor classroom.

PARTNERSHIPS

Based on the current need for improved EE within classes, as well as the expressed need for teachers to be exposed to more environmental experiences and undergo training for EE, a two part collaboration recommendation is proposed. First, partnerships could be formed between local environmental groups and associations, particularly those involved in EE, and the Department of Education, as well as the HRSB. These partnerships could help facilitate classroom visits and presentations from these organizations. This could also help both the environmental groups to have larger, additional audiences for their program objectives, which may help them to secure funding opportunities, and the Department of Education to better align the curriculum outcomes and the principles of environmental learning. Second, partnerships between local environmental groups and the HRSB could encourage and develop teacher interaction

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with these groups for resources, suggestions on incorporating the environment, and possible workshops for teacher education.

4.4 STUDY LIMITATIONS

With any research project, there are some limitations that must be overcome and some limitations that must be accepted. This research was primarily restricted due to time and finances. Within the constraints of a typical two-year graduate program, a narrow window of time to promote and complete data collection exists, and given the physical distances between school boards, it was decided that one, large school board would be the focus of the study. Within this school board, there are limited months for conducting research in HRSB schools (October, November, January-May of any given school year). It is a HRSB research policy that research not be conducted in June and September, and teachers are not accessible during July-August.

An additional limitation associated with the research is the shortage of literature on EE in Nova Scotia; Canada; in the sixth grade; and within the context of elementary pedagogy. The lack of academic content in these specific areas forced reliance on fewer specific local resources than anticipated which had to be supplemented with literature from other countries, age groups, and teaching styles.

The avoidance of bias in a study such as this is virtually impossible. By having an open call for participants, it is possible that teachers with a previous inclination towards EE or the environment in general would be the most likely to respond (Heckman, 1979). Although no participant stated outright that they had any professional partiality for EE, their reasons for involvement in the study were not questioned and no controls were put in place to avoid self-selection bias (Diefenbach, 2009; Gustafson and McCandless, 2010).

The advantages for this form of data collection are that by purposefully sampling only current sixth grade teachers, the participants are guaranteed to be active teachers with some stake in the sixth grade curricula (Hamilton and Bowers, 2006). This is also known as a type of judgement sample (Marshall, 1996). Recruitment was undertaken specifically within the HRSB for the practicality of time, finances, as well as this school

board being the largest in the province (Marshall, 1996). The disadvantages of this type of data collection are the aforementioned possibility of bias on the part of participants.

For this study and similar research, a random probabilistic sampling technique would overcome this limitation of self-selection (Sandelowski, 2000). However, given that no possible participants were refused from this study and that the investigator had no prior connections to the study population; this data collection was conducted in the most suitable manner possible.

4.5 IMPLICATIONS OF STUDY FOR THEORY AND PRACTICE

In spite of the limitations facing this research, there are important, previously undocumented, insights into the perceptions of EE as well as the challenges faced by Nova Scotian sixth grade teachers trying to implement EE in the classroom. These results can be utilized to advance the formulation of partnerships between provincial EE groups and schools to the benefits of teachers and students. For example, some participants expressed a desire to have more guest speakers in order to better integrate EE into multiple subjects:

> I, as an elementary teacher, I teach them 5 subjects, so I will often take time from my language arts to make it [guest speakers] fit... I know that if I bring in, or participate with the Clean Air Champions program, that it is addressing, not just language arts outcomes with the writing they do, but the social studies is engrained with environmental awareness, so is the science, so you're hitting 3 different core subjects. (George)

A guest speaker can provide a unique, prepared lesson that potentially covers more than one outcome (as stated by George, above). This allows the teacher to "check off" more than one outcome, learn from the presentations/activities and potentially gain resources from the speakers or organization. Students also benefit – some programs, such as the Sierra Club of Canada Atlantic Chapter's "Sierra Buddies", are peer teaching programs. Tenth grade students are taught ecological footprint and sustainability information and attitudes, as well as leadership and team work skills. These students then deliver presentations to sixth grade classes. Peer teaching such as this can enhance student learning, as expressed by interview participant Janelle: "I find that students sharing often makes it so that they understand it more because they're able to take it down to their level".

