Teachers’ cross-curricular instructional practices of environmental education in Ontario’s primary elementary classrooms

By

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Abstract

In recent years, children’s interactions with nature have become of interest in the education. Although these interactions have demonstrated benefits for children across all developmental domains, the disconnect between nature and the classroom is apparent in elementary schools today (Saylan and Blumstein, 2011; McBeth and Volk, 2010). This study seeks to discover how primary elementary school teachers create learning opportunities for environmental education (EE) across curriculum areas. This qualitative exploratory study involves semi-structured interviews with three Ontario elementary teachers in the primary division who are committed to infusing an EE approach across curriculum subject areas. The data yielded from this study found that effective EE is infused into the curriculum using inquiry-based practices and a cross-curricular approach. Implications from this research emphasize the importance of infusing EE into early elementary learning experiences in order to shape students’ positive attitudes towards and love for the environment at a young age.

**Key Words:** environmental education, primary division teachers, cross-curricular, inquiry-based approach
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Teachers’ Cross-Curricular Instructional Practices of Environmental Education in Ontario’s Elementary Classrooms

Chapter 1: INTRODUCTION

The education system has been concerned with environmental education (EE) since the late 1960’s (Yueh, 2007). EE is the teaching of the environment in its physicality and towards its sustainability, which aims at producing citizens who have the capacity to solve environmental issues (Saylan & Blumstein, 2011; Parlo and Butler, 2007). In Ontario’s curriculum for primary and junior elementary students, EE is covered within the science, social studies, history, and geography curriculum documents; however, Ontario lacks stated EE implementation opportunities within its other core subjects. In its EE policy statement Ontario affirms that “environmental education is an integrative undertaking that allows for teaching across disciplines” in a cross-curricular method (Ministry of Education Ontario, 2009, p. 11). Cross-curricular education is defined as an approach to teaching and learning which combines curriculum subjects or themes that overlap with one another in order to provide learning experiences with more breadth and coherence (Barlow, Brook, Shuttleworth and Bowden, 2009). A goal of the education system in Ontario is to promote this teaching strategy through the implementation of EE.

As part of its vision for EE, Ontario claims that its “schools will provide opportunities for students to acquire knowledge and skills related to environmental education in all subject areas” (Ministry of Education Ontario, 2009, p. 12). While there exists policies for EE in Ontario, there is little by way of instructional support or guidance for teachers. Such support could serve to meet the goals set out by the Ontario Government in regards to EE and also provide teachers with a framework to integrate EE across all curriculum areas.
In Ontario, Canada, and the world as a whole, EE is necessary across elementary disciplines. EE curriculum should encompass “multidisciplinary teaching approaches,… [stimulate] community engagement, [foster] an understanding of moral systems,… and trigger a full integration of environmental education in a form that inspires practical and critical reevaluation of education as a whole” (Saylan & Blumstein, 2011, p. 3). This approach is further required to support Ontario teachers in their implementation of EE within the entirety of their classrooms. Moreover, the curriculum should grow to include the objectives of “awareness, knowledge, affect, skills, and participation” (McBeth & Volk, 2010, p. 55).

Through these objectives, according to McBeth, Hungerford, Marcinkowski, Volk and Meyers (2008), teachers can produce students who are intrinsically involved in and who care about environmental issues, encourage their desire to aid in the prevention and resolution of problems within their environment; they can encourage students to become environmentally literate (EL) citizens. Environmental literacy is defined as “the capacity to perceive and interpret the relative health of environmental systems and to take appropriate action to maintain, restore or improve the health of those systems” (Victorian Institute of Teaching, p. 1, 2014). An EE program within a classroom could generate students who are EL if it is embedded in all curriculum areas.

**Purpose of the Study**

The purpose of this study is to investigate how three primary division teachers in Ontario are infusing EE into their curriculum, the strategies they are using for EE to be effective, and the barriers that prevent the successful incorporation of EE into the classroom. Furthermore, this study adds to the EE literature that provides support to teachers in implementing EE into the elementary classroom. The current Ontario curriculum encompasses six core subjects which
regret to include a concrete focus on EE. It is important to note that Full-Day Kindergarten in Ontario has its own curriculum wherein play-based learning is at the core of the program and EE is a central component of this curriculum document. Thus, this study aims to inform Ontario policy makers and support elementary teachers in meeting the commitment of Ontario’s EE policy within the remaining elementary curriculum documents.

**Research Questions**

The guiding research question that I will use in this study is:

How are primary division teachers in Ontario infusing environmental education into their curriculum? What effective strategies are teachers using for EE to be successful in their curriculum, and what are the barriers that prevent the successful incorporation of EE into the classroom?

The following subsidiary questions will be used to support the main research question:

What strategies and cross-curricular methods are teachers using to implement environmental education across curriculum areas?

How do teachers use an inquiry-based approach to teach environmental education?

Which factors support and hinder teachers’ abilities to implement environmental education into their classroom curriculum?

**Background of the Researcher**

My interest in the area of EE was sparked during my participation in a study that occurred during my undergraduate degree. In 2012 and 2013 I worked as a Research Assistant at Humber College, observing children and their connection with nature. The study focused on
young children’s interactions with their outdoor play spaces and compared natural materials in outdoor environments with human-made play spaces such as jungle gyms and swing sets.

This study encouraged me to question how school environments are connecting children with nature; how are students connected to nature not only through the physical space but also through the curriculum? I thought about how schools as a whole as well as individual classrooms connected children with nature and the environment. What do students learn? How do they learn about the world around them? What approaches to educating students about nature are being used in Ontario classrooms? Does Ontario mandate that all students learn about the natural environment at some point in the elementary curriculum?

As a believer in education that is responsive to students’ interests and in creating meaningful learning experiences for them, I became interested in inquiry-based education within an EE framework. Through this research I hope to gain a more comprehensive understanding of the practical, inquiry-based approaches that primary teachers use to integrate EE into the mandated curriculum in all core subjects. Furthermore, this research will aid in creating the dynamic, inquiry-based classroom that I desire to present to students in my future as an educator.

EE comprises a large component of my teaching philosophy due to my background experience as a research assistant of students who interact with nature on a daily basis. As such, it is pertinent to draw attention to the possible bias which may arise as a result of my belief in the positive outcomes of EE on student learning. This bias may be demonstrated within the analysis and discussion of my research in chapters four and five. However, as I am aware of my personal bias, I will be diligent in my objectiveness as I discuss the implications of my findings.
Overview

In order to respond to the preceding research questions, I will present the findings that were formed through my qualitative, purposive sampling study. My study utilized interviews with three primary division educators who teach in Ontario. The teachers discussed their past and current experiences, and strategies for creating and implementing an approach to EE that encompasses all curriculum subjects in their classrooms. In chapter two I present a review of the literature which speaks to the benefits of EE in schools and EE pedagogy which stems from both national and international research. The focus of chapter three is the design and conduction of my research. In chapter four a report of my findings is presented, and a discussion of these findings in relation to the literature and its implications for my own practice as a beginning teacher are the focus of chapter five.
Chapter 2: Review of the Literature

In chapter one, I provided an outline of the significance of the implementation of a cross-curricular school curriculum wherein environmental education (EE) is at the core. The following research question was posed in chapter one: How are primary division elementary teachers infusing opportunities for learning about environmental education in their curriculum, and what are the barriers which hinder and the strategies teachers use to effectively implement EE? In order to present a thorough understanding of this issue, in chapter two I will compare, contrast and analyze current academic literature related to EE. Using research conducted in different countries, I focus on topics which directly relate to the implementation of EE in elementary schools: the need for EE in elementary schools, the benefits of EE for students, challenges towards the implementation of EE in schools, and creating a successful curriculum for EE. I conclude this chapter with a discussion of the areas in this field of research which require further investigation as well as my own position in relation to this research study.

The Need for Environmental Education in Elementary Schools

The intention of this literature review is to understand the rationale for the movement towards EE-based curriculum and teaching within Ministries of Education, school boards, schools and teachers around the world. According to Beigel (1996), in the 1990s, elementary schools focused their teaching of EE utilizing outdoor education and nature study. However, the reality of EE in elementary schools today is a recognition that, in order to be successful, EE must be a framework from which students and educators can become collaborative learners within and outside of the classroom environment. Through EE, educators can facilitate the abilities of students to think critically and build on their problem-solving capabilities; these skills can prepare and enable students to become productive members in the prevention and resolution of
issues within the local and global environment, creating EL citizens (McBeth and Volk, 2010; Taylor, Taloga and Tagivakatini, 2009; Sarabhai and Chhokar, 2009). This view of education inclines me to question the ways in which an EE program would be implemented into the already overloaded elementary curriculums of countries around the world today.

