

Experiences of Secondary School Teachers, Students, and Administrators
in One Exemplary *EcoSchool*:
A Description of Successful Practices and Challenges

Rachel Brodie, B.Sc., B.Ed.

Department of Graduate and Undergraduate
Studies in Education

Submitted in partial fulfillment
of the requirements for the degree of
Master of Education

Faculty of Education, Brock University
St. Catharines, Ontario

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Abstract

This descriptive case study focused on the implementation strategies, experiences of teacher members, and involvement of students in an Ontario environmental education (EE) program called *EcoSchools*. Data were collected during the 2015–2016 academic year within a Gold certified secondary school in southern Ontario. Data sources included document analysis of 7 years of Eco certification portfolios, observations of EcoTeam activities, and semi-structured interviews with 15 teachers, administrators, and students. The study offered important insights into the successes and challenges of *EcoSchools* implementation. Successes include democratic EcoTeam dynamics, administrative support, student leadership opportunities, and rewarding greening projects in the school and local community. Data reveal major challenges with low student involvement in the EcoTeam and eco-projects, emphasizing participation over student learning, and a lack of engaging activities for secondary level students. Recommendations for schools include incorporating eco-goals into the school improvement plan, recruiting more student volunteers for school ground greening projects, planning environmental stewardship projects that engage the whole school community, and emphasizing the educational focus of eco-campaigns. Critical recommendations for Ontario *EcoSchools* program developers include revising activities to specially engage secondary school students, requiring an action plan so *EcoSchools* make data-driven decisions towards improvements, and promoting school-wide professional development to build capacity for all teachers. It is also recommended that student environmental literacy assessments be initiated across the province to build accountability for the Ontario EE policy framework and encourage EE to hold more of a priority position within secondary schools.

Acknowledgements

There are a few individuals whom I would like to acknowledge, as their support significantly impacted my experience in completing this project. First I would like to thank Dr. Xavier Fazio for his guidance and support as my thesis supervisor. I could not have finished this project without your expertise and encouragement. I would also like to thank my committee members for their additional input that helped to enhance my work.

I would also like to extend a special thank you to all of the participants in this research project. The 15 individuals who were involved in interviews provided invaluable insights to this study. The leading EcoTeam teachers were especially accommodating; helping to set up the first meeting, meeting the principal, coordinating EcoTeam observations, and interviews with the EcoTeam students. I will always remember the lessons I learned during my time collecting data at the school and speaking with passionate environmental education leaders.

On a personal note, I would like to thank my partner and best friend Justin for his unconditional support, editing skills, and encouragement throughout my time at Brock University. You were my biggest supporter throughout this process and I am so thankful for your positivity. Finally, I would like to thank my family who consistently inspired me to follow my passion in pursuit of higher education. Thank you to everyone! The experience would not have been the same without you.

“After observing the planet for eight days from space, I have a deeper interest and respect for the forces that shape our world. Each particle of soil, each plant and animal is special. I also marvel at the creativity and ingenuity of our own species, but at the same time, I wonder why we all cannot see that we create our future each day, and that our local actions affect the global community today as well as for generations to come.”

~ Dr. Roberta Bondar, 2011

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CHAPTER ONE: INTRODUCTION TO THE STUDY

The purpose of this thesis was to describe the experiences of teachers, students, and administrators involved in an environmental education (EE) program called Ontario *EcoSchools*. A descriptive case study was developed to examine the successes and challenges involved in implementing the *EcoSchools* program in one Gold Certified secondary school in Southern Ontario.

This chapter contextualizes the problem the thesis will address. The reader is introduced to the rationale behind conducting the study, its purpose, guiding research questions, and anticipates the study's limitations. It also provides an overview of the remaining chapters in the document.

Background of the Problem

There exists a growing concern for various environmental problems, such as climate change, deforestation, pollution, and loss of biodiversity, that are occurring on a global scale (DiGiuseppe, 2013). These complex environmental problems will be of critical concern to future generations who will have to live with the consequences of our actions in the environment (Eisner, 2004). To help amend our relationship with the environment and prepare environmentally literate citizens, the need for effective EE in schools has been emphasized by Ministers of Education worldwide, policymakers, and educators from international organizations (Council of Ministers of Education, Canada [CMEC], 2012; North American Association for Environmental Education [NAAEE], 2011; Ontario Ministry of Education [OME], 2009a). Education has an important role to play to prepare students for the present and future environmental issues. Eisner (2004)

claims, “students will be living in a world different from the one they now occupy, and schools should enable them to deal with that world” (p. 6).

Schools can play a significant role towards achieving the goal of developing students’ environmental knowledge, skills, dispositions, and environmentally responsible actions. However, there are problems with the status of EE in schools. Palmer (1998) emphasizes the serious paradox of EE in schools:

It is a field characterised by a paradox: Few would doubt the urgency and importance of learning to live in sustainable ways ... of conserving the world’s natural resources and of taking care of the Earth today so that future generations may not only meet their own needs, but also enjoy life on our planet. Yet environmental education holds nowhere near the priority position in formal education programmes around the world that this scenario suggests should be the case. (p. ix)

Although written almost two decades ago, Palmer’s view on the status of EE in schools is still relevant (Puk & Behm, 2003; Tan & Pedretti, 2010; Working Group on EE, 2007). As Palmer (1998) states, EE should hold a “priority position” in schools; however, this is not evident today.

To explain why EE is not flourishing in school settings, Stevenson (2007) describes fundamental conflicts between the objectives of EE and the traditional purposes of schooling. Traditional schooling aims to conserve the existing social order by reproducing social norms and values, whereas EE seeks to transform our values in order to address environmental degradation. These contrasting philosophical objectives may create tension and challenges in implementing EE in a school setting (Tan & Pedretti,

2010). These challenges may contribute to EE that is not transformative¹, but instead superficially teaches students about the environment, without discussing possible solutions to environmental issues (Karrow & Fazio, 2010). In addition, Stevenson (2007) identifies contrasting curriculum and pedagogical practices. Teachers are under organizational constraints to cover curricular material within certain time periods and award grades objectively, thus certain conditions persist in the majority of classrooms. Classrooms commonly emphasize fragmented facts within discrete disciplines in which students are passive recipients of knowledge dispensed by the teacher. In contrast, an EE curriculum should be interdisciplinary and focus on real world problems using cooperative approaches where students take an active role in generating knowledge (Stevenson, 2007). These significant conflicts make the possibility of EE holding a position of priority within formal schools a challenging task for practitioners and leaders. In the context of EE, transformative learning is a desired outcome (Tbilisi Intergovernmental Conference on Environmental Education [TICEE], 1978). However, there are certain critical theorists such as Henry Giroux and Michael Apple who question the ability for schools to serve as sites of transformation, and instead may reproduce status quo with respect to teaching and learning in EE.

The marginalization of EE has occurred on multiple levels in Ontario. Under the conservative government from 1995-2003, a shift towards greater accountability significantly impacted EE. For instance, the environmental science “teachable” was removed from the secondary school Ontario curriculum in 2000 (Puk & Behm, 2003),

¹ Transformative EE refers to fostering individual and collective resolutions to problems (TICEE, 1978), reflecting on ways to fundamentally change the social conditions which have led to environmental degradation, and developing the skills necessary to implement action plans for positive environmental change (Rathzel & Uzzell, 2009).

numerous outdoor education centres were closed (Fawcett, 2009), and EE opportunities moved towards providers external to the school curriculum (Sharpe & Breunig, 2009). In 2009, the OME created an EE policy framework which promotes an integrated curriculum model where EE expectations are infused into all grades and subjects from kindergarten to grade 12 (OME, 2009a). This is challenging within the secondary school context, as learning takes place under distinct subject domains. In addition, secondary teachers have specialized training in one discipline and lack opportunities for environmental professional development (Working Group on EE, 2007). This further marginalizes EE as teachers struggle to integrate environmental lessons holistically within specialized subject domains, resulting in superficial infusion (Karrow & Fazio, 2015).

In a recent study of teachers within one school district in Ontario, focus group comments emphasized the difficulties in gaining administrative, teacher, and student support (Fazio & Karrow, 2013a). According to secondary school EE leaders, administrative support and teacher leadership beyond the teacher members of the Eco-Club was difficult to cultivate. Teachers mentioned feelings of isolation and frustration in working to gain student participation among other competing extracurricular activities (Fazio & Karrow, 2013a). According to Fazio and Karrow (2013a), “the role of an EE teacher-leader is often ‘caught in the middle’ of school political hierarchies with competing educational and management aims (e.g., assessment practices, scheduling)” (p. 3). Although many challenges exist in the field of EE, there are positive signs of EE gaining ground in K-12 schools in Ontario (OME, 2009b, 2009c).

This study will describe the experiences of teachers, students, and administrators involved in implementation. The school environment within one secondary school will

provide the context to study the implementation of EE (e.g., *EcoSchools*) which often conflicts with the dominant purposes, structures, and practices of schooling (Stevenson, 2007). The positive changes of EE gaining ground in Ontario through the widespread adoption of EE programs will be described further below with a critical lens. This will help to frame the importance of a descriptive case study of EE in one exemplary secondary school in southern Ontario.

Statement of the Problem Context

To understand the main problem that frames the context of this study, the increasing use of EE programs in Ontario schools will first be described. The Ontario *EcoSchools* program will also be introduced as one of the most predominant EE programs currently being used in elementary and secondary schools. Despite these positive signs of EE gaining ground, there is evidence that although many EE programs exist in Ontario, the amount of EE being taught in schools remains very limited (Puk & Behm, 2003; Tan & Pedretti, 2010). The main issue that frames the context of the problem for this study is the uncertainty of whether the Ontario *EcoSchools* program does in fact manifest as transformative EE when implemented in practice. The context of the problem in Ontario will be explored further in the following sections.

The Increasing Use of EE Programs in Ontario Schools

The OME (2009a) has outlined the objectives for EE in a policy document entitled *Acting Today, Shaping Tomorrow*. In order to achieve guidance and support for whole-school implementation of EE, many schools adopt prescribed EE programs. Within the last decade, the number of Ontario schools using EE programs to guide their implementation has grown (Igbokwe, 2016). The fact that EE programs are being adopted

and schools are showing signs of valuing EE is optimistic. However, the rise in EE programs seems to be a paradox against the lack of EE actually being taught in schools (Puk & Behm, 2003; Tan & Pedretti, 2010). In addition there is a lack of descriptive research examining the nature and implementation of EE programs. There remains a lack of evidence whether EE programs, such as the Ontario *EcoSchools* program, may help EE take on more of a priority within secondary school classrooms. It must be noted that the Ontario *EcoSchools* program is only one example of an approach that may manifest as EE within a secondary school. Other forms of EE in secondary schools will be described in Chapter 2.

Ontario *EcoSchools* Program

The origins of the Ontario *EcoSchools* program stem from one of the most successful EE programs in the world; the international Eco-Schools program. In response to the goals developed from the United Nations Conference on Environment and Development, the international Eco-Schools program was created in 1992 (Foundation for Environmental Education, 2017). It is now implemented in over 50 countries around the world (Cincera & Kovacikova, 2014), influencing the principles of the Ontario *EcoSchools* program established a decade later.

The Ontario *EcoSchools* program was developed in 2002 by the Toronto District School Board (TDSB) in consortium with York University and a few other Greater Toronto Area school districts. Ontario *EcoSchools* is a certification program where schools complete specific activities in order to earn points towards Bronze (50-65 points), Silver (66-74 points), Gold (75-100 points), or Platinum level (75-100 points and at least 20 out of 25 Platinum points). The goal of the program is to foster Environmental

Literacy (EL)², help school communities reduce their environmental footprint, and develop environmentally responsible citizens. The program has been successful in terms of school adoption, as 36% (n=1718) of all elementary and secondary schools in Ontario have been certified as Ontario *EcoSchools* (Ontario EcoSchools, 2017).

The adoption of the Ontario *EcoSchools* program by numerous elementary and secondary schools across the province is a positive sign that school leaders and districts recognize the importance of EE. Some problems still exist, however, with respect to the true effectiveness of such programs and how they may benefit students' development of EL (Igbokwe, 2016).

Central Problem of the Research Study

The main problem that grounds this thesis is the uncertainty of what actually takes place within a school implementing the Ontario *EcoSchools* program and whether this program helps secondary schools address the goals for EE set out in the Ontario EE framework (OME, 2009a). It is unknown whether this program represents transformational EE for students, where they consider individual and collective solutions and develop action competency to address environmental issues. The Ontario *EcoSchools* program independently conducts assessments of elementary and secondary schools that wish to be certified as an *EcoSchool* (Ontario EcoSchools, 2017). However, the data they collect on the school-based activities across Ontario are not shared in detail to a broader practitioner or academic audience. Therefore, there is a need for the experiences of administrators, teachers, and students within *EcoSchools* to be shared through a

² According to NAAEE (2011) EL involves knowledge (ecological, social, cultural, environmental), competencies (asking relevant question and using evidence to make personal judgements about environmental issues), dispositions (environmental sensitivity, attitudes, concern), and environmentally responsible behaviour (consumer, economic, political, and legal action). See page 30 for a further discussion on EL.

descriptive case study so that other educators may be inspired to expand the reach of EE in all schools across the province. In addition, the validity of the data submitted by schools for program certification is not thoroughly investigated. A descriptive case study can analyze the data collected by an *EcoSchool* to determine whether it reflects a true representation of the activities occurring in the school.

It must be noted that the Ontario *EcoSchools* program does not necessarily equate to EE. The Ontario *EcoSchools* program aims to offer a guide for K-12 schools to infuse meaningful environmental activities and goals into the school operations and classrooms (Ontario EcoSchools, 2017). Whether transformative EE does manifest itself when the Ontario *EcoSchools* program is being used by a school depends largely on the context and individuals involved. The OME has endorsed the Ontario *EcoSchools* program as enabling children to be leaders in protecting the earth and supporting EL across classrooms in Ontario (OME, 2009d). Despite endorsing the program as aligning with the goals for EE, there is a lack of evidence demonstrating that Ontario *EcoSchools* do offer transformative EE for students in practice. In addition, EE can take on different forms within a school setting beyond whole-school programs. For instance, EE may occur within individual classrooms as knowledgeable teachers facilitate environmental lessons. EE may also include greening projects or lessons outside in the local environment. Schools may also organize short-term projects, such as monitoring initiatives, that help students engage with environmental issues and possible solutions.

Rationale

The global and local environmental problems that exist today add significance to this thesis project. The OME recognizes the key role schools must take in preparing

students to face complex environmental problems, and develop competence to take action towards reducing our environmental footprint (OME, 2009a). According to the EE framework *Acting Today, Shaping Tomorrow* (OME, 2009a), three goals exist for the implementation of EE in Ontario.

The first goal promotes learning about environmental issues and solutions. The second goal engages students to participate actively in practising and promoting environmental stewardship, both in the school and in the community. The third stresses the importance of providing leadership by implementing and promoting responsible environmental practices throughout the education system so that staff, parents, community members, and students become dedicated to living more sustainably. (OME, 2009a, p. 8)

In order to achieve these goals, it was essential to understand how the *EcoSchools* program was being implemented in a Gold certified secondary school. The lack of research on the *EcoSchools* program leaves the educational community needing to know if the *EcoSchools* program may be used effectively to support schools in reaching the three goals of EE implementation in Ontario. This research project is therefore important to conduct in order to contribute an in-depth description of the processes involved in implementing the program. This description may help the educational community determine what the *EcoSchools* program is accomplishing and how it could be improved to better support EE goals in Ontario for all students.

The experiences of teachers, students, and administrators involved in the *EcoSchools* program will be described in this descriptive case study. Previous research on *EcoSchools* in Ontario has collected data from adults, mainly teachers and administrators

(Chowdhury, 2015; Fazio & Karrow, 2013b; Zhang, 2005). In addition to teachers and administrators, this thesis will also describe the experiences of students to help gain a deeper understanding of the implementation of the *EcoSchools* program in the secondary school context. Students are the target of many EE programs, and therefore their insights and suggestions based on personal involvement with the *EcoSchools* program may be valuable to EE practitioners looking to support authentic student participation.

This thesis is important to carry out because the findings can be applied to school implementation of *EcoSchools* and inform teachers and administrators who want to become more involved in the program. The successful practices outlined from a descriptive case study on a Gold Certified *EcoSchool* may offer suggestions to other schools who wish to promote EE. The results from the present study may also be used by program developers who wish to understand how the program is used and how authentic student involvement may be supported.

In addition to the global and local significance of this research topic, there are several personal reasons why I have chosen to investigate this topic. From my early childhood and adolescent years, spending time in nature has always been an important part of my life. I had multiple opportunities to spend time in nature through family excursions, trail walks with my family dog, and keeping active in the outdoors at local conservation areas. As a senior secondary school student, I formed a “Green Girl” club for young girls at the local elementary school to talk about environmental issues and participate in schoolyard cleaning initiatives. During my undergraduate degree at Brock University, I took two Biology courses that allowed me to conduct fieldwork, which fuelled my interest for discovering the relationships in the natural environment.

My passion for the environment continued as I entered the final year in the Concurrent Education Program at Brock University. As a teacher candidate, the first professional development workshop I attended was Project Wild. I used the lessons from this workshop during my last teaching practicum, where I taught the Sustainable Ecosystems unit to a group of lively Grade 9 students. This is where a comment by a student left a significant impression on me. I assume that many teachers have heard similar comments, but for some reason this comment emerged as I was determining a research topic for my Master of Education thesis project. The student said, “Why should we learn about environmental problems when we won’t even be around to be affected by them?” After that comment on the first day of teaching the Sustainable Ecosystems unit, I dedicated myself to showing students why learning about the environment is so important. I was interested in how other teachers and schools were teaching students about the environment and handling student apathy and despair. I wanted to learn more about the strategies Ontario schools were using to foster a young generation of knowledgeable, compassionate, and action-driven students motivated to solve environmental problems. This interest led me to a conversation about the Ontario *EcoSchools* program with a fellow colleague. She was discussing all the hard work and effort she assumed as the leading EcoTeam teacher at her elementary school. This thesis gave me the opportunity to explore a topic that I have been personally interested to learn more about since my first environmental education teaching experience.

Purpose and Research Questions

The purpose of this study was to describe the experiences, successes, and challenges of implementing the Ontario *EcoSchools* program in a Gold Certified

secondary school. In order to examine successes, the study focused on one Gold Certified secondary school, as defined by the *EcoSchools* program evaluation and certification process. Each year, schools that wish to achieve *EcoSchool* status are assessed based on six program areas. In order to achieve Gold status, schools must earn a minimum of 75% of the possible points in each of the following areas: Teamwork and Leadership, Energy Conservation, Waste Minimization, School Ground Greening, Curriculum, and Environmental Stewardship (Ontario EcoSchools, 2017). The assumption is that a secondary school with Gold status will embody successful practices in various areas such as EE leadership, program implementation strategies, student participation, and school-based EE initiatives, resulting in valuable knowledge to share with other EE practitioners.

The experiences of teachers, students, and administrators involved in the Ontario *EcoSchools* program were examined using interviews, observation sessions, and document analysis. These three methods of data collection were used to triangulate the data, with the intention of providing a deeper understanding of how teachers, students, and administrators are involved in the *EcoSchools* program in one Gold certified secondary school. This descriptive case study was guided by three central research questions. The first research question aims at describing the detailed techniques and strategies used to implement the program objectives from the point of view of teachers, students, and administrators. The second research question was aimed at describing the overall successful experiences and challenges that teachers and administrators perceive. The third research question sought to describe student involvement, primarily from interviews with students directly and also the perspectives

of teachers and administrators. The three central research questions that have guided this descriptive case study of one Gold Certified secondary school are outlined below:

1. How is the *EcoSchools* program implemented in a Gold Certified secondary school?
2. What are the experiences of teachers and administrators implementing the *EcoSchools* program in a Gold Certified secondary school?
3. What is the nature of student involvement in the *EcoSchools* program in a Gold Certified secondary school?

Scope and Limitations of the Study

This study was a descriptive case study of one Gold Certified *EcoSchool* within a school board in southern Ontario. This study has limitations that restrict the ability to generalize the findings to all secondary schools implementing the Ontario *EcoSchools* program. The descriptive case study was very specific to the particular context of the secondary school under investigation. Therefore, the results do not reflect all schools in the school board, but reports the in-depth experiences at one Gold Certified secondary school implementing the *EcoSchools* program. The findings of how students are involved in the program are also specific to the group of students who were interviewed at the secondary school.

The effectiveness of the *EcoSchools* program cannot be significantly critiqued given the limited scope of the project. Only suggestions from the Gold Certified secondary school studied can be given. The project intended to investigate the implementation of EE at one Gold Certified *EcoSchool* within a secondary school context, and therefore cannot make wide generalizations about the usefulness of the

program on a provincial level. Circumstances in other schools could be different, and therefore the findings could be dissimilar to the conclusions of this study.

Overview of the Document

The remaining chapters of this document include: Literature Review, Methodology and Research Procedure, Presentation of Results, and Discussion. These remaining chapters provide the background on the research area, the research design and results, and the implications of the research findings.

Chapter 2 presents a review of the pertinent literature related to the present study. It begins with a discussion of the current environmental challenges and growing disconnection with nature, which offers a rationale for EE in schools. It provides a historical view of EE and outlines various definitions that may impact the nature of EE implemented in schools. A description of EL is also provided, as the Ontario *EcoSchools* program aims to develop EL in students as a result of program implementation. A review of important EE programs, research on the Ontario *EcoSchools* program, student involvement in EE programs, challenges in implementing school-based EE, and EE leadership are also examined.

Chapter 3 provides an explanation of the methods employed in the research study. The chapter outlines specific details on the research design, the selection of the study site and participants, procedures used at the study site, instruments used to collect data, and the data analysis process. The research methodology and design are also considered through the lens of acquiring valid and reliable results, and therefore the assumptions, limitations, credibility issues, and ethical considerations are outlined.

Chapter 4 describes the research findings of this study. Results from the qualitative interviews are presented by discussing important themes evident from data analysis. Interviews with teachers, students, and the school principal were analyzed to collect information from multiple perspectives on the *EcoSchools* program. Document analysis and observation session results are also presented to help triangulate the data on the program implementation described in the interviews.

Chapter 5 provides a summary of the study and a discussion of the important research findings. The implications of the results for practitioners are explored. The chapter concludes with recommendations for future research in the field of EE.

CHAPTER TWO: SELECTIVE LITERATURE REVIEW

Chapter 2 presents a selective literature review that synthesizes the pertinent literature surrounding EE. The chapter begins with a discussion of environmental challenges and a growing disconnection of individuals with nature. This discussion sets that stage for providing a rationale for the importance of EE in schools. Following this, the review focuses on significant international documents that have influenced the field, the difficulty in establishing a definition for EE, and an exploration of the approach in Ontario. The concept of environmental literacy (EL) is also explored, as it is a major objective of the Ontario *EcoSchools* program. The remainder of the chapter examines school-based EE programs, existing research on the Ontario *EcoSchools* program, the involvement of students in EE programs, challenges in implementing EE in schools, and school-based EE leadership.

Environmental Challenges and the Rationale for EE

This research project fits within a context of several significant challenges. One challenge is the state of the environment and the number of complex problems that currently face our planet on a local and global scale. Another significant challenge is the growing disconnection many individuals have with the natural world. With growing environmental concern and increasing disconnection from the natural world, the important role that EE can play to mediate these problems is evident. These significant problems are described in more detail in the following sections.

Unprecedented Environmental Challenges

The health of all living things depends on the health of the natural environment. Concern for the state of the environment began to grow during the 1960s, as scientists increasingly reported the negative impact of human activities on the environment

(DiGiuseppe, 2013). Rachel Carson's seminal work, *Silent Spring*, in 1962 represents the emergence of the environmental movement that raised concern about unsustainable human activities. In the 1960s, environmental problems were more localized, including urbanization, pesticide use, and water and air pollution. In comparison, current environmental problems are more extensive and global (DiGiuseppe, 2013). Human-induced changes to the environment are occurring at unprecedented rates. For instance, the Intergovernmental Panel on Climate Change (2014) stated that,

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen. (p. 1)

Climate change is not the only extensive, global environmental concern. Humans today are faced with the reality of an unmatched amount of environmental challenges (Suzuki & McConnell, 2002). There are numerous interconnected environmental issues such as unsustainable use of renewable and non-renewable energy sources, depletion of the ozone layer, loss of biodiversity on a large scale equitable to a mass extinction event, and the increase of pollutants which have serious implications for human health (Enger & Smith, 2006).

More than ever before, the health of the natural environment demands the attention and action of an environmentally literate citizenry. We need individuals who seek to protect our environment, as future generations will have to live with the consequences of our past and present actions (Eisner, 2004). To cultivate an environmentally literate citizenry, the education system has a significant responsibility.

In Ontario, the Ministry of Education confirms its understanding of the role schools must play in the current environmental context:

Schools have a vital role to play in preparing our young people to take their place as informed, engaged, and empowered citizens who will be pivotal in shaping the future of our communities, our province, our country, and our global environment. (Working Group on Environmental Education, 2007, p. 1)

The importance of EE becomes even more critical when one explores the relationship that many young individuals share with the natural world.

Disconnection With the Natural World

Chawla (2006) found that having a connection with the natural world is an important factor to predicting whether individuals will seek to protect the environment. Children and adolescents who form a relationship with the natural world are more likely to disagree with destructive environmental practices, care for the land they live on and the surrounding regional land, enjoy spending time in nature, and have an appreciation for other living elements (Chawla, 2006). This early connection was found to translate into adult actions, including taking active political measures when environmental preservation is considered at risk. The importance of connection with nature during childhood and adolescence emphasizes the critical presence of EE in K-12 schools. Teachers who implement EE must be aware of this growing problem, and plan curriculum that can foster a relationship between youth and the environment. It is important to note, however, that having exposure to nature does not guarantee a desire to protect the environment. Spending time in nature is not the only factor that is important for instilling a respect for nature and a desire to protect it. Other important factors for

youth include role models such as teachers and environmental club advisors, the environmental behaviour of caregivers, and the behaviour of peers (Chawla, 2006).

Teachers are encouraged to act as role models for students and consider how economic, social, and political dimensions may impact students' development of pro-environmental dispositions.

Humans have a historical connection to nature. Around the world, various cultures continue to honour their relationship with the earth through stories, ceremonial traditions, prayers, and rituals (Suzuki & McConnell, 2002). Regardless of this historical connection, individuals of modern society have been losing their ties with the environment and have become increasingly preoccupied with technology, economics, and consumerism (Suzuki & McConnell, 2002). Research indicates that young individuals are increasingly disconnected from the natural world (Clements, 2004; Louv, 2005, 2009). This may have implications on the success of EE in schools, as students may not be interested in learning about nature and young teachers may lack a passion for teaching environment lessons. Louv (2005) uses the term *Nature-Deficit Disorder*, which is not a clinical term but is used to bring attention to the disconnection with nature and the consequences, including possible health issues, psychological issues, and a lack of desire to address environmental issues.