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Additionally, this research identifies the quantity and quality of EE within sixth grade curriculum documents. Such knowledge is important for understanding what students learn in terms of formal EE and what teachers are required to teach. A curriculum is a province wide connection among students, teachers, and school boards. It is a steady document in the face of diverse teachers, classrooms and learning environments. As such, it is important to investigate the content being put forth by the curricula. The teachers of this study may interpret the same curricula in different ways however they are required to teach to it. Analyzing the three curriculum documents in this study allows for a greater insight of what influences teacher understandings and actions.

In terms of theory, this study contributes to the limited academic research on the subject of formal EE in Nova Scotia and Canada. In particular, contributions are made to the growing scholarly recognition of the importance of formal education curriculum for integrating EE and the significance of teacher perceptions and actions. These are essential areas to conduct EE research in order to determine a baseline understanding of the current effectiveness of EE in public schools, envisage future adaptations for EE to improve its position within schools, and to monitor teachers and scholars evolving conceptions of EE in schools.

4.6 RECOMMENDATIONS FOR FUTURE RESEARCH

As the future of EE in schools is a shifting concept, additional investigations into curricula, teachers, and administrative professionals (principals, school board members, and Department of Education employees) are needed to determine a general understanding of how EE is valued by teachers across the province. An expanded study with teachers from all school boards within Nova Scotia would be beneficial, particularly to develop a sense of EE from a province-wide perspective. Furthermore, a random probabilistic sampling technique would overcome the limitations of self-selection mentioned above. Also, an examination of other curriculum subjects would also be advantageous to identify more opportunities for EE in other core subjects, especially language arts and physical education. Specifically, the following recommendations for future research are made:

- A similar study that uses probabilistic sampling techniques which examines the views and beliefs regarding EE of sixth grade teachers across the province using stratified random sampling techniques.

- A similar study that examines the views and beliefs regarding EE of administrators from schools and school boards, as support for outdoor activities, field trips, and extracurricular resources often come from these individuals.

- A province-wide study examining the barriers and challenges facing sixth grade teachers and administrators in implementing EE in their classroom.

- Case study research examining individuals who have attempted to overcome barriers and challenges to incorporating EE in the classroom.

- A study on the curriculum documents of physical education and language arts for their inclusion or exclusion of the environment as a holistic, interdisciplinary subject, the attitudes and experiences taught/provided to students, and resources available.

- A study on the relevancy, importance and possibilities of including EE across all sixth grade subjects, in curriculum outcomes, resources, and teacher training for those subjects.

- A comparison study of teacher education programs in the province of Nova Scotia for the quantity of EE included and how it is valued. Although not all teachers employed in Nova Scotia will have obtained their teaching education in the province, it is important to determine what teachers who are educated in the province are taught regarding EE and how this can be improved.

4.7 CONCLUDING COMMENTS

This research has gathered the views of a cohort of educators on the subject of EE and the status of it within their school board and Department of Education, as well as the significance and worth allotted EE within curriculum documents and outcomes. This information, identifying the perceptions of educators and the challenges they face, is pertinent for the future development of different types of EE in the HRSB. How the curriculum regards EE, explicitly and implicitly, also impacts the future of education in the HRSB, as well as in Nova Scotia as a whole. As Canada continues to encourage developments in education and the environment, greater value will likely be placed on EE. By integrating EE in both the curriculum and the education or personal development

training for teachers, Nova Scotia will be better prepared to meet the need for a more ecologically literate, aware and active society.

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APPENDIX A

Specific curriculum outcomes

Health Education 6 (2011)

General Curriculum Outcomes
Students will be expected to:
A. demonstrate positive self-identity that effectively enables them to manage their health, relationships, and interactions with the world
B. think critically and make informed decisions to enhance health of self, those around oneself, and within a global context
C. demonstrate effective communication and interpersonal skills that facilitate positive relationships between themselves and the world

Specific Curriculum Outcomes
Students will be expected to:

Healthy Self
1.1 investigate the concept of sexuality and sexual health
1.2 describe the most common sexually transmitted infections for youth
1.3 demonstrate an awareness that personal needs for physical activity may change for girls and boys as they develop physically and emotionally
1.4 recognize the signs and symptoms of major depressive disorder and attention deficit/hyperactive disorders
1.5 identify and practice health enhancing ways to manage feelings and changes associated with the onset of puberty
1.6 differentiate between internal and external cues of hunger and satiety and suggest techniques for mindful eating
1.7 describe the role of physical activity and healthy eating in maintaining healthy weight and preventing chronic disease
1.8 assess total minutes of moderate and vigorous activity during school compared to after school and weekends