The key to the successful implementation of EE is through the promotion of a whole-school approach and the infusion of EE into current curriculum subjects (Sarabhai and Chhokar, 2009). Does EE fit into each of the curriculum subjects, easing its infusion or does this infusion require a reconstruction of elementary curriculums in their entirety? According to Saylan and Blumstein (2011), to achieve the successful pervasion of EE into the curriculum, a remodeled version of some curriculum subjects would be required as the current curriculum fails “to teach aesthetics, reason, the importance of a sense of community, civics, morality, evaluation and compromise – the fundamental building blocks on which…sustainable societies [are] constructed” (p. 46). Although the authors draw attention to aspects of teaching and learning that are not mandated in the Ontario curriculum, I believe it is important to recognize that elementary teachers are expected to offer their students opportunities to build and gain a sense of community within the classroom, to compromise, and to understand the meaning of morality in their daily learning experiences (Ministry of Ontario, 2010).

In compliance with Saylan and Blumstein, the Working Group on Environmental Education (2007) acknowledges that Ontario’s current elementary curriculum contains minimal subjects which include a concrete focus on EE. However, Ontario’s Ministry of Education understands that their initiative to successfully integrate a curriculum based on EE would be achieved if it grew to incorporate “hands-on learning, action projects,…higher order thinking and cooperative learning, and [if it employed] relevant subject matter and topics that actively engage
Ontario’s position on the implementation of an EE-based curriculum leads me to believe that it must remodel its present system, where EE is taught in separate subjects throughout the education system. To achieve its goal, the literature suggests that the Ministry of Education in Ontario is required to direct its curriculum away from overspecialization, and in a direction which enables students to understand the connection between current environmental issues and the broader context in which they exist (Platje and Slodczyk, 2009). Thus, a cross-curricular system of EE which begins in Kindergarten and continues through high school is required if Ontario truly strives to meet the needs of its students to become EL.

Benefits of an Environmental Education Approach to Teaching and Learning

Scholars in the field of EE share both commonalities and differences in opinions and findings related to the benefits of this approach to education. However, there are three definite themes that emerge from the academic literature: 1. Academic and attitudinal benefits for students, 2. Critical thinking, and 3. Meaningful educational experiences. In this section I will focus on each of the themes, demonstrating the breadth of research regarding the benefits of EE in schools.

Academic and Attitudinal Benefits of Environmental Education for Students

The benefits of EE for students were similar throughout the literature. Much research has indicated that the incorporation of EE within the curriculum enables students’ interest in learning to increase across disciplines including mathematics, science and literacy, leading to a decrease in the achievement gap (Riordan and Klein, 2010; Ministry of Education Ontario, 2009; Parlo and Butler, 2007). The factors which contribute to students’ abilities to become more invested in
their learning when it includes EE is unclear throughout the literature, however. This research is, therefore, limited in its ability to provide concrete examples of learning experiences related to EE wherein students have become further interested and engaged in learning than without EE.

As it has been noted in the literature that EE initiatives in classrooms have thrived when it is cross-curricular, it is relevant to state that research has also indicated that this approach builds on students’ “critical thinking, problem-solving, leadership characteristics, high academic engagement, and healthy lifestyles” (Archie, 2003, as cited in Riordan and Klein, 2010, p. 120). In agreement, the Ministry of Education Ontario (2009) states that integrated EE enables students to understand environmental issues affecting their local communities and, utilizing their learned critical thinking and problem-solving skills, students can internalize environmentally sustainable practices. This literature suggests that a cross-curricular system of EE has the ability to produce students who are able to solve environmental crises. However, the Ontario Ministry of Education has failed to bring its visions and goals for EE into the forefront of its education system in recent years (Parlo & Butler, 2007). This lack of concentration on EE suggests a hindrance in the ability of Ontario students to make informed decisions, which contribute to environmentally sustainable practices, unless initiated at the school board, school or classroom level. Therefore, Ontario’s goal to produce EL citizens is inhibited by its own Ministry of Education.

Research has shown that another benefit to EE is the positive impact it has on students’ attitudes and behaviours. Students who are involved in EE have demonstrated an increase in “environmental sensitivity, ecological knowledge, environmental emotion (attitudes), issue and action skills, verbal commitment (willingness to act), and actual commitment (behaviour)” (McBeth and Volk, 2010, p. 57). The authors, however, found that these successes did not necessarily occur as a result of a school-based curriculum about EE, rather through students’
attendance to EE programs within their communities (McBeth and Volk, 2010). The work of McBeth and Volk holds strong against other research in this field as it provides a three-sided framework from which the benefits of EE can be seen: those through the education system, through a community-based program, and through a combination of both opportunities.

EE within the classroom has demonstrated that students can attain skills that can be utilized in their everyday lives (Riordan and Klein, 2010; Howe and Warren, 1989). Through EE, students build on their abilities to understand that different points of view exist, and that at times they may be challenged with having to adapt their own beliefs in order to respect the differing perspectives of others. This skill can enable students to work towards developing strategies for balancing out priorities and sustaining a positive outlook on life (Ministry of Education Ontario, 2009; Working Group on Environmental Education, 2007). As these findings stem from research conducted in Ontario schools through the Ontario Ministry of Education, there is a possibly of bias within them. It was difficult to locate research from other Canadian provinces or other countries that support these findings, indicating a need for studies related to the skill-based benefits of EE in other Canadian provinces.

**Critical Thinking**

In the conflicted natural environment of the world today, it is essential that schools offer students opportunities to build on skills that are required for solving environmental problems and sustaining the future of the environment. Research has demonstrated that education systems can help students to further develop these skills by providing them with learning experiences that are inquiry-based (Riordan and Klein, 2010; Howe and Warren, 1989). Educators can be successful in creating these experiences by promoting their students’ curiosity about the world around them. Strategies offered in the research include in-depth investigations of issues, the use of artifacts,
books and media literacy, and outdoor and hands-on experiences, each of which can lead to capturing students’ interest and engagement in their learning (Riordan and Klein, 2010). How is it, then, that these learning experiences aid in building on students’ willingness to care about the environment in both local and global contexts?

The answer is that “education as a whole is concerned with producing citizens who are critical thinkers” (Robinson, 2005, p. 46). Critical thinking is the “process and skills involved in rationally deciding what to do or what to believe and encompasses four main elements: content knowledge, procedural knowledge, metacognition, and an attitude to use thinking skills and knowledge” (Howe and Warren, 1989, p. 2). As critical thinkers are needed in order to solve the environmental problems of the twenty-first century, it is the responsibility of the education system to provide students with learning experiences that promote critical thinking skills through the use of inquiry-based learning. In order to do so, teachers must be equipped with the skills that enable them to present students with opportunities to analyze and evaluate current environmental issues (Robinson, 2005). According to Howe and Warren (1989), unless a focus on the development of critical thinking skills is implemented in classrooms on a continuous basis, it is difficult for students to develop true critical thinking skills. These findings suggest that even if inquiry-based learning opportunities occur within classrooms, students may not gain critical thinking skills unless these types of investigations are used within daily learning experiences.

EE, however, can offer teachers opportunities to present their students with diverse educational experiences which promote critical thinking. EE contains “topics and problems that cut across the school curriculum and can enhance the integration of knowledge,…real problems that can be studied or simulated, and…topics and problems that can be adjusted to the developmental levels of students” (Howe and Warren, 1989, p. 4). Therefore, it can be concluded
that EE can serve as a framework, which will enable teachers to promote the critical thinking skills of their students through the use of inquiry-based investigations of current environmental issues, each of which are problems that connect to the students’ lives in the present and future.

**Meaningful Educational Experiences**

Based on the current research on EE, I believe that it is essential to emphasize the impact of meaningful learning experiences as they relate to student learning and understanding. Some research has demonstrated that when students make real-world connections within their learning of academic subjects, the learning process becomes more relevant and meaningful; thus, students who make meaning with their learning are better able to internalize and conceptualize the content (Parlo and Butler, 2007; Riordan and Klein, 2010; Tenzin and Maxwell, 2009). Furthermore, a call for a “connection to a broader world through academic action” is recommended by Riordan and Klein (2010) as their research study concluded that students became more immersed in inquiry and in their connection to the learning process when the process itself was meaningfully relevant to their lives (p. 132). This research suggests that when students’ learning experiences directly relate to their own lives, the success of students’ learning is more pronounced as they are more actively involved in the process.

The preceding research, however, is limited as it stems from a professional standpoint. The results of the study were found through interviews with two middle school teachers who implemented predetermined activities and lessons in their classrooms. My research study aims to complement these findings as it will provide further information about different strategies, activities and lessons in which three primary division teachers implement with their students.
Educators have the ability to incorporate learning experiences in ways they believe will be most effective and most meaningful with their group of students. Localization is a way in which teachers in Bhutan have immersed their students in relevant learning experiences. In their research study, Tenzin and Maxwell (2009) found that the Bhutanese curriculum is focused on teaching students how to use and conserve the environment in a sensible manner through the utilization of local community environmental issues in which children can take part in solving.