In the current environmental context, there is a growing recognition that EE is of utmost importance for the future (OME, 2009a). To address the growing disconnection with nature among individuals and amend the relationship with our environment, prominent and effective EE is critical. EE must inspire young generations to develop the

skills and understanding necessary to take action as environmentally responsible citizens. The OME EE policy framework echoes these sentiments.

The future of environmental solutions ultimately rests with students. Today's students will shape the world of tomorrow. More than ever, it is vitally important that our education system not only prepare students academically but also provide them with the skills, perspectives, and practices they will need to meet the social and environmental challenges of the future. (OME, 2009a, p. 7)

The need for EE is undeniable. Providing a definition for EE is slightly more challenging, given the diverse branches within the field. The nature of EE and how it is addressed in Ontario are examined below.

Environmental Education

The field of EE is complex, reflecting the environmental problems that inspired its origins. The development of EE was spawned through a realization that solving complex environmental problems cannot be achieved by scientific experts and politicians alone, but requires “the support and active participation of an informed public in their various roles as consumers, voters, employers, and business and community leaders” (Canadian Environmental Grantmakers Network, 2006, p. 2). The field of EE is sometimes compared to a thriving tree, with its branches representing the “differing definitions, the many programs, the plethora of materials, and the fractal like growth of the field” (McCrea, 2006, p. 1). At the base of the tree, representing the strong foundational roots of EE, include the influential Belgrade Charter of 1975 and the Tbilisi Declaration of 1977.

Foundational Documents in Environmental Education

Possibly the two most significant international documents in the field of EE are the Belgrade Charter of 1975 and the Tbilisi Declaration of 1977. The Belgrade Charter was a document that outlined a concise set of objectives for EE. It was created at an International Workshop on EE held in Belgrade, which was attended by members of the education community (Palmer, 1998). All levels of formal and non-formal education were represented, including primary, secondary, tertiary, youth, and adult (UNESCO, 1975). Prominent international organizations concerned with EE also attended, including United Nations Environment Programme (UNEP), whose then Deputy Executive Director Dr. Mustafa Tolba delivered an opening keynote speech (UNESCO, 1975). The Belgrade Charter set out the following goal statement for EE that is generally accepted by practitioners in the field:

The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. (UNESCO, 1975, para. 4)

One resulting objective from the Workshop in Belgrade was to have a follow-up conference that would be attended by government representatives (Palmer, 1998). This objective was achieved in 1977, at the first Inter-governmental Conference on Environmental Education held in Tbilisi, Georgia, USSR. The Final Report from the Tbilisi Conference contained a Declaration with recommendations for EE. The Tbilisi Declaration articulated the overall goals of environmental education:

1. To foster clear awareness of, and concern about, economic, social, political and ecological inter-dependence in urban and rural areas.
2. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.
3. To create new patterns of behaviour of individuals, groups, and society as a whole, towards the environment. (UNESCO, 1977, section II, para. 1)

The Belgrade Charter and the Tbilisi Declaration have contributed significantly to the direction of the EE field. The Tbilisi Declaration, based on the principles established at the Belgrade Conference, provided an international framework which has been “the seminal influence on the development of environmental education policies around the globe” (Palmer, 1998, p. 8). As the importance of EE spread across many countries, various perspectives emerged. Research in the field has reflected a wide diversity of goals, methodologies, and contexts. A significant document that has provided a recent compendium for the field is the *International Handbook of Research on Environmental Education* (Stevenson, Brody, Dillon, & Wals, 2013). The handbook offers a review of a wide variety of methodological techniques, important concepts, findings, and theories. It also describes current debates and controversies, research gaps, and potential future directions (Stevenson et al., 2013). The handbook offers perspectives on EE from around the world. The various perspectives have created challenges in defining EE since the term was first used.

A Definition for Environmental Education

Disinger (1983) claimed that the term “environmental education” was first used internationally by Thomas Pritchard in 1948, at a meeting in Paris with the International

Union for the Conservation of Nature and Natural Resources (IUCN). Since the term was acknowledged, the task of formulating a definition has been ongoing. To date, there is no single agreed upon definition. “Probably the greatest landmark in the history of attempting to define the term ‘environmental education’ was an ‘International Working Meeting on Environmental Education in the School Curriculum’ held in 1970” (Palmer, 1998, p. 7). This meeting formulated what might be described as the ‘classic’ definition of environmental education:

Environmental education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality. (IUCN, 1970, p. 26)

The emphasis on concepts, skills, attitudes, and decision-making in this definition has influenced the policy frameworks that Ministries of Education have developed. Another definition that has influenced Ministry frameworks was given by Lucas (1972) who states EE “can refer to education *about* the environment, *for* the (preservation of the) environment, or *in* the environment” (p. 98). This definition by Lucas underscores the flexibility of EE, such that there are no exclusive content areas or geographical locations in which it must take place.

This definition appears to have influenced the OME definition for EE. The policy framework document *Acting Today, Shaping Tomorrow* (OME, 2009a), promotes the following definition:

Environmental education is education about the environment, for the environment, and in the environment that promotes an understanding of, rich and active experience in, and an appreciation for the dynamic interactions of:

- the Earth’s physical and biological systems;
- the dependency of our social and economic systems on these natural systems;
- the scientific and human dimensions of environmental issues;
- the positive and negative consequences, both intended and unintended, of the interactions between human created and natural systems. (Working Group on EE, 2007, p. 6)

To enhance the understanding of differing EE discourses, Sauv  (2005) developed a map of 15 EE “currents” from which EE can be conceptualized, practiced, and evaluated. Sauv  includes a description of each current’s dominant conception, primary aim, approaches and strategies, example activities, and critical questions. According to Tan & Pedretti (2010), the four most prominent currents manifesting in schools include naturalist, value centered, problem-solving, and scientific currents. The naturalist current aims at reconstructing a link with nature using approaches such as experiential discovery activities and immersion in nature. The value centered current seeks to develop a system of ethics centered on environmental values. The problem-solving current aims to develop problem-solving skills from diagnosis to action. The scientific current focuses on knowledge acquisition in environmental sciences and skill development related to the scientific method (Sauv , 2005).

Developing a definition for EE is further complicated by the challenges of considering it a discipline, traditionally aligning itself with science, or an integrated area

of study. Environmental science and environmental education are related in many ways but need to be differentiated. These comparisons will be outlined below.

Disciplinary Challenges of Defining Environmental Education

Within a school context, it is important to consider how EE is defined. There are two ways that EE can be considered in a school setting: as a discipline, such as science or as an integrated area of study that incorporates multiple disciplines. This important distinction is visible in the two focus options for Specialist High Skills Major (SHSM) program available in Ontario secondary schools. Within the SHSM Environment Major, there are two options for students: an Environmental Science focus and an Environmental Studies focus (OME, 2010).

Environmental science is the scientific study of the environment, both natural and human-built. It involves disciplines such as chemistry, biology, geography, ecology, earth science, physics, atmospheric science, and mathematics (DiGueseppe, 2013).

Environmental scientists work to expand the current knowledge on environmental processes and propose solutions to environmental problems using scientific methods. In contrast, EE is broader in scope as it goes beyond the science disciplines to incorporate aspects of sociology, politics, law, economics, philosophy, architecture, culture, and the arts (DiGueseppe, 2013). EE encourages individuals to consider environmental problems through physical, social, economic, and cultural dimensions (UNESCO, 1977). The broader scope of EE may pose a challenge to the K-12 school setting, as teachers, curricula, and resources may not be well equipped to address environmental issues from such a broad variety of disciplines (Beckford, 2008). Recall, the constraining regularities identified by Stevenson (2007). Putting the interdisciplinary nature of EE into practice is

also a challenge for pre-service programs, as the “interconnectedness of environment, society, economy, politics, and culture is not acknowledged in many programs” (Inwood & Jagger, 2014, p. 15). The interdisciplinary nature of EE is often not pursued, resulting in the placement of EE topics within K-12 schools and pre-service teacher programs in science, social studies, or geography courses (Inwood & Jagger, 2014).

The two fields of environmental science and EE are closely related. The tendency to view environmental issues from a scientific perspective seems to have influenced the placement of EE within Ontario school curricula (Karrow & Fazio, 2015). However, the approach for EE in Ontario has had many changes since the 1980s, possibly reflecting a shift from a predominantly scientific focus to an integrated area of study threaded throughout multiple disciplines in the curricula. The next section will provide an overview of EE in Ontario, focusing on the implementation approach and inclusion of environmental topics in the curriculum.

Environmental Education in Ontario

One goal identified in the Ontario EE policy framework is that “by the end of Grade 12, students will acquire knowledge, skills, and perspectives that foster understanding of their fundamental connections to each other, to the world around them, and to all living things” (OME, 2009a, p. 11). Further, the Ontario document entitled *Environmental Education: Scope and Sequence of Expectations* outlines all of the expectations in each discipline from Grades 1-8 and 9-12 that relate to the environment. This sequence is intended to help teachers recognize the environmental connections that can be made across various disciplines throughout the schooling experience for Ontario

students. The approach taken by the OME is to embed specific EE expectations “in all grades and all subjects of the Ontario curriculum” (OME, 2009a, p. 12).

The curricular approach taken by the OME towards EE has changed numerous times since the late 1980s. In secondary schools from 1988 until 2000, environmental topics were mainly covered in compulsory science and geography courses, and in elective Grade 10 and 12 *Environmental Science* courses (Puk & Behm, 2003). The only single-focus, stand-alone courses on *Environmental Science* were elective courses, and thus had to compete with other elective offerings in the secondary curriculum. As a result, only approximately 25% of Ontario secondary schools offered the elective *Environmental Science* courses (Puk & Behm, 2003). When the new secondary curriculum was released in 2000, the Ministry chose to eliminate Grade 10 and 12 *Environmental Science*, the only courses explicitly devoted to studying the environment. The “infusion model” for curricular implementation was chosen as a new approach, in which environmental topics would be integrated into the curriculum expectations of all compulsory science courses and some geography courses (Puk & Behm, 2003).

The result of the curriculum revisions were studied by Puk and Behm (2003). They surveyed 226 secondary school teachers of Grades 9-12 to determine the amount of time teachers were dedicating to environmental topics in compulsory science courses. They found that the topics previously included in stand-alone *Environmental Science* courses, such as microbiology, forestry, plant science, and environmental health hazards, were receiving significantly less time in the revised curriculum for Grades 9-12 (Puk & Behm, 2003). As a result, very little environmental science was taught from Grades 9-12, and two reasons were provided. First, there are little environmental topics in the new

science guidelines. Second, the science curriculum is extensive and there is no time available for teachers to voluntarily add environmental topics into their teaching (Puk & Behm, 2003).

In response to these concerns with the new approach of EE being “infused” into the curriculum, the Working Group on Environmental Education, chaired by Dr. Roberta Bondar, released a document with several recommendations for improving EE in Ontario schools. The document released in 2007, *Shaping our Schools, Shaping our Future*, had several important recommendations for the Ontario curriculum, including the following:

In addition to providing an environmental education focus across compulsory courses, ensure that secondary students have the opportunity to take at least one additional course with an environmental focus during their senior high school program. It is recommended that such a course option be available to students in Grade 11 to maintain continuity. (Working Group on EE, 2007, pp. 15)

The 2007 science curriculum revisions reflected the above recommendation by the Bondar Working Group on EE. The OME developed one University/College Preparation elective course (SNV 3M) and one Workplace Preparation elective course (SVN 3E)—both new Grade 11 electives focused exclusively on *Environmental Science* (DiGiuseppe, 2013). The science curriculum revisions also introduced expectations that emphasize the connections among science, technology, society and the environment (i.e., STSE expectations) in all strands of all courses in the entire science program (OME, 2008a, 2008b). Another initiative beginning in 2006, the Specialist High Skills Major (SHSM) program, now incorporates a stream focusing on the environment (OME, 2013). Some of the courses offered in the Environment Major include the environment and resource

management, environmental science, Canadian and World issues, outdoor activities, travel and tourism, and physical geography (OME, 2010). The SHSM in Environment also involves seven sector-recognized certifications and/or training courses. Students can choose from a variety of elective courses/programs, such as watershed management, habitat restoration, stream assessment protocol, and Project Wild (OME, 2010).

In addition to two stand-alone courses on *Environmental Sciences*, many schools have decided to take a whole-school approach to EE. A whole-school approach involves various initiatives with an environmental focus that the whole schools works together in order to achieve. For example, some projects that reflect whole-school approaches to EE include schoolyard greening projects, school gardening, using renewable energy sources, reducing waste and resource usage, and holding waste-free lunch weeks (OME, 2007b). Recently the OME (2007b) has highlighted some project ideas within a document entitled *Ready, Set, Green*. Many of the project ideas shared in this document reflect a whole-school approach to EE. In order to achieve guidance on implementing a whole-school approach, many schools adopt EE programs. Within the last decade, the number of Ontario schools using EE programs to guide their implementation has grown (Igbokwe, 2016). One such whole-school program that has been endorsed by the Council of Education Directors and the OME is the Ontario *EcoSchools* program (Igbokwe, 2016; OME, 2009b). In order to address the undeniable need for EE, many Ontario schools have decided to use the Ontario *EcoSchools* program. To align with the goals of the Ontario EE framework (OME, 2009a), one of the main objectives of many EE programs is to foster EL among students.

Environmental Literacy

One of the goals of the Ontario EE policy framework is to have all students acquire the knowledge, skills, and dispositions they need to understand the connections between humans and the environment (OME, 2009a). To achieve these goals, the OME (2009a) has stated that it will embed EE expectations across all disciplines in K-12 schools, with the aim of guiding all students towards EL. This goal is reflective of an overall objective that is widely accepted internationally for EE; that is, to support the development of a citizenry that is environmentally literate (NAAEE, 2011, pp. 1-2).

Dimensions of Environmental Literacy

In the 1970s, UNESCO developed a refined definition and established objectives for EE, including awareness, knowledge, skills, attitudes, evaluation ability, and participation (UNESCO, 1978). UNESCO's 1978 objectives for EE have generally been reflected in the dimensions of various EL frameworks published since the 1990s (e.g., Hungerford & Volk, 1990; Roth, 1992; Simmons, 1995; Wilke, 1995). The four interrelated dimensions found in EL frameworks include "knowledge (awareness and knowledge), cognitive skill (skills), affective disposition (attitudes), and behaviour (participation)" (NAAEE, 2011, pp. 1-2).

The NAAEE (2011) also developed a framework for assessing EL, with the aim of promoting consistent cognitive and affective dimensions that other international assessments can follow. NAAEE provides a summary of its framework, describing each of the four interrelated dimensions: knowledge, competencies, affective dispositions, and environmentally responsible behaviour. According to NAAEE, EL involves knowledge of physical and ecological systems, social, cultural and political systems, environmental issues, multiple solutions for environmental issues, and citizen participation and action

strategies (p. 3). Competencies include the ability to identify, analyze, investigate, evaluate, and make personal judgments about environmental issues. Competencies also involve the ability to ask relevant questions and use evidence to defend positions and resolve issues (p. 3). Dispositions include environmental sensitivity, attitudes, concern, worldview, personal responsibility, self-efficacy, motivation, and intentions (p. 4). Environmentally responsible behaviour is considered the ultimate demonstration of EL, as environmental knowledge, competencies, and dispositions are expressed in such behaviour. Such behaviour can include eco-management, persuasion, consumer/economic, political, and legal action (p. 4).

Environmental Literacy Assessments

To assess how well EE approaches are developing EL, national assessments have been carried out (Marcinkowski et al., 2013). Since 2000, there have been four national assessments of EL involving K-12 students: South Korea (2002-2003), Israel (2004-2006), the United States (2006-2008), and Turkey (2007-2009). Assessments of EL in Canada have been very limited (Igbokwe, 2016). One of the few recent studies examining environmental literacy in Canada compared 15-year-old students' performances in knowledge, awareness, attitudes, and behaviour about environmental issues between U.S. and Canada using the 2006 PISA data (Lin & Shi, 2014). The results indicated that Canadian students performed higher in environmental knowledge, awareness and pro-environmental behaviour, and U.S. students had higher scores on environmental optimism and concern/perception about environmental issues (Lin & Shi, 2014, p. 90). The positive relationship between environmental knowledge, awareness, and behaviour is supported by previous research, suggesting that greater knowledge is connected to

awareness and a stronger sense of responsibility to take positive environmental action (Hart, 2007; NAAEE, 2011). In addition, students with more environmental knowledge appear to be less optimistic about the future in the context of environmental issues (NAAEE, 2011; Schreiner & Sjoberg 2004). Comparisons between two nations with comparable schooling systems are valuable for considering individual and school-level factors that may influence EL dimensions. EL assessments on a provincial level can also be useful to determine the effectiveness of EE programs in secondary schools in Ontario.

Ontario Student Environmental Literacy Baseline

Currently, many K-12 schools are adopting EE programs to act as a guide while pursuing the goals set out in the Ontario EE framework (Igbokwe, 2016). Various EE program options exist, which can make it difficult to determine which program a given school should pursue to implement. One way the effectiveness of EE implementation has been measured is through conducting assessments. Measuring student EL proficiency provides a reflection of how well EE is meeting one of its primary objectives of developing EL. To understand the effectiveness of an EE program, however, the level of student EL can be compared to a provincial baseline of student EL. One significant problem that exists for EE in Ontario is the limited availability of baseline data for students' EL levels (Igbokwe, 2016). According to Igbokwe (2016), "The availability of limited studies and baseline reference on Ontario students' EL for K-12 makes it difficult to state with confidence the degree of impact the EE programs are having in terms of improving students' EL" (p. 9). With all of the planning, meetings, time commitments, energy, and resources that go into maintaining popular EE programs, it seems valuable to determine whether EE programs are benefiting students.

A recent study by Igbokwe (2016) aimed to address this gap in the research by measuring EL levels of secondary students in *EcoSchools* and non-*EcoSchools*. Igbokwe found the majority of students (71%) from both types of schools failed to achieve 70% or higher on the Middle Schools Environmental Literacy Instrument Survey (MSELS) assessment. The Ontario *EcoSchools* program appeared to make some significant difference in the EL levels achieved, as *EcoSchools* students earned 63.56% and non-*EcoSchools* students earned 59.64%. The baseline EL results can help inform EE program implementation, targeting specific dimensions of EL that were found to be lacking, such as action planning and identification of key environmental issues.

EE Programs in Ontario

There are many ways Canadian youth can experience EE. Learning about the environment can take place in three main ways: formal EE, non-formal EE, and informal EE approaches (Canadian Environmental Grantmakers Network, 2006). Formal EE takes place within the formal education system; that is, in a school-based context. Non-formal EE is delivered outside of the school system, and may involve activities or programs within museums, zoos, outdoor nature centres, and community organizations. Informal EE involves learning about the environment through media, personal reading and interactions with other people and daily experiences (Canadian Environmental Grantmakers Network, 2006). For the purpose of narrowing the focus, this review will explore some formal EE programs that are currently being implemented in Ontario secondary school settings. There are many programs that exist in Ontario; therefore, the following section will provide an illustrative sample of a few EE programs currently operating in secondary schools.

Formal EE programs that secondary school students could become involved in can be grouped into three categories: monitoring programs, single project-based programs, and whole-school EE programs. Monitoring programs offer students the opportunity to become citizen scientists and collect data on various biotic and abiotic factors in order to contribute to environmental databases (EcoSpark, 2017; NatureWatch, 2017). Single project-based programs focus on a particular environmental issue that can be incorporated into classroom curriculum and culminating projects. For example, a project-based program focused on school ground greening involves the planning and creation of a schoolyard that supports a diverse array of living things within the school environment (Evergreen, 2017a). Another project-based program, the *Ontario Envirothon* program, focuses on a different environmental issue each year (Ontario Envirothon, 2017). Whole-school programs involve a holistic approach to EE, addressing a variety of issues such as physical improvements to school grounds, resource consumption and management, environmental curriculum connections, extracurricular activities, and community partnerships (Tilbury & Wortman, 2005, p. 22).

Monitoring Programs

Monitoring programs allow students to be engaged in citizen science, and sometimes offer the potential to consider the data and offer solutions to mediate environmental issues that are observed. Two monitoring programs that occur in Ontario secondary schools will be described below: *NatureWatch* and *Changing Currents*.

NatureWatch. A national Ecological Monitoring and Assessment Network (EMAN) program that Canadian secondary students can become involved in is called *NatureWatch*. The EMAN program is directed by a partnership between Environment

Canada and Nature Canada (NatureWatch, 2017). The program is designed to engage students, whole schools, community groups, individuals, and naturalists of any age group. Scientific observation and data collection skills are required for students to take on the role of a citizen scientist and submit data in collaboration with other participants across Canada (NatureWatch, 2017). Once data are collected, they are entered into Environment Canada's EMAN database. The objective of the program is to gather information on the changing environment so that researchers can analyze the data and policymakers can inform their decision-making (NatureWatch, 2017). Students can collect data for a variety of subprograms, including *FrogWatch*, *IceWatch*, *PlantWatch*, and *WormWatch*. One limitation of the program is that the identification of ecological problems and possible solutions does not involve common citizens, but is left to scientists and political bodies.

The implementation of the *NatureWatch* EMAN program has been studied in an Ontario school. Karrow and Fazio (2010) evaluated a pilot project with four junior-intermediate elementary school teachers implementing *WormWatch*. The authors also investigated *WormWatch* implementation in a secondary school (Karrow & Fazio, 2010). They found that the type of EE that actualized in the classrooms of the teachers using the *WormWatch* program did not reach the potential of "transformative EE," but rather emphasized skills such as observation, classification and data collection.

The *WormWatch* program only superficially incorporates environmental problem-solving activities and the potential significance of student data is not an educational focus (Karrow & Fazio, 2010). The teachers implementing the program expressed a desire to move beyond the conservative ideology of the monitoring program. However, feedback on the student's data was not provided, resulting in the teachers having a lack of direction

on how to support student thinking on the meaning behind the data they collected (Karrow & Fazio, 2010). The potential for transformative EE was not encouraged by the *WormWatch* program, but can be acted upon by the teacher (Karrow & Fazio, 2010).

Changing Currents. This program was developed by *EcoSpark*, a non-profit organization that works with communities and schools in environmental monitoring initiatives. *EcoSpark* (previously called *Citizens' Environment Watch*) was formed in 1996 during a time of severe cutbacks within the Ontario Ministry of Environment, limiting the ability to track environmental change (EcoSpark, 2017). *Changing Currents*, created in 2000, is a monitoring program for Grade 8-12 students which uses Benthic Macro-invertebrates (BMIs) to assess water quality. The program serves schools in the GTA (Toronto, Peel, Durham, and York school boards) wanting to learn about the health and importance of local watersheds (EcoSpark, 2017). The program involves a training session for teachers, classroom lessons to prepare students for the stream monitoring field trip, a stream study field trip directed by *EcoSpark* staff, and analysis of the data that is collected. After students collect data, there is an option to pursue a project to take action on the findings.

A case study on the *Changing Currents* program was presented by Fazio and Karrow (2010) at a NAAEE Research Symposium. They analyzed how the program compares to EE policy. Their findings state that the program offers environmental monitoring to make environmental issues visible, a high emphasis on student engagement, and strong incorporation of EE that is locally relevant (Fazio & Karrow, 2010). The program falls short on promoting active stewardship, emphasizing students' leadership roles, and linking the findings to a wider social community.

Single Project-Based Programs

There are many programs that focus on the completion of a particular project. Examples of two project-based programs will be outlined below. School ground greening programs will be discussed using the example of the *Evergreen* program called *The Learning Grounds*. A competition-based program called *Ontario Envirothon* will also be described. This program engages students in different projects each year, offering a diversity of environmental issues to plan school curriculum and EE efforts around in Ontario secondary schools.

School ground greening. *Evergreen* offers a program called *The Learning Grounds* for schools. It is a Canada-wide program that provides a comprehensive resource guide to support the process of improving the health of the schoolyard environment. School ground greening grants are also available through the *Evergreen* website (Evergreen, 2017a). A collaborative team of students and staff are encouraged to plan and create a design for the school grounds in order to enhance the biodiversity, health, and sustainability of the school environment (Evergreen, 2017c). The team of students and teachers must research and choose native plant species, design for shade, ensure abiotic conditions will be optimal for all plants, develop a maintenance plan, and consider fundraising and planting practices. This program provides an excellent opportunity for senior students to take on leadership roles as active participants on the school ground greening planning committee. One caution with this approach is that too much emphasis is placed on active student participation in environmental stewardship; the second goal within the Ontario EE policy framework. The focus on active participation must be coupled with a development of knowledge about the natural

environment and the importance of conducting schoolyard greening projects in the first place. This must also be coupled with the promotion of responsible environmental practices to maintain the green space within the school. Therefore, environmental educators should plan for all three goals in the Ontario EE policy framework (OME, 2009a), to be pursued during school ground greening initiatives.

An additional consideration for this type of program is how to get a large amount of students involved. Studies on schoolyard greening and gardening projects show that high student involvement can be acquired during the planting or building of the green space, but participation drops off after the project is complete (Zhang, 2005). The planning phase can also be strongly teacher-centered, instead of encouraging the input from students. Engaging students throughout the project and at its completion should be taken into account for these types of programs.

Competition-based projects. A program that has recently been described in the Canadian Publication *Green Teacher* is the *Ontario Envirothon* (Kaknevicus, 2015). The program was developed by *Forests Ontario*, a non-profit charity that has been working on building *Ontario Envirothon* since 1994 (Ontario Envirothon, 2017). Participation in the program has grown from 10 schools to over 200 secondary schools, across 24 regions in Ontario. Field trips, workshops, and regional competitions are offered to expand student knowledge and awareness in the four core areas of the program: forests, soil, wildlife, and aquatic ecosystems. These core areas are addressed in terms of how human activities impact their health and sustainability (Ontario Envirothon, 2017). The program website also promotes how it can “help teachers and students excel within Ontario *EcoSchools*’ Teamwork and Leadership section by engaging teams of students in

developing leadership skills and environmental awareness” (Ontario Envirothon, 2017, para. 11).

The program is a part of a larger network of regional programs that combine to form the *North American Envirothon*. Regional competitions are held and teams of five students represent their school by completing activities to test their knowledge on the four core areas. Student teams also present solutions to a specific environmental problem to a panel of judges. For example, the 2016 Ontario Envirothon focused on “Invasive Species: A Challenge for the Environment, Economy, and Society” (Ontario Envirothon, 2017). Winning teams from provincial and state competitions attend the North American-wide championship (Kaknevicius, 2015).