Healthy Relationships
2.1 practice communication skills that keep relationships in their lives healthy, safe, and productive
2.2 create a personal value code of ethics on relationships within their lives

Healthy Community
3.1 identify responsibilities of global citizenship and take age-appropriate action to address a global health issue
3.2 take age-appropriate action to present a mental health issues faced among school-aged children in order to reduce the stigma that is often attached to mental health disorders

3.3 respond to advertising of and communication about the use of alcohol, tobacco, gambling, caffeine, medicines, food and natural/alternative health products and communicate these ideas within the school community

3.4 identify personal safety strategies to use when home alone and/or babysitting

3.5 demonstrate an awareness of health issues related to the overuse of networking devices and video gaming, and assess signs of concern in oneself or others

Health Education 6 (2003)

General Curriculum Outcomes

The following general curriculum outcome statements identify what students will be expected to know and be able to do upon completion of their study in health education in grade primary – 12.

The Body: Growth and Development: students will be expected to demonstrate a knowledge of the body, body functions, growth and development.

Values and Practices for Healthy Living: students will be expected to demonstrate a knowledge of factors that contribute to healthy-living values and practice.

Strategies for Healthy Living: students will be expected to demonstrate knowledge, skills, and attitudes that contribute to active, healthy living.

Strategies for Positive Personal Development and Healthy Relationships: students will be expected to demonstrate the knowledge, skills, and attitudes necessary to live happily and productively as individuals both within a family and within the community.

Specific Curriculum Outcomes

Students will be expected to:

The Body: Growth and Development

A2.1 demonstrate an understanding of how the body systems work together

Values and Practices for Healthy Living:

B1.1 demonstrate an understanding of the factors that determine nutrient and energy needs

B1.2 assess the nutritional value of various convenience and restaurant foods

B2.1 demonstrate assertiveness when refusing potentially harmful substances and behaviours

B3.1 identify and practise baby-sitting safety precautions

B3.2 identify and practise strategies for preventing injuries in various non-competitive sports

B3.3 identify and practise safety precautions when using or working with electricity

B3.4 identify and practise strategies for protecting themselves and others from abuse and violence

B4.1 practise strategies for the prevention of skin cancer

B4.2 review and practise strategies for the prevention of tooth and gum disease

B4.3 identify services in the community for the prevention of diseases

B4.4 maintain a personal health history

B5.1 identify and practise strategies for making healthy adjustments to change

B5.2 identify strategies for dealing with life crises

B7.1 participate in a broad range of physical activities
B7.2 identify the effects of a regular physical-fitness program on the body systems

Strategies for Healthy Living:
C1.1 demonstrate an awareness of the effects of change within the family
C2.1 identify laws related to the possession and distribution of tobacco, alcohol, prescription drugs and street drugs
C3.1 assess the impact of current and emerging technologies on the health and fitness of Canadians
C4.1 identify the ways in which individuals, communities, and countries co-operate to protect and maintain environmental health
C5.1 demonstrate an appreciation of the heritage of cultural groups in the community and province
C5.2 demonstrate an awareness of provincial services and facilities for people with special needs

Strategies for Positive Personal Development and Healthy Relationships:
D1.1 identify and document personal traits, interests, abilities, skills, lifestyle preferences, and goals for the future
D1.2 set personal goals and work towards them
D1.3 identify and practise effective work habits at home and at school
D1.4 apply stress-management strategies
D1.5 apply decision-making strategies to complex and/or challenging problems
D2.1 demonstrate respect and caring in relating to classmates
D2.2 identify and practise conflict-resolution skills
D2.3 recognize and respect the needs of people in other age groups
D2.4 identify the consequences of being sexually active
D3.1 examine the role of the media in shaping and reinforcing lifestyle values and practices
D3.2 evaluate the usefulness and reliability of various sources of information regarding drugs
D3.3 identify and evaluate reasons why some people use legal and illegal drugs
D3.4 identify and examine reasons why some young adolescents are sexually active
D4.1 compare male/female roles in Canada to those in other cultures
D4.2 identify a range of occupations related to personal interests
D5.1 practise citizenship at school and in the community and region
D5.2 identify some of the responsibilities of global citizenship
D5.3 demonstrate an awareness of human rights and international children's rights

Science 6

General Curriculum Outcomes

STSE/Knowledge
1. Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology. (STSE)

3. Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge. (Knowledge)

Skills

2. Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.