“Localization of [a] school’s formal curriculum facilitates better learning outcomes; students enjoy their learning because it is contextualized” to their everyday environment (Tenzin and Maxwell, 2009, p. 281). This research, although a case study focusing solely on the teaching strategies of teachers in Bhutan, is strong as it presents educators with an effective strategy that includes both EE and meaningful and authentic learning experiences. Further, it is related to the concept of delivering lessons within an authentic learning environment that is relevant to the lives of the students. By focusing on the environmental issues in their school community, teachers can encourage students to practice and participate in environmentally friendly behaviours and to hold positive attitudes about environmental sustainability. Additionally, this strategy can help students to recognize the value of environmental stewardship.

**Challenges towards the Implementation of Environmental Education in Schools**

In implementing EE in classrooms and curricula, schools across the globe face similar and diverse issues. Some countries are affected by their Ministry of Education initiatives, others by outside influential factors relative to the environmental issues they specifically face, and others by the skills and knowledge of educators in creating EE-based curricula. In the following section I will discuss the experiences of various countries in relation to these three challenges.
Ministry of Education Initiatives

One of the most current challenges towards the implementation of EE in schools is that many countries lack a mandated framework or curriculum of EE. In Ontario, there are few opportunities for EE to be embedded within the curriculum, for instances, environmental sustainability issues in the Science and Technology curriculum from grades one through eight and in Social Studies, History and Geography (Working Group on Environmental Education, 2007). Thus, Ontario educators face the challenge of generating and discovering creative ways of implementing developmentally appropriate EE-based learning experiences. Moreover, many teachers have limited prior experience in teaching about EE and lack confidence in their ability to do so (Robinson, 2005; Saylan and Blumstein, 2010; Riordan and Klein, 2011).

In another example, the current system of EE in Polish elementary schools is challenged by a lack of consensus about the importance of environmental sustainability among Polish citizens (Platje and Slodczyk, 2009). When attitudes about caring for and sustaining the environment are not a priority of the citizens of a country or community, it is difficult for education systems to place EE at the core of the curriculum. These findings suggest that a barrier to the successful implementation of a mandated EE-based curriculum is the absence of positive environmental attitudes among a country’s population. This research, however, is situational to Poland and does not necessarily fit the actions of other countries in placing importance on EE despite a lack of support from its population.

In contrast, Taiwan is a country whose education system faces the challenge of successfully implementing a cross-curricular approach to EE although its citizens understand and support its benefits regarding environmental sustainability. In their study, Yueh, Cowie, Barker and Jones (2010) interviewed Taiwanese teachers who claim that Taiwan has not mandated EE
as a subject in the formal curriculum, yet it is the responsibility of the teachers to help students gain skills related to environmental stewardship. Yeuh et al. (2010) concluded that there are benefits to teaching EE through the informal curriculum, however, they are not as pronounced as those raised through the formal curriculum. This study suggests that when teachers are not given guidance to teach EE through the formal education system, the student learning outcomes exist but do not compare to those that occur when teachers are given support from the school, school board and the Ministry of Education.

Skills, Knowledge, Attitudes and Training of Teachers

Along with having to implement EE into a classroom with a lack of support from a mandated curriculum, many teachers around the globe face the challenge of little knowledge and training in order to effectively execute EE with their students. Some research has shown that teachers’ attitudes and willingness towards teaching EE stems directly from their exposure to EE courses, or lack thereof, in initial teacher education programs (Parlo and Butler, 2007; Yueh et al., 2010; Phiri, 2009; Taylor, Littledyke, Eames and Coll, 2009). In their study, Platje and Slodczyk (2009) found that “the key to successful EE is the teacher, who should be well prepared and have high environmental awareness. However,…environmental awareness among teachers is…low. Many teachers lack knowledge about interdisciplinary issues and…interest in different environmental aspects of sustainable development” (p. 101). This research calls attention to the fact that many teachers come into the education system with minimal knowledge of EE, which affects their desire and success in delivering it within in the classroom.

Research argues that teachers who do not have sufficient access to EE teaching resources through curriculum initiatives, hold negative attitudes about EE. Yeuh et al. (2010) suggest that a major constraint to teachers’ willingness to incorporate EE into their teaching stems from their
belief that it is a comprehensive subject that is difficult to merge into the classroom. In agreement, Riordan’s and Klein’s (2010) research study indicated a tendency of teachers to deter from teaching EE when they learned of its numerous expectations, including critical thinking, inquiry-based activities and its infusion into all curriculum subjects. This research argues that without effective teacher training that is current, consistent and relevant, new and experienced teachers who lack the depth and breadth of EE knowledge will have difficulty understanding the importance of including it in the curriculum.

Teacher knowledge and delivery of learning experiences related to EE is compared in the research. Robinson (2005) found that teachers who had “presented content in an engaging, open classroom where students were allowed to explore and discover new ideas in independent ways…were able to make real world connections to the concepts” being taught (p. 94). These teachers had prior experience teaching EE as well as extensive exposure to EE training. However, teachers who offered learning experiences that were not as in-depth and relevant for students were often beginning teachers who “had difficulty organizing units of instruction” (Robinson, 2005. p. 95). This raises questions related to the amount of access new teachers have to training courses related to the teaching of EE. This also signifies the findings in research that the more education and training teachers have, the more successful they will be in implementing appropriate learning experiences and building on students’ environmental literacy.

I am confident that my research study will help teachers to recognize that the above challenges can be overcome. The three elementary teachers who I interviewed are master teachers with a minimum of four years of experience utilizing a cross-curricular approach to EE in their classrooms. These teachers’ have had various training opportunities, and their classroom strategies will demonstrate how the teaching of students about environmental issues and
sustainability can be achieved with simplified, consistent training and access to appropriate teaching resources.

Creating a Successful Curriculum for Environmental Education

The research regarding the curriculum of EE in schools is consistent in its findings. Multiple research utilized in my study states that traditional teaching styles, including teacher-directed learning experiences and lecturing, are ineffective towards the teaching of EE. Rather, educators must focus on creating age appropriate, inquiry-based learning opportunities which focus on education for the environment (Taylor et al., 2009; Fien, 2000; Huckle, 2005). The beliefs and findings of these studies support the movement of the education system as a whole towards producing students who are able to think critically. When educating for the environment, rather than about the environment, teachers are modelling their own positive attitudes and behaviours about environmental sustainability, encouraging their students to acquire those same qualities and skills and leading them to become EL (Robinson, 2005; Huckle, 2005).

Research documents specific teaching practices towards effective EE-based curriculum. Teachers and researchers have recognized that successful EE curriculum topics include environmental protection, development for a future that can be maintained, reduction of the human footprint, the role of students as members of a larger society, development of problem-solving skills, assessment of alternatives, collaboration among all members within the school community, and topics and subject matter which directly relate to the lives of the students and encourage their engagement and participation (Barker et al., 2009; Chu and Treagust, 2009; Saylan and Blumstein, 2011; Beigel, 1996; Working Group on Environmental Education, 2007; Riordan and Klein, 2010). Each of these topics and strategies encourage student engagement in EE through a community-based or grass-roots approach. In utilizing this method, teachers can
aid their students’ recognition of their own role in creating, sustaining and solving environmental issues as well as their understanding of EE through both local and global lenses.

In addition to community focused EE, Yueh 2007 states that “environmental education calls for interdisciplinary and flexible inquiry such as having problem-solving, action-based activities individually or in groups on real environmental issues” (p. 87). In this type of learning experience students are “active in decision making and experiential learning,…and learning through social action is encouraged” (DEH, 2007, p. 26). Riordan and Klein (2010) shared teachers’ experiences with EE and inquiry-based learning. One teacher claimed that inquiry-based EE encourages students to take risks in their learning, and that “inquiry works with kids when they’re able to construct their own meaning of EE issues” (p. 129). Another teacher explained that inquiry-based learning experiences in EE are rich and authentic, and come naturally among students; these learning experiences encouraged her students to ask questions, make hypotheses, investigate through research and then come to conclusions (Riordan & Klein, 2010).

The preceding successes indicate that the education system has the ability to develop EL citizens who can come together to advocate for environmental issues affecting all humans. This system can also produce students who are prepared “to share in community decision-making processes” regarding the future of the environment (Beigel, 1996, p. 109). Evidentially, the process of creating a successful cross-curricular approach to EE requires all members of the school community to be involved as well as for classroom teachers to infuse EE issues through students’ inquiry. These approaches can aid in molding students’ positive attitudes and active participation in creating their environmentally sustainable future.
**Missing Research in the Field of Environmental Education**

In the field of EE, research is limited in its ability to demonstrate the long-term benefits of an EE-based curriculum. Although studies beginning as early as 1970 have shown that there are a range of benefits, little research has focused on how students who have had repeated exposure to EE in the school environment have fared in their attitudes and behaviours regarding environmental sustainability. In order to serve a significant purpose in this field, long-term studies should focus on students’ prior experiences with EE-based curriculum in comparison to students with limited access to EE in school. Research could also focus on students’ exposure to EE through outside environmental programs in order to determine the long-term outcomes.