Kaknevicius’s (2015) article in *Green Teacher* (2015) describes the experience of a secondary science teacher (now the current Education Programs Manager at Forests Canada) with the program. Kaknevicius explains that a major benefit of the program is the career opportunities that students learn about through conversations with professionals working in the field of natural resources. Study guides are also provided on the program website that can be incorporated into classroom curriculum or Club projects (Ontario Envirothon, 2017). One limitation of the program is the restriction of student participation to one team of five students per school in competitions. Depending on the region, some may permit more than one team to participate, but this still represents a very limited group of students that can be fully involved in the program. It is unclear based on the website, whether more students can attend field trips and workshops, or whether these activities are limited to the members of the Envirothon team. The issue of participation

should be considered, as the Ontario EE policy outlines that all students should be actively involved in environmental stewardship, not a select few (OME, 2009a).

Whole-School EE Programs

Two of the more common whole-school EE programs found in Ontario schools are the *EarthCARE* program and the *EcoSchools* program. Each of these popular EE programs were developed by Ontario school boards and have been successfully implemented across numerous K-12 Ontario schools since their introduction.

EarthCARE program. The *EarthCARE* program was initiated by the Ottawa-Carleton District School Board. It is designed specifically to meet the local needs of the schools within the district. This program can be considered highly successful within its targeted audience, as over 90% of the 146 schools in the district are currently participating (Igbokwe, 2012). The program has eight main objectives: avoiding wasted energy costs through behavioural changes; becoming an educational leader in the sustainability movement; fostering a culture of environmental stewardship and action; improving the efficiency of building operations; adding cross-curricular EE resources and strategies; collaboration among diverse communities for a common focus of environmental sustainability; and enhancing the fiscal health by tracking wasted expenditures (Igbokwe, 2012). The main difference between the *EarthCARE* program and Ontario *EcoSchools* program is that *EarthCARE* is only practiced within the Ottawa-Carleton District School Board. There is also a limited amount of information available on the school board's website, limiting the adoption of the program in other boards or schools.

Ontario *EcoSchools* program. The Ontario *EcoSchools* program was developed in 2002 by the TDSB and a few other GTA districts. It is an EE and certification program

for Grades K-12. Seven school boards, York University, and the Toronto and Region Conservation Authority adapted the *EcoSchools* program in 2005. It was later expanded across the province to become the Ontario *EcoSchools* program. The goal of the program is to foster EL, help school communities reduce their environmental footprint, and develop environmentally responsible citizens who have knowledge, skills, and the ability to take action. The guiding principles of the program include supporting student-centered learning, developing resources to improve school operations, accountable certification processes, and building capacity through resources to guide the implementation of EE initiatives (Ontario EcoSchools, 2017).

The program has been successful in terms of school adoption, as 36% of all schools in Ontario have been certified as *EcoSchools* (Ontario EcoSchools, 2017). In addition, it has been endorsed by the OME as a program that aligns and supports all of the 32 recommendations espoused in the Bondar Report (OME, 2009b). After gaining recognition and wide scale acceptance, *EcoSchools* is acknowledging over a decade of encouraging EL in schools (Ontario EcoSchools, 2017).

The program provides a framework for the adoption of a whole-school approach to EE. The program emphasizes six main areas: Teamwork and Leadership, Energy Conservation, Waste Minimization, School Ground Greening, Curriculum, and Environmental Stewardship. The main steps *EcoSchools* complete throughout a school year include forming an EcoTeam, conducting an initial eco-review of resources used (energy and waste), developing an action plan, implementing the action plan, and monitoring and evaluating progress (Ontario EcoSchools, 2017). An online portfolio must also be maintained to provide evidence of the practices the EcoTeam has carried out

towards certification in the program. Teachers have access to curriculum resources, *EcoSchools* professional development workshops, exemplars of EE projects, and guides to establish an EcoTeam along with other steps needed to get certified as an *EcoSchool*.

Previous Research on *EcoSchools*

Previous research on the International Eco-Schools program and the Ontario *EcoSchools* program will be described below.

International Eco-Schools

Internationally, the Eco-Schools program was developed in 1992, responding to needs identified at the United Nations Conference on Environment and Development (Foundation for Environmental Education, 2017). This international program is directed by the Foundation for EE, and pursues a whole-school approach to EE like the Ontario *EcoSchools* program. It is one of the most widespread EE programs in the world, being implemented in almost 50 countries (Cincera & Kovacicova, 2014). The Eco-Schools program has received an extensive amount of research in areas such as the environmental performance of Eco-Schools (Hens et al., 2010), implementation challenges and practices of Eco-School programs (Kalshoven, 2014; Ten, 2010), the effect of Eco-Schools on student EL dimensions (Boeve-de Pauw & Petegem, 2011; Cincera & Krajhanzl, 2013), and the types of environmental initiatives Eco-School teachers promote and tend to exclude (Stagell, Almers, Askerlund, & Apelqvist, 2014). Although the international Eco-Schools program is one of the most widespread, it has not been adopted in Canada. However, the principles of the program influenced the development of the Ontario *EcoSchools* program, which was created in 2002.

Ontario *EcoSchools*

Since the development of Ontario *EcoSchools*, there have been a few Ontario-based studies on the program. Four pertinent studies on the Ontario *EcoSchools* program will be outlined below. The studies reviewed either focus on teachers and administrators, the involvement of students in the Ontario *EcoSchools* program, or the impact of the *EcoSchools* program on students' EL level. A description of how this thesis study expands the knowledge acquired through these studies will also be provided.

Perspectives of Teachers and Administrators in Ontario *EcoSchools*

A wide-scale study of elementary and secondary schools (n=58) was conducted in one school district in south-central Canada to examine EE practices (Fazio & Karrow, 2013b). Using focus groups and a survey, classroom and whole-school perspectives of the supports, and resources for EE in these schools are described. The survey results indicated that funding for materials, planning time, and class schedule posed a significant challenge to EE leaders in elementary and secondary school contexts (Fazio & Karrow, 2013b). Suggestions were offered by respondents in the survey to improve EE, including providing exemplar lessons and activities, release time for planning, in-school time for teacher collaboration, and financial assistance for EE initiatives.

An interesting aspect of the study was the emphasis on the focus group conversations. According to Fazio and Karrow (2013b), “without prompting from the researchers, focus groups’ discussions overwhelmingly centered on the *EcoSchools* program” (p. 646). Comments from teachers in the focus group spoke to the importance of the *EcoSchools* program in providing a framework and overall direction. District level supports for the *EcoSchools* program and district science liaison are additional factors

that support the implementation of EE in the schools. The study concludes with questions about the effectiveness of the *EcoSchools* program to guide implementation alongside the Ministry of Education's new EE policy framework (Fazio & Karrow, 2013b). This thesis study may extend the findings of Fazio and Karrow (2013b) by describing the experiences of teachers, administrators, and students. One limitation of the study by Fazio and Karrow (2013b) was that the participants involved were mainly classroom teachers, with a small percentage being school administrators. My study offers new perspectives on EE in secondary schools by including student participants. Gaining more knowledge on how students experience EE may help secondary school EE leaders achieve the objectives set out in the Ontario EE framework (OME, 2009a).

A case study of the practices and implementation of EE by Ontario educators in the TDSB was conducted for a Master's thesis project. Chowdhury (2015) conducted semi-structured interviews with one elementary teacher, two secondary teachers, one outdoor educator, and one elementary school administrator. Chowdhury found that each of the educators implementing EE in their classrooms shared a strong interest and passion for the environment. Two of the participants described extensive time spent outdoors during childhood as a major driving force motivating their interest in EE. The other three participants described moments in their postsecondary education that inspired them to focus on EE. This highlights the importance of ensuring that teacher education programs provide opportunities for pre-service teachers to develop an interest and understanding of how to implement EE in the classroom, as outlined in the Ontario EE policy framework. One pedagogical objective described by the teachers was to promote change beyond the classroom (Chowdhury, 2015). To achieve this goal, the participants agreed that the

EcoSchools program helps “provide an extension for students to go beyond the classroom into the school community” (Chowdhury, 2015, p. 52). Beyond using the *EcoSchools* program, teachers described using outdoor learning opportunities, and developing activities that connected to the experiences of the students.

This thesis elaborates and extends the research findings of Chowdhury (2015) by examining one Gold Certified *EcoSchool* secondary school, and providing a descriptive case study of the implementation of the *EcoSchools* program. The perspectives of administrators, teachers, and students were examined to add to the knowledge of Ontario EE experiences from multiple stakeholders. One limitation of the study conducted by Chowdhury (2015) is the reliance on self-reporting of the pedagogical practices used in EE implementation. Instead of relying on self-reported data collected from interviews, this study triangulated the data by conducting interviews to discuss successful practices and observations of how the *EcoSchools* program is implemented. This will help to develop a more complete understanding of how EE is implemented in a Gold Certified secondary school.

A recent Ph.D. study conducted by Igbokwe (2016) sought to develop a baseline of Ontario student EL levels, describe student involvement, and explore the perspectives of ten leading EcoTeam teachers. Through teacher interviews, the most useful aspects of the program were described as activities that were largely student-directed, teacher training opportunities to build capacity, data from energy and waste audits to set goals towards improvement, bringing students outside for greening projects, and the sharing of successful practices from the *EcoSchools* community. Teachers offered numerous suggestions for program improvement including more emphasis on green school

infrastructure, enhanced administrative support, greater involvement of additional teachers to build school awareness, more consistent student body participation, and streamlined certification paperwork to make the process less overwhelming. This thesis works to expand the understanding of teacher perspectives described in Igbokwe (2016). Working with the same EcoTeam teachers over 6 months in this study complement the data gathered from teachers in 10 different Ontario schools by Igbokwe (2016).

Student Involvement in the Ontario *EcoSchools* Program

The Ph.D. thesis conducted by Igbokwe (2016) described above also investigated students' EL levels and student involvement in the *EcoSchools* program. Ten schools from one school board in southern Ontario were involved in the study, including eight *EcoSchools* and two non-*EcoSchools*. The Middle School Environmental Literacy Survey (MSELS) was administered to students ranging from Grade 7 to 13 (n=641). The results showed the overall EL mean for all participating schools was 62.71%. Furthermore, student EL was generally low, with only 29% of students surveyed achieving 70% or higher. Students from *EcoSchools* performed significantly better on the EL assessment, earning a mean of 63.56%, while non-*EcoSchools* had a mean of 59.64%.

The survey also investigated the involvement of students in eco-clubs or environmental groups of any kind. Overall 22% indicated that they are or have been a member of an environmental group, while 78% stated they have never participated. From the sample of 641 students, only 74 students reported being currently involved in some form of environmental club, with 43% participating weekly and 27.5% participating less than twice a semester.

The present thesis study focused on speaking to students about their learning experiences within one Gold certified *EcoSchool*. The results may help add onto the findings in Igbokwe (2016) by describing how students were involved as EcoTeam members, not simply the frequency of their involvement. The results from the present study can be combined with the EL assessment results from Igbokwe (2016) to contribute to a better understanding of student learning experiences within Ontario *EcoSchools*.

A study conducted in the TDSB for a Master's thesis project used a collective case study design to examine student involvement in *EcoSchools*. Zhang (2005) used adult perceptions of student involvement in three schools running schoolyard gardening projects to examine factors that encourage and limit student involvement. Interviews with 16 key individuals were conducted, including teachers, administrators, parents, Evergreen representatives, and one educational officer at the Curriculum and Assessment Policy Branch of the Ministry of Education (Zhang, 2005).

Interviews revealed common factors enabling student participation, including teacher's leadership, principal's support, curriculum integration, parental volunteers and donations, tangible visual result of their hard work (i.e., the school garden), community partners, and the resources and workshops provided by the *EcoSchools* program (Zhang, 2005). Significant limiting factors included time, funding for materials, and unions' "work-to-rule" issue limiting extra initiatives teachers can take on (Zhang, 2005, p. 100). This thesis aimed to add onto the research by Zhang (2005) by directly asking students about the nature of their involvement. Instead of indirectly using adult perceptions to consider student involvement, this research project interviewed students about factors that have influenced their participation in the *EcoSchools* program. This can add to the

knowledge of how to encourage secondary student participation in EE initiatives.

There are no studies that use qualitative methods to describe student involvement in the Ontario *EcoSchools* program from the students' perspectives. To consider students' perspectives directly, a study based on eight exemplary Czech Republic schools implementing the international Eco-Schools program will be reviewed. Although the work of Cincera and Kovacikova (2014) was conducted in the Czech Republic, the results helped to inform the present thesis study as the international Eco-Schools program and the Ontario *EcoSchools* program share common goals of enhancing student EL and improving the ecological footprint of the school building.

Cincera and Kovacikova (2014) bring up some excellent questions in terms of the focus of whole-school programs such as the Eco-Schools program: "Is the program focused on schools or on pupils? Is it an instrument for making schools greener or is the greening of schools an opportunity for developing pupils' skills?" (pp. 227-228). To explore the view that Eco-Schools are for the benefit of the students, their study focused on the following central research question: How do members of the best Eco-Schools in the country reflect on the program and its influence on themselves? Eight focus groups composed of student EcoTeam members were interviewed.

Cincera and Kovacikova (2014) describe how the balance between teacher and student control mediates how much responsibility students have in determining what initiatives are implemented. In some Eco-Schools the teacher decides the task and EcoTeam members execute it with a varying degree of autonomy. In other schools, students have much more autonomy:

Pupils may initiate the EcoTeams' tasks ... proposals are discussed and pupils decide on their roles in the project. They have a high level of autonomy in fulfilling their task. Pupils usually identify with their projects to a great extent and feel pride in their results. (Cincera & Kovacikova, 2014, p. 230)

Satisfied, motivated, and active student members of the EcoTeam commonly attended Eco-Schools that were based on voluntary participation, and high levels of student autonomy (Cincera & Kovacikova, 2014). Frustration and dissatisfaction were found among students who attended Eco-Schools with mandatory participation in the program, and limited student freedom (Cincera & Kovacikova, 2014). The sense of accomplishment from observing the concrete changes they have made as EcoTeam members was a common positive reflection on the program. One activity that caused tension between peers was inspections (e.g., waste separation, recycling practices, resource use, etc.).

The nature of participation as ranging from "tokenism" to real authentic participation is discussed in Cincera and Kovacikova (2014). This consideration can also be applied to secondary schools in Ontario implementing the *EcoSchools* program. If secondary schools are more concerned with their tiered certification level (e.g., Bronze, Silver, Gold, Platinum), and implementing a teacher-centered program that efficiently satisfies accreditation objectives, the goal of authentic student participation and opportunities to launch their own ideas may be in jeopardy. Strong EE leadership that understands the power of facilitating higher degrees of student autonomy in whole-school EE initiatives has the potential to transform the nature of student involvement.

Challenges and Leadership in Ontario School-Based EE

When EE is implemented within a school setting, there are various challenges that exist. Strong leaders can help navigate these challenges in order to deliver meaningful learning experiences about, in and for the environment. The final consideration for this literature review focuses on the challenges and leadership involved in school-based EE. Multiple research studies have described the challenges that exist in EE as a whole, and within school contexts. The first section will describe some of the most prominent challenges that are significant for school-based EE in Ontario. A section describing Teacher Education in EE is also included to outline a major challenge to providing effective EE in Ontario. The last section will describe characteristics of EE leaders that have been outlined in the literature as critical to the success of school-based EE initiatives.

Challenges for School-Based EE in Ontario

A significant challenge reported by five highly involved EE educators in Ontario is a lack of accountability (Chowdhury, 2015). One elementary school teacher discussing the struggle to get other educators on board with EE effectively states the issue by asking, “Why are you going to waste your time on it if you don’t have to report it? You don’t have to report on environmental education, what is the point?” (Chowdhury, 2015, p. 54). Within the OME’s EE policy framework *Acting Today, Shaping Tomorrow*, there is no outline describing how school districts will be held accountable for enacting EE. Therefore, with a lack of accountability established by the OME, it is up to school administrators and teachers taking a leadership role to place EE as a priority in their school. When schools decide to become an *EcoSchool*, accountability is achieved through the certification process (Ontario EcoSchools, 2017). However, accountability for EE

across the province, including schools that are not following the *EcoSchools* program, remains a challenge in Ontario.

Another challenge is getting teachers, students, and administrators to care about EE (Chowdhury, 2015). Encouraging teachers to implement EE in their classrooms when the priorities are literacy and numeracy scores was echoed by a few teacher participants and one administrator interviewed (Chowdhury, 2015). This problem was also voiced in a focus group of secondary school teachers in Ontario (Fazio & Karrow, 2013a). Other competing initiatives within a secondary school setting make it particularly difficult to gain support of other staff members and of the students. One secondary school teacher commented that for a school-wide energy audit event planned for *EcoSchools*, only one student showed up (Fazio & Karrow, 2013a). Difficulty getting students to care about EE also extends to the classroom. Another study of Ontario teachers found that eight out of the 24 teachers interviewed reported apathy from students (Tan & Pedretti, 2010). One secondary teacher stated “There’s a lot of apathy to environmental issues among high school students ... they don’t think that climate change is going to affect them in any way” (Tan & Pedretti, 2010, p. 75). Having a supportive administrator willing to encourage staff and students to pursue a focus on EE in curriculum and school-wide initiatives was also emphasized (Fazio & Karrow, 2013a). When administrative support is lacking, simply taking students outdoors can become a challenge. An elementary teacher discussed having to provide justification to administrators for taking students outside (Tan & Pedretti, 2010), as covering an overcrowded curriculum and improving testing scores impose structural regularities (Stevenson, 2007). These challenges reflect a deeper fundamental difference between the traditional goals of schooling and the reform-

based objectives of EE (Stevenson, 2007). The traditional goals materialize through a strong emphasis on test scores, achieving literacy standards, and maintaining the status quo. As a result, EE pursuits that may challenge the social and political order of the institution are not supported as a top priority (Stevenson, 2007).

The third challenge present in Ontario is a lack of funding. Numerous studies of K-12 Ontario teachers have identified a lack of funding for EE as a significant challenge (Chowdhury, 2015; Fazio & Karrow, 2013b; Tan & Pedretti, 2010; Zhang, 2005). Zhang (2005) identified parent council donations and partnerships with community businesses as important sources of funding. However, these sources are not long-term options and building a schoolyard garden requires a lot of financial support (Zhang, 2005). When damage is done to the planting materials, expensive trees are very challenging to replace.

A lack of accountability, apathy towards EE, and access to funding are all challenges expressed by EE educators in Ontario. Another significant challenge that may explain why EE is not as pervasive is teacher education.

Teacher Education and Environmental Education

In order to provide effective EE, knowledgeable and dedicated teachers are required. However, there exists a scarcity of formal training on EE in comparison to other disciplines (Beckford, 2008; Berkowitz, Ford, & Brewer, 2005). Formal EE professional learning exists as Additional Qualification (AQ) courses (Ontario College of Teachers [OCT], 2017), or optional workshops (e.g., Project Wild), and only a limited number of teacher education programs in Ontario offer EE courses (Inwood & Jagger, 2014; Lin, 2002; Pandya, 2006; Working Group on EE, 2007). One Canadian study of 35 teacher

education programs found only around half of the programs included EE for pre-service teachers (Lin, 2002).

Based on the placement of EE in AQ courses and programs outside of required pre-service teacher training, it is evident that EE holds a low priority in the overall training of teachers (Inwood & Jagger, 2014; Working Group on EE, 2007). As stated by the Working Group on EE (2007), “if environmental education is to succeed in Ontario, it must without question be introduced as a requisite part of teacher training” (p. 15). The lack of teacher preparation may be a critical barrier to effective EE. These challenges are acknowledged in an Ontario Ministry of Education document,

Many teachers currently lack the knowledge, skills, and background in perspectives taking required to teach environmental education effectively. Partly due to the fact that environmental education has relatively low visibility within the curriculum, there is little incentive, or opportunity, for developing the required skills, and there are few resources available to support teachers. (Working Group on EE, 2007, p. 7)

The lack of teacher preparation poses a significant threat to implementing effective EE in K-12 schools. This problem is further complicated by the specific approach Ontario has taken to implement EE in its schools. The “infusion model” calls for all teachers of all grades and subjects to embed EE into their classrooms (Puk & Behm, 2003). This is difficult to achieve if teachers do not receive the training they need and provincial education regulations do not require teachers to pursue professional development in EE (Beckford, 2008). This challenge has been the focus of an informal group of Ontario pre-service EE advocates, which has been meeting since 2010 to discuss their concerns and

share strategies. A resource called the DEEPER guide, was collectively written to share successful practices with the objective of inspiring “faculty, staff and students to broaden and deepen the implementation of environmental education in initial teacher education programs across the province” (Inwood & Jagger, 2014, p. 6).

The OME (2009a) has outlined the objectives for EE in a policy document entitled *Acting Today, Shaping Tomorrow*. Despite the lack of teacher training on EE and other challenges that Ontario educators face while pursuing EE implementation, schools in Ontario are striving to meet EE objectives. The dedication and commitment of EE school leaders is critical to the success of EE implementation efforts.

Characteristics of Successful EE Leaders

The final section of this literature review is dedicated to EE leaders; the individuals whose commitment to the objectives of EE can make a significant impact on the young generation of students. Research on EE leadership is limited within the literature. A nation-wide survey conducted across the United States by May (2000), surveyed over 328 environmental educators to identify characteristics of successful EE leaders. The results showed that EE educators must possess an awareness of local cultural understandings, teaching and learning theory, and a strong knowledge base of ecological and sociopolitical issues (May, 2000). In addition, EE leaders must have a diversified skill-set, and an ability to be resourceful within variable teaching conditions in the school and broader community. EE leaders must display an infectious passion and “can-do” attitude for EE and teaching, and commit themselves through their time, energy and abilities (May, 2000). Successful EE leaders also lead by example, through practicing environmentally responsible behaviour in and outside the classroom. They work to

challenge the status quo and use constructivist teaching methods, allow student autonomy to direct EE initiatives, and take advantage of experiential outdoor learning opportunities (May, 2000). Some of these characteristics can be nurtured through professional development opportunities and initial teacher education programs, such as a strong knowledge base, diversified skill-sets, and pedagogical methods. However, some characteristics simply manifest from the commitment and efforts of highly dedicated environmental educators who state that “good environmental education is hard work” (Volk, 2003, p. 11).

One of the few studies that examines EE leadership in Ontario used a case study within one school district to examine the professional characteristics of EE leaders in elementary and secondary school contexts (Fazio & Karrow, 2013a). Based on survey responses, EE leaders are overwhelmingly classroom teachers (88%) with many years of school-based experience, 74% having 6 or more years of experience, and 40% having more than 15 years of experience (Fazio & Karrow, 2013a). The significant experience was suggested to be important for negotiating school-based challenges in EE programming.

One difference between elementary and secondary school leadership was the role students played. Two secondary school teachers commented that students in the Eco-Club can sometimes take on strong leadership roles, advocating for environmentally responsible behaviours, initiating project ideas, and gaining support from school administrators and community partners (Fazio & Karrow, 2013a). This difference between elementary and secondary school contexts highlights the potential of distributed leadership having a positive impact on secondary school EE initiatives. The authors

outline the idea of distributed leadership, in which roles are shared beyond the formal leader, leading to collaborative group work between administrators, teachers and students (Fazio & Karrow, 2013a). This leadership model could greatly benefit secondary school EE implementation, where there are many tasks to carry out and a large student body to reach. Often entire EE programs are directed by one or two committed individuals (Russell, Bell, & Fawcett, 2000), making distributed leadership an approach that could relieve some of the pressure on school-based EE leaders. This leadership approach can also foster a higher level of student involvement, where many initiatives are largely student-driven. This practice would support the goal in Ontario “students to participate actively in practising and promoting environmental stewardship, both in the school and in the community,” as stated in the Ministry of Education EE policy framework (OME, 2009a, p. 8).

Chapter Summary

The review of literature has helped to explore the complex field of EE, clarifying the definition and approach that Ontario EE is taking. As EE expectations are added to achieve the goal of incorporating EE into every subject and every grade from K-12 (OME, 2009a), the challenges that EE educators may face are significant. A lack of accountability, funding, professional teacher education in EE, and interest from administrators, teachers, and students are issues that EE leaders will have to overcome as they pursue EE implementation in secondary schools. Studies of EE practices in *EcoSchools* show that experienced teacher leadership, positive administrative support, greater autonomy for student participants, and community partnerships contribute to

successful EE implementation (Chowdhury, 2015; Fazio & Karrow, 2013b; Zhang, 2005).

This study reiterates some of the challenges reviewed in the literature, and identifies more specific challenges around implementing *EcoSchools* in the Ontario secondary school context. The literature review has outlined some factors that influenced the implementation of the *EcoSchools* program within the Gold Certified secondary school that was studied. Literature on secondary school implementation of the *EcoSchools* program is limited, and no study directly asking Ontario secondary students about their involvement in the program exists. This research project has added new insights into the formal whole-school *EcoSchools* program implementation, providing successful practices and suggestions for other EE practitioners in Ontario.

CHAPTER THREE: METHODOLOGY AND PROCEDURES

This chapter describes the methodology and design, selection of site and participants, data collection and analysis, methodological assumptions, limitations, credibility, and ethical considerations. Sufficient details are provided in order to offer an in-depth understanding of the study's methodological approaches and procedures.

Research Methodology and Design

This study described the experiences of teachers, administrators, and students in one Gold Certified secondary school implementing the Ontario *EcoSchools* program. The research was guided by the following research questions:

1. How is the *EcoSchools* program implemented in a Gold Certified secondary school?
2. What are the experiences of teachers and administrators implementing the *EcoSchools* program in a Gold Certified secondary school?
3. What is the nature of student involvement in the *EcoSchools* program in a Gold Certified secondary school?

In order to address these research questions, this study used a descriptive case study methodology. A descriptive case study research method is particularly well suited to this study. The reasons for using a descriptive case study methodology are discussed in this section.

Case studies are described by Creswell (2014) as “bounded by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time” (p. 14). Case studies are a form of qualitative research, where the researchers explore in depth a case, program, event, activity, process, or one or

more individuals within a real-life context (Creswell, 2014). Multiple sources of evidence are used as a way to triangulate the data, adding validity to the findings (Yin, 2009).

To distinguish a case study from other research designs requires three conditions to be met: (a) the type of research question, (b) the extent of control an investigator has over actual behavioural events, and (c) the degree of focus on contemporary as opposed to historical events (Yin, 2009). Research questions that need to be traced over time and require an in-depth explanation or description may lead to the need for a case study. The central research questions in this study align with the research criteria identified by Yin (2009) for a case study. The advantage of conducting a case study for this study lies in the multiple sources of data, the extended period of time, and the evidence collected from real-world settings in which the *EcoSchools* program is being implemented.

In comparison to other research methods, the case study is also preferred when a contemporary event is being studied in which no relevant behaviour can be manipulated. Data sources for case studies often include direct observation of the event being studied, interviews of the persons involved in the events, as well as documents and artifacts (Yin, 2009). These forms of data and collection aligned with this study, and enabled the researcher to gain a deeper understanding of the experiences of teachers, administrators and students in one *EcoSchool*.