Attitudes

4. Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.

Specific Curriculum Outcomes
Students will be expected to:

Physical Science: Electricity
Uses for Electricity
• demonstrate how electricity in circuits can produce light, heat, sound motion, and magnetic effects (303-26)
• describe how electricity has led to inventions and discuss electrical safety features at work and at play (107-9, 106-4, 108-2, 303-31)
Investigating Static Electricity
• make predictions and investigate static electricity; and draw conclusions based on evidence (104-5, 204-3, 204-7, 205-9, 206-5)
Circuit Pathways
• compare a variety of electrical pathways by constructing simple circuits, series circuits, and parallel circuits and illustrate them with appropriate symbols (303-23, 303-25, 207-2)
• perform activities that compare the conductivity of different solids and liquids (205-3, 300-20)
• describe the role of switches in electrical circuits, and identify materials that can be used to make a switch (303-24, 204-8)
Electromagnets and Electric Generators
• investigate and describe the relationship between electricity and magnetism using electromagnets and electric generators (204-1, 303-27, 303-22)
Consumption and Conservation
• explain various methods by which electricity is generated including renewable and non-renewable (105-3, 303-28, 303-29)
• describe how our actions could lead to reducing electrical energy consumption in your environment (108-5, 108-8, 303-30, 106-3)

Physical Science: Flight
Drag
• demonstrate methods for altering drag in flying devices and describe and show improvements in design (206-6, 301-18)
Lift and Wing Shape

• identify characteristics and adaptations from living things that have led to flight designs (104-3,
106-3, 300-21)
• plan and perform a fair test demonstrating the characteristics that influence lift on objects in flight (204-7, 301-17, 303-32)
Lift
• identify characteristics and adaptations from living things that have led to flight designs (104-3,
106-3, 300-21)
• identify and collect information using models that involve lift (205-5, 303-33)
Thrust and Propulsion
• describe examples of technological design between aircraft and spacecraft, and their influence on our lives (105-3, 107-9, 300-22)
• describe and demonstrate the means of propulsion for flying devices, using a variety of sources
(303-34)

Earth and Space Science: Space
Space Exploration
• describe and give examples of information and contributions that have led to new inventions and applications (106-3, 107-15, 206-4)
• describe and compare how different societies have interpreted natural phenomena, using a variety of sources, to validate scientific knowledge (105-6, 205-8, 107-3)
• describe, based on evidence, and make conclusions about how astronauts are able to meet their basic needs in space (206-5, 301-21)
Relative Position and Motion of Earth, the Moon, and the Sun
• demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons (301-19)
• observe and explain how the relative positions of Earth, the moon, and the sun are responsible for the moon phases, eclipses, and tides (301-20)
The Solar System
• gather information, describe, and display the physical characteristics of components of the solar system (205-2, 300-23, 104-8)
Stars and Constellations
• identify constellations from diagrams, pictures, and/or representations of the night sky (302-13,
207-2)
• describe and compare how different societies have interpreted natural phenomena, using a variety of sources, to validate scientific knowledge (105-6, 205-8, 107-3)

Life Science: Diversity of Life
The Role of a Common Classification Scheme for Living Things
• create and analyze your own chart or diagram for classifying and describe the role of a common classification system (206-1, 206-9, 300-15)
The Animal Kingdom: Vertebrates and Invertebrates
• classify animals as vertebrates or invertebrates and compare the characteristics of mammals, birds, reptiles, amphibians, and fishes (300-16, 300-17)

• classify common arthropods using a variety of sources (205-8, 300-18)
Micro-organisms
• identify and use appropriate tools to examine micro-organisms and describe how they meet their basic needs (204-8, 300-19, 302-12)
• provide examples of how science and technology have been used in identifying and controlling micro-organisms by different people around the world (107-3, 107-6)
Adaptations and Natural Selection
• propose questions and gather information about the relationship among the structural features of plants and animals in their environments and identify the positive and negative impacts of humans on these resources (204-1, 108-8)
• classify and compare the adaptations of closely related animals living in their local habitat and in different parts of the world and discuss reasons for any differences (301-15, 104-5, 204-6)
• identify changes in animals over time and research and model the work of scientists (107-11, 207-4, 301-16)

Social Studies 6

General Curriculum Outcomes
Students will be expected to:

Citizenship, Power, and Governance
A. demonstrate an understanding of the rights and responsibilities of citizenship and the origins, functions, and sources of power, authority, and governance
Culture and Diversity
B. demonstrate an understanding of culture, diversity, and world view, recognizing the similarities and differences reflected in various personal, cultural, racial, and ethnic perspectives
Individuals, Societies, and Economic Decisions
C. demonstrate the ability to make responsible economic decisions as individuals and as members of society
Interdependence
D. demonstrate an understanding of the interdependent relationship among individuals, societies, and the environment—locally, nationally, and globally—and the implications for a sustainable future
People, Place, and Environment
E. demonstrate an understanding of the interactions among people, places, and the environment
Time, Continuity, and Change
F. demonstrate an understanding of the past and how it affects the present and the future

Specific Curriculum Outcomes
Students will be expected to:

Unit One: An Introduction to Culture
6.1.1 explore the concept of culture and demonstrate an understanding of its role in their lives

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– classify elements of culture as material or non-material
– investigate how cultures are transmitted from generation to generation
– identify factors that shape culture
6.1.2 identify, locate, and map major cultural regions of the world
– recognize that there are various criteria for defining a cultural region, such as language, religion, location and place, shared traditions, and history
– use various criteria to identify, locate, and map cultural regions
– give examples of social and cultural diversity in the world
6.1.3 analyze the importance of cross-cultural understanding
– give examples that illustrate the impact of cross-cultural understanding or a lack of cross-cultural understanding
– explain the concept of a stereotype
– examine the extent to which the mass media stereotype different cultural groups
– give examples of actions that are being taken to improve cross-cultural understanding (local, national, global)
6.1.4 identify and explain factors that are creating a more global culture around the world
– describe how the movement of people impacts on cultures
– explain how the spread of ideas and technology is creating a more global culture
– give examples that are illustrative of a global culture

Unit Two: Environment and Culture
6.2.1 compare climate and vegetation in different types of physical regions of the world
– identify and locate on a world map types of physical regions, such as polar regions, rainforests, deserts, and grasslands
– give examples of the characteristics of climate and vegetation in these different types of physical regions
– give examples of similarities and differences of the climate and vegetation in these different types of physical regions
6.2.2 assess the relationship between culture and environment in a selected cultural region
– identify, locate, and map the cultural region selected and identify its physical environment(s)
– analyze how the way of life in this culture is influenced by its physical environment(s)
– evaluate the impact that culture has on the environment
6.2.3 compare the use of resources and sustainability practices between Canada and a selected country
– give examples of similarities and differences in the use of resources and sustainability practices between Canada and the selected country
– explain reasons for different perspectives on the use of resources and sustainability practices

Unit Three: Some Elements of Culture
6.3.1 examine how traditions relate to culture in a selected cultural region
– identify, locate, and map the selected region including examples of its major features
– describe how religious traditions influence the region's culture
– describe how customs and rituals are reflected in the region's culture
– analyze how change factors affect cultural traditions
6.3.2 describe how government relates to culture in a selected country

– identify, locate, and map the selected country including examples of its major features
– describe the government of the selected country
– give examples of how government influences, and has influenced, culture
6.3.3 explain how economic systems relate to cultures
– identify different economic systems
– examine the differences among different economic systems
– explain how the economic programs and services of a country influence its culture
– identify current economic trends that are influencing culture

Unit Four: Expressions of Culture
6.4.1 analyze how the arts reflect beliefs and values in a selected cultural region
– identify visual arts, crafts, dance, and music practised in the region
– analyze how music and dance reflect the beliefs and values of the culture
– analyze how crafts and visual art reflect the beliefs and values of the culture
6.4.2 examine the importance of language, literature, and theatre arts as expressions of culture in a selected cultural region
– examine the extent to which language is important in preserving culture
– use examples of literature and oral tradition to explain how cultural values and beliefs are reflected
– demonstrate an understanding of the importance of theatre arts in expressing culture
6.4.3 analyze the extent to which sports and games are expressions of culture in a selected cultural region
– explore sports and games that reflect the geographic influences of the culture
– analyze how the sports and games reflect the beliefs and values of the culture
– examine whether current trends reflect increased globalization in sport