Research in this field is also weak in demonstrating the academic benefits that cross-curricular EE can offer students. Although current studies have highlighted that there are academic benefits, the specific benefits appear to be difficult to address. Much of the current research focusing on this aspect of EE, thus, inadequately offers the specific academic benefits. Additional in-depth research about specific academic benefits of EE is necessary to further develop the priority of EE in the education system.

Furthermore, research is essential in studying the impact of the cross-curricular implementation of EE on students’ learning and environmental literacy. Moreover, the strategies that teachers perceive to be effective in implementing this type of program into various curriculum subjects is minimal within the research. The question of how teachers infuse EE practices and teaching into mathematics is raised in this respect. To this end, research is inconclusive on the relationship between EE and mathematics, thus, more attention must be drawn to this area. I am confident that my research will contribute to this aspect of study as some
of my interview questions address the specific strategies that teachers utilize to carry out cross-curricular activities in relation to some academic subjects covered in the Ontario curriculum.

My research study focuses on the practical strategies that aid teachers’ infusion of EE into the curriculum as well as the factors which hinder and support EE in the classroom. My study will contribute to the examination of the experiences of teachers and students who implement and are exposed to EE on a consistent basis at school. In addition, it will further add to the field of EE research as it offers a novel investigation of the implementation of EE in diverse school settings, enhancing the growing knowledge on a curriculum-based approach to EE in schools.
Procedure

My research study focused on the commitment of Ontario elementary school educators who teach in the primary division and actively implement cross-curricular instructional practices of EE into their classrooms. In order to conduct my research I utilized a qualitative exploratory approach. Through this approach I investigated the factors which prevent and encourage the successful infusion of EE practices into primary classrooms using a cross-curricular method. Specifically, I focused on the strategies and methods used by three master elementary teachers to implement EE across curriculum areas; how EE looks within their classrooms; and the factors which support and hinder their abilities to implement EE into the curriculum. My research uses a framework developed by McBeth and Volk (2010), focusing on the knowledge, attitudes and behaviors of teachers in their practice of EE.

My rationale for the use of a qualitative exploratory research approach is to begin to understand the experience of teachers and students in relation to the topic (EE?) as well as to ensure an accurate delineation of the perspectives of the teachers interviewed. I also conducted research through a review of the literature on the implementation of EE in elementary classrooms. Three semi-structured, informal interviews with primary elementary teachers who work in Ontario were also utilized as a form of data collection.

The participants I interviewed were selected using recommendations from two university professors I worked with while completing my undergraduate degree and through an OISE practicum experience. Through these processes, I located a range of experienced teachers from three Ontario school boards who expressed interest in participating in my research study. The selected participants each have at least eight years of teaching experience in Ontario and a
minimum of four years implementing EE within their classroom. As each interviewee was
teaching in an EE-based classroom at the time of their interview, these requirements aided in my
ability to form research questions which promoted the interviewees to discuss the changes and
developments of EE in their classrooms throughout their teaching experiences.

**Instruments of Data Collection**

For the purpose of this research study three semi-structured, face-to-face interviews were
the sole instrument used for data collection. I asked the primary elementary teachers a series of
open-ended questions throughout their interviews; however, I posed minimal closed-ended
questions at the commencement of each interview to present a contextual framework for
discussion, and asked follow-up questions based on the interviewees’ responses. In comparison,
open questions prompt interviewees to respond using their own terms, details and examples, and
do not persuade respondents to answer in a way that is suggested by the interviewer, as in closed
questions (Bryman, Teevan & Bell, 2009). The open questions used within my interview
outnumber the amount of closed questions.

During the interviews I asked each teacher to identify specific barriers towards the full
implementation of an EE curriculum in their classroom and which specific strategies are most
beneficial towards integrating EE in their classroom. These questions are open in that they
allowed the interviewees to provide an answer which articulated their own perspectives and
experiences, while enabling them to elaborate and offer specific examples of implementing EE
practices with a group of students. Furthermore, these questions presented me with opportunities
to encourage the interviewee to provide a deeper thought or analysis of their practices within the
classroom, as I was able to ask sub-questions which enabled me to achieve an answer I intended.
For example, in my first interview I posed the question “how does EE look in your classroom?”.
Using the interviewee’s response, I asked a follow-up question to aid the participant in delving deeper into the example she provided. The question I asked was “You just mentioned some natural items that you bring into your Kindergarten classroom. Using these items as examples, do you ever discuss environmental implications with the students?” (personal communication, November 27, 2014).

During each interview, I utilized an audio tape as well as a cellular device to record the discussion, and also wrote detailed notes of the teachers’ verbal and non-verbal responses throughout. Following each interview, I transcribed the interviewees’ responses from the audio recording devices, and asked each participant to review the transcripts from their interview. A complete list of the interview questions can be found in Appendix A.

Participants

Three elementary school teachers in the primary division participated in my research study. The first participant, Laura (pseudonym), works in the Dufferin Peel Catholic District School Board, and was my Associate Teacher during one of my practicum experiences at OISE. Laura is currently a full-day kindergarten teacher. Laura studied Early Childhood Education at Ryerson University during her undergraduate studies and continued at York University where she conducted her Bachelor of Education with a Primary Specialist. Laura has been teaching in the field of education for fifteen years, thirteen of which she has taught at her current school, and has taught children in kindergarten to grade four. I chose Laura as an interview participant because of her daily infusion of EE into her kindergarten classroom during my practicum experience. Laura is a master teacher who uses EE in a cross-curricular manner and who incorporates elements of EE within her daily interaction with students.
Amanda (pseudonym) is the second participant in my research study. Amanda works in the York Catholic District School Board, is currently a grade one teacher, and was recommended by a professor I worked with during my undergraduate studies. During her own undergraduate studies, Amanda attended York University where she majored in Environmental Science and minored in Children’s Studies. She then attended the University of Western Ontario to complete her Bachelor of Education. Amanda is qualified in the primary, junior and intermediate teaching divisions. Laura began her teaching career as a supply teacher in 2008, completed two Long Term Occasional positions, and was permanently hired by York Catholic District School Board as a grade one teacher in 2011. Amanda has been teaching grade one for the past three and a half school years. I selected Amanda as an interviewee as I believe that her studies and interest in Environmental Science would contribute to my research from an EE sustainability lens, in addition to the practical and strategy-based perspectives she could offer.

My third interview participant is Nicole (pseudonym). Nicole has been working for the Toronto District School Board since 2008, and was also recommended by a professor I worked with during my undergraduate studies. She is currently teaching in a grade two/three split class. Nicole attended York University where she studied Psychology and Child Development, and also conducted her Bachelor of Education at York University with a specialization in Equity, Diversity and Social Justice. Nicole’s division specialization is in primary and junior, and she has taught in four Long Term Occasional positions from kindergarten to grade three. She also completed a Long Term Occasional position working with students who have developmental disabilities. Nicole currently teaches a grade two/three spilt class. I believe that Nicole’s graduate degree studies in equity, diversity and social justice will contribute to my research by bringing a
unique insight into how teachers can use EE to teach the curriculum as well as issues related to equity and social justice.

**Data Collection and Analysis**

In order to analyze the interview data, I began by listening to the interviews on the audio tapes rather than beginning with the transcription process. As I am both a visual and audio learner, listening to the interviews helped me to grasp the main concepts that I wanted to identify during the decoding phase in order to determine specific sections which were appropriate for the four predetermined themes. I worked in a backwards decoding manner as I chose my themes prior to the interviews and created the interview questions based on the themes. The four themes I began with stemmed from an article by McBeth and Volk (2010) and are teacher’s knowledge, teacher’s attitude, teacher’s behaviour and teaching strategies. However, through my decoding I added a fifth theme called access to resources as it emerged in all of the interviews.

After listening to and transcribing the three interviews, I used five different colour highlighters on Microsoft Word to highlight the quotes in each interview that pertained to the five themes. I then created a table for each interview, which were categorized by theme, and selected quotes from the interviews that fit into the five themes. The five themes that are finalized according to my decoded data are teacher’s knowledge, teacher’s attitude, teacher’s behaviour, teaching strategies and access to resources.

**Ethical Review Procedures**

In conducting my research study interviews, I utilized the ethical review approval procedures for the Master of Teaching program at OISE. In following these procedures, I ensured the confidentiality of each interview participant, their statements, opinions and
perspectives through the use of pseudonyms. Furthermore, I gathered signed consent forms from each interviewee stating their agreement to participate in the interview process and their understanding of their rights during the study. Each participant was aware of their ability to reject to answer a posed question, to withdraw from the interview at any point, and to view and revise the interview notes and transcripts as related to their interview question responses. The “Letter of Consent for Interview” can be found in Appendix B.