A descriptive case study was used to meet the objectives of this specific research study. This type of case study is particularly suited to this project based on the purpose and approach in which the research was carried out. The purpose of this study was to describe the experiences of teachers, administrators, and students implementing the *EcoSchools* program in a Gold certified secondary school. Based on the data collection methods, this

case study had a descriptive approach. The interviews, document analysis, and observation sessions were conducted to describe the experiences of implementing the *EcoSchools* program and describe the specific process of successfully achieving Gold status in the six program areas. The approach of a case study can be considered descriptive when the data collection and analysis seeks to describe an intervention or process and the real-life context in which it occurred (Thomas, 2011). Overall, the purpose and approach of this research made a descriptive case study the best fit for this research study.

Selection of Site and Participants

The selection of the site and participants was a critical part of this descriptive case study. In order to examine successful practices in implementing EE, one exemplar secondary school was selected for in-depth analysis. The participants were also selected to provide a wide variety of perspectives to expand the scope of this project.

Selection of the Site

One secondary school from a school district in southern Ontario was chosen for the case study. The school will be identified by the pseudonym Trillium Heights Secondary School (THSS). As Creswell (1998) advises, “Typically, however, the researcher chooses no more than four cases ... the more cases an individual studies, the greater the lack of depth in any single case” (p. 63). While using a higher number of cases would be motivated by the ability to generalize the findings, however this is not a goal for qualitative research.

THSS has been following the *EcoSchools* program since the 2007-2008 academic year. This particular school was suggested by the Research Coordinator of the school board as a good candidate for this research project. Since the 2007-2008 academic year,

THSS has achieved seven Gold level certifications from the *EcoSchools* program Assessments, one Silver level, and one Platinum level. Given the repeated success of THSS maintaining *EcoSchool* certification across 9 consecutive years, this school was selected to represent an exemplary secondary school. THSS has also offered the Grade 11 Environmental Science course in the past, and submitted a team of students in the local Ontario *Envirothon* competition since the 2009-2010 school year. The school is located within a rural area that is experiencing increasing residential development. The student population ranges from 800-900 students and approximately 70 staff members. A summary of the school demographics for THSS is presented in Table 1.

Participants

The selection of participants was conducted using purposeful sampling, which enabled the researcher to deliberately choose individuals for this study to best address the research questions (Creswell, 2014). Purposeful sampling was used to select interviewees from THSS that offered a diversity of perspectives on the implementation of the *EcoSchools* program. This has been referred to by Creswell (2014) as *maximum variation*, in which sampling targets individuals that offer a range of viewpoints. This study involved a variety of participants, including teachers, administrators, and students. Table 2 presents a summary of the staff participants involved the study.

The three leading teachers were interviewed to determine the experiences of implementing the *EcoSchools* program. Four teachers and the school chaplain not directly involved in the implementation of the program were also interviewed. These additional staff members offered insights into the influence of the *EcoSchools* program on the school and how well the initiatives of the EcoTeam are spread throughout the school.

Table 1

Participating School Demographics

Student population	800-900
Number of teaching staff	70
Extracurricular sport offerings	27
Extracurricular club offerings	39
Grade 11 Environmental Science course	Offered in 2014-2015 academic year; not offered in 2015-2016 academic year due to low enrolment
Specialist High Skills Major offerings	Environmental SHSM not offered

Table 2

Summary of Staff Participants

Role in EcoTeam	Subject and/or school role	Years of experience	Years on EcoTeam
Leading teacher of EcoTeam	Science, Dept. Head	15	9
Leading teacher of EcoTeam	Art, Dept. Head	15	6
Leading teacher of EcoTeam	Art	8	8
Not directly involved in EcoTeam	Technology, Dept. Head	26	0
Not directly involved in EcoTeam	Math, Dept. Head	24	0
Previous leading teacher of EcoTeam	Science, Environmental	11	1
Not directly involved in EcoTeam	Law, History, and English	10	0
Administrative member of EcoTeam	School Principal	8	Administrative member for 5 years
Not directly involved in EcoTeam	School Chaplain	12	0

The school principal was also interviewed as he is considered to be a main support for school-based EE implementation. This case study also focused on the descriptions provided by students. The EcoTeam consisted of seven student members, six of whom agreed to participate in an interview. Table 3 presents a summary of the student participants in the study.

Recruitment

Prior to recruitment, research ethics board approval from Brock University (file #15-066) and one southern Ontario school board was sought. Once the school board and Brock University REB approvals were complete, the Research Consultant at the school board emailed the *EcoSchools* Board Representative to inquire about possible secondary schools who would be interested in participating in the study. THSS was suggested and the Research Consultant emailed the principal and lead EcoTeam teacher about the opportunity to be involved in the study. The principal replied that he would be interested in having THSS participate. An introductory email was sent to the principal and the lead teacher moderator of the EcoTeam to formally outline the purpose of the study, the data collection process, and the benefits of participation. This email requested an introductory meeting to begin the process of setting up interviews with the leading EcoTeam teachers.

The lead teacher moderator responded first, and an informal meeting took place in December 2015 to introduce me to the school and the EcoTeam teachers and students. The Letter of Invitation was reviewed to explain the purpose of the study and methods of data collection with the three lead teachers of the EcoTeam. I was given access to the online certification documents created since 2009-2010; 7 of the 9 years since THSS first began implementing the *EcoSchools* program in 2007-2008.

Table 3

Summary of Student Participants

Participant	Role	Grade	Years on EcoTeam	Participation in other clubs
Alex	Student member of EcoTeam	12	8 (Grades 4-12)	– Photography Club – Tech Crew – Envirothon Team
Faith	Student member of EcoTeam	12	3 (Grades 10-12)	– Photography Club – Tech Crew – Envirothon Team
Unis	Student member of EcoTeam	12	4 (Grades 9-12)	Skills Club
Rodrick	Student member of EcoTeam	12	3 (Grades 10-12)	– Skills Club – Tech Crew
Mario	Student member of the EcoTeam	12	4 (Grades 9-12)	– Student Council – Drumline – Tech Crew
Hanna	Student member of EcoTeam	9	1 (Grade 9)	Art Club

The Consent Form was also reviewed with the lead teachers and signed. A date during January 2016 was confirmed for a group interview with the three lead teachers of the EcoTeam. The lead teachers were emailed the Interview Prompts (Appendix A) to review before their group interview. The lead teachers brought me to the office to speak with the principal about the purpose and methods of the study. We also reviewed the Consent Form and set up an individual interview in February 2016. Interview Prompts (Appendix B) were also emailed to the principal for review in advance.

Once the interviews with the three lead teacher moderators and the principal were conducted, I attended a weekly EcoTeam meeting in March 2016 to speak with the student members. I explained the project and offered the invitation to participate in an interview to all students. This method helped to ensure that the lead teachers who hold a position of authority over students did not strongly influence their decision to participate. Students were all given a Letter of Invitation and a Consent Form. The Letter of Invitation described the purpose of the study, the observation process of EcoTeam activities, the interview process, the voluntary nature of participation, and benefits of participation. The Consent Form allowed students to provide informed consent for the observation and/or an interview. The five students in Grade 12 signed the Consent Form and provided their school based emails. The Grade 9 student had her parental guardian provide permission for participation in the study. The Interview Prompts (Appendix C) were sent to students so they could review the questions before their interview. Through conversation with the students and lead teachers it was decided that some students would complete interviews in pairs so they felt more comfortable. Four students completed interviews in pairs, and two students were interviewed individually.

Recruitment of other staff members occurred by asking lead EcoTeam teachers to suggest certain staff members that may add valuable insights to the project. They suggested the environmental science teacher, who also was involved in coaching the Envirothon team of five students who participate in a local environmental competition. In addition, I contacted Department Chairs at the school through sending a Letter of Invitation by email. Interested participants were directed to contact the primary student researcher by email to confirm their interest. Three individuals expressed interest in participating, including the Department Chair for Business/Technology studies, Mathematics, and Social Sciences. I was also introduced to the School Chaplain after my interview with the Business/Technology teacher who suggested that she would be interested in participating. All additional staff participants were emailed a Consent Form and Interview Prompts (Appendix D) for them to review and sign before their scheduled individual interview.

Data Collection and Recording

Three different methods were used to collect and record data in this study. Face-to-face semi-structured interviews with teachers, administrators, and students were conducted to describe the experiences and involvement that each individual had with the *EcoSchools* program. Observations of EcoTeam initiatives and document analysis occurred to address the research question of how the *EcoSchools* program is implemented. Through the use of semi-structured interviews, observations, and document analysis, an in-depth understanding of the experiences within a Gold Certified *EcoSchool* was attained.

Semi-structured interviews were conducted with teachers, administrators, and students. The interviews took place during January to May 2016. Semi-structured

interviews were chosen to enable specific questions to be addressed but not restrict participants from expanding their answers with personal experiences (Thomas, 2011). The interview questions for the three leading teachers of the EcoTeam focused on challenges and successful practices, implementation strategies, and communication of EcoTeam activities throughout the whole secondary school. The interview questions (Appendix A) were developed to specifically address the research questions and to offer a thorough insight into the experiences of implementing the *EcoSchools* program. The three leading teachers of the EcoTeam participated in a group interview, which can provide greater depth of information due to the synergy of group interaction (Carey & Asbury, 2012). They requested this format as each of them has a different responsibility as part of the EcoTeam. Due to this dynamic, the teachers felt they would support each other's answers and develop more comprehensive responses as a group. The limitations of a group interview are described later in this chapter under the limitations section.

The school principal was interviewed to describe the supports he provides the EcoTeam, the challenges he observes in implementing EE within a secondary school, and the suggestions he has for other administrators wanting to support EE in their school. Interviews with six student members of the EcoTeam were conducted to describe their role on the EcoTeam, the main lessons they learn from the program, and any suggestions they may have for the program. Five Grade 12 students were interviewed and one Grade 9 student was interviewed. Four Grade 12 students were interviewed in pairs, one Grade 12 student was interviewed individually, and one Grade 9 student was interviewed individually. Some students requested to be interviewed in pairs so they would feel more comfortable.

Interview questions for five other staff members who were less involved in the program focused on how they become aware of EcoTeam activities, EE connections they make in the classroom, and suggestions for helping the objectives of the *EcoSchools* program spread throughout the school. Three department chair teachers were interviewed, including Business/Technological Studies, Mathematics, and Social Sciences. The Environmental Science teacher and the School Chaplain also participated in individual interviews. All interviews with other staff members were conducted on an individual basis. All of the semi-structured interviews were conducted at the school site, during a time that was convenient for the interviewee. During each interview, the interviewee was informed that participation was voluntary and he/she could discontinue at any time without penalty. Interviews were audio-taped, with permission of the participants. This helped to ensure reliability and credibility, as the interview responses were accurately transcribed and reviewed on multiple occasions. The interviews were a significant part of describing the experiences of individuals within a Gold Certified *EcoSchool*.

Two other methods of collecting data in this study include observations and document analysis. These methods served to triangulate the interview data that was collected directly from discussions with teachers, administrators, and students (Thomas, 2011). Triangulation served to add validity to the data collected and provide a rich account of the experiences of individuals involved in the *EcoSchools* program. Observations took place in accordance with the activities planned by the EcoTeam. In total, eight observations occurred between April and May 2016. Non-structured observation notes were recorded during each observation session. The certification criteria were also used as an informal observation guide (Appendix E) to add program-

specific comments to the written observation notes. These criteria are areas that *EcoSchools* assessors look for as they conduct school assessments at the end of the school year. The approach for implementing the six sections of the *EcoSchools* program was the emphasis of school observations. Document analysis was conducted on 7 years of online portfolio documents that each *EcoSchool* is required to maintain for certification in the program (Ontario EcoSchools, 2016). These documents were analyzed to offer more information on the trends across 7 years of *EcoSchools* program implementation. As well, the observation guide (Appendix E) was used to direct the document analysis to focus on key areas of the program.

Data Processing and Analysis

The data analyses were mainly carried out from June to August 2016. However, as data were collected, analyses of the trends in portfolio documents, interviews, and observations occurred and influenced the continued collection of data. Certification portfolios were analyzed first, and the major challenges and successes evident in the trends over 7 years were brought up during interviews with the three leading teachers of the EcoTeam. Document analysis findings and prominent comments that the lead teachers made in their January 2016 interviews were incorporated into the interview with the principal in February 2016. In addition, prior data analyses also directed some of the questions used during interviews with the student members of the EcoTeam in March 2016. Observations that began in April 2016, as well as key findings from prior document analysis and interviews, were incorporated into the individual interviews with other staff members in May 2016. Thus, analyses of the data occurred during and after data collection of documents, interviews, and observations.

Each of the three sources of data from document analysis, interviews, and observations were reviewed in their entirety, coded, and analyzed to develop major themes. This process was conducted separately for each form of data collection, and then compared across all three sources using pattern matching to establish collective themes that thread through all the data for the descriptive case study (Yin, 2009).

The first step towards the final objective of identifying major themes from the interviews was to organize the data by transcribing interviews. Audio-taped interviews were transcribed into a word document. Separate Word documents were used to store the interview transcripts from the four different participants: three lead EcoTeam teachers, school principal, six EcoTeam students, and five additional staff members. The second step was to read through all the transcribed data a couple of times in order to get an overall sense of the information (Olson, 2011). General thoughts about the data were added to the margins of the document, identifying the topic of discussion and keywords relating to my research questions (Olson, 2011). Once all of the interview transcripts were reviewed and initial thoughts were recorded, the third step of coding began. Coding involved organizing the transcript's segments of text into small categories of information (Rossman & Rallis, 2012). These segments were grouped together by code and assembled in a separate document to help analyze the information. Pre-determined codes were not used; instead, codes emerged during the data analysis process. Codes included themes that were expected based on the literature review and some codes had unexpected themes (Creswell, 2014; Thomas, 2011).

Through the coding process, major themes were identified and described. Once coding for each of the four types of participants was conducted, codes were grouped by

overarching themes emphasized by all participants using pattern matching analysis (Yin, 2009). These overarching themes were grouped under the six sections of the program (i.e., Teamwork and Leadership, Energy Conservation, Waste Minimization, School Ground Greening, Curriculum, and Environmental Stewardship). A few codes did not fit under a specific section of the program, but instead represented overall themes about the *EcoSchools* program. The final step in analyzing the interview data was to interpret the findings by considering the lessons that were learned and implications for other EE practitioners.

The analyses of the observation field notes and document analysis followed a similar process as the interview transcripts. Field notes were transcribed into a word document and read over completely as the first step. Codes were developed and applied to the text segments, and then grouped together in a separate document. The codes were used to generate predominate themes, which were grouped into the six sections of the program or considered as themes relating to the *EcoSchools* program as whole. The online portfolio documents were copied and transferred into a word document for analysis through coding and identifying major themes (Thomas, 2011). Each section of the program was analyzed based on the points earned for each criteria (See Appendix F for a sample of the points system for the Energy Conservation section). Criteria were either coded as successful (e.g., the EcoTeam has never lost points on this criteria), challenging (e.g., the EcoTeam has lost points on this criteria). Based on these codes, the biggest challenges of each section were identified. Once all six sections of the program were analyzed in terms of points earned, the most successful and challenging sections of the program were identified. Special attention was given to the Curriculum section, where lesson submissions were analyzed in terms of the subjects and grades that were

represented. In addition, the Environmental Stewardship section was analyzed in more detail to determine the types of projects that were selected across multiple years.

Once interviews, observations, and document analysis data were reviewed, coded, and described using major themes, the themes that were emphasized in multiple sources of data were described using pattern matching analysis (Yin, 2009). This process of triangulating the findings from multiple sources of data helped to validate the results of this study (Creswell, 2014).

The process of interpreting the findings from three data sources was influenced by the assumptions, biases, experiences and background of the researcher. This is a characteristic of qualitative research, as the data is collected and interpreted by the researcher themselves (Creswell, 2014). To provide the reader with an understanding of how the interpretation process may be influenced, the researcher will identify her personal assumptions and biases, experiences to conclude this section.

Researcher's Assumptions and Biases

The personal assumptions and biases of a qualitative researcher should be reflected upon and identified, as they will shape the interpretations formed during the study (Creswell, 2014). Due to my personal experiences with EE and passion for the environment, I had a bias towards the belief that any EE is a step in the right direction. However, I was aware of this bias when interviewing students about their involvement in the program. The goals for EE in Ontario encourage participation of all students and the development of EL. Based on the lack of curriculum resources across all subjects at the secondary school level, I had the assumption that the program emphasized student participation more than developing students' knowledge base through classroom lessons.

Another prominent assumption I had was regarding the quality of EE within a Gold Certified secondary school. I assumed that the practices of the EcoTeam, leading teachers, administrators and students were exemplary. This assumption was based on the certification level the school has attained as a result of program assessments. I was aware of this positive bias towards the school EE quality before collecting and interpreting data as this could have lead me to create a favourable conclusion about the site and participants (Creswell, 2014).

Philosophical Assumptions

The first philosophical assumption that grounded this research project was that multiple perspectives should be reported. I believe a pragmatic approach of using multiple participants and data collection techniques has produced an in-depth understanding of the experiences within a Gold Certified *EcoSchool*. The second assumption was that knowledge claims should be generated through the experiences of the participants being studied (Creswell, 2013). I believe that discussions and observations of participants to understand their involvement have provided valuable insights for this project. I spent extensive time in the field to gain an in-depth understanding of the participants and report evidence using quotes from participants. This practice of emphasizing the experiences of participants reflects a social constructivist worldview to qualitative research (Schwandt, 2007).

Limitations

A few methodological limitations of this study should be identified. The first limitation of a descriptive case study is the inability to generalize the findings as only one secondary school was studied. This limitation was addressed by providing rich

descriptions of the findings so the results that are reported can be practical within certain contexts. Another limitation of the study involves the potential for bias to influence the interpretation of the results. This limitation was minimized by clearly identifying the researcher's assumptions, biases, and relevant experience.

Limitations exist around the forms of data collection that were used in the study. Interviews allowed the researcher to control the questioning that occurs (Creswell, 2014). However, the researcher's presence may bias the responses. This limitation was addressed by providing the participants with the questions in advance, so they could prepare their answers without the presence of the researcher to influence their responses. In addition, one group interview was conducted with the three lead EcoTeam teachers, and four students requested to be interviewed in pairs. The group setting may have influenced the responses of participants and resulted in the interview to be dominated by one individual. This limitation was addressed by the researcher encouraging each participant to respond to all questions so a diversity of perspectives was shared. Observations offered the researcher first-hand experience with participants, but the researcher's presence may seem intrusive. This limitation was minimized by establishing rapport with the EcoTeam through eight observation sessions. Document analysis offered the words of participants, saving time in transcribing, and serving as an unobtrusive source of information (Creswell, 2014). A critical limitation of document analysis is that documents may not always be accurate. This limitation was addressed by confirming what was found in the portfolio document during interviews with all participants.

Establishing Credibility

To add credibility to the findings for this study, several steps have been taken.

Using multiple sources of evidence to triangulate the data, performing member checking of interview themes, providing rich description of the findings, identifying the researcher's own biases, and spending prolonged time at the research site, improved the credibility of this study.

The data were triangulated by gathering evidence through three main sources: document analyses, interviews, and observations. In addition, interviews were conducted with three main stakeholders to offer a diversity of perspectives from teachers, administrators, and students. The themes that are highlighted from data analysis were discovered by triangulating the data, which adds validity to the study (Creswell, 2014). Once the interviews were audio-taped, transcribed, and coded, themes evident from the interviews were reviewed with participants who requested to check the findings. The process of conducting a member check of the major themes helped to determine whether participants felt the findings were accurate (Creswell, 2014). This step enhanced the credibility of this study. To be realistic in terms of time management, member checking was not conducted with all participants, only those who requested to review the major themes identified from their coded interviews (e.g., the leading EcoTeam teacher). As often included in qualitative studies, thick description was used to convey the findings of the study. This was achieved by presenting the original data comments from the interviewees themselves and providing a rich description of the school setting. Incorporating rich details have helped add validity to the findings (Thomas, 2011).

Data collection through interviews, observations, and document analysis took place from December 2015 until May 2016. Spending 6 months collecting data at the study site has helped the researcher build an in-depth understanding of the site and

individuals who are involved in implementing the *EcoSchools* program. This prolonged time spent at one Gold Certified *EcoSchool* has enabled the researcher to acquire more experience in the real-life setting, making the description of the implementation more valid (Creswell, 2014).

Ethical Considerations

The research ethics boards at Brock University (file # 15-066) and the school board reviewed and accepted the proposed research before the project commenced. In this study, ethical considerations were given to the issue of informed consent, participant withdrawal, confidentiality, and anonymity.

Informed Consent

All teachers and administrators were emailed a Letter of Invitation and students received a Letter of Invitation directly from the researcher in an EcoTeam meeting. Each Letter of Invitation directed individuals to contact the researcher to confirm their interest in participating in the study. Once participants responded using their school-based email, they were emailed an Informed Consent Form, which was signed before any observations or face-to-face interviews were conducted. One student was under the age of 16 and required the consent of her parental guardian to participate in an interview. The Consent Form was the participant's agreement that he/she wished to be involved in the research. It also outlined the rights of the participant that were protected during data collection (Creswell, 2014).

Participant Withdrawal

The Letter of Invitation described how the participation in this study was voluntary. In addition, participants were notified in the Letter of Invitation and Consent

Form that they had the right to withdraw from the study at any time without penalty or negative consequences. If a participant decided to withdraw from the study, their data would be immediately deleted and would not appear in any written or verbal presentation of this research project (i.e., thesis, summary report, presentation). No participant decided to withdrawal from this study.

Confidentiality and Anonymity

To protect the confidentiality of the participants, personal identifiers such as names, emails, organization names, and titles were kept on a password-protected computer. All participants were assigned a pseudonym, which was used to store and report each individual's data. Consent forms were stored in a file folder within a locked office. Audio recordings were conducted using a voice recording device and the files were transferred to a password protected laptop. Once recordings were transferred to the laptop, the files on the voice recorder were deleted upon transcription into a word document. Only the primary student researcher, and faculty advisor, had access to this information. No personal identifiers were retained once the project was completed. During the study, all data were kept under password protection or stored in a locked office. No personal identifiers were used in the reporting of this study.

Due to the audio-recordings during the interviews, the interview data cannot be considered anonymous. The Letter of Invitation and Consent Forms described the use of audio-recordings during the interviews and how personal identifiers will not be included in the reporting of the study. Participants were informed by these two forms that pseudonyms will be used to report data so that confidentiality will be maintained.

CHAPTER FOUR: PRESENTATION OF RESULTS

Chapter 4 provides an overview of results emerging from this descriptive case study. The purpose of this study was to describe the experiences of teachers, administrators, and students in a Gold Certified secondary school implementing the Ontario *EcoSchools* program. The research was guided by the following research questions:

1. How is the *EcoSchools* program implemented in a Gold Certified secondary school?
2. What are the experiences of teachers and administrators implementing the *EcoSchools* program in a Gold Certified secondary school?
3. What is the nature of student involvement in the *EcoSchools* program in a Gold Certified secondary school?

This descriptive case study took place in a secondary school in southern Ontario called THSS. To gain a thorough understanding of implementing the *EcoSchools* program, data were collected using document analysis, observations, and semi-structured interviews. Seven years of the EcoTeam's online certification portfolios were analyzed in order to better understand how the program was implemented and identify trends in implementation over time. Eight observations were conducted of EcoTeam meetings and projects during the 2015-2016 academic year to describe implementation strategies and experiences of teachers, students, and administrators. Interviews were conducted with three lead teachers, six EcoTeam students, the principal, and five other teachers at the school who were not directly involved in implementing the program to help gain a holistic picture of the experiences in the school. In total, 7 years of documents were

analyzed, eight observations were conducted, and 15 individuals were interviewed. These three data collection strategies were used to triangulate the emerging themes from this study.

The presentation of results in Chapter 4 follows the chronology of data collection. The first section presents trends from a comparison of 7 years of certification documents from THSS. The remainder of the chapter has been organized into six sections according to the *EcoSchools* program (Ontario EcoSchools, 2017): Leadership and Teamwork, Energy Conservation, Waste Minimization, School Ground Greening, Curriculum, and Environmental Stewardship.

The original plan for this chapter was to organize the data based on the type of participant (i.e., lead EcoTeam teachers, EcoTeam students, school principal, and other teachers) so all experiences would be emphasized. However, by grouping the participant descriptions together under the six sections, the reader can understand multiple experiences of similar activities concurrently. In these six sections, I have described the main themes from interviews and observations. Substantiating evidence from the certification documents from the 2015-2016 school year has also been integrated. Each section highlights four thematic categories which include: Implementation Strategies for the *EcoSchools* Program, Challenges in Implementing the *EcoSchools* Program, Positive Outcomes from the *EcoSchools* Program, and Student Involvement in the *EcoSchools* Program

In addition, themes that address the program as a whole are described at the end of the chapter. This organizational framework for Chapter 4 ensures that emerging themes for each section of the program are clearly described and data addressing the three

research questions are evident. Results from the interviews, observations, and document analysis will be merged together to present a holistic description for each emerging theme.

Comparison of Multiple Years of Certification Documents

Data analysis began with a comparison of the certification documents across 7 academic school years beginning in 2009-2010 until 2015-2016. The records of site visits and level earned in the program are outlined in Table 4. As shown in Table 4, 2 years (2012-2013, 2014-2015) have minimal data when the complete certification portfolio documents were not required, as the school was following the Experienced *EcoSchool* Certification Cycle (EECC). Schools are eligible for EECC after being a certified *EcoSchool* for 5 consecutive years (Ontario EcoSchools, 2017). During a year following the EECC guide, only 3 pieces of evidence are required: an EcoTeam pledge to continue following the program from all members involved, a yearly planner, and a description of one eco-project implemented during the school year.

Document analysis was used, in part, to guide the interviews and highlight particular challenges and successes as evident in the documents. Certification documents reveal the points earned for the six sections of the program. In order to earn Gold level status, schools must earn at least 75% of points available in all sections. To review a list of certification criteria and sample point system for the Energy Conservation section, refer to Appendix F. The documents also revealed trends regarding how the program has been implemented, opportunities for student involvement, and staff participation.

Table 4

Site Visit Records and Level of Program Certification Earned Across 7 Years of Program Implementation at Trillium Heights S.S.

Year	Site visit	Level earned
2015-2016	Yes	Gold
2014-2015	No	Gold - EECC
2013-2014	Yes	Platinum
2012-2013	No	Gold - EECC
2011-2012	Yes	Gold
2010-2011	No	Gold
2009-2010	Yes	Gold

Points Earned: Successes and Challenges

Success in terms of points earned has been fairly consistent for three sections of the program: Leadership and Teamwork, School Ground Greening, and Curriculum. Across 5 years of data when the whole certification portfolio was completed (2009-2010, 2010-2011, 2011-2012, 2013-2014, 2015-2016), the EcoTeam was most successful in the Curriculum section, consistently earning all available points (Figure 1). Data from Leadership and Teamwork and School Ground Greening show 2 years when full points were not earned.