Unit Five: World Issues
6.5.1 analyze the effects of the distribution of wealth around the world
– use statistical data to represent the distribution of wealth around the world
– examine the effects of the uneven distribution of wealth on quality of life
– define poverty and give examples of its effects
6.5.2 examine selected examples of human rights issues around the world
– give examples of rights included in the United Nations Declaration of the Rights of the Child
– give examples of rights included in the United Nations Universal Declaration of Human Rights
– identify human rights issues related to rights of children
– examine selected examples of current human rights abuses
6.5.3 take age-appropriate actions to demonstrate an understanding of responsibilities as global citizens
– explain the rights and responsibilities of being a global citizen
– support a position on a local/national/international issue after considering various perspectives
– plan and take age-appropriate actions to address local/national/international problems or issues

Unit Six: Canada: Reflections on a Multicultural Mosaic
6.6.1 illustrate an understanding of how cultures from around the world have contributed to the development of Canada's multicultural mosaic

References

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APPENDIX B

Social Sciences and Humanities Research Ethics Board
Letter of Approval

Date: March 4, 2010.

To: Elizabeth Spence , School for Resource and Environmental Studies

The Social Sciences Research Ethics Board has examined the following application for research involving human subjects:

Project # 2010-2156 (version 2)

Title: Cultivating Curriculum: Investigating Perceptions of Sixth Grade Educators in Nova Scotia Towards Teaching Environmental Education

and found the proposed research involving human subjects to be in accordance with Dalhousie Guidelines and the Tricouncil Policy Statement on *Ethical Conduct in Research Using Human Subjects*. This approval will be in effect for 12 months from the date indicated below and is subject to the following conditions:

1. Prior to the expiry date of this approval an annual report must be submitted and approved.
2. Any significant changes to either the research methodology, or the consent form used, must be submitted for ethics review and approval *prior to their implementation.*
3. You must also notify Research Ethics when the project is completed or terminated, at which time a final report should be completed.
4. Any adverse events involving study participants are reported immediately to the REB

Effective Date: March 3, 2010.   signed: ▮▮▮▮▮▮▮▮▮▮▮
Expiry Date: March 3, 2011.   Dr. Stephen Coughlan (Chair SSHREB)

IMPORTANT FUNDING INFORMATION - *Do not ignore*

To ensure that funding for this project is available for use, you **must** provide the following information and **FAX** this page to **RESEARCH SERVICES** at 494-1595

Name of grant /contract holder _____ Dept. _____
Signature of grant / contract holder _____
Funding agency _____
Award Number _____ Dal Account # (if known) _____

APPENDIX C

Halifax Regional
School Board

April 6, 2010

Ms. Elizabeth Spence
6058 Pepperell Street, Apt. 15
Halifax, Nova Scotia
B3H 2N7

Dear Ms. Spence:

**Cultivating Curriculum: Investigating Perceptions of
Sixth Grade Educators in NS towards Teaching Environmental Education**

I am writing in response to your application to conduct external research in the Halifax Regional School Board and to advise that your project is approved.

As noted in the Halifax Regional School Board's External Research Application, the participation of schools in your research is voluntary. Our approval does not compromise a school's right to decline participation in external research projects.

You are reminded that the personal identity of all participants must remain confidential and may not be included in any publication or communication describing the research; nor released to any other party. Any media publicity regarding the project must be reviewed and discussed fully with the Halifax Regional School Board's Communications Unit prior to publication.

Should you have any questions regarding this approval, please contact Patricia DeYoung at 464-2000, Extension 2549.

We wish you every success with this effort and look forward to receiving your final report.

Sincerely

Kim Matheson
Coordinator, Policy & Research

Research, Planning & Policy
90 Alderney Drive, 2nd Floor
Dartmouth, Nova Scotia – B2Y 4S8
Phone (902) 464-2000, Ext. 2549
Fax (902) 464-2336

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APPENDIX D

Letter of explanation for teachers

DALHOUSIE UNIVERSITY
Inspiring Minds

<u>Title of the study</u>
Cultivating Curriculum: Investigating Environmental Education Perceptions of Sixth Grade Teachers in Nova Scotia

<u>Principal Investigator</u>
Elizabeth Spence
Master's of Environmental Studies
School for Resource and Environmental Studies
Dalhousie University
Email: el697944@dal.ca
Telephone: 902-492-8145

<u>Academic Supervisors</u>
Dr. Tarah Wright
College of Sustainability/ Faculty of Science, Dalhousie University
Dr. Heather Castleden
School for Resource and Environmental Studies, Dalhousie University

Hello,

I would like to invite you to take part in a research study I am conducting as a part of my Master's of Environmental Studies degree, at Dalhousie University. I am the Principal Investigator for this research and will be your contact person. If you decide to participate, please note that your participation in this study is voluntary and you may withdraw from the study at any time. The study is described below, detailing the purpose, methods, confidentiality, and outcome of the research. If you have any questions, please do not hesitate to contact me. My information is located at the top of this letter.