Limitations

The limitations of my study stem from the restrictions set in place by the Master of Teaching program. As interviews with three elementary teachers are the only means of research utilized in this study, my research discussion may be limited in its ability to provide generalized information which could contribute to the field of EE. Moreover, the interviewees who were selected teach in elementary schools which are located in the Greater Toronto Area and are considered to be in middle-class neighbourhoods. The locations of the schools and teachers’ access to teaching resources may also affect the ability of this study to be generalized across educational settings which use a cross-curricular approach to EE, as teachers in schools whose class statuses differ from those in this study may have different experiences with the infusion of EE into the curriculum. Although it is believed by various scholars that EE can be taught with little to no teaching resources (McBeth and Volk, 2010; Robinson, 2005; Tenzin and Maxwell, 2009), access to teaching resources may enhance EE programs implemented in classrooms. Therefore, the access which one interviewee had to teaching resources may yield more positive results in relation to implementing a cross-curricular approach to EE, possibly misrepresenting EE programs across Ontario schools.
Another limitation of my study is the way that the interviewees were found and chosen. I located two of my interviewees through networking with the professors I worked with on the Humber College child study. The professors recommended elementary teachers who fit the criteria of my study, and through these recommendations I chose teachers that I believed would be able to provide substantive information about the posed research questions. However, this process raises the issue of bias in my results as I may have selected teachers who I thought would provide information that suited my own beliefs about EE. This may limit my ability to provide a breadth of information about implementing EE using a cross-curricular approach.

Strengths

Interviews, the sole method of data collection used in my study, have shown to be beneficial within the field of qualitative research for education. According to Slavin (2007) “interviews in qualitative research are considered an excellent medium for gaining elaborate responses, detailed descriptions and accurate perspectives of the respondents being studied” (as cited in Doering, 2008, p. 37). Utilizing this one-on-one approach in a setting that was relaxing and comfortable aided in the interviewees’ inclination to elaborate on their thoughts and to take time to think about their responses prior to answering aloud. Bryman et al. (2009) also state that qualitative interviewing “may allow greater access to a variety of people and situations, [and] can address a particular matter in detail” (p. 181-182). Interviewing enabled me to choose participants who I believed would best suit the aims of my research and who also met my predetermined participant criteria.

Interview questions are designed with the specific purpose of answering the main research question, and as such, they are prepared well in advance of the interview process. This presents both the interviewer and interviewees with an advantage as the interviewees can view
the questions prior to the interview. This process permits the interviewees to prepare elaborate and detailed responses, and to ensure that they understand each question. Additionally, this process allows for the revisal or removal of any questions that the interviewee does not feel comfortable answering. Each of these factors contribute to the abilities of both parties to work collaboratively in order to yield accurate research results.
Chapter 4: FINDINGS

In chapter three I discussed the methodology used in conducting my research. I began with an outline of the procedure I followed as well as a discussion of the interview process used to collect my data. In addition, I focused on the three participants whom I interviewed and continued with the specific process of analysis that I followed in coding my data. I then discussed the ethical review procedures set out by the Master of Teaching program, followed by the limitations and strengths of my study. In chapter four I will analyze the data from the three interviews by comparing and contrasting the teaching experiences of the primary division teachers who participated in my study. I will analyze the data using five coded themes; teacher’s knowledge, teacher’s attitude, teacher’s behaviour, teaching strategies, and access to resources.

After conducting and analyzing the three interviews, I recognized considerable overlap among the responses that Laura, Amanda and Nicole provided. I found that the commonalties existed mainly in the participants’ attitudes towards EE and the teaching strategies they used to incorporate EE into the curriculum. Difference in opinion was identified in the interviewees’ knowledge and behaviours regarding EE and in their access to resources. However, I did not recognize any opposing opinions. The data gathered through these interviews coincides with the data seen in my literature review; however, a difference existed in two of the teachers’ interviews regarding their limited access to resources. Researchers have found that resources are not necessarily required to effectively teach EE (McBeth and Volk, 2010; Robinson, 2005; Tenzin and Maxwell, 2009), yet two of the teachers’ responses suggested the opposite. The data will be presented in the following themes:

Theme 1: Teacher’s Knowledge

Theme 2: Teacher’s Attitude
Theme 3: Teacher’s Behaviour

Theme 4: Teaching Strategies

Theme 5: Access to Resources

Subthemes were used in addition to each overarching theme in order to narrow the focus of the data. Pseudonyms were used for each individual participant.

Teacher’s Knowledge

This theme refers to the knowledge which the participants hold in relation to their experience with EE both inside and outside of educational settings. All subjects that teachers are required to teach are supported by a curriculum document which outlines the overall and specific expectations of all concepts to be taught. In EE there are documents that support implementation as well as documents which mandate its teaching throughout the curriculum. However, no document exists which is centered on informing teachers’ practices for incorporating EE into their daily teaching. Teachers must rely on their own knowledge of and experiences with EE in order to effectively infuse it into their classroom. This theme includes the subthemes of Educational Background and Childhood Experiences.

Educational Background

My interview participants varied in their knowledge of EE. Each participant described their educational background as it relates to EE. All three teachers conducted their undergraduate studies in majors that related to childhood growth and development, including Early Childhood Education, Childhood Studies, and Psychology with a focus on child development. However, Amanda was the only participant who studied a topic that is specifically related to EE; Environmental Science. Furthermore, both Laura and Nicole could not recall taking a course in their undergraduate or graduate studies that related to EE. All three of the participants have,
however, taken at least one Additional Qualification course or workshop regarding EE in the classroom.

Two of the participants were aware of EE policies that exist in Canada today. Laura supports two environmental policies including the Wetland Protection and Conservation policies wherein Canadian wetlands are protected through various pieces of legislation, and the Kyoto Protocol which relates to greenhouse gas emissions (personal communication, November 27, 2014). Amanda also supports the Kyoto protocol and utilizes this knowledge to teach her grade one students about the role they play in greenhouse gas emissions inside their houses and in the school they attend (personal communication, January 6, 2015).

Amanda’s knowledge of EE stems from her educational background in Environmental Science. In her studies, Amanda focused on the human footprint and uses this knowledge in her daily teaching (personal communication, January 6, 2015). Laura and Nicole each discussed one workshop they attended that was related to EE. Laura took a one-day workshop that linked the Arts with EE. The workshop focused on teachers’ incorporation of EE into visual arts. The workshop did not offer practical strategies that related to dance and drama with EE, however (personal communication, January 6, 2015). Nicole’s workshop was centered on using an inquiry-based approach to teaching science and social studies through an EE lens. Nicole described a strategy called the Inquiry Log where students record their questions about the day’s lesson or the unit and are then given research periods to find the answers to their questions (personal communication, January 12, 2015).
Childhood Experiences

Two of the interview participants described their upbringing as a factor that contributed to their interest in, passion for and knowledge of EE. Laura’s knowledge and passion for EE stemmed from her experiences as a child where she was encouraged to explore the outdoors with her siblings.

I grew up near a lake front marsh…called the Rattray Marsh. As a child I was always very passionate about the outdoors. We never played inside. We were always outside experiencing nature. I want to share this love for our environment…with the children I teach. (Laura, personal communication, November 27, 2014)

Laura and her siblings also played a role in challenging a neighbour to build additional houses on his land to sell them. From her years exploring the marsh as a child, she knew that if her neighbour “built houses on this land, it would take away vegetation and animal life, and the water would be redirected to somewhere else” (personal communication, November 27, 2014). From her own early childhood, Laura’s interest in the environment was sparked and her knowledge was gained.

Amanda also discussed her childhood experiences as a contributor to her knowledge of EE. Amanda grew up in a small town and her parents encouraged her to make friends by playing outside after school with the neighbourhood children. She remembers exploring the ravine and river behind her house, and watching the “snapping turtles lay eggs, snakes eating frogs, collecting tadpoles, watching the deer, picking wild flowers, looking for bugs on plants, and observing which trees would withstand storms and the seasonal changes” (personal communication, January 6, 2015). Amanda described these childhood memories as the beginning...
of her questioning in science; she remembers asking her teachers a lot of questions about
different life cycles and how humans affect the lives of animals and their habitats. It was because
of these memories that Amanda decided to major in Environmental Science in university
(personal communication, January 6, 2015).

**Teacher’s Attitudes**

The theme of teacher’s attitudes considers the way in which teachers approach their
incorporation of EE into the classroom, and how they believe their attitude affects their students’
openness towards learning about EE. Do teachers approach EE with a positive attitude, and what
factors contributed to forming that type of attitude? If teachers approach EE with a negative or
care-free attitude, what impacts does this have on their students’ attitude towards EE? The
subthemes within this category are Positive Teacher Attitudes and Openness to Environmental
Education. Both subthemes will discuss the teachers’ perceived impacts on their students.