Based on the points not obtained across the same 5 years when whole certification portfolios were completed, the main challenges were concentrated in the Energy Conservation, Waste Minimization, and the Environmental Stewardship sections. In terms of the points earned for all criteria in one section, the Environmental Stewardship section has been the most challenging (Figure 2). Across 5 years, 92% of points available were earned for the Environmental Stewardship section, followed by 93% for the Energy section, and 94% for the Waste Minimization section (Table 5).

Certain criteria were also analyzed to determine the most challenging criteria in the whole program. The most consistent challenge across the 5 years was criteria 2.2, which focuses on turning monitors off when they are not required. The EcoTeam has lost points for not properly turning off monitors on 80% of the complete portfolios (Table 5). The other challenges where points have been lost on 60% of complete portfolios include maintaining lights off when not required and reducing food-related waste (Table 5). In terms of total points lost, reducing food waste has been the most challenging criteria in the whole program, with the EcoTeam only earning 75% of points (criteria 3.3).

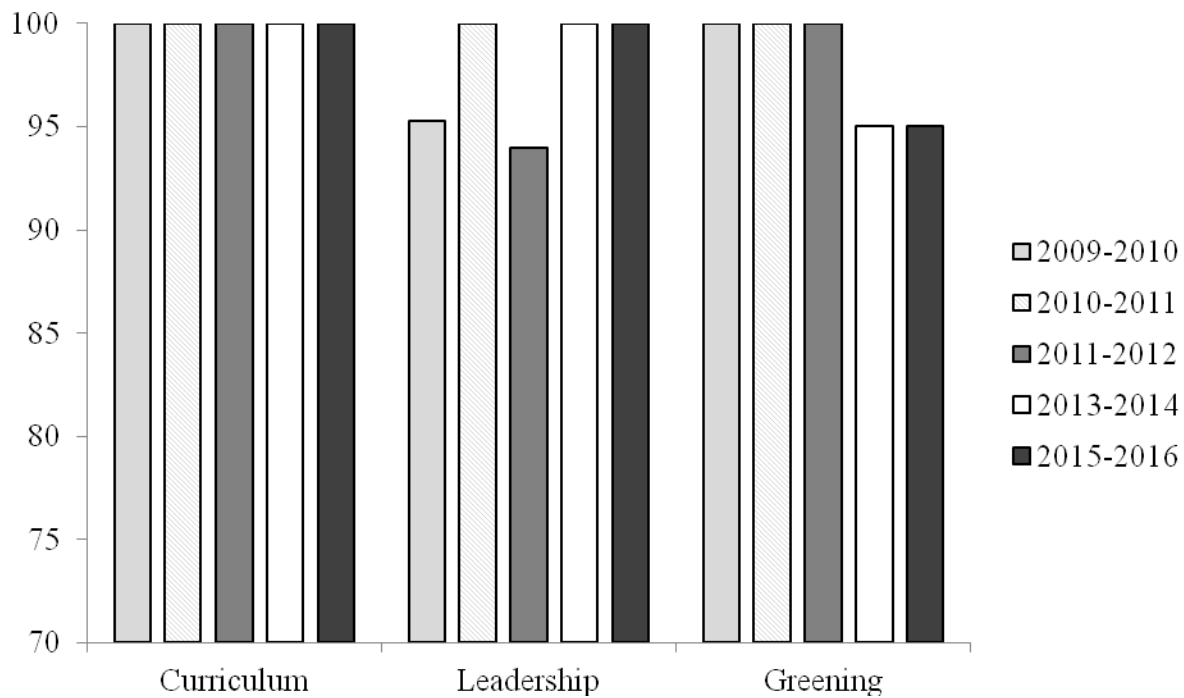


Figure 1. Percentage of points earned across 5 years for the most successful sections of the *EcoSchools* program for Trillium Heights S.S.

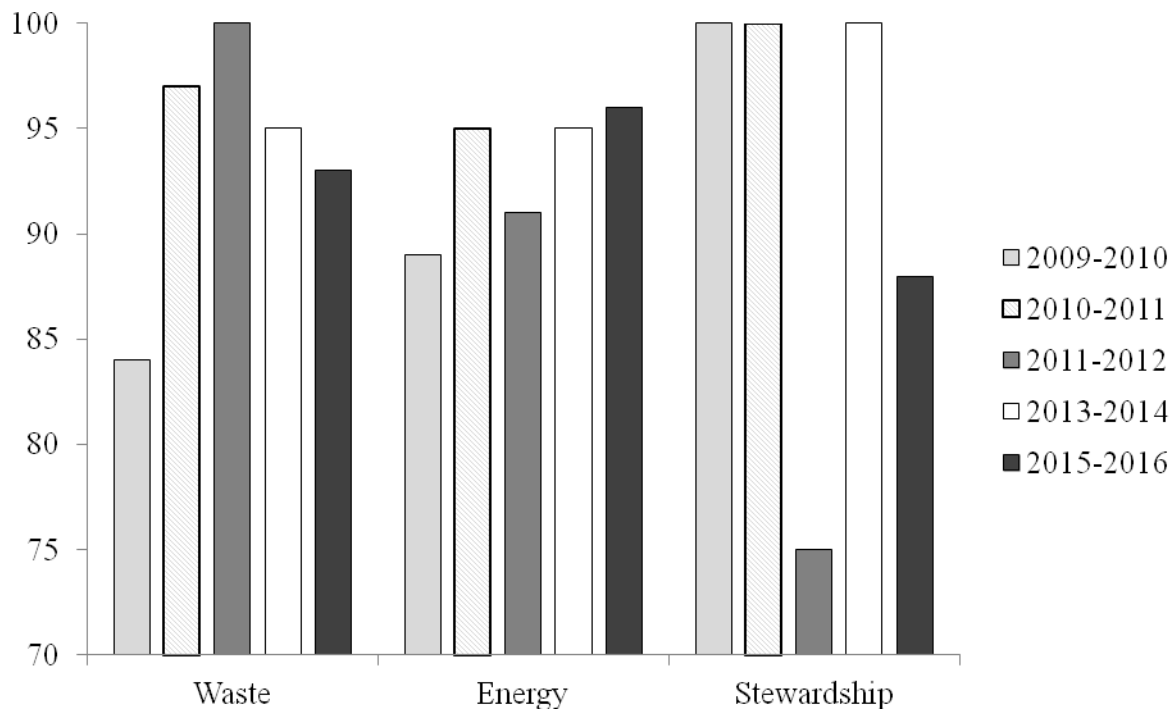


Figure 2. Percentage of points earned across 5 years for the most challenging sections of the EcoSchools program for Trillium Heights S.S.

Table 5

Points Earned for Challenging and Successful Criteria or Sections of the EcoSchools Program

Section/criteria	Total points earned	# of years points lost
Curriculum section	70/70 (100%)	0/5 (0%)
School Ground Greening section	68.5/70 (98%)	2/5 (40%)
Leadership and Teamwork section	78.25/80 (98%)	2/5 (40%)
Waste Minimization section	97.25/104 (94%)	4/5 (80%)
Energy Conservation section	97/104 (93%)	5/5 (100%)
Environmental Stewardship projects	66/72 (92%)	2/5 (40%)
2.1 Lights off when not required	14.5/17 (85%)	3/5 (60%)
2.2 Monitors off when not required	13.5/17 (79%)	4/5 (80%)
3.3 Reduce food-related waste	11.25/15 (75%)	3/5 (60%)

Data submitted for the walkabout activities also support the challenges in terms of points lost. For example, the walkabout worksheets provided evidence that the main issue from the energy walkabout data was monitors left on, while organic food waste in the garbage bins was a common problem in the waste walkabout data.

Student Involvement

Based on the documents, some consistent opportunities for student involvement were evident. The documents have captured student involvement in the local Envirothon, where five students participate in environmental workshops and a competition focusing on forestry, aquatics, wildlife, soil and a current issue. The documents also report students taking a role in communicating with the school through announcements, posters, and updating the eco-bulletin board. For the School Ground Greening section, students have been engaged in planning, planting, and regular care. In addition, EcoTeam students helped to organize stewardship campaigns and advertise their events with the whole school community.

Implementation Trends in the Documents

For the School Ground Greening section, one major trend was student involvement in planting native tree species around the school, which were donated by community organizations. A more recent trend has been the consultation with the School of Horticulture for support in planning and bringing volunteers for larger greening projects.

Analysis of the Curriculum section of the certificate documents highlights the implementation strategy of relying strongly on Science curriculum lessons (Figure 3). Submissions from other disciplines include Mathematics (14%), Art (11%), Social Sciences (6%), and English (3%). Science was clearly dominant, representing 66% of all

curriculum submissions across 5 years (Figure 3). In particular, Science submissions were most frequently provided from Grade 9 Science (43%), followed by Grade 11 (26%) and Grade 10 (22%). However, Grade 12 Science represents only 9% of Science submissions across 5 years. Submissions were also predominantly lessons for the environment (23/35) and about the environment (17/35). Only three submissions over 5 years were examples of lessons in the environment. A trend in the grade level submissions also appeared across 5 years, where Grade 9 submissions were most prominent for all disciplines (37%), followed by Grade 11 (29%), Grade 10 (20%), and Grade 12 represented the lowest curriculum submissions (14%) across 5 years.

The environmental stewardship projects documented by the EcoTeam highlight repeating projects. Two of the most predominant projects that have been included in 5 of the past 7 years, include electronic recycling collections and earth hour energy conservation campaigns. The other common projects that have been implemented in three of the past 7 years include a clothing drive and rain barrel sale to the school and surrounding community.

Overall, the comparison of certification documents across multiple years revealed several consistent trends in the data. Comparing the points lost across the years highlight the main challenges in turning off lights and monitors and reducing food waste in a high school setting. The documents show reoccurring opportunities for student involvement, annual planting activities, and environmental stewardship projects that have become annual events. The submissions for the Curriculum section also highlight the prevalence of Science lessons and fewer submissions for learning In the Environment.

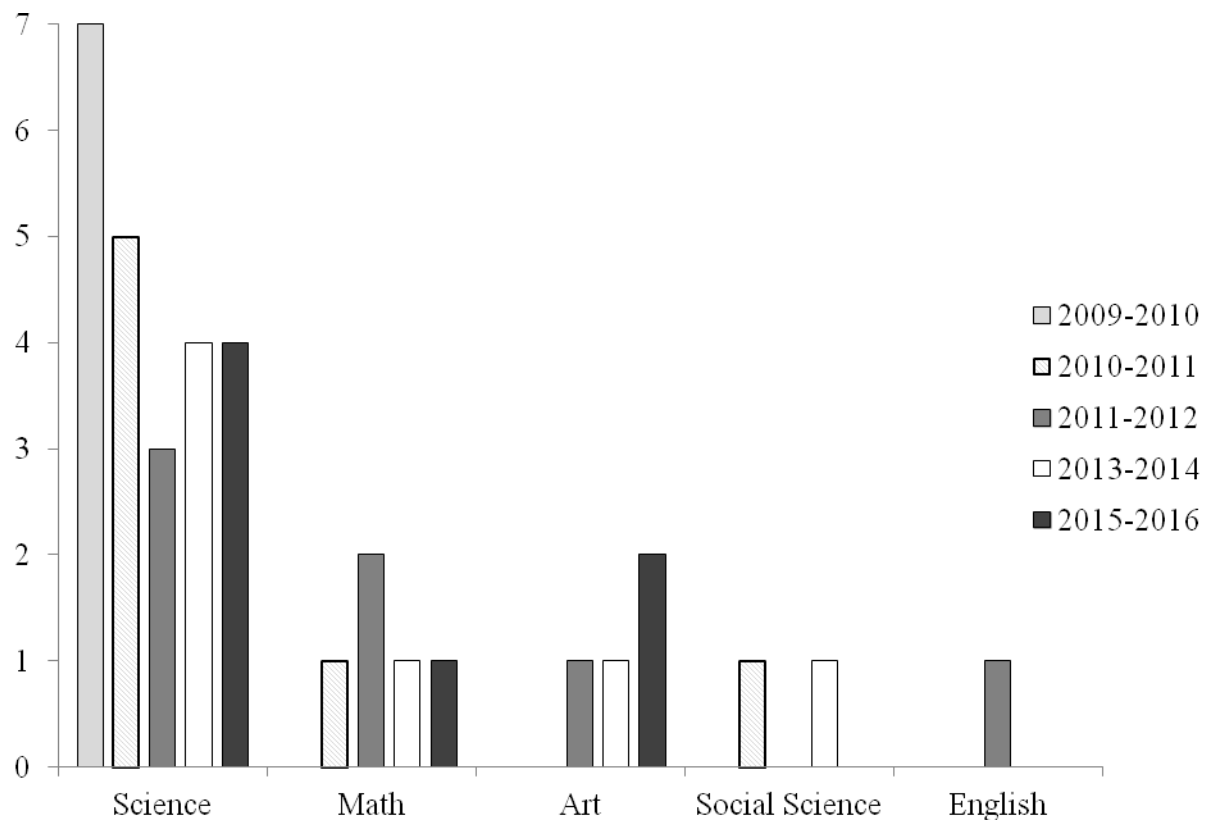


Figure 3. Curriculum submissions from various disciplines across 5 years.

Leadership and Teamwork

The first section of the *EcoSchools* program focuses on how the whole school builds capacity with a diverse EcoTeam and communicates feedback to promote an environmentally responsible school. Criteria include regular EcoTeam meetings, diverse membership of students and staff, student leadership opportunities, communicating successes and improvements, and making the environmental program visible.

Predominant themes include: communication techniques with the whole school, administrative support, low visibility of the EcoTeam within the school, low student involvement, and student leadership opportunities.

Implementation Strategies for Leadership and Teamwork

In order to communicate the successes and areas for improvement with the whole school, an EcoTeam is required. The Eco Action Team at THSS was led by three classroom teachers. One teacher moderator was the head of the Science department, the second was the head of the Art department (referred to now on as the Art department head teacher moderator), and the third was a teacher in the Art department (referred to now on as the Art teacher moderator). Based on eight observations throughout the school year, these teacher moderators were consistently present at weekly EcoTeam meetings that generally lasted between 60 to 90 minutes. Typically, a dedicated group of four student members would attend weekly meetings. Two of these students were in Grade 9 and two were in Grade 12. One of the senior students has been on the EcoTeam since Grade 10, and the other student described participating in school eco-activities since Grade 4. There were three other Grade 12 student members who attended meetings less

frequently. The core group of three teachers and four student members were the individuals driving the communication with the whole school.

Communication in the school occurred on a daily basis and during specific times of the year to help raise awareness for EcoTeam projects. All participants interviewed were aware of the daily announcement by the School Chaplain. According to the Chaplain, “I do an announcement at the end of every school day saying ‘please turn off all of your lights and computers in the classroom.’ It has just become a part of our whole routine” (Chaplain, May 2016). Recruiting the Chaplain to help communicate a reminder of conservation was one key strategy the EcoTeam used to promote environmental practices in the whole school.

To communicate the results of energy and waste audits, the Science teacher moderator explained, “We have a board upstairs. It has stuff like how we have improved in our counting of the garbage, if our lights are turned off at the end of the day, if our garbage and recycling is sorted properly” (Science Teacher, January 2016). When the EcoTeam has to promote a new project within the school a senior EcoTeam student explained how auditory announcements also put up on screens throughout the school are “the main form of communication used for publicity for our events” (Alex, EcoTeam Student, March 2016). The Art department head teacher moderator also talked about school newsletters as “a way for the parents to see what’s going on. We hope that the parents read about it and they think it’s something their son or daughter may enjoy, ‘Oh, why aren’t you in the EcoClub?’” (Art Department Head Teacher, January 2016). They also started using Twitter last year to engage students. To inform staff members of

EcoTeam projects, teacher moderators send staff emails and have time to provide more information during staff meetings.

The EcoTeam also has strategies for reaching the local community to bring even greater attention to their events beyond the walls of the school. One example the teacher moderators shared was their Rain Barrel Sales initiative during a previous Earth Day. The teachers explained that they use the school's community partners to help get the word out:

We put it in the newspaper. We contact everyone, we have a list. We just go through the list and some people will pick up on it and say yes can we come by and do an article. And sometimes we don't, but we just try and do as much as we can. We put advertisements in community buildings or the entrances of places.

(Art Teacher, January 2016)

They also mentioned using automated phone calls to all the parents in the school, laminated posters so they can be reused for another year, and flyers that EcoTeam students distributed throughout the community. The EcoTeam even set up a website to help them plan for the interest in their Rain Barrel sales. When the EcoTeam plans to welcome the greater community to a project, they communicate using multiple channels available to them.

Positive Outcomes of Leadership and Teamwork

The Science teacher moderator said that to be successful, you must “try to reiterate with your principal that it's an important club and to try to access and encourage them to provide the resources you need to get the job done” (Science Teacher, January 2016). Administrative support for the initiatives of the EcoTeam was quite evident through conversations with various individuals. The teacher moderators stated that

administration has always been supportive of their projects, the principal helps communicate their initiatives, and they are given time in staff meetings to promote their club. One of the main positive outcomes for this section was the role the principal played in incorporating eco goals into the School Improvement Plan. The principal explained, “There are a lot of Smart Goals in our School Improvement Plan that address *EcoSchools* directly or indirectly” (Principal, February 2016). According to the principal, “the Eco piece fits into faith well in the whole taking care of our planet, taking care of each other, and God’s gift of nature” (Principal, February 2016). One positive result of including environmental goals into the School Improvement Plan is that large school events were occasionally planned to have a limited impact on the environment. For example, one goal from a previous year was to eliminate plastic water bottles from Literacy testing. Another whole school event, the cultural food festival, used compostable materials and had an educational waste sorting Eco Station run by EcoTeam students.

Challenges Experienced for the Leadership and Teamwork

Low visibility of the EcoTeam and their goals. One of the criteria of the Leadership and Teamwork section is dedicated to the extent that the environmental program is visible throughout the school. As a visitor to the school, evidence that the school has been a certified *EcoSchool* for the past 9 years was not prominently displayed. Certification plaques are not displayed in the office or on the bulletin board right beside the main office where visitors walk past to sign in. The school website also had no distinct information about the success of the EcoTeam’s Gold certification. Only through opening a school newsletter from the website can one find details about the club. The EcoTeam bulletin board was on the second floor of the school in the Science area.

One teacher moderator explained, “We have a board upstairs. But again, not everybody passes that board on their way” (Science Teacher, January 2016). A student member of the EcoTeam also talked about this challenge by saying, “I’m not sure that anybody ever looks at it” (Mario, EcoTeam Student, March 2016).

Although visibility was low, a few staff members did comment on the signage around the school to remind individuals to follow eco-practices. They explained how lights off stickers were found by all light switches around the school and there was notification by the photocopier to print on both sides and turn off devices when you’re done.

Low student involvement in the EcoTeam. When the teacher moderators were asked about the main challenges they have experienced, they immediately discussed the issue of low student involvement. This challenge was explained by the teacher moderators, other staff members, and the principal as competition with other extra-curricular activities at the school and part-time jobs. The Art department head teacher moderator stated, “They have so many other commitments that it makes it challenging to arrange to get things done. We’ll have meetings and we’ll plan things and kids can’t come. That is a big challenge” (Art Department Head Teacher, January 2016).

During the observations the teacher moderators even discussed changing the meeting day so a Grade 12 student who has been involved since Grade 9 could attend. This student was an important part of the EcoTeam because when Mario came, he also brought along a group of friends to bolster the involvement in the club. Unfortunately a mandatory student council meeting on the same day as EcoTeam prevented Mario from participating. The teacher moderators also focused their advice for this section on recruitment. The Science teacher moderator exclaimed, “Try to recruit. Try to capture

everyone that comes. Don't let them go. We've been pretty good we've kept our kids from 9-12. It's just pulling in the new ones that we are having trouble with" (Science Teacher, January 2016).

Recruiting new students was a common topic of conversation between the teacher moderators during EcoTeam observations. The teachers discussed how they will have only two returning members since five members will be graduating. One teacher moderator mentioned that they will put in an announcement at the beginning of second semester to try to gain a few members. The teachers also decided to open up the planting of their butterfly garden to any students in the school who wanted to earn some volunteer hours after school. The teachers discussed how this approach may get more students in the school involved, which could pique the interest of a few to join the EcoTeam next year. Low student involvement in the EcoTeam was a major challenge that was also found in the school initiatives run by the EcoTeam.

Student Involvement in the Leadership and Teamwork

During interviews, students described taking on a wide variety of roles as members of the EcoTeam. Alex mentioned, "We kind of do everything really. We all help decide what projects to do, we do morning announcements to advertise our events, we attend community planting events, and we do energy and waste audits" (Alex, EcoTeam Student, March 2016). Observations of EcoTeam meetings confirmed that students were involved in every step of the process when deciding what to do for a new project. For example, the brainstorming session for Earth Day events involved students and teachers building ideas off of each other. The students confirmed this cooperative dynamic. Faith stated, "There's really not a hierarchy, it's more of just the teachers and

the students working together” (Faith, EcoTeam Student, March 2016). This teamwork started at the beginning of the year where the students were involved in directing the focus of the club for the year. A senior student explained,

The first few meetings we come together and we decide this year what will happen and who will be put into what, and who wants to be in charge in what.

We split off into groups, we go online and we look up eco projects. (Unis, March 2016)

Once a project idea was decided upon by the students and teacher moderators, the students also took a leadership role in promoting their initiative to the school community. Based on the documents, students have consistently taken a role in creating advertisements, reading announcements, and posting to their Twitter account. The Science teacher moderator stated, “They design all the ads. When we do the stall-talks, like in the back of the bathroom stalls, they’ve designed all those” (Science Teacher, January 2016).

The teacher moderators also talked about the leadership opportunities the students have had in the past. As part of a mentorship role the Science teacher explained, “We’ve gone and presented at elementary schools, the kids have run little activities that the little ones get involved in” (Science Teacher, January 2016). This opportunity happened during the year the EcoTeam completed the Platinum level extension criteria for certification requirements, which includes a section on student mentorship. According to the documents, the EcoTeam students led a lab activity about ground water pollution with grade three students during the winter, and came back in May 2014 to plant trees together.

During observations teacher moderators would ask students for their input, but opportunities for students to take on a leadership role beyond brainstorming and

advertising were not prominently observed this year. In fact, during a meeting to finish up the certification documents, the Science teacher moderator who completes the documents went through the entire document with the students. When the Science teacher got to the criteria about leadership opportunities, she had recorded that senior EcoTeam students “led workshops on the Grade 9 eco-field trip.” The students spoke up and said they were not on this field trip, but this remained in the certification documents anyway.

Overall the Leadership and Teamwork section illuminates a wide variety of communication techniques and leadership roles that students can take on within the EcoTeam. Although the principal has shown strong support of the club and made environmental goals a priority in the School Improvement Plan, the challenges of low visibility and low student involvement still exist for the EcoTeam.

Energy Conservation

The Energy Conservation section of the *EcoSchools* program focuses on how the whole school follows routines and makes decisions to reduce the use of energy. Prominent themes found in the data include conducting the energy walkabout, learning outcomes for students, conservation practices followed by other staff, lack of meaningful activities for students, lack of awareness of conservation goals, and student monitoring of energy conservation practices.

Implementation of the Energy Conservation Section

The initial EcoReview the EcoTeam conducts includes an Energy Walkabout around the school to check if lights and electronics are turned off when not in use, vents are clear, and blinds or windows are shut when appropriate. Based on the documents, the EcoTeam has never lost marks on their walkabout activity. The teacher moderators

emphasized how the students take on a leadership role and complete the walkabout independently of teacher assistance. The Science teacher moderator explained the process of the walkabout:

We have a checklist and students go around and take a sampling of classrooms. They peak in to see if anyone is in there and if the lights are on or off. Then you report the data. That's your initial walkabout and then you have a baseline with which to compare it with later. (Science Teacher, January 2016)

Although the steps of the walkabout were described to the students before they completed the task, there was no discussion on the rationale behind this task. Based on the documents, the results of the walkabout and goals to conserve energy should be communicated to the school. However, the EcoTeam students were not observed discussing the results of the walkabout or creating an announcement. In addition, the Eco bulletin board was not updated between January and May. One student mentioned that the EcoTeam used to post a tracking sheet on the front of every classroom door. The Technological Studies department head commented, "It was definitely a good reminder. I think it was important to remind teachers to help build conservation habits" (Technology Department Head, May 2016). This strategy was not used this year.

A few staff members suggested this approach may not have been well received by all staff members. The EcoTeam should also create an Action Plan to work towards reducing the amount of energy used in the school. I did not observe the EcoTeam develop an Action Plan for energy conservation. The EcoTeam does send reminders to staff and students to conserve energy. As previously mentioned, there is a daily announcement by

the Chaplain to turn off lights and electronics at the end of the day and lights off stickers are posted beside every doorway light switch.

Positive Outcomes in Implementing the Energy Conservation Section

Student learning outcomes. Although there were some concerns with the energy walkabout activity in terms of meaningful conservation and the reliability of the data, there were reports of positive learning outcomes for students. A few students commented on how the energy walkabout made them reflect on their personal habits. Unis explained,

I think when you leave something plugged in its still taking energy. I've gotten into the habit of unplugging something that I've stopped using. I do that even if it's something that I'll use in a few hours because I don't want to waste energy.

(Unis, EcoTeam Student, March 2016)

The principal also emphasized the multi-faceted learning outcomes that can come from the walkabouts, including environmental benefits, monitoring strategies, and human nature in terms of following conservation practices. Another staff member also pointed out the learning opportunities when students calculate the trees needed to offset lighting the school. The Environmental Science teacher explained, "I think they need to see that to have some kind of emotion because if they don't, they just won't care if they don't know.

I think when they relate it to how many trees I think that's very effective"

(Environmental Science Teacher, May 2016). One Grade 9 Science class completed the Lighting Assessment activity as part of their electricity unit. However, the EcoTeam students did not analyze the results of the Lighting Assessment.

Staff encouragement of conservation practices. All teachers I interviewed could describe a strategy they were using to follow conservation practices in their

classroom. Teachers described using one set of lights or using natural lighting to conserve energy. The Social Science head teacher explained, “I teach with the lights off for the most part. If we’re not using computers, they’re all off. Before I leave the room I always shut the monitor off” (Social Science Teacher, May 2016). Another teacher said he turns his room temperature down to conserve energy in the winter. The head of the Technology Department explained that he “collaborated with the computer tech to make sure computers sitting unused for a while go on sleep mode” (Technology Teacher, May 2016). The school Chaplain also reported turning off all the computers at the end of the after school tutoring sessions on her days of supervision in the library. Although the individual efforts of these four teachers are positive, there seems to be a lack of coordination beyond each teacher being responsible for his or her own classroom. For example, the principal brought up the issue of computer labs lacking a strategy to ensure the devices are turned off. If there was no class using the lab during the final period of the day, no one was responsible for turning off these computers.