The purpose of this research is to gain an understanding of how sixth grade teachers think of environmental education compared to what scholars think of the subject, as well as the barriers, if any, placed on environmental education by provincial curriculum. This study aims to increase the knowledge on environmental education in Nova Scotia, and to clarify the relationship between environmental education and teachers.

This research will involve a review of scholarly literature on the subject of environmental education, as well as an analysis of Nova Scotia's sixth grade curriculum. I plan to conduct one, one hour interviews with fifteen sixth grade teachers within the Halifax Regional School Board. With permission from participants, interviews will be digitally recorded and transcribed. I will then analyze the transcripts of these interviews, to find common themes among the responses. You will be able to review the transcript of your interview, as well as a

working copy of my thesis project to see how, and if, your quotations will be used. Only myself and my thesis committee will hear the recordings of the interviews. Audio files will be destroyed once they are transcribed. The written transcripts of the interviews will be kept in a locked filing cabinet in Dr. Heather Castleden's office at the School for Resource and Environmental Studies at Dalhousie University for at least five years before being destroyed as required by the Dalhousie University Policy on Research Integrity.

The results of this study will be presented in an academic thesis, and may be communicated in academic articles and at academic conferences.

If you have any questions or would like more information, please do not hesitate to contact me. I look forward to hearing from you!

Sincerely,

Elizabeth Spence

APPENDIX E

INTERVIEW QUESTIONS

Thank you for agreeing to participate in this study on environmental education. Before I start recording the interview, I want to tell you a little bit about how our conversation will go. The interview should take about an hour and our conversation will be about what you think of environmental education and how it fits into your classroom.

I just wanted to remind you that during this interview I'll be recording our conversation. There are no right or wrong answers; I am just interested in what you think. If there are things you don't want to talk about that's ok. We'll just move on. If you say something that you don't want recorded, just say so, and it can be removed, even after you have completed the interview.

The only people who will hear and see the interview material will be myself and my thesis committee. All original notes, digital recordings and back-up files will be stored in a secure location in a locked office at Dalhousie University and will be kept until 2016.

At the end of this project, I will be writing a publication style thesis report. This means that I will write my thesis with the hopes of having it published as two stand alone papers, in two separate journals. My thesis will also be kept at the School for Resource and Environmental Studies at Dalhousie. In this and any other dissemination of the research, such as conferences, I will keep the information you have provided confidential and any comments you make will be identified using a pseudonym.

Do you have any questions before we get started?

I have some general questions to begin:

1. Where did you go to school for your teaching degree?

2. Did you find that the program included information on environmental education, or environmental concepts related to education?

PROMPT:
Were you encouraged to include environmental education when creating lesson plans?

> *If environmental education was included, what did you find most interesting?*
> *If it wasn't included, was that a concern for you as a pre-service teacher? Would you have liked to learn about environmental education before graduating?*

3. How long have you been teaching?

4. How long have you been teaching at this school? Have you taught elsewhere in Nova Scotia or outside of the province?

5. Have you ever taught in a rural area (or an inner-city school for those currently teaching in a rural area)?

Now I have a few questions that are more about your personal experience with nature and environmental education:

6. Did you grow up in a rural area or in a city?

7. Do you have a particular memory or experience that stands out for you as a way in which you connected with nature?
   How did this experience (or lack of one) impact your point of view towards the environment?

     a. Was it a positive impact? How so?
     b. Do you believe that experiences like this are important for children? Why or why not?

8. When you think of environmental education, what is the first thing that comes to mind?

PROMPT:
Do you think of formal education, like your own profession, or non-formal education such as programs at museums?
Do you think of outdoors rather than indoors? Or as actions, such as cleaning up litter, versus reading and reflection?

9. An environmental studies professor and scholar states that "All education is environmental education. By what is included or excluded, emphasized or ignored, students learn that they are a part of or apart from the natural world."
     a. What are your thoughts on this statement?
     David Orr is a professor of Environmental Studies and Politics at Oberlin College, and a professor at the University of Vermont. His career also includes writer, speaker, and entrepreneur in fields of environmental education, environment and politics, campus greening, and ecological design. He has written six books, including two that are at the foundations of environmental education – Ecological Literacy (1992) and Earth in Mind (1994/2004).