**Positive Teacher Attitude**

Each of the interviewees were asked to describe their attitude towards teaching EE as
positive about EE, open to teaching EE, and opposed to teaching EE. They were also asked to
explain the rationale for their answer. Two of the three teachers, Laura and Amanda, stated that
they held a positive attitude about EE. Laura explained that her positive attitude is a result of her
childhood experiences with the outdoor environment, and that she believes EE is important
because it “stimulates and nurtures children’s curiosity and observational skills of our natural
world” (personal communication, November 27, 2014). She also believes that teaching students
about, in and for their environment helps them to “learn to care for their surroundings more and
hopefully appreciate it more because they are informed about where they live” (personal
communication, November 27, 2014). It was Laura’s hands-on experiences as a child that encouraged her positive attitude towards EE.

Amanda also discussed how her childhood and educational experiences contributed to her positive attitude towards and her belief in the importance of EE. Amanda compared the outdoors to a second classroom during her childhood, and explained that this is how she wants her students to feel. “I want to instill in my students the belief that they can be agents of change, and teach them to become those agents. I often bring my students outside to observe, question and discuss their role in improving negative environmental conditions” (personal communication, January 6, 2014). Amanda’s interest in the human footprint, as a result of her undergraduate studies, is another factor that shapes her positive attitude about teaching EE in the classroom. Amanda states that her teaching strategies relate to educating children about their role and responsibility as citizens to become environmental stewards (personal communication, January 6, 2015).

In describing the impact in which their own attitude has on their students’ attitudes towards EE, both Laura and Amanda questioned what the world would look like today and in the near future if teachers did not educate their students about environmental sustainability. Amanda, for example, stated that:

Environmental Education is teaching children how to become citizens who consider the sustainability of the future by thinking about the environment, animals, and humans as a community that effect one another. In this way, we teach children to become critical thinkers and encourage their curiosity about how they can and do play a role in the health and well-being of the environment they live in and the environment of the global community. (personal communication, January 6, 2015)
In agreement, Laura questioned the future state of the environment:

Imagine, though, if we didn’t take the time to introduce [children] to environmental conditions or stimulate the questioning of their surroundings? The world might be treated like a disposable toy, with an attitude of ‘it doesn’t really matter’. That’s a little scary to me. (personal communication, November 27, 2014)

Amanda and Laura agree that it is the responsibility of teachers to educate children about, for and in the environment, and that their own attitudes towards the environment affect their students’ attitudes. Laura gave the example of how her kindergarteners will mimic anything she does, and how she is a role model in their lives (personal communication, November 27, 2014).

Similarly, Amanda discussed how students in the primary grades are easily influenced by the actions of the adults in their lives, especially their teachers. “This means that if I don’t bring in a litter-less lunch or if I forget to model proper recycling, I expect that my grade one students will follow my lead and put a banana peel in the blue recycling bin” (personal communication, January 6, 2015). Both participants encourage their students through modelling, and perceive that when they teach passionately about EE their students’ attitudes towards it become positive.

**Openness to Environmental Education**

Like Laura and Amanda, Nicole was asked to describe her attitude towards teaching EE as positive, open to teaching EE, or opposed to teaching EE. Nicole is the only participant who identified herself as a teacher who is open to teaching EE and explains that her knowledge of EE practices in the classroom is limited to the workshop she took in 2011. However, as her school is involved in multiple school-wide greening and EE initiatives, her acceptance of EE is high and she considers herself to be an “EE teacher in training” (personal communication, January 12, 2015). Over the past three years, Nicole states that she has implemented many other teachers’
strategies for teaching EE and ensures that her class participates in all of the school-wide EE activities. In addition, Nicole has used her educational background in equity, diversity and social justice as a strategy for infusing environmental issues into her teaching. In this way, Nicole believes that her students understand the importance of the issues of diversity and social justice, while also learning more about their environment (personal communication, January 12, 2015). Nicole stated that regardless of her personal attitude towards EE, most of her students have positive attitudes about it; she can see it through the actions and behaviours they exhibit towards the environment and through the words they use around the classroom and schoolyard (personal communication, January 12, 2015).

**Teacher’s Behaviour**

The second theme regards teachers’ behaviours in implementing EE into the classroom and curriculum. Although closely related to the theme of teaching strategies, this theme encompasses the ways in which a teacher’s attitude towards EE affect her behaviour in carrying out EE-based teaching practices with her students. Each of the interview participants discussed how their attitude and beliefs about EE effect their behaviours as EE teachers. The subthemes in this category are Contact with Nature and the Environment and School-Wide Approach to Environmental Education.

**Contact with Nature and the Environment**

Laura and Amanda responded by relating their positive attitude about EE to their decisions to bring nature to the children and to bring the children into nature. Laura claimed that “teachers who are passionate about the natural environment will make the conscious decision to get children into contact with it, whether it is through a nature walk, field trip or simply bringing natural objects into the classroom for exploration and manipulation” (personal communication,
November 27, 2014). Similar to Laura, Amanda discussed the numerous EE-related field trips she plans for her students in order to teach concepts in science and social studies while simultaneously teaching them about environmental issues and sustainability (personal communication, January 6, 2015). Both teachers discussed the different conservation areas and natural outdoor spaces they bring their students to for field trips and nature walks. For example, every June Laura plans a picnic at the Rattray Marsh as a year-end excursion with her students and their families. As a group they observe and tour the lake, beach and wetlands of the outdoor setting (personal communication, November 27, 2014).

Amanda examined her behaviour towards EE through an approach to bringing nature into the classroom. She stated that it is not always feasible to bring the children out into the environment, but an alternative is to bring nature to them. Laura, Amanda and Nicole each have a science discovery table in their classroom where they place natural objects from the outdoors and allow the students to manipulate and investigate them. The three teachers also give their students the freedom to bring in their own natural objects or those they have found outdoors.

**School-Wide Approach to Environmental Education**

Two of the three teachers discussed their behaviour towards EE as exhibited through school-wide initiatives. Laura and Nicole focused on their school’s Eco Club status as an Ontario Eco School. Laura identified her school’s Eco Club as one that takes part in three of the six program sections for Ontario Eco Schools: teamwork and leadership, energy conservation, and waste minimization (personal communication, November 27, 2014). Nicole’s school, however, is considered a Platinum status school as they have reached all six of the program sections. In addition to the sections achieved by Laura’s school, Nicole’s school also takes part in school
ground greening, curriculum, and environmental stewardship (personal communication, January 12, 2015).

Nicole’s entire school participates in the following school-wide EE activities: the ABC Learning Garden, the Outdoor Classroom, and the Great Big Crunch. In working with her co-workers to plan these initiatives and with her students to aid their participation and learning through these initiatives, Nicole states that her own learning and attitude about EE has grown in a positive way. Furthermore, all of these initiatives have encouraged her to be open to EE in the classroom and school community (personal communication, January 12, 2015).

Teaching Strategies

In this theme, I will discuss the practical EE teaching strategies in which the teachers have found to be successful in the classroom. This theme will also review the concerns in which the teachers expressed in incorporating EE into mathematics. The subthemes within this category are Inquiry-Based Strategies, Cross-Curricular Strategies, and Integrating Math and Environmental Education.

Inquiry-Based Strategies

Each of the interview participants were asked to explain the specific teaching strategies they use in the classroom to teach EE. Laura and Nicole discussed different strategies that incorporate an inquiry-based approach to teaching EE. Laura suggested that “the best teaching strategy is to give the children independent time to look, observe and discuss. Teachers need to allow their students to inquire, ask questions and discover the natural world independently” (personal communication, November 27, 2014). In agreement, Amanda uses her science discovery table as a question and investigation station where students write down their questions and wonders about natural objects and then conduct research online, in the library and outdoors
to come to conclusions (personal communication, January 6, 2015). Both teachers recommend using an inquiry-based approach which allows the interests of the students to create the EE curriculum. Nicole, who also uses a similar discovery centre in her classroom, utilizes the students’ questions to lead discussions about environmental issues in Ontario, Canada and on the global scale (personal communication, January 12, 2015).

**Cross-Curricular Strategies**

The participants were asked which subjects were closely related to EE and which subjects’ curriculum expectations easily connect with EE. All three teachers agreed that science, social studies and language were most related to EE. Laura was able to incorporate aspects of science, language and EE in a science unit she created which stemmed from her students’ interest in the habitat of ducks. The students’ interest was sparked by the ducks they discovered in one of their school’s neighbouring rivers. According to Laura, the science unit covered changes in water levels, the life cycle of ducks, and human-imposed dangers to the ducks’ habitat in the river (personal communication, November 27, 2015).