Challenges Experienced for the Energy Conservation

Lack of meaningful activities for high school students. One main challenge that was strongly communicated by the teacher moderators was the lack of meaningful activities for the high school students. The Science teacher in particular felt strongly that the data from the walkabouts was not significant in terms of energy conservation in the school. She emphasized,

The reality is energy conservation in a meaningful way is done on the level of the construction and the technology that is put into the building. Turning your lights

on and off at this point in time when we use the low-energy lights, that's not where the consumption is happening. (Science Teacher, January 2016)

The lack of green technology and design incorporated into the school renovation was also discussed among teacher moderators during gardening observations. In addition, the Science teacher moderator explained, "Students aren't clueless. They understand that it's not meaningful. We need big real time, big construction based changes to really make it meaningful" (Science Teacher, January 2016).

The teachers also commented that the activities do not help them recruit new students. The Art teacher moderator stated, "We're talking about trying to retain members and make the club fun and make kids want to get involved. Counting light bulbs for most students doesn't sound fun" (Art Teacher, January 2016). The teachers emphasized that to engage students they would rather be planning an event so they could provide a rich experience for all the students in the school. According to the Science teacher moderator, "Even knowing we've improved by whatever percent, I don't think that's an engaging statement. Whereas, we did an event that fed a thousand people and we generated zero waste, that's more impactful" (Science Teacher, January 2016).

The teacher moderators also brought up some issues with conducting the energy walkabout in a high school setting. The Science teacher explained,

I think those activities are easy to get excited about in the elementary school. Everybody's on recess at the same time and everybody's on lunch at the same time so making those decisions of 'oh your lights aren't on or your lights are on' are a lot more black and white. In a high school, when are you going to go around and count whether the lights are on or off? There's no one period where

everybody's on lunch. (Science Teacher, January 2016)

Another issue illuminated by a student is the value of the data that are collected. Hanna explained,

I'm not going to lie. We normally looked at the classrooms where the lights were turned off. We did it because, unfortunately, a lot of them actually had the lights on. We tried to make our school look better so we targeted towards rooms that had the lights off. (Hanna, EcoTeam Student, March 2016)

Lack of awareness of school goals to conserve energy. The EcoTeam should communicate goals for energy conservation and create an Action Plan to work towards achieving those goals. During the eight observations that were conducted, an Action Plan to conserve energy was not created by the EcoTeam members. Staff members asked to talk about school goals to conserve energy were unaware. The head teacher of the Social Science department stated, "No. I have seen the walkabouts, but I'm not familiar with their goals or their action plan from there" (Social Science Teacher, May 2016). The program activities describe creating an action plan, but only the certification documents for Platinum level require three goals and a written action plan to earn points.

Student Involvement in the Energy Conservation

As mentioned above the students are involved in conducting the energy walkabouts of the school and one Grade 9 Science class completed the Lighting Assessment Activity. Communication of the energy conservation goals by student members of the EcoTeam was not observed. The documents claim that students used announcements and the Eco-Bulletin Board to report the results of the Energy Walkabout. Students did talk about making announcements to the whole school during their interviews, but the bulletin board was not

updated this year. However, on the walkabout students did say that they make the graphs of the results that get posted on the board. The graphs on the board were from the previous year. In terms of the Energy Conservation section, there are no other significant ways that students are involved in this section of the program.

Overall the Energy Conservation section involves a few activities in which students can take a leadership role and learn to reflect on their own conservation behaviour. Despite the potential for leadership and learning, participants expressed concerns about the value of the activities for this section. Other staff members were engaging in conservation practices in their own classrooms; however, no strategy existed for shared computer labs.

Waste Minimization

The Waste Minimization section focuses on the daily routines and operational practices that work to reduce the impact on the environment through waste reduction. Criteria include printing on both sides of paper, using electronic communication, reducing food waste, establishing “Good on One Side” (GOOS) paper bins, having waste-free events and meetings, and maintaining a school-wide recycling system for paper and containers. The main themes include conducting the waste walkabout and the school-wide audit, administrative support of waste minimization practices, staff encourage waste minimization, lack of meaningful activities for students, cafeteria waste challenges, and student monitoring of waste minimization around the school.

Implementation of Waste Minimization

Conducting the Waste Minimization walkabout. The Waste Minimization Walkabout is conducted to check for contamination in the garbage and recycling bins. According to the document analysis across 5 years with whole portfolios, the EcoTeam

has never lost marks on the waste minimization walkabout. The teacher moderators once again emphasized how the students independently complete the waste minimization walkabouts. The teachers shared the tip that they have the students complete the energy walkabout and the waste walkabout at the same time. This ensured that they get three walkabouts done and they have time to focus on planning whole school initiatives, which they believe are more engaging and impactful for the school. Before students independently conducted the waste walkabout around the school, the lead Science teacher explained the process of completing the task but there was no discussion on the importance of this activity.

School-wide waste audit. Based on the documents, the School-wide Waste Audit requires students to estimate the contents of nine bags of recycling and nine bags of garbage from around the school. This year one teacher moderator had her grade 9 Science class complete the School-wide Waste Audit. The teacher moderator emphasized the curriculum connections for the Lighting Assessment activity, but no discussion about the relevant connections with the Waste Audit and the Grade 9 Science curriculum was brought up during EcoTeam meetings.

The teacher moderators shared several tips on how to ensure this activity is successful. One week before the audit, a teacher moderator will talk with the head custodian to ensure that clear bags are placed into nine garbage bins and nine recycling bins in various locations around the school on the day of the audit. To be more efficient the Science teacher moderator explained, “We would go around and weigh the garbage in place rather than gather it all together in one spot” (Science Teacher, January 2016). The teacher moderators explained how this saved them time and effort from transporting bags

of garbage and recycling to one central location. The Science teacher explained, “For the waste audit we don’t make them go thru the garbage. They just have to pick it up and be able to sort and say ‘this is 10% or 90% paper.’ The clear bags are important!” (Science Teacher, January 2016).

The final step described in the documents for the waste audit is the creation of a Waste Minimization Action Plan. Unfortunately no discussion about an Action Plan was observed during the EcoTeam meetings. Based on observations, the data that the grade 9 Science class collected was not shared with student members of the EcoTeam. According to the documents, the results of the waste audit from previous years have been communicated to the school through announcements and the EcoTeam bulletin board. The documents for this year do not indicate any strategy that was used to share the School-wide Waste audit with the school.

Positive Outcomes of Waste Minimization

Administrative initiatives to reduce waste in the school. The current principal has been the administrative member of the EcoTeam for the past 5 years. The teacher moderators, EcoTeam students, and other staff members all talked about the support the principal has given to the EcoTeam. According to the teacher moderators, administration took a strong leadership role over paper minimization. As one teacher explained,

They put restrictions on the amount of paper being used so it forces you to adapt your teaching style if you are still using a lot of paper. You have to be creative and figure out ways that are better for the environment. (Social Science Teacher, May 2016)

Each teacher is limited to 10,000 copies each year, whereas in prior years a few teachers

were using upwards of 200,000 copies. The principal also invested in a Paper-Cut™ software tracking system so he could follow up on paper reduction goals. The system allows teachers to see their total prints every time they print something at the school. A few staff members also mentioned that the students have printing limits too. Teachers were supportive of these initiatives, as one explained, “I think it sometimes makes teachers uncomfortable because they actually have to start thinking about how much they are photocopying. But without getting uncomfortable, change will never happen. I think it is wonderful to make teachers more aware” (Environmental Science Teacher, May 2016).

The principal also required teachers to have a class website to reduce paper-based teaching, engage students in technology, and save money. The principal also acts as a leader in environmentally responsible practices:

I led by example in all of our management council meetings. They used to get agendas and I would hit the copier and they would get printouts of everything sitting in front of them. Everything now is PDF, everything now is LCD. I don't do any meetings anymore with paper. All of our meetings are paperless.

(Principal, February 2016)

The five other staff members fully supported this change to paperless staff meetings. Instead of printing out staff meeting agendas, the minutes are emailed to the staff and posted to a shared drive for the whole school. The practice of emailing information has also extended to the school mass run by the Chaplain: “I used to print out a piece of paper for every teacher for masses. I don't do that anymore. I send it electronically and they can look it up themselves” (Chaplain, May 2016).

Staff encouragement of waste minimization practices. Along with the efforts of the principal to minimize waste in the school, every other staff member I talked with could describe how they work to minimize waste in their classroom. The teacher from the Technology department talked about reusing old electrical components and producing very little waste. All of the other staff members talked about encouraging students to use recycling bins properly in their classrooms.

The school Chaplain talked about maintaining a GOOS paper bin and encouraging students to use GOOS paper in the after school program in the library. GOOS paper bins were observed in strategic locations around the school, such as beside the photocopying machine in the staff room, in the library, and in many classrooms throughout the school. One teacher explained,

We only have printers in the staff room, so we have a GOOS paper bin there. I know in the library we use GOOS paper quite often. When I'm tutoring, it's the first thing I reach for. I like doing that so students know that it's there.

(Technology Teacher, May 2016)

Staff reported other strategies to minimize paper usage. Two staff members described how they tried to implement paperless courses. The Grade 11 Environmental Science course was completely paperless. The teacher explained how she posted class notes to her website and generated tests using an LMS website. The head of the Technology department also reported going mostly paperless for the past 15 years, using a computer lab to teach and his website. A Social Science teacher described having students email their assignments to her and giving feedback online. The Mathematics department head stated, "Everyday I'm handing out a lesson. It's tough. The only thing

we've tried to do is really condense lessons so it's one page front and back and less paper is wasted" (Mathematics Teacher, May 2016). She also described students using dry-erase table-tops and allowing students to take pictures of big examples on the board.

Challenges Experienced for the Waste Minimization

This section has two overlapping challenges with the previous section on Energy Conservation: Lack of Engaging Activities and Lack of Awareness of the Goals to Minimize Waste. The Lack of Engaging Activities theme will be described in detail below, as some unique challenges exist for the waste activities. The Lack of Awareness of the Goals to Minimize Waste will not be thoroughly described again because the message is repetitive. Consistent with the Energy Conservation section, other staff members were unable to describe the goals or the action plan to minimize waste in the school. The two themes that will be described below include the Lack of Engaging Activities for the Waste Minimization section and Cafeteria Waste Challenges.

Lack of engaging activities for the Waste Minimization section. The teacher moderators made comments about the waste activities for students not helping to bring new members to the club. The Science teacher explained,

When you have 10 kids and they come out and you're like we could go and plan an event or we could go around and weigh the garbage it's painful. We have single stream recycling anyway, so it doesn't matter if there's paper in the bin.

The kids ask, "do we have to do this?" (Science Teacher, January 2016)

The teachers emphasized that they would rather be planning a waste-free event instead of weighing the garbage.

The value of the data was also questioned by the teacher moderators. The Science

teacher stated, “It’s incredibly easy to manipulate. If we pick a day in April and if that day is 25 degrees, our garbage is down by 50%. It took us about 3 years to realize everyone had gone out for lunch” (Science Teacher, January 2016). The teachers said this fallacy in the data is difficult to control when the weather is variable. The challenges specific to a high school setting were also highlighted by the teachers. The Science teacher emphasized,

When it’s a little elementary school when there’s one garbage can where they’re all eating their lunch in the room, you can go around and get 12 garbage cans and it’s much easier to manage. But here we have to pick up all the classroom garbage and everything from the cafeteria. It’s a huge job. (Science Teacher, January 2016)

Cafeteria waste challenges. Comparing 5 years of whole portfolio documents, one of the top challenges based on points lost is minimizing food related waste. According to the documents, their organic bins were fully operational beginning in 2013-2014. When asked about the cafeteria this year, the teachers explained that they have been using the compost bins for their garden instead. The Science teacher moderator explained,

Summer came and the organic bins disappeared. By the time we got around to finding them, the wind had been out of the sails. Management didn’t have a contract. They were doing it but I think they decided we’re not doing it anymore. (Science Teacher, January 2016)

When the students were asked about the challenges of being a member of the EcoTeam, two students spoke about composting. Alex stated, “We did have compost bins, but I

don't think we do anymore. I don't know why they would be removed. I would like to see them added to classrooms, not taken away from the cafeteria" (Alex, EcoTeam Student, March 2016). The cafeteria materials are also beyond their control. The Art teacher moderator explained, "Our cafeteria is run by an outside company that comes in. It would be nice if we could make sure everything was biodegradable, but again it's an outside company that has control" (Art Teacher, January 2016).

Other staff members also recognized issues with food-related waste. The principal explained, "It's tough. You do need to educate, you need to monitor, and you need to hopefully get them to a point where they're doing it as part of regular practice" (Principal, February 2016). The head of the Mathematics department noticed that many students buy lunch instead of bringing their own in reusable containers. Alex, a senior EcoTeam student, talked about his elementary school's initiative for zero-waste lunches, but no campaigns at the high school. During the eight observations, no discussions were focused on how to minimize waste produced in the cafeteria.

Student Involvement in Waste Minimization

Students participate in two activities for this section of the program: the Waste Minimization Walkabout and the School-Wide Waste Audit. This year the student members of the EcoTeam completed the three Waste Walkabouts involving 10 classrooms. They were also involved in advertising for two campaigns, their battery recycling and clothing drive, which both focused on diverting materials from the landfill. The School-Wide Waste Audit was completed by one Grade 9 Science class.

Students around the school are also involved in the school recycling program. According to the documents and interviews with multiple participants, a few students

from each classroom bring down the recycling every Tuesday and Thursday. Based on the 2013-2014 Waste Action Plan the EcoTeam decided to use “frequent collection (Tuesdays and Thursdays) to minimize time for contamination.” The EcoTeam analyzed the change in contamination and reported in the document reflection: “We noticed a decrease in contamination. We feel the increased collection helped this as we noticed full bins tend to collect more trash (when one piece of garbage is there already people add more)” (Waste Action Reflection Document, 2014).

Overall the Waste Minimization section highlights some of the challenges that are specific to conducting a Waste Audit in a secondary school and also beyond the control of the EcoTeam in terms of organic food pickup and materials used in the cafeteria. The students get to take a lead on the Waste Walkabout and one Grade 9 Science class completed the School-Wide Waste Audit. The principal has encouraged waste minimization by limiting paper of staff and students, requiring staff websites, investing in paper-tracking software, and leading paperless staff meetings. Staff members also use GOOS paper bins, implement paperless courses, have students email assignments, and condense daily lessons to reduce paper.

School Ground Greening

The School Ground Greening section focuses on how the school encourages outdoor learning and projects that increase biodiversity on school grounds. Criteria include engaging in greening projects that improves biodiversity or creates useful shade, involvement of students and community members, and greening projects enriching student learning. The predominant themes include strategies for successful greening

projects, rewarding experiences for EcoTeam students and teachers, greening projects lack school-wide support, and student roles in greening projects.

Implementation of the School Ground Greening Section

The first phase of implementing the School Ground Greening section is planning. The teacher moderators talked about getting support from an expert. “Our board requires us to have an overall plan and our horticulture teacher helps us with a vision of proposed trees and where they would go and we use that” (Science Teacher, January 2016). The teacher moderators explained that each year they tackle a small section of their overall plan so it is manageable. This year the Science teacher moderator pitched the idea of creating a butterfly/pollinator garden and the other teacher moderators agreed. Students were not consulted on this decision.

For the first day of garden work in spring, the Horticulture teacher was observed taking a lead role. He was directing EcoTeam students on how to properly pull weeds and confirming with the Science teacher about tree planting locations. The Art teachers let the Horticulture and Science teacher make final decisions and instruct students on the tasks in the garden.

In terms of materials, the Art department head teacher moderator stated, “Most of our trees come from donations to the point where we don’t have to purchase them. A lot of donators have approached us so we haven’t had to seek out opportunities, which is wonderful” (Art Department Head Teacher, January 2016). This year the EcoTeam asked for donations of drought-tolerant species for their garden and used school funds to get milkweed from a local supplier that the Science teacher found.

To help plant the butterfly/pollinator garden, the Art teacher moderator suggested they recruit students who still need volunteer hours. A sign-up sheet was put on a teacher moderator’s door and approximately 20 student volunteers helped plant and water the

new garden with the EcoTeam. The custodial staff weeds and waters the garden during the summer.

Positive Outcomes of School Ground Greening

When students and teacher moderators were asked about the most rewarding part of being involved in the EcoTeam, they consistently talked about projects related to greening. The Science teacher stated,

I really enjoy the community planting opportunities because it's very concrete and the rewards are right there. Last year we did a huge patch of wildflowers and dozens and dozens of native trees in a local park, so those rewards are long lasting. (Science Teacher, January 2016)

The Art teacher moderator mentioned that the EcoTeam implements other successful initiatives that run for one day or one week and students tend to forget about them, whereas “tree planting is nice because every year the trees grow and in the future students can be reminded of their contribution” (Art Teacher, January 2016). EcoTeam students also described how rewarding it will be to see the growth of the trees they planted. Alex explained, “I like the idea of driving by in 30 years and seeing these giant trees that we planted. It will be rewarding to see all the change that has happened” (Alex, EcoTeam Student, March 2016). The theme of school beautification also came up with three student members of the EcoTeam and the principal as being a rewarding outcome. Hanna explained, “When you're taking out the weeds and you look at it, it just looks better than before. I think that's the most productive thing that we've really done is just gardening and making our school look beautiful” (Hanna, EcoTeam Student, March 2016).

Challenges Experienced for the School Ground Greening

Lack of focus on student learning. Observations of the greening projects at the school revealed a stronger focus on participation of students as opposed to student learning.

The knowledge that students have acquired from participation in greening projects was not strongly communicated or observed. When asked to describe what they have learned students gave short answers which included gardening skills, the difficulty of weeding, and that teamwork is essential. No specific environmental knowledge was shared by the students.

Based on observations, work in the garden was not paired with conversations about the ecosystem or environmental issues that may relate. This was especially evident during the butterfly/pollinator gardening sessions. Teacher moderators did not describe the concerns about Monarch butterflies and the health of pollinators. Instead the Art teacher moderator vaguely stated that their garden would help these species. Conversations with students who were volunteering during the planting revealed some students who were unaware of the importance of milkweed for Monarchs and the threats facing pollinators.

Garden initiatives lack whole school support. Observations of the EcoTeam during the spring highlighted the challenge of their expanded garden since a recent school renovation. Teacher moderators emphasized the important tip of keeping garden projects small so they are manageable. The Science teacher explained,

We have limited bodies. The weeds within one week go from zero to a forest of weeds. Our principal weeks ago said in the spring some of our budget is going towards professional help in that department because it's gotten so big, we can't do it with our little club. (Science Teacher, January 2016)

One strategy the teacher moderators described was trying to get each department in the school to be responsible for a section of the garden. The teachers hoped this would get more students involved in the garden and help them do more than just maintenance. Alex explained,

I know at one point what we wanted to do for the garden is section it off so each department has a part of the garden. We didn't have enough interest from the other departments unfortunately. I think Science and Art were in, which was the lead teachers from our club and Special Needs wanted in. But the other departments weren't too keen on it. So if we had interest from them we could do a lot more. (Alex, EcoTeam Student, March 2016)

Unfortunately the only departments that were involved in maintaining the garden were Science department, Art, and Special Needs. Another challenge was the criteria of the program encouraging teachers to do activities that they feel are not completely necessary. The Science teacher moderator stated,

I just wonder how much is enough? Where do you stop? We could let the trees grow and in 10 years, we'll be a really "greened" school. There's a ton of trees out there. But for the program okay let's squeeze one over here and let's squeeze one other there. And again, I would rather be running some other activity.

(Science Teacher, January 2016)

Student Involvement in the School Ground Greening

Based on observations, the students participated in a variety of tasks for the School Ground Greening section of the program in spring 2016. Students were observed weeding, planting, watering, removing dead trees, and composting plant matter. During interviews, students mentioned that in previous years they helped to decide the design and types of plants to incorporate in their school garden, however sometimes plants are donated without student input. This year, the garden plans were made by the teacher moderators in collaboration with the Horticulture teacher. During the butterfly and

pollinator garden project students from the EcoTeam and student volunteers from the school participated in planting and watering the new garden. In particular, students from the Special Needs department helped weed the garden before the butterfly and pollinator garden was put in. Beyond the school, seven EcoTeam students participated in the annual Arbor Day community event where they collaborated with other secondary school EcoTeams to plant approximately 50 trees native to the region. This was the only community event the EcoTeam participated in throughout the school year.

Overall the School Ground Greening section highlights how the EcoTeam uses support of experts to help plan and work in their school gardens. They received material donations from community groups, despite the lack of support from departments throughout the school. Students take on a variety of roles for the school greening projects, and participate in one community planting event each year. Student participation was emphasized over student learning during greening projects.

Curriculum

The Curriculum section focuses on how students learn in, about, and for the environment in their classroom. Criteria include seven curriculum samples of students learning over at least two class periods with one copy of completed student work. Off-site environmental field trips can also be claimed in this section. The main themes included: collecting curriculum samples, sharing EE resources within the school, obstacles to teaching EE, and EE rarely reported in classes beyond Science. The Student Involvement category is not included in this section because there are no actions for the EcoTeam students to complete.

Implementation of the Curriculum

Implementation of the Curriculum section was completely teacher-driven. The Art teacher moderator questioned the purpose of this section, stating that “*EcoSchools* should be more of a student-driven thing and then this ends up being more teacher-driven. Why is it even in there? We’re all doing it, it’s being taught, it’s part of the curriculum, and it’s an expectation” (Art Teacher, January 2016).

To collect samples the teacher moderators communicate at their staff meetings what they need:

Early in the semester, maybe at our next staff meeting we’ll say “I need this, it needs to be taught over two periods and if you could take a picture of whatever the kids are doing and email it to me.” I’ve even gone so far as, just give me the lesson and I’ll find the expectation because it’s not hard to back-track that way.

(Science Teacher, January 2016)

The teacher moderators often use their own curriculum samples to make the collection easier on them. The Science teacher explained, “It’s far easier for us to sit around and say ‘she’s got these two, I’ve got these two, I’ve got these three, we went on this field trip, done.’ I think it works out really well” (Science Teacher, January 2016). A conversation was observed between the Science teacher who completes the documents and the Art teacher moderator regarding curriculum samples a few weeks before the certification document deadline. Two lessons were still needed to complete the seven submissions that are required. Based on the documents from this year, six out of the seven curriculum submissions were from EcoTeam teachers.

Positive Outcomes of the Curriculum Section

Based on the curriculum samples over 5 years of whole portfolio documents, students have had a variety of opportunities to learn about/in/for the environment. For instance, students have built solar cookers and vermicomposters, created eco-friendly art and designed their own green dream home, presented environmental world issues in school prayer services, calculated the environmental impact of plastic water bottles, and analyzed the species in a local forest (see Appendix G for example lesson submission). Student learning outcomes are most evident in Science, which is the most frequent discipline featured in the data over 5 years. To encourage other disciplines to explore environmental lessons, the teacher moderators created a folder on the shared drive at the school. This initiative was only brought up by one staff member not a part of the EcoTeam. The head of the Technology department explained,

They were looking for each department to develop a little bit of curriculum or lesson plans around conservation. We have a shared drive at the school. If you didn't have something you could take it from the drive and see if you could use it in your class. It was done to try to get everyone on the same page. (Technology Teacher, May 2016)

Challenges Experienced for the Curriculum Section

Obstacles to teaching EE. Staff members talked about the obstacles to teaching EE within a packed curriculum. The Social Science teacher stated,

I think it's more just having the time to fit it into the curriculum. Civics is a half credit so it's already very condensed. Finding the time to add on and take it that

step further to address EE is probably the biggest challenge. (Social Science Teacher, May 2016)

The Environmental Science teacher emphasized how one unit may not be enough to impact students:

Every day that I'm with them I can teach environmental education, whereas in biology class I have to cover other curriculum. In the Environmental Science course they have a whole year of exploring different topics and I think by the end they really get it because they had so much of it. But just having one unit makes it very difficult to inspire changes. (Environmental Science Teacher, May 2016)

Another obstacle that teachers described was our consumer-based society and how it makes environmental messages less attractive to students. One teacher explained, It's a society where we are consumers and they don't want to give up that consumerism for environmental efforts. They have a big problem with that, like buying all the brand name clothes. They don't want to sacrifice that. They don't like the thought of conserving. It's hard when you have all the advertisements telling the kids that they need this or that. That's hard to fight and encourage kids to make changes. (Environmental Science Teacher, May 2016)

Some teachers commented on the interest students have in environmental issues during classroom lessons, but they still recognized our consumer-driven society as a major challenge. For example, the school Chaplain described student attitudes during the school clothing drive. She explained that students may think, "It's okay for me to donate clothes but I'm not so sure I'm comfortable shopping at a second hand store" (Chaplain, May

2016). Despite these challenges to teaching EE, the other staff members said the school has never had any environmentally focused Professional Development.

EE rarely reported beyond Science courses. Document analysis revealed a strong prevalence of Science curriculum samples over any other discipline. Out of the past 35 submissions over 5 years, 23 contributions were from the Science department. In comparison, there were only four Art lessons, five Mathematic lessons, one English lesson, and two lessons from the Social Science department. When students were asked if their classroom teachers focused on environmental lessons, they consistently reported lessons from Science class. Alex explained, “I find they don’t really focus on it. You won’t find that in a Math class. The odd Science class, sure. But as far as your more English, Math, your core stuff, you’re not going to find that there” (Alex, EcoTeam Student, March 2016). Student volunteers who were working in the butterfly/pollinator garden also reported that EE occurred only in their Science classes. EcoTeam students also pointed out how EcoTeam teachers do incorporate EE, but few of their other teachers do. Alex stated, “Not so much in the typical classroom. I mean if the class is from an Eco Teacher, then there is evidence of it there” (Alex, EcoTeam Student, March 2016). The document analysis from 5 years of whole portfolio documents also shows that 77% of all curriculum submissions were from EcoTeam teachers.

Overall the Curriculum section of the program revealed how EcoTeam teachers often rely on their own samples of EE curriculum to complete this section. Other staff members talked about the challenges to incorporate EE due to limited time, a lack of curriculum focus beyond a single unit, and fighting messages from our consumer-driven society that may deter students from internalizing environmental lessons. Students

identified the dominance of EE within science lessons and a lack of EE in other disciplines and from teachers outside of the EcoTeam. To encourage the whole school to incorporate EE into the curriculum, the teacher moderators created a shared folder for staff to share their own EE lessons.

Environmental Stewardship

This section focuses on how the school encourages Environmental Stewardship through whole-school and community actions. Criteria for initiatives include a clear connection to environmental learning and engaging the whole school in an action focused on an environmental issue. These projects cannot be initiatives that have already been allocated points (e.g., greening projects, lights and electronics off, general recycling). The predominant themes include strategies for stewardship initiatives, lack of initiatives with whole school participation, environmental issues require clarification, and student roles.