10. Environmental education can be seen has having three parts: knowledge, skills, and values. Knowledge might be learning some facts about a tree, values might target emotional connections to trees, and skills might be how to plant and care for a tree. Which part do you feel is most important for this age group?

I'd like to talk a bit about your classroom, but before moving on would you like to take a quick break?

11. Do any of your students show an interest in the environment?

PROMPT: For example, are the students concerned with local issues of littering or recycling? Do they get excited when going outside or studying aspects of the natural world like animals or plants?

12. Have you ever taken a class on a nature hike or another type of activity that helps people to connect with nature?
    a. Was it a positive experience?
    b. What were some of the reactions of the students?
    c. How did you feel?

13. What sort of resources on the environment and/or sustainability are available to you as a teacher?
    a. Do you ever supplement classes with your own resources?

14. What do you think is the greatest challenge to teaching environmental education, in your classroom?
    a. Why is this a challenge?
    b. How would/do you overcome it?
    c. *Examples: not being included in curriculum/learning outcomes; lack of resources; inability or lack of coordination within schools for an interdisciplinary and cross grade subject matter.*

And lastly I would like to talk with you about the education system and its relationship with environmental education:

15. Do you have as a teacher feel that you have a responsibility towards educating your students on the environment and sustainability? *I realize this depends on the subject you are teaching; however I would still like to know how teachers feel about this subject matter.*
    a. Are there any others who should carry this responsibility? *Eg. Parents, politicians*

16. How involved are teachers in terms of the development of curriculum outcomes?

17. Should environmental education be its own curriculum outcome, either as a general curriculum outcome-broad expectations, or a key-stage curriculum outcome, an essential grad learning, or something else?

18. *(If someone who has been teaching for more than five years)* – Have you seen an increase in the substance of environmental education in the curriculum?

19. How would you describe the province's (Department of Education's) position on environmental education?
    a. Is it positive? Negative? Avoiding the topic? Trying to include it? Keeping it as a separate subject rather than an integrated one?

20. What sort of guidance does the school district or provincial education department provide on environmental education at teacher development conferences?
    a. Would you like to see any such guidance?
    b. Have you ever attended a conference with a separate association, such as the Atlantic Canada Association of Science Educators?

21. Would you be willing to attend seminars or workshops to increase your own environmental knowledge? Why or why not?

      a.   What about workshops on teaching environmental education? Why or why not?

If participant has checked off that he/she would like to see either transcript of preliminary analysis say: That's all for now, I'll be in touch with a copy of your transcript for you to review and/or a copy of my preliminary analysis for your comments.

Thanks so much, it was great to talk to you, have a nice day!

Dependent on time, these questions may be asked:

1. Is there a certain grade that you think is a good starting point for environmental education? Why/Why not?
2. In an ideal situation, how would you like to teach environmental education?
3. How do you think other teachers perceive environmental education?

APPENDIX F

CONSENT FORM

DALHOUSIE UNIVERSITY
Inspiring Minds

<u>Title of the study</u>
Cultivating Curriculum: Investigating Perceptions of Sixth Grade Educators in Nova Scotia Towards Teaching Environmental Education

1. Do you consent to being audio-taped?   Yes   No

2. Do you wish to review a copy of your transcript?   Yes   No

3. Do you wish to review a working copy of the thesis to view how your quotations will be used?   Yes   No

I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. However I realize that my participation is voluntary and that I am free to withdraw from the study at any time. **I agree to take part in this study.**

_____
Signature

_____
Printed Name

_____
Date

Thank you for your participation.

APPENDIX G

DIRECT QUOTATION CONSENT FORM

DALHOUSIE UNIVERSITY
Inspiring Minds

<u>Title of the study</u>
Cultivating Curriculum: Investigating Perceptions of Sixth Grade Educators in Nova Scotia Towards Teaching Environmental Education

<u>Consent for use of direct quotations</u>
I have reviewed my transcript and **I hereby consent to allow the researcher to use direct quotations from this interview in writing and presenting study results**. I understand that these quotations will not refer to my name.

_____   _____

Signature of research participant   Date

_____   _____

Signature of researcher obtaining consent   Date

Thank you for your participation.