The students were studying letter writing in language and, thus, wrote a class-created letter to the Conservation Authority in their town to discuss their concerns about the ducks’ safety in the river. Laura stated that the Conservation Authority’s response “assured us that what we were observing was natural but they also asked the students to continue to observe the water level because there could be a dam or blockage further along the river that could affect the water levels” (personal communication, November 27, 2014). Laura allowed this response to further the students’ investigation of the river’s water levels until the end of the school year. Laura believes that having a response from the Conservation Authority and continuing their observations “made this experience real for the children and encouraged their understanding of
themselves as being good stewards of the land and of their community” (personal communication, November 27, 2014). All of the content she covered within these units were based on the interests of her students, and covered some of the overall and specific expectations in the Science and Language Arts curriculum documents.

Amanda’s approach to cross-curricular teaching involving EE is centered on her class’ nature walks around the school’s community and the Greening Garden in the front yard of the school. In order to teach her students about environmental stewardship, Amanda’s class took part in planting the Greening Garden. Amanda suggests that her students take pride in planting and caring for the vegetables they grow in the garden, and that it teaches them about the Earth’s preciousness. Students recognize the role they play in keeping the Earth clean when they understand that plants need oxygen to undergo photosynthesis. “Planting seeds turned into an exploration of a plant’s life cycle, and later lead to the students investigating their school’s and their town’s greenhouse gas emission rates” (personal communication, January 6, 2015).

Amanda has found that many of the science curriculum expectations link to EE, and the two subjects can easily be taught simultaneously. However, many of her science lessons and units stem from the students’ interests (personal communication, January 6, 2015).

As Nicole is a teacher of grade two and three students, she must be diligent in selecting curriculum expectations from both grades when combining her teaching with EE. Nicole found an effective strategy to concurrently teach social studies, science, language and EE. Nicole brought in a guest speaker of Aboriginal descent to speak towards the Aboriginal perspective on water. This discussion lead to the students’ investigation of proper water use, sources and strategies for conserving water, and air and water pollution. Nicole integrated language by reading the students a book called “Anna Carries Water” to compare the lives of Canadians with
those in third world countries who may not have easy access to clean water. This read aloud raised discussions about environmental conditions caused by natural disasters and human behaviours on the quality of water. In addition, Nicole selected non-fiction books about environmental issues for reading groups, shared reading, read-aloud sessions and reading centres (personal communication, January 12, 2015). Nicole integrated curriculum expectations from three subjects while focusing on EE and created extended units of exploration for her students in both grades.

**Integrating Math and Environmental Education**

In their interviews, the three participants were asked to speak towards experiences wherein they encountered difficulty integrating EE with specific subjects. Two of the three teachers discussed math as the most difficult subject to combine with EE. According to Amanda and Nicole, although math concepts can be used to teach EE and environmental issues, both teachers discovered that depending on the strand being taught, math requires more planning than other subjects. They found it is difficult to find time to create cross-curricular lessons that are meaningful for both math and EE (personal communication, January 6, 2015; January 12, 2015). For example, Nicole taught a math lesson about measurement and attempted to integrate EE by following the lead of her students who were interested in water evaporation. However, Nicole claims that this lesson focused on activating the students’ prior knowledge of measurement rather than teaching them new concepts in math and/or EE (personal communication, January 12, 2015).

Laura, however, has had more positive experiences integrating math with EE. Laura has used math to teach EE through measurement, timelines, tally charts, and having students present their findings to one another and other classes. Laura also stated: “I have not found a subject that
really couldn’t be connected [to EE]. I’ve been connecting the environment with both primary and junior classrooms for many years, so I have gained a lot of experience in finding ways to make the connections” (personal communication, November 27, 2014).

**Access to Resources**

The final theme is access to resources, which refers to the ease and/or challenges in which the participants face in retrieving resources to teach EE. The three teachers discussed their access to resources in relation to money and school funding. Access to resources for EE encompasses the use of resources that currently exist in classrooms and schools, gaining outside funding to use for EE, and allocating school budgets and funding for EE resources. The subthemes in this category are Utilization of Existing Resources, and School Budgets and Outside Funding.

**Utilization of Existing Resources**

As it may not always be feasible to rely on school budgets and outside funding to create opportunities for teaching EE, Laura suggests that teachers must work with the resources they already have access to in a way that supports EE. For example, Laura relies on the SMART Board in her kindergarten classroom to “facilitate research lessons and knowledge circles. We also come back from a nature walk, post our pictures, look up information instantly and record new questions for our next trip using the SMART Board” (personal communication, November 27, 2014). In addition, Laura and Nicole discuss the nature walks they bring their students on in the school community or backyard, stressing that it “doesn’t cost any money” (personal communication, November 27, 2014; January 12, 2015).
School Budgets and Outside Funding

In their EE teaching experiences, each of the participants encountered a project or lesson that required funding which could not fit into the school’s budget. According to Laura, “like anything you want to do well with, money always hinders certain projects. There is never enough money and I put in a lot of my own money to see some projects through to fruition” (personal communication, November 27, 2014). Nicole suggested turning to the school’s parent council as a support system for EE resources as many big projects require funding; “in order to fund our ABC Learning Garden, the parent council raised funds and our alumni donated money. Without these outside funds, the ABC Learning Garden may not exist for our students” (personal communication, January 12, 2015).

In Amanda’s school, a strategy used to overcome financial challenges is asking parents and families to donate gently used EE resources. For example, Amanda’s school planted a Greening Garden in the school’s front yard four years ago but the initial funding for the garden was depleted. Amanda suggests that instead of spending her own money, a simple solution is to request that her students’ families donate gently used gardening tools and supplies. This technique was successful in Amanda’s school (personal communication, January 6, 2015).

The Ontario Eco Schools project in which both Laura and Nicole’s schools are involved, sometimes provide additional funding for schools that reach the Platinum status. According to Nicole, her school reached the Platinum status through the ABC Learning Garden. Ontario Eco Schools provided the school with a grant to fund the initial phases of the project, and continues to provide funds so long as the school maintains its Platinum status (personal communication, January 12, 2015).
Chapter 5: DISCUSSION

Implications and Recommendations

My research study has influenced change in my thoughts and behaviours as a researcher of EE as well as a teacher of EE. As a result of this study, I have gained new insights for infusing EE into the classroom and into Ontario’s elementary curriculum in multiple subjects. My research has also generated implications and recommendations for EE in the educational community in relation to teachers, pre-service education programs, schools, and the Ontario Ministry of Education.

Implications as a Researcher

EE is an area of research in which I personally believe requires immediate exploration within the field of education. This study gave me the opportunity to build on my skills as a researcher as well as to raise awareness of EE in the education sector. Furthermore, this research aided my understanding and belief in the importance of conducting further studies on EE in the elementary classroom. Additional research could serve as a foundation for educators to expand on and create their own philosophy and curriculum of EE. Through my research on EE, I have recognized that research has the ability to change peoples’ attitudes towards and build upon their understanding of different topics. This research has provided me with a rationale for conducting research of all areas in the field of education, as without it, education may become static.

Implications as a Teacher

Prior to conducting research on the existing data of EE and interviewing three primary division teachers, I understood the importance of EE and supported the Ontario Ministry of Education’s mandate for EE in schools. My appreciation and understanding of EE have grown,
and I have now gained knowledge of strategies that aid in teachers’ infusion of EE into the classroom in a cross-curricular manner. From the responses generated by Laura, Amanda and Nicole, I have learned that I can easily infuse EE with the science, social studies, language, and the arts curriculum expectations across the primary grade levels. I have also discovered that although it is difficult to infuse EE with the math curriculum expectations, effective lessons are possible with deliberate and meaningful planning. In addition, I recognize that many successful learning experiences that involve EE are delivered through inquiry-based practices and follow the lead, interests and questions of the students.

The three teachers discussed that access to resources can be a barrier towards the effective integration of EE. Through their experiences, I have learned that whole-school EE-based projects often require school funding. However, taking part in the Ontario Eco Schools program can aid funding for projects that involve EE initiatives. Furthermore, the parents and families of students can help to alleviate the issue of funding by donating new and gently used resources for EE-based projects and lessons.

**Implications for Pre-Service Education Programs**

The data I have provided based on three primary division teachers’ experiences with EE has raised important implications for pre-service education programs in Ontario. The teachers’ experiences in pre-service education did not include courses specific to EE; although one of the teacher’s program taught elements of EE in some courses (Nicole, personal communication, January 12, 2015). Thus, it is evident that initial teacher education programs in Ontario require an implementation of courses centered on EE or must at least integrate EE into all subject courses. For example, the courses could focus on practical strategies for teaching EE with math, science, language, the arts and physical education. However, implementing a course specifically
related to EE would serve to build on pre-service teachers’ understanding of EE and their belief in the need for children to learn about EE. Furthermore, pre-service teachers would begin their career with knowledge of, a positive attitude towards and the confidence to infuse EE into the curriculum.

**Implications for Teachers**

Two of the three teachers who participated in my research study had a strong connection with nature and the environment as a result of their personal childhood experiences. Both Laura and Amanda utilized their early connections with and knowledge of the natural world as a vehicle for introducing students to and for immersing students into learning experiences that focused on EE. This finding suggests that a true belief in EE stems from early childhood experiences which included the environment. Thus, it is the responsibility of teachers to create and provide students with learning experiences that are based on EE at an early age. With this early exposure to EE, students’ own belief in and love for EE can be shaped.