Implementation of the Environmental Stewardship Section

A consistent theme communicated by the teacher moderators was their desire to be spending more time on stewardship projects because they recognized the value for students. Teacher moderators talked very positively about stewardship projects. The Science teacher explained, “They’re high impact, memorable, and real actions for change. I think that’s what kids like. They want to see real impacts” (Science Teacher, January 2016).

At the beginning of the year all members of the EcoTeam brainstorm potential projects. Rodrick explained, “Earlier in the year we have brainstorming sessions. What did we do last year that we enjoyed and what new ideas do we have for this year? We split into groups and look up projects online” (Rodrick, EcoTeam Student, March 2016).

The teacher moderators explained that there are annual events and they are also open to new opportunities throughout the year. The Science teacher stated,

There are some initiatives that happen year after year. We know that there is an Earth week and an Earth hour every year. And then if something comes up, like the battery recycling came up, we bring it to the students. The students were on board so we got involved with that. (Science Teacher, January 2016)

Based on the document analysis of projects implemented over the past 7 years, repeating initiatives include electronics recycling, battery recycling, rain barrel sales, and earth hour campaigns to conserve energy (see Table 6). The EcoTeam has also done an initiative each year that diverts materials from the landfill. For example, for the past 3 years they have organized a Clothing Drive to recycle textiles and donate second hand clothing. The clothing drive, electronic recycling and battery recycling projects are all organized through community groups that supply posters and pick up materials that are collected. The teacher moderators explained their strategy with these types of collection initiatives:

We just found that once we introduced something the first year it was huge and then slowly it got less popular just because everyone in the community had brought in their recycling. So we are starting to realize that maybe we can't do the same initiatives every year and maybe vary it a little bit. (Art Teacher, January 2016)

The teacher moderators also talked about forming partnerships with other clubs in the school. The Art department head teacher stated, "Try to create partnerships. We work together with the Chaplain's Crew and the Social Justice Club for events like the

Table 6

Stewardship Projects Completed at Trillium Heights S.S

Year	Energy and waste management	Re-use projects	Recycling collections	Other
2015-16	Earth hour	–	Batteries; clothing	Succulent plants
2014-15	Earth hour; yard cleanup	Rain barrel sales	Clothing	–
2013-14	Earth hour	Reusable gift bags	Electronics; clothing	–
2012-13	–	Rain barrel sales; reusable gift bags	Electronics	–
2011-12	Organic bins	Rain barrel sales	Cell phone/ batteries	Green Art show
2010-11	Earth hour	Reusable water bottles	Cell phone/ batteries	–
2009-10	Earth hour; yard cleanup	Milk bags into sleeping mats	–	–

Clothing Drive so we don't make extra work for ourselves" (Art Department Head Teacher, January 2016).

The EcoTeam has used a variety of methods to communicate their events to the school including announcements, Eco Bulletin Board, posters, Twitter, school newsletter, staff meeting updates, emails to staff, brief presentations to classrooms, automated calls to parents, community newspaper articles, and community flyers. Table 6 illustrates the Stewardship projects from the past 7 years.

Challenges Experienced for the Environmental Stewardship Section

Lacking events that get the whole school involved. Document analysis trends revealed that the EcoTeam tends to organize campaigns that result in optional participation. For example, the clothing drive, battery recycling and earth hour projects did not involve the whole school. Individuals could decide whether to donate clothing or batteries, and each classroom teacher could partake in turning off classroom lights depending on their plans. When asking the other staff how the EcoTeam could improve, many talked about having events that got more participation and visibility in the school. The Social Science department head explained,

A suggestion would be just doing some initiatives to get more students involved. I would say even having a couple of rallies each year in the sense that you are doing something collectively. So like a cleanup, which we do in the spring, but not necessarily the whole school. Or a competition between classes for reducing waste or the best recycling, just something that would make more students think about it on a daily basis. (Social Science Teacher, May 2016)

The school Chaplain also commented that the clothing drive and battery recycling projects are good; however, events where the whole school gets together to address a relevant environmental issue would bring much more awareness.

Environmental issues need to be the focus. Another key challenge observed was the need for more emphasis on the environmental issue(s) connected to a project. The Environmental Science teacher explained how she has covered stewardship projects in her class so students do make the connection:

I know that when we were having the rain barrel sale we were talking about water conservation and why it was important to have a rain barrel because sometimes kids don't put two and two together. They know that rain barrels are environmentally friendly but they don't understand how it helps. I try to make it more clear to the students. (Environmental Science Teacher, May 2016)

Other staff members were not comfortable addressing environmental issues without guidance. For example, the Mathematics teacher explained how she did not use the potted succulent plant given to each classroom teacher on Earth Day by the EcoTeam:

I haven't really spoken about it. Maybe they could have also provided what we could have said about it or done about it. I think some teachers like me maybe don't feel comfortable to just initiate a conversation without facts. (Mathematics Teacher, May 2016)

A good example of the EcoTeam lacking focus on an environmental issue was observed for Earth Day. During the planning for Earth Day, teacher moderators ensured that they had the budget and the activity would be fun for students. There was no conversation about any specific environmental issue. When the EcoTeam was completing the certification documents, one student questioned the relevance of giving potted

succulents to first period classes as their Earth Day stewardship project. The student emphasized that she didn't think there was an environmental issue they were addressing. The Art teacher quickly stepped in and said the plants were to remind students that they are stewards of the earth. The Science teacher added that students would also learn about improving air quality with plants. However, neither of these issues was brought up during the planning session.

Student Involvement in Environmental Stewardship

This year EcoTeam students took on a variety of roles to successfully complete stewardship projects. They were actively involved in brainstorming, which was observed during a meeting before Earth Day. Students also helped to advertise their events, which was supported in the documents and was observed as students went around the school placing posters for their Battery Recycling Campaign. They also decorated a giant bin to look like a battery to advertise for their Battery Recycling Campaign. In addition, students talked about reading announcements about their Clothing Drive. This year students also helped build terrariums with succulents and river rocks to give to each first period class on Earth Day.

Based on the document analysis across 7 years, students have had the opportunity to make a few items including reusable holiday gift bags, terrariums with succulents, and a giant battery for the Battery Recycling Campaign. Students have also been involved in selling green items such as rain barrels, reusable water bottles, and gift bags. Student roles mainly include advertising for events such as Earth Hour, School Yard Cleanup, Organic Bin Campaign, Cell Phone and Battery Recycling, and the Clothing Drive. Opportunities to run a project where the whole school is engaged and EcoTeam students' present information to their peers have not been observed in 2015-2016 academic year or reported in the certification portfolio documents.

Overall the Environmental Stewardship section revealed how the students were involved in brainstorming, planning, advertising, and running campaigns and projects at the school. The EcoTeam implemented annual projects while remaining open to new ideas throughout the year. Despite the success the EcoTeam has experienced, they have a history of planning projects with optional participation and this year their Earth Day project lacked an environmental issue.

Overall Trends of the *EcoSchools* Program

Analysis of the data also revealed two main themes that do not fall under a specific *EcoSchools* program. These themes were: competitive nature of the program and overall student learning outcomes.

Competitive Nature of the *EcoSchools* Program

Comments made by the teacher moderators emphasized how the nature of earning points and maintaining their status as a Gold certified *EcoSchool* has influenced their decisions. When the teacher moderators were asked about what resources they use to implement the program the Science teacher explained,

We only use the *EcoSchools* resources. We use the templates and activities that are on the program site just because we know those will count towards the points. So we're not going to invest time in something that might not work. (Science Teacher, January 2016)

When asked how they would improve the program, the teacher moderators brought up the emphasis on competition. The Science teacher explained, "I think they should take away the quantification of Gold, Silver, and Bronze. It's really not a competition. We are in a board where everybody's doing the program so it's not enough to be in it; you've got to be Gold" (Science Teacher, January 2016). The teacher

moderators also talked about wanting to spend more time on Stewardship projects instead of counting the lights or sorting the garbage, however they described completing those tasks anyways to collect points needed for Gold. When describing the advice given to a colleague asked to run the EcoTeam at another high school, the Science teacher explained,

I get calls at the beginning of the year like “I got moved to this school and I’ve got to run the EcoClub and I need to be Gold, the principal said I have to be Gold.” I said “focus on the waste minimization section because that is where you are going to lose points.” (Science Teacher, January 2016)

When other staff members talked about hearing goals from the EcoTeam teachers in staff meetings, a few said they hear it from the perspective of “this is what we have to do to improve and make sure we earn Gold” (Chaplain, May, 2016). The principal also mentioned conversations with the EcoTeam teachers about specific criteria, such as computer monitor strategies, in order to target criteria and earn points.

Overall Student Learning Outcomes

When teacher moderators were asked what EcoTeam students learn from their participation in the club their answers were very general. The Art teacher stated, “It really gives them an opportunity to build friendships, learn leadership within their peers, and I think it helps them build some character” (Art Teacher, January 2016). The EcoTeam students mentioned learning from personal reflections on their conservation behaviours, developing strategies to encourage others to follow environmental practices, and gaining skills in organizing events. Mario, a Grade 12 student who has been a member since Grade 9 explained,

I think I have learned how to organize things better with all the initiatives we have done. I feel like I was already pretty aware of environmental things, like recycling. ... If anything I have learned lawn maintenance and organization skills, brainstorming, that sort of thing. (Mario, EcoTeam Student, May 2016)

Hanna, a Grade 9 EcoTeam student provided a slightly different response by stating,

I have learned that not a lot of people are interested in environmental stuff, and also that the gardens are actually student-run. I've learned that we want to try to make our school seem good, so we are a bit biased when it comes to information. (Hanna, EcoTeam Student, March 2016)

When students were asked about what environmental issues they have learned about in the club, the students stated they were already aware and had learned nothing new or they brought up the Envirothon. For example, Alex, a Grade 12 EcoTeam student, replied:

I find that our own education on environmental issues is done best with Envirothon. As the special topic changes every year, we go in depth on something new every year. As an EcoTeam, we educate other students about environmental issues like recycling, power usage, waste, and tree planting. We don't spend much time educating ourselves past this. (Alex, EcoTeam Student, March 2016)

Summary

This chapter has identified and described the themes from document analysis, observations, and interviews. The comparison of points earned in the certification documents across 7 years revealed that the EcoTeam struggles to encourage others to turn off lights and computer monitors when not required, and reducing cafeteria waste is the

most significant challenge of the program. The EcoTeam has consistently earned a high level of points for the Leadership and Teamwork, School Ground Greening, Curriculum, and Environmental Stewardship sections of the program.

Key implementation strategies include using a wide variety of communication techniques, having students conduct the energy and waste audits concurrently, accepting support from the Horticulture teacher and outside community groups for greening projects, relying on EcoTeam teacher curriculum submissions, and running annual stewardship projects under reoccurring themes.

Predominant challenges include reducing cafeteria waste, low student involvement in the EcoTeam, low visibility of the EcoTeam around the school, lack of meaningful activities for secondary students, lack of staff support for school greening projects, difficulties teaching EE, lack of EE beyond Science, and a lack of stewardship projects that involve whole school participation on a clearly defined environmental issue.

Positive outcomes include the inclusion of environmental goals in the School Improvement Plan, environmental practices followed by staff members, administrator initiatives to minimize paper usage, learning opportunities for students, rewarding greening projects, a shared school folder dedicated to EE resources, and a wide variety of successful stewardship projects.

Finally there were a variety of opportunities for student involvement. Students took on multiple roles, including mentoring elementary students, advertising events, conducting walkabouts and audits, developing stewardship projects, working in the school garden, and participating in community planting events.

Organizing themes under the six sections of the program emphasize the unique

implementation strategies, challenges, positive outcomes, and opportunities for student involvement in various capacities of the program. In addition, there were two overall themes related to the whole program, not a specific section. These two themes addressed student learning and the competitive nature of the program. The next chapter will provide a discussion of the main results and recommendations for school leaders and the EcoTeam, the *EcoSchools* program, and considerations for the Ministry of Education.

CHAPTER FIVE: DISCUSSION

This chapter provides a brief summary of a case study of one Gold certified secondary school implementing Ontario's *EcoSchools* program. Following the summary, the key results will be discussed in the context of the current literature on EE. Implications from the study will be presented in terms of future research directions and recommendations for school leadership and EcoTeam members, the Ontario *EcoSchools* program, and the OME.

Problem

Our society is currently experiencing environmental degradation at an unprecedented rate (Intergovernmental Panel on Climate Change, 2014). Problems are not only impacting local ecosystems, problems are being observed on a massive global scale (DiGiuseppe, 2013). To address the environmental challenges that are occurring at a global scale, we must cultivate a generation of environmentally literate citizens. Without citizens who have the knowledge, skills, dispositions, and action competencies to recognize environmental issues and work towards potential solutions, the urgency of the problem will continue to grow (McMillan & Vasseur, 2010; Puk & Makin, 2006). Within this context of pressing environmental concern, schools can serve as one of the main institutions to help mitigate these problems (OME, 2009a).

Despite the positive role that schools can play in educating students about the environment, EE has been largely marginalized in Ontario secondary schools (Puk & Behm, 2003; Tan & Pedretti, 2010; Working Group on EE, 2007). This marginalization is evident in the removal of the stand-alone Environmental Science course from the curriculum in 2000 (Puk & Behm, 2003). A result of this change was the reduction of

time spent on EE, especially within science classrooms in Ontario (Puk & Behm, 2003). In 2007, the Working Group developed several recommendations for Ontario to make EE more of a priority. In response, two stand-alone Environmental Science courses were re-introduced for Grade 11 University/College and Workplace Preparation level both as elective courses under General Sciences (DiGiuseppe, 2013). Although a framework document exists outlining the goals for EE in Ontario, there remains no accountability to ensure that teachers are in fact “infusing” EE into their courses as was intended across all grades and subjects from K-12 (Chowdhury, 2015; Karrow & Fazio, 2015).

In 2002 the Ontario *EcoSchools* program was created to help guide schools wanting to implement a whole-school approach to EE. The OME has supported this program financially³ and stated that it aligns with the objectives for EE in Ontario (OME, 2007a). In addition, in 2016 the Ontario Ministry of Energy announced an investment of \$1.35 million in Ontario to support learning and action for the environment in schools (Ontario EcoSchools, 2017). Despite the growing success of the program, adopted by 36% of schools in Ontario (Ontario EcoSchools, 2017), there remains no understanding of the level of EE currently taking place within schools.

The main problem that grounds this thesis research is that despite so many EE programs in Ontario, the priority of EE in secondary schools remains very low (Tan & Pedretti, 2010). Through a descriptive case study on one secondary school, a better understanding of the actions and learning opportunities for students may be achieved.

Without an understanding of school implementation practices of the Ontario *EcoSchools*

³ In a Newsroom release on May 1, 2007, the OME announced a \$500,000 grant to support the growth and expansion of the Ontario *EcoSchools* program (OME, 2007a). The OME has continued its support of the program, listed in the 2014-2015 Annual Report under “Fundings and Supporters” and identified on the Ontario *EcoSchools* website as a “Platinum Level” supporter (Ontario EcoSchools, 2017).

program, we will not know whether this whole school approach to EE is an effective method for realizing Ontario's EE goals. It is essential that the next generation acquire the knowledge, skills, dispositions, and action competencies in order to address environmental challenges (OME, 2009a). Descriptive research on the implementation of the *EcoSchools* program may help practitioners understand how the program is currently being implemented and reveal possible improvements to enhance student learning.

Purpose

The purpose of this study was to describe the experiences of teachers, students, and administrators in one Gold Certified secondary school implementing the Ontario *EcoSchools* program. The research was guided by the following research questions:

1. How is the *EcoSchools* program implemented in a Gold Certified secondary school?
2. What are the experiences of teachers and administrators implementing the *EcoSchools* program in a Gold Certified secondary school?
3. What is the nature of student involvement in the *EcoSchools* program in a Gold Certified secondary school?

Summary of the Study

This case study used a qualitative research approach to describe the experiences of individuals within one Gold certified *EcoSchool*. Multiple sources of data were collected to construct a detailed description of the successful practices, challenges, and specific implementation strategies used by the EcoTeam within THSS. This study was conducted over 6 months during the 2015-2016 academic year at THSS, located in southern Ontario. Data collection began in December 2015 with analysis of 7 years of

online certification documents, followed by interviews with three lead EcoTeam teachers, the school principal, six EcoTeam student members, and five additional teaching staff not part of the EcoTeam. Key findings from the document analysis were incorporated into the interviews with participants. As interviews were conducted, comments deemed significant were addressed in subsequent interviews. Observations of EcoTeam activities also took place to gain an understanding of the actual dynamics and actions of the team members. Each source of data was analyzed in its entirety to develop codes and group codes into dominant themes, followed by pattern matching across all data sources to identify consistent findings. Key results of the study can be organized based on implementation strategies, successes and challenges, and student involvement.

The first research question focused on the implementation strategies used by the EcoTeam. Some of the key strategies include exercising distributed leadership to encourage eco-actions, running greening projects with the support of student volunteers, using EcoTeam teacher curriculum submissions, and organizing environmental stewardship campaigns based on reoccurring themes.

The second research question focused on the experiences of teachers and administrators implementing the program. These experiences were described in terms of significant successes and challenges. Some prominent successful experiences include the democratic dynamics of the EcoTeam, rewarding greening projects in the school and wider community, and support from administration. Some critical challenges that were described include low student involvement in the EcoTeam and eco-projects, lack of engaging activities focused on energy and waste, low priority for EE professional

development, and a heavy focus on documentation to satisfy the large number of criteria for the certification documents.

The third research question focused on the nature of student involvement in the *EcoSchools* program. Students were observed to take on multiple roles, including participating in weekly meetings, brainstorming for stewardship projects, advertising eco-events, completing energy and waste walkabouts, maintaining the school gardens, and engaging in community tree planting events. In terms of student learning outcomes, the EcoTeam teachers described opportunities to take on leadership roles with their peers and build character. EcoTeam students talked about learning how to brainstorm and organize stewardship initiatives, encourage themselves and others to follow conservation practices, and maintain school ground greening projects. The EcoTeam recognized the challenge of low student involvement on their team.

Discussion

This section provides a critical discussion of the key results, situating them within the current knowledge within the field of EE. The discussion is grounded in the six sections of the program: teamwork and leadership, energy conservation, waste minimization, school ground greening, curriculum, and environmental stewardship. This approach allows for a variety of issues to be compared to the research findings observed in the literature, and address the research questions.

Democratic EcoTeam Dynamics

The key unit of the *EcoSchools* program is the formation of an EcoTeam. This team works throughout the school year to implement the program and encourage the whole school to participate in various campaigns and projects. The power dynamics

within the EcoTeam are important to understand because they can shape the experience of student members (Cincera & Kovacikova, 2014).

Data from interviews and observations at THSS revealed that the EcoTeam operated in a democratic manner during some activities, and relied on the lead EcoTeam teachers to make decisions in other situations. Teachers and students worked collaboratively without a hierarchy of power to determine their projects for the environmental stewardship section. The EcoTeam students described brainstorming project ideas all together at the beginning of each school year. They worked in groups to research eco-projects online before having a discussion to select a new environmental stewardship project. In terms of the other sections of the *EcoSchools* program, the school ground greening section was the only other section where student input was exercised. In the 2015-2016 school year, the lead science teacher decided they would create a butterfly/pollinator garden. Students were occasionally asked to give their input where plants should be located.

The benefits of maintaining a democratic dynamic have been discussed in the literature. Cincera and Kovacikova (2014) describe how the balance between teacher and student control mediates how much responsibility students have in determining what initiatives are implemented. In some schools the teacher decides the task and EcoTeam student members execute it with varying degrees of autonomy. In other schools, students have much more autonomy and feel pride in their initiatives.

The EcoTeam teachers recognized the value of environmental stewardship projects for students. They even suggested that the program be completely project-based, instead of having to complete prescribed activities required for certification. A study

evaluating Eco-Schools in Scotland surveyed secondary students and found that one of the most important aspects of the program was organizing their own activities (Pirrie, Elliot, McConnel, & Wilkinson, 2006). In addition, a study of 15 schools with sustainability learning programs in England also emphasized the value of student autonomy (Gayford, 2009). Using discussions with groups of pupils from primary and secondary schools, one of the top recommendations was to give sufficient attention to pupil voice through student councils where pupils have opportunities for collaborative decision-making and significant control over meetings.

In the present study, students described stewardship projects and school ground greening projects, as rewarding experiences. Perhaps the level of autonomy provided by these activities contributed to this positive description by students. It is interesting to note that the energy and waste sections did not include opportunities for students to provide input. Coincidentally, no student mentioned these activities as rewarding. Although the *EcoSchools* program lists the development of an Action Plan as a final step after conducting the waste audit, the EcoTeam were not observed creating an Action Plan for the academic year. The required Action Plan for Platinum schools should describe three targets the school would like to achieve, actions the school will take, indicators of success, required resources, a timeline, and a reflection on the results which is to be completed at the end of the year (see Appendix H for a sample). Perhaps students could experience more ownership over the energy and waste section if they could provide input into the creation of a school-wide action plan for energy conservation and waste minimization.

Low Student Involvement

One of the key challenges identified by the EcoTeam teachers and students was the issue of low student involvement. When EcoTeam student members were asked about changes they would make, they brought up the need for more student members to increase the productivity of the club and expand the diversity of viewpoints to develop new stewardship projects. The teacher moderators emphasized that the *EcoSchools* program should be largely student-driven, therefore having low student involvement made it difficult to accomplish tasks. Low levels of student members imposed a limit on the type of projects they can take on and made the EcoTeam dependent on student volunteers to keep their garden projects manageable. In addition, the EcoTeam teachers were frequently talking about recruiting new student members to ensure the sustainability of the club. Recognizing that only two EcoTeam student members would be returning, they decided to invite student volunteers for the butterfly/pollinator garden project with the goal of recruiting a few new members for the following school year.

To explain this low level of student membership in the EcoTeam, lead teachers referred to all of the clubs, athletic teams, and extra-curricular opportunities offered at THSS. Other staff members reported the same issue of multiple opportunities for students to get involved in at THSS, and that other clubs also experience this same challenge of low student involvement.

The finding of low student involvement has been previously reported in the literature. A study conducted by Fazio and Karrow (2013a) also found that getting students involved in the Ontario *EcoSchools* program was a challenge in a secondary school setting. Interviews with teachers confirmed that other competing initiatives within

a secondary school context make it particularly difficult to recruit students and gain the support of other staff members. A secondary school teacher described a school-wide energy audit event for *EcoSchools* where only one student showed up (Fazio & Karrow, 2013a). At THSS, some EcoTeam meetings had to be cancelled because student attendance was too low for tasks to be completed.

Another recent study of Ontario *EcoSchools* also found that many teacher moderators agreed that “students’ involvement with the program needed to improve drastically” (Igbokwe, 2016, p. 191). This was one of the main suggestions for changes to the *EcoSchools* program. Some EcoTeam teachers suggested getting Grade 9 and 10 students engaged in the program early, and other teachers suggested more consistent participation from the student body throughout the academic year (Igbokwe, 2016).

The EcoTeam teachers recognized that the dynamics of the student population change from year to year. In prior years, consistent student attendance at EcoTeam meetings and activities was not an issue. The teachers commented that participation in a number of clubs were lower for the 2015-2016 academic year. Despite this natural fluctuation, it is interesting to consider why the EcoTeam would not be a club that students want to prioritize over other options. THSS has approximately 900 students, yet only four students consistently attend EcoTeam meetings throughout the year. Even if there are many choices available, why do more students not prioritize the EcoTeam? Perhaps there is another issue that may explain low student involvement, in addition to the wide variety of competing extracurricular activities within a secondary school.

Another issue that was linked to low student involvement was identified by the Art teacher moderator: the lack of engaging activities. She commented that “we’re

talking about trying to retain members and make the club fun and make kids want to get involved. Counting light bulbs for most students doesn't sound fun" (Art Teacher, January 2016). The teacher moderators all agreed that the *EcoSchools* activities could be more engaging for secondary school students. Pirrie et al. (2006) also reported that the Eco-Schools program in Scotland did not significantly appeal to secondary school pupils in comparison to primary school participants. Secondary student survey responses indicated a desire to learn about climate change and local environmental initiatives. In addition, EcoTeam meetings in Scottish secondary schools addressed broader issues, such as social justice and health inequalities, reflecting a more holistic view of sustainability issues. The authors suggested that this indicates the program "may need to develop a greater critical edge in order to broaden its appeal to the secondary sector" (Pirrie et al., 2006, p. 18). It was proposed that there should be a gradual shift from primary level initiatives where students focus on anti-litter campaigns, towards broader issues to reflect the deepening understanding of secondary students.

Currently there is little distinction between the Ontario *EcoSchools* program in terms of activities for elementary and secondary level students. Conversations with EcoTeam students and teachers support the need for more engaging activities specifically for secondary school students. Specific activities for secondary students may help engage more students in EcoTeam activities, resulting in meaningful learning opportunities.

Administrative Leadership Encourages Staff to Make Positive Changes

One interesting finding was the predominant role that the school principal played to encourage the minimization of paper usage in the school. The principal personally lead by example at board meetings, going paperless and bringing this approach back to his

staff meetings at THSS. The principal also supported eco-goals in the School Improvement Plan, resulting in the continued effort to eliminate plastic water bottles from the school. In addition, he promoted eco-projects through communication with students and staff at school events, and encouraged staff to take their classes out to use the green space for outdoor learning opportunities. He also offered funding for the EcoTeam to get professional help with the garden, an area in which they expressed the need for help. Through interviewing the principal it became evident that his method of leading by example encouraged all staff in the school to continue to adopt more environmentally friendly teaching practices.

The literature strongly supports the critical role of school leadership in the success of environmental programs within a secondary school. An evaluation of Eco-Schools in Scotland found that key leaders modeling environmentally responsible actions within the school was the most effective way to initiate and maintain active participation in the Eco-Schools program (Pirrie et al., 2006). In another study, Zhang (2005) found that once the program is adopted, a supportive principal was found to facilitate student participation in school-wide projects, such as gardening. This finding was evident at THSS, as teachers acknowledged that the school principal played a critically supportive role for granting teachers authority to take their students outside during class time to work in the school gardens.

Secondary school EE leaders typically recognize the importance of having a supportive administrator to encourage teachers to prioritize EE in the curriculum (Fazio & Karrow, 2013a). School leaders can help maximize channels of communication to ensure the success of time-bound initiatives, but also establish program objectives as an

integral part of daily school operations for longer term success (Pirrie et al., 2006). It is evident that the findings from THSS are consistent with the literature in recognizing the key role that school leaders play in promoting environmental actions. Having the support of the school principal was reported as a key to the success of the EcoTeam and positive changes around the school. Although the principal was described as supportive by all participants, a discussion in the upcoming section highlights some areas where support could be strengthened.