**Implications for Schools**

Courses specifically focusing on EE in pre-service education programs are limited in Ontario today. As a result, schools must take on the responsibility of preparing their educators to effectively teach EE in the classroom. The teachers in my study discussed Additional Qualification courses and workshops they attended regarding EE as a positive experience which aided in building their confidence for teaching it. This suggests that teachers will benefit from attending workshops on EE. Furthermore, it is recommended that administration teams create opportunities for EE to be the focus of Professional Development Day seminars. These types of educator learning experiences are beneficial as they could serve to build on teacher knowledge of
EE and its importance in the twenty-first century, create opportunities to introduce effective teaching strategies for infusing EE into the curriculum, and raise teachers’ confidence in teaching about, for and in the environment.

Funding for and support of EE are two barriers that have risen from my research study. As school budgets cannot always fund school-wide and individual classroom projects, the Ontario Eco Schools program has shown to be effective in supporting and guiding EE initiatives at the school level (personal communication, November 27, 2014; January 12, 2015). The Ontario Eco Schools program also works as a supporter of EE integration as it aids in creating opportunities for school-wide initiatives.

**Implications for the Ontario Ministry of Education**

Ontario curriculum documents, which are established by the Ministry of Education, provide educators with the specific concepts they must teach students at each grade level and in each subject. However, the current curriculum documents have little focus on EE concepts aside from the Science curriculum. Through the responses of my interview participants, I recognized the need for a revision in the current Ontario curriculum documents to include a greater focus on EE within the specific expectations. For example, practical strategies for EE could be suggested within the teacher prompts provided for the specific expectations. Furthermore, the overall and specific expectations could grow or be adapted to focus on EE.

The interviewed teachers also discussed the awareness of EE in relation to individuals’ understanding of it. The teachers’ responses suggest that this awareness is low in some schools and among school staff. In order to overcome this challenge, it is the responsibility of the Ministry of Education to raise greater awareness of the mandate for EE and the responsibility of
Ontario educators to teach it through the curriculum. Increasing teachers’ awareness of EE may aid in the movement towards whole-school EE initiatives as well as those in individual teacher’s classrooms and in different elementary subjects.

Limitations

The responses of the three interview participants yielded both implications for infusing EE programs into classrooms and schools as well as recommendations of practical strategies used to teach EE. However, this data presents with limitations. My research study is partial in providing generalized information which accurately represents EE programs in the province of Ontario. This is a result of the guidelines set out by the Master of Teaching program which limited me to three interviews with Ontario teachers. With the opportunity to select and interview another two or three primary division teachers, the data would better serve as an instrument for generalization. Furthermore, all three participants work for different school boards which hindered my ability to discuss the implications for a specific school board in their integration of EE at the school level. Therefore, it is difficult to generalize the findings yielded through my study, and additional research is required regarding EE in the classroom.

Further Study

My research elicited a comprehensive outline of the practical teaching strategies in which three primary teachers utilize in order to infuse EE into the curriculum. However, my data requires further investigation of two concepts. First, it is essential for future studies on EE in the school system to focus on the infusion of EE into specific subjects. The studies should be centered on the strategies in which Ontario teachers have found to be effective in integrating EE with science, social studies, mathematics, the arts and physical education. However, two of my
interview participants expressed that mathematics is the most difficult subject to infuse with EE concepts. Therefore, it is essential that future studies concentrate on cross-curricular strategies involving EE and math at various grade levels.

Second, my data revealed a small gap between teachers’ knowledge, attitudes and behaviours towards EE and their desire to teach EE. As a result, my research calls attention of the requirement of EE-based courses in pre-service education programs. These courses would serve to prepare teachers with greater knowledge and understanding of EE as well as more positive attitudes towards EE programs at the elementary level. Future research must focus on the teacher-based outcomes produced by existing EE courses in pre-service education programs. These outcomes are related to teachers’ knowledge, acceptance and attitudes of EE. With this focus, future research could aid in the movement towards the mandate of EE courses within all teacher education programs in Ontario.
References


APPENDICES

Appendix A: Interview Questions

Educational Background and Experiences

Can you tell me about your educational background, including your undergraduate degree and/or college diploma studies?

How many years have you worked as an elementary school teacher?

How long have you worked at _______________________ (current school of employment)?

How many years have you taught using an environmental education (EE) approach within your classroom?

What outdoor activities do you participate in during your spare time?

Which environmental policies and/or issues are you aware of? Can you explain ____?

Classroom Practices using a Cross-Curricular Approach to Environmental Education

How do you define EE?

What is your rationale for teaching EE within your classroom?

How does EE look in your classroom?

Why do you believe that using EE is beneficial for your students?

What specific teaching strategies help you to implement EE across curriculum areas?

Choose one strategy that you often use to teach EE. How would you change or adapt it to make it more successful in teaching EE to a group of students?

Cross-Curricular Teaching of Environmental Education

Give me an example of a time when you used cross-curricular teaching in order to help your students understand EE?

Which subjects do you have had difficulty teaching EE in a cross-curricular manner? Explain.

Factors Effecting the Implementation of EE

Which factors support your ability to implement EE into your classroom curriculum?

Which factors hinder your ability to implement EE into your classroom curriculum?
Appendix B: Letter of Consent for Interview

Date: ___________________

Dear ___________________,

I am a graduate student at OISE, University of Toronto, and am currently enrolled as a Master of Teaching candidate. I am studying primary and junior teachers’ cross-curricular, inquiry-based instructional practices of environmental education in Ontario’s elementary classrooms for the purposes of investigating an educational topic as a major assignment for the completion of my program. I believe that your professional knowledge and experience will provide insights and perspective into my topic.

I am writing a report on this study as a requirement of the Master of Teaching Program. My advisor and research supervisor who is providing support for this process is Dr. Cheryl Madeira. The purpose of this requirement is to build on my familiarity with the variety of methods used in conducting research. My data collection consists of a 40 to 60 minute interview that will be audio-recorded using two devices. I would be grateful if you would allow me to interview you at a place and time convenient to you. I can conduct the interview at your office or workplace, in a public place, or anywhere else that you might prefer.

The contents of this interview will be used for my assignment, which will include a final research paper, as well as informal presentations to my classmates and/or potentially at a conference or publication. I will not use your name or anything else that might identify you in my written work, oral presentations, or publications. This information remains confidential. The only people who will have access to my assignment work will be my research supervisor and my course instructor.

You are free to change your mind at any time, and to withdraw even after you have consented to participate. You may decline to answer any specific questions. I will destroy the tape recordings after the paper has been presented and/or published, which may take up to five years after the data has been collected. There are no known risks or benefits to you for assisting in the project, and I will share with you a copy of my notes and transcripts to ensure accuracy.

Please sign the attached form, if you agree to be interviewed. The second copy is for your records. Thank you very much for your help and participation.
Yours sincerely,

Researcher name: Victoria Varvaro

Phone number, email: 905-951-0201/416-550-3996, victoria.varvaro@mail.utoronto.ca

Research Supervisor’s Name: Cheryl Madeira
Phone #: 416-768-5156      Email: cheryl.medeira@utoronto.ca

Consent Form

I acknowledge that the topic of this interview has been explained to me and that any questions I have asked have been answered to my satisfaction. I understand that I can withdraw at any time without penalty.

I have read the letter provided to me by Victoria Varvaro and agree to participate in an interview for the purposes described.

Signature: _______________________________

Name (printed): ___________________________ 

Date: ___________________________
## Appendix C: Summary of Teachers’ Educational Information

<table>
<thead>
<tr>
<th>Teacher’s Name/Date of Interview</th>
<th>School Board</th>
<th>Number of Years in the Profession</th>
<th>Grade</th>
<th>Undergraduate/Graduate Qualifications</th>
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<tbody>
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<td>Laura November 27, 2014</td>
<td>Dufferin Peel Catholic District School Board</td>
<td>15</td>
<td>Full-Day Kindergarten</td>
<td>Ryerson University: Early Childhood Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>York University: Bachelor of Education – Primary/Junior Division, Primary Specialist</td>
</tr>
<tr>
<td>Amanda January 6, 2015</td>
<td>York Catholic District School Board</td>
<td>8</td>
<td>One</td>
<td>York University: Environmental Science Children’s Studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>University of Western Ontario: Bachelor of Education – Primary, Junior and Intermediate Divisions</td>
</tr>
<tr>
<td>Nicole January 12, 2015</td>
<td>Toronto District School Board</td>
<td>8</td>
<td>Two/Three</td>
<td>Psychology and Child Development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bachelor of Education – Primary/Junior Division, Equity, Diversity and Social Justice Specialist</td>
</tr>
</tbody>
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