The Importance of a School-Wide Action Plan

The Energy and Waste sections of the *EcoSchools* program include activities where students collect data from school-wide walkabouts and audit tasks. Observations of the EcoTeam revealed the lack of discussion on data students collected from walkabouts and audit activities. When *EcoSchools* prioritize completing tasks to earn points towards program certification, transformational EE cannot be achieved. All students should experience transformative EE where data is analyzed, potential solutions are identified, and skills are developed so students can take individual and collective action to mitigate the issues evident in the school data. Only schools that follow the Platinum certification track in the Ontario *EcoSchools* program are required to submit an Action Plan based on the data collected. Therefore, students in Gold, Silver, and Bronze *EcoSchools* are not required to create meaning from the data they collect through the creation of an Action Plan.

The emphasis on students collecting data, but failing to put that data into a meaningful context for learning has also been observed in other EE programs in Ontario. For example, a citizen science program called *WormWatch* only superficially incorporated environmental problem-solving activities and the potential significance of data was not an

educational focus for students (Karrow & Fazio, 2010). The teachers implementing the program expressed a desire to move beyond the conservative ideology of the monitoring program, however no direction was provided to address the meaning of data collected by students. Another study of student perspectives on sustainability in their schools in the U.K. found that activities involving tracking, reporting and planning by students for sustainable changes in their school are motivating and educational (Gayford, 2009). Collecting any school-based data without analysis or developing a plan for action diminishes the potential for valuable educational outcomes and student engagement in eco-activities.

Greening Projects the Most Rewarding for EcoTeam Members

When EcoTeam members were asked about the most rewarding part of their involvement with the *EcoSchools* program, they invariably stated that their work with greening projects at the school and in the community were most significant. It is interesting to consider why school ground greening projects are considered the most rewarding aspects of the program. The literature includes a wide variety of benefits to students who engage in school greening and gardening activities. However, there is limited research involving the benefits to secondary school students engaged in school greening activities (Blair, 2009).

One Canadian study on school garden projects in three *EcoSchools* within the greater Toronto region reported positive student experiences (Zhang, 2005). The study described three key factors promoting student participation, including teamwork as a social motivator, the awareness of improving the environment, and the visual rewards of students seeing their accomplishments from school garden projects. These factors were also evident in students at THSS. Many students talked about the enjoyment they

experienced working with their friends, feeling relaxed in the garden, and feeling good about the positive actions they were taking. In addition, numerous EcoTeam students talked about learning the value of teamwork through their work in the garden.

The review of the literature conducted by Blair (2009) also described the academic, social, physical, and mental benefits of students working within gardens. School gardens may also help students feel a sense of community, foster student bonding, and develop pride in the garden (Blair, 2009; Faddegon, 2005; Thorp & Townsend, 2001). The need for more teaching training so all staff are confident taking advantage of the learning opportunities within a school garden is imperative. This was also evident in observations of the EcoTeam teachers, where the Art teachers let the Science and Horticulture teacher direct students and answer questions. This highlights the importance of a diversity of subject perspectives among EcoTeam teachers as a critical element of success. The EcoTeam teachers at THSS successfully identified their strengths and weaknesses, and determined which teacher should take the lead on certain activities.

Evidence of Teaching EE in Subject Areas

The EcoTeam has earned full marks over the past 5 years of certification assessments in the Curriculum section. They have consistently provided the required seven curriculum submissions and evidence of student work. Despite this success in points earned, when considering that a large secondary school is only required to submit seven EE samples for an entire academic year, this is hardly a clear indication that EE is pervasive within the school. In Ontario, the goal is to embed EE into all grades and all subjects in the curriculum (OME, 2009a). The Curriculum section does not help determine if a secondary school is effectively providing EE opportunities for students. It

simply provides a snapshot of seven curriculum samples, instead of an indication of how well schools are integrating EE in all subject areas (OME, 2009a).

This study identified several issues related to the Curriculum section of the *EcoSchools* program. One issue expressed by the lead EcoTeam teachers was the need for the curriculum section to serve a more explicit purpose. The teachers critiqued the value of this section as simply collecting evidence with no direct benefit to students. In addition, the EcoTeam teachers stated that it is not difficult to collect seven curriculum submissions. EcoTeam teachers would collaborate amongst each other and a few other staff members in the school. As a result, the EcoTeam teachers relied strongly on their own curriculum samples and lessons from the Science department. Despite the dominance of Science lessons submitted for the Curriculum section, the EcoTeam continued to earn 100%. Thus, there was no push to make EE a top priority across the school in other disciplines. This is problematic because it does not encourage other staff members to incorporate EE into their teaching. When speaking with the principal about the curriculum section, he emphasized collecting the required evidence. He did not mention encouraging EE throughout the curriculum. Perhaps administrative support is required to shift the culture towards meaningful EE experiences instead of focusing on earning points.

Challenges in teaching EE in all subjects were also revealed in this project. The EcoTeam Art teacher assumed that because EE expectations were identified in other curricula, other teachers were teaching it. This assumption is problematic because there is no initiative to determine if teachers are in fact addressing the required EE expectations in their classrooms across Ontario. In addition, students noticed that EcoTeam teachers are mainly the ones who include EE into their classroom. Student volunteers working on

the butterfly/pollinator garden also confirmed that they mainly learned about the environment in their science classes. This is also problematic because this does not align with the goals of the Ontario EE framework to incorporate EE into all subjects and grades in the curriculum (OME, 2009a). The literature confirms the importance of EE lessons in the classroom. For instance, Igbokwe (2016) found that secondary students consider school subjects as their main source of knowledge about environmental issues.

Conversations with teachers at THSS also identified the need for more professional development, as the school has never offered school-wide support on EE. The priority of whole-school professional development for EE could have been enhanced with stronger administrative support. The principal described his role as encouraging teachers to submit curriculum submissions as evidence for the program, and not as encouraging all teachers to address EE. The literature has numerous examples of Ontario teachers expressing challenges and the need for support in EE (Fazio & Karrow, 2013; Pedretti & Nazir, 2014; Tan & Pedretti, 2010). Rather than exclusively collecting EE curriculum submissions, the Ontario *EcoSchools* program could use their position of influence and promote school-wide professional development in EE. Based on the evidence, it is suggested that a combination of EE curriculum submissions and whole-school professional development would be more beneficial to the teachers and students within *EcoSchools*. Specific recommendations to improve the breadth and depth of the Curriculum section will be outlined below in the Recommendations section.

Environmental Stewardship Projects Must Engage More Students

The lead EcoTeam teachers spoke very positively about the stewardship section. The Science teacher felt that stewardship projects were valuable to students as examples

of meaningful actions for change. Analysis of the certification documents revealed that most of the repeating projects are collection drives or sales events. The three campaigns for the 2015-2016 academic year, Earth Hour, battery recycling, and a clothing drive, were all done in previous years. Instead of collection events which are optional, an event that engaged the whole school in critical thinking about the underlying environmental issue(s) and action would be much more impactful.

One of the goals of the Ontario EE policy framework is to increase active participation of students through the support of eco-activities designed by students themselves (OME, 2009a). The low engagement of the student body in stewardship projects was recognized by other staff at THSS. All staff members that were interviewed talked about the necessity of having projects where the whole school could be involved. An eco-assembly was suggested by one teacher as an opportunity for the whole school to gather together and be inspired to take action. This would ensure that students understand the importance of the EcoTeam's projects and how they are helping address environmental challenges.

It is significant to acknowledge that the EcoTeam was comprised of few students and overall student participation in school-wide stewardship projects was poor. The low student body participation in eco-projects is also found within the literature. Igbokwe (2016) interviewed lead EcoTeam teachers within Ontario *EcoSchools*. The *EcoSchools* teachers identified increasing students' participation as a key element that needed to drastically improve in the program (Igbokwe, 2016). Another indication of low student body participation in eco-projects was the lack of awareness of a majority of students that their school is part of the *EcoSchools* program (Igbokwe, 2016). The findings from

Igbokwe (2016) are also echoed in the present study at THSS. When speaking to student volunteers working in the butterfly/pollinator garden in April, all students said this was their first time participating in an eco-project at the school. In fact, a group of student volunteers never gathered for a stewardship project at THSS; this was only observed for a project under the School Ground Greening section of the program. This highlights the critical need for stewardship projects to be planned with student participation in mind. In addition, it also reveals the paradox of program intentions that contrast with how the program is implemented within the context of a secondary school setting. Although the environmental stewardship section emphasizes the expectation of involving the whole school community, students within a Gold certified secondary school can complete an entire year without participating in a single eco-project.

Student Participation Prioritized Over Learning Outcomes

When asked what students learn from being a part of the EcoTeam, the teacher moderators talked about leadership, building friendships, and building character. It is considered problematic that the lead EcoTeam teachers did not articulate specific learning outcomes related to the environment for the club. Indeed, these social learning outcomes could be achieved by any club offered at the school. The EcoTeam students shared personal reflections on conservation behaviours, developing strategies to encourage others to follow environmental practices, and gaining skills in organizing events. One student said their own education on environmental issues is done best by the Envirothon competition. As members of the EcoTeam, they do not go beyond recycling, power usage, waste and tree planting. The question of whether the *EcoSchools* program is a method for supporting significant student learning is evident in the literature.

According to a recent Ontario study examining *EcoSchools*, environmental literacy (EL) was generally low. Igbokwe (2016) found that only 29% of secondary students studied (n=641) achieved 70% or higher on the met Middle School Environmental Literacy Survey (MSELS). Although there was a significant difference between EL scores for students in *EcoSchools* scoring relatively higher (level 2: 63.56% average score) than non-*EcoSchools* (level 1: 59.64%), the average student did not meet the provincial standard level 3 (70%), regardless of the status of being an *EcoSchool* (Igbokwe, 2016). These low EL levels offer validity to the question brought up by Cincera and Kovacikova (2014), who asked: “Is the program focused on schools or on pupils? Is it an instrument for making schools greener or is the greening of a school an opportunity for developing pupils’ skills?” (pp. 227-228).

EcoTeam activities at THSS frequently illustrated the lack of focus on student learning in favour of student participation, ensuring activities were fun, and satisfying program requirements. Student participation was prioritized over student learning on multiple occasions. For example, students completed energy and waste walkabouts, but the EcoTeam never discussed the purpose of these tasks or analyzed the data to learn how they could act on their findings. During the butterfly/pollinator garden project, the Art teacher explained what student volunteers would be doing, but failed to provide an adequate description of why their efforts were so vital. In addition, the *EcoSchools* assessor who spoke with students asked about their favourite activity they are involved in, and neglected to ask about what EcoTeam students had learned from their experiences. This lack of focus on student learning is supported by Igbokwe (2016), who found that students do not view the *EcoSchools* program as their main source of

environmental knowledge. When students were asked about how they learned about environmental issues, school subjects were ranked as the main source of knowledge. The other sources of knowledge in descending order of importance included Web/Internet, television, books, friends, the *EcoSchool* club, and other environmental clubs. This low ranking is problematic as student learning should be the ultimate goal of the program, yet students did not consider *EcoSchools* a valued source of environmental knowledge. Some method of tracking the progression of student learning in *EcoSchools* may help keep the focus on developing environmental literacy, as opposed to prioritizing student participation and the completion of tasks for points towards certification.

Recommendations

Recommendations for school leaders and EcoTeam members, the *EcoSchool* program developers, and the OME are presented below.

School Leaders and EcoTeam Members

School improvement plan and eco-representative. The first recommendation for school-level practices was inspired by the proactive actions of the EcoTeam teachers at THSS. They strongly believed in the importance of having the support of their principal. The EcoTeam teachers encouraged the principal to include eco-goals into the School Improvement Plan. As a result, some school-wide events were planned with an “eco-lens.” For example, the eco-goal for the Grade 10 literacy test was to eliminate plastic water bottles usage. This approach of integrating EE into school strategic plans is echoed by the Ontario EE framework (OME, 2009a). One suggested action for schools is to consider the school board’s EE policy and develop an appropriate implementation plan that prioritizes eco-goals. Including eco-goals into the School Improvement Plan adds an

element of accountability for the school to make environmentally responsible practices an integral part of daily operations. To further encourage environmental goals, secondary schools could also have a required eco-representative on the student council and parent council. This could be a requirement that all school activities explain how they considered the environment during the planning phase to ensure eco-goals are incorporated and become part of the school ethos (see Pirrie et al., 2006). Evidence that one whole-school event included an eco-goal could also be a criterion of the *EcoSchools* program assessment.

School and community planting projects with more student involvement. The criteria for the School Ground Greening section do not specify if “Student Involvement” refers to EcoTeam students or students at the school in general. To help improve visibility of the club, it is recommended that schools involve students outside of the EcoTeam. This could occur within a secondary school in two ways: students could earn volunteer hours for helping in the garden after school, or a class could participate in a greening project to complement their classroom learning.

The small EcoTeam at THSS was able to successfully plant and maintain their butterfly/pollinator garden project with the help of student volunteers. This approach is not captured by the *EcoSchools* program certification documents. Including students beyond the EcoTeam would enable more students to experience the benefits of working within the school garden. This recommendation would align with the action suggested by the Ontario EE framework, which states “Schools will encourage students to consider ways of completing their community service requirements that involve addressing environmental issues in their communities” (OME, 2009a, p. 17).

It must be considered that a horticulture class may take care of the garden at certain secondary schools. Including a criterion for student involvement beyond the EcoTeam would capture this type of involvement, and align with another action in the Ontario EE framework: “Schools will enrich and complement students’ classroom learning by organizing out-of-classroom experiences and activities (such as the naturalization of the school yard)” (OME, 2009a, p. 17).

Involve *all* students in meaningful stewardship projects. This recommendation is grounded in the critical reflection on the types of stewardship projects implemented by the EcoTeam at THSS. Based on the observations of the stewardship projects run in the 2015-2016 academic year, and their past portfolios, collection drives for batteries and used clothing lacked the opportunity for students to develop meaningful skills and knowledge. Student participation was voluntary and could be reduced to only 1 hour of minimizing their energy use for Earth Hour, since the school never gathered collectively to take action.

According to a study on Sustainability in schools from pupils’ perspectives in the U.K., students value events that are a priority in the school, resulting in an interruption of the regular routine of the school and offer the opportunity for everyone to be involved (Gayford, 2009). “Where pupils are involved in planning for changes in their school or local community there are both valuable educational outcomes and increased motivations” (Gayford, 2009, p. 5). It is recommended that EcoTeams consider the type of experience students will gain from their projects. Collection and sales of green items may be less difficult to organize, however it is suggested that collective action projects take priority so that the whole student body can get together and take action.

Consider “private sphere” and “public sphere” environmental stewardship projects. Trends in the types of stewardship projects THSS implemented highlight the dominance of “private sphere” actions. This is expected, as the literature describes how private sphere actions are emphasized within schools (Gayford, 2009; Stern, 2000). These actions may include recycling efforts, encouraging proper energy conservation in switching off lights, and buying products that are environmentally friendly, as found in the Ontario *EcoSchools* program. When considering the complex nature of environmental problems, it is suggested that “private” actions alone are not enough to elicit significant change without collective public change (Gayford, 2009). According to Gayford (2009), pupils may disengage if they restrict their participation only to actions in the private sphere. It is suggested that EcoTeams take advantage of the civic action resources available on the Ontario *EcoSchools* website and engage students in collective projects involving public sphere action. For example, Leamington District Secondary School received recognition as the Evergreen Watershed Champions in 2016 for their initiative (Evergreen, 2017b). Students from the Leamington EcoTeam studied the importance of wetland protection to maintain water quality and biodiversity. The EcoTeam students spoke at a town council meeting advocating for the reduction or elimination of phosphorous-containing fertilizer on property in the municipality. They suggested native plants in town planters, which do not require fertilizer and attract pollinators. Students collaborated with the Public Works Department to implement their suggestions.

Emphasize educational aspect of campaigns, support classroom teachers. This recommendation originates from an interview with the Mathematics department head. She commented that the EcoTeam could have provided information for her to address a

plant given to her for Earth Day. She explained how she was uncomfortable initiating a conversation with her students without background knowledge about the environmental issue. Currently the EcoTeam at THSS educates the school community about their projects primarily through announcements. This relegates EE to a passive role, with students listening to announcements or classroom teachers promoting events in their classes. Beyond the announcements, nothing was done to ensure students and staff understood the environmental issues that served as the foundation for their stewardship projects.

It is suggested that EcoTeam students create a brief “educational background” describing the environmental issue underlying each stewardship project. This will ensure that students learn some basics about the environmental issue and clearly link this issue to their school eco-projects. EcoTeam students could also visit classrooms to present the environmental issues to their peers, a strategy that was described by an EcoTeam teacher in an Ontario secondary school (Igbokwe, 2016). The teacher described visiting classrooms over the span of a week with the EcoTeam students to teach lessons about algae blooms, along with morning announcements and sending out emails to staff on *EcoSchools* news (Igbokwe, 2016).

All EcoTeam stewardship projects involved optional participation and therefore the school never gathered all together to learn about the environmental issues. It is suggested that the EcoTeam organize at least one eco-assembly. Based on pupil suggestions from 15 schools focusing on Sustainability in the U.K., assemblies should have strong student involvement in planning and presentation, as assemblies where teachers “preach” to pupils are considered counterproductive (Gayford, 2009). This

recommendation would align with the action suggested by the EE framework which states that “Schools will create opportunities for students to address environmental issues in their homes, in their local communities, or at the global level” (OME, 2009a, p. 15). An eco-assembly could help contribute to educating the whole school, introduce an action project, and encourage all students to participate. Inviting a guest speaker from the local community to the eco-assembly could also help inspire students. Without this sense of collective action, students may remain unaware of the potential to engage in transformative eco-projects.

The School Board must act as a leader to address cafeteria food waste. The most challenging criterion for THSS was the reduction of cafeteria food waste. The EcoTeam teachers and other staff described the frustration with a lack of success for their composting efforts due to a lack of control over the school waste contract. The teachers identified the school board as a source of leadership that could help address this challenge on a wide-scale.

This challenge was also found in Eco-Schools in Scotland (Pirrie et al., 2006). The study found a wide diversity in the level of support local authorities’ offer to Eco-Schools launching recycling schemes. An urgent need for increased support in school waste management was emphasized so that schools could exert a positive influence on the environmental attitudes and behaviours of students.

It is recommended that the school board take a leading role in establishing contracts for all schools to collect organic food waste from elementary and secondary schools across the board. In areas where green bins are a part of the city-wide waste collection services, schools should also have the ability to collect compost from daily

lunches. The literature supports the benefits of school composting programs on minimizing garbage weight and teaching students how to properly sort their waste (Cooper, 2015; James, 2016). If school boards want to honor the goals within the EE framework (OME, 2009a), there is a strong need for boards to take a leading role in establishing environmentally responsible waste management contracts for all schools.

EcoSchools Program Developers

Design activities specifically to engage secondary students. The EcoTeam teachers explained how the activities for the energy conservation and waste minimization sections of the program are not engaging for secondary school students. It is important to note that the suggested activities are no different for the elementary and secondary levels. It is recommended that activities be revised so secondary and elementary students engage in activities which reflect their cognitive abilities. The underlying issues behind the energy and waste walkabouts are relevant to both age groups. However, the task for secondary students should be revised to reflect the complexity of environmental issues and more advanced cognitive abilities. It is suggested the perspectives of secondary school students, be utilized, to help redesign more engaging activities. This approach is recommended by an evaluation of Eco-Schools in Scotland (Pirrie et al., 2006).

Expand criteria to include efforts to reduce paper consumption. This recommendation was inspired by the various green initiatives promoted by the school principal at THSS. He encouraged the reduction of paper usage by setting limits on printing for staff and students, invested in Paper-Cut™ tracking software, requiring each teacher have a class website, holding paperless staff meetings, and leading by example with his own paperless organization system using Google Docs and electronic folders.

Unfortunately, these efforts are not captured on the *EcoSchools* certification documents. This has been reported in the literature, as one EcoTeam leader explained that many activities the school initiates are not counted towards points for *EcoSchools* (Igbokwe, 2016).

To reduce paper usage, the *EcoSchools* program promotes photocopying/printing on both sides of the paper and using Good On One Side/Reuse paper boxes around the school. However, ensuring that staff members are printing on both sides is difficult to track, according to the EcoTeam teachers at THSS. In addition, these criteria do not actually set a limit on the amount of paper that an environmentally responsible teacher should use. It is suggested that the *EcoSchools* program expand these criteria to include efforts to set environmentally responsible limits on paper usage for staff and students. Printing limits and tracking efforts could be claimed in the waste minimization section.

Offer strategies on EcoTeam recruitment, retention, and continuity. This recommendation stems from the low level of student involvement in the EcoTeam. During the 2015-2016 academic year, the EcoTeam at THSS only had two returning members who were not graduating. The EcoTeam teachers frequently discussed recruitment strategies at their meetings to ensure their club survived in the next academic year. The EcoTeam teachers also talked about this issue being one of their weaknesses that they continue to work on as student involvement fluctuates. It is suggested that the *EcoSchools* program offer professional development for EcoTeam leaders on student recruitment, retention, and continuity of the club to build capacity for long-term sustainability of whole-school EE. Schools that continue to have high levels of student involvement should be the focus of professional development offered by the *EcoSchools*

program to share successful strategies. This is a critical issue to ensure EE is consistently a presence within schools and EcoTeam leaders have strategies to address the challenges of low student involvement.

Require school-wide EE professional development and higher quality and quantity of curriculum submissions. The Curriculum section of the program requires significant improvements. Currently the requirement of seven EE lessons for elementary and secondary schools simply provides a snapshot of EE occurring within the school. In addition, there is no incentive for teachers from a variety of disciplines to include EE in their teaching or for the school to offer support. The literature confirms that teachers often lack the requisite knowledge to address EE. According to the Working Group on EE,

Many teachers currently lack the knowledge, skills, and background in perspectives taking required to teach environmental education effectively. Partly due to the fact that environmental education has relatively low visibility within the curriculum, there is little incentive, or opportunity, for developing the required skills, and there are few resources available to support teachers. (Working Group on EE, 2007, p. 7)

Despite this lack of knowledge, the Ontario *EcoSchools* program criteria do not encourage professional development among all teachers in the school. The first suggestion is that school-wide EE professional development be added as a criterion of the Curriculum section for all *EcoSchools* (e.g., Bronze–Platinum). This would align with the Ontario EE framework which suggests that “Schools will develop professional learning communities to share effective practices about pedagogical strategies that support learning and teaching about the environment” (OME, 2009a, p. 14).

The second suggestion is focused on the quality and quantity of curriculum submissions. Each department in a secondary school could have time to develop a detailed lesson plan collectively for one teacher who will use this lesson in their classroom. The collective lessons created by each department could be added to a shared school folder dedicated to EE. *EcoSchools* should require a detailed lesson plan outlining the curriculum expectations, learning activities, assessment techniques, learning outcomes for students, and resources used to support student learning. Currently, the Curriculum section only requires a description of the environmental lesson and what students learned about the environment. The standards for *EcoSchools* must be higher if the Ontario *EcoSchools* program claims to support student EL levels (Ontario EcoSchools, 2017). A school who has achieved Gold or Platinum status for 8 consecutive years should be required to demonstrate school-wide EE professional development and high quality EE lessons in all subjects, as outlined in the goals for EE in Ontario (OME, 2009a).

All *EcoSchools* activities should provide a clear explanation regarding the significance of the tasks. Student learning was not observed to be a priority in the EcoTeam activities. The main goal appeared to be completing tasks to earn points towards continued Gold level certification at THSS. A discussion on the rationale for completing EcoTeam activities, such as the energy and waste walkabouts was absent. During the school ground greening project for the butterfly/pollinator garden, the Art teacher offered an inadequate explanation of the importance of their efforts. It is evident that EcoTeam teachers from a variety of educational backgrounds require different levels of support. It is suggested that all *EcoSchools* activities include an extensive explanation for EcoTeam leaders so they explain the significance for all activities. Currently the

activity guides offer a detailed list of steps to complete each task. However, it is also critical to ensure students understand why they are engaging in EcoTeam tasks. As described by one EcoTeam student, “I’ve learned that we want to try to make our school seem good, so we are a bit biased when it comes to information” (Hanna, EcoTeam Student, March 2016). If students are clear about the intention of the activity, this may help ensure they perform it with a higher standard of responsibility.

Require all schools to submit an Action Plan using data from energy and waste activities. For schools who wish to earn level Gold, Silver, or Bronze under the Ontario *EcoSchools* program, it is not required to have an Action Plan to improve energy and waste practices, even though its creation is described in activity guidelines. Action Plans are only required for Platinum certification.

Energy and waste walkabout activities led by students were observed during data collection at THSS. However, there was never a discussion on the findings or any suggestions for actions to improve the energy conservation and waste minimization in the school. This is problematic because the educational benefits of monitoring activities are not transformative unless the data is analyzed and solutions are proposed by students. Students from 15 schools in the U.K. reported increased motivation and valuable learning when they participated in monitoring, recording, reporting, and using this data to plan changes in the school or local community (Gayford, 2009). Without the creation of an Action Plan, the collection of data by students is simply to complete a task to earn points towards *EcoSchool* certification.

Collect data on student-reported learning outcomes. The meeting between the *EcoSchools* assessor and the EcoTeam of THSS demonstrated the feedback that is valued

by the program. EcoTeam students were asked to what their favourite activity was as a member of the EcoTeam, but not what they had learned. For a program that aims at developing students' EL, it is suggested that data be collected on student learning when *EcoSchools* assessors conduct visits to *EcoSchools*. Two publications recently added to the *EcoSchools* website focus on waste production and energy usage in *EcoSchools* in comparison to non-*EcoSchools*, whereas no publications focus on student learning. The program is clearly prioritizing evidence that *EcoSchools* reduce the amount of waste per pupil and improve energy efficiency. The same priority must be given to providing evidence of student learning. If student learning is a fundamental goal of *EcoSchools*, then this should be reflected in the standard set of questions asked by the *EcoSchools* assessors during their site visits. The *EcoSchools* organization should be actively collecting data to describe the learning outcomes voiced by students within *EcoSchools*.

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Establish an environmental and sustainability education course for secondary students. Discussions with other teachers at THSS who were not members of the EcoTeam highlighted one key challenge. Teachers talked about having difficulty incorporating EE into an already “packed” curriculum. They also mentioned that even when they have one unit, it is challenging to inspire change in students. Multiple teachers said they would love to see a required Environmental Education course for secondary school students. This would ensure that all students would acquire knowledge, skills, dispositions, and environmentally responsible behaviour in order to be environmentally literate, which is essential in our current society.

Environmental Education Ontario (EEO, 2003) established a set of

recommendations to help greening the way Ontario learns. For pre-school to Grade 12 students it was recommended, “To mandate environmental and sustainability education (ESE), including outdoor education, as a separate subject in core curriculum with its own learning expectations and report card assessment, conferring upon it academic status in education” (EEO, 2003, p. 20).

Build environmental literacy accountability. This recommendation comes from critical reflection on the lack of understanding of whether student learning within *EcoSchools* is effective. Observations at THSS frequently led the researcher to question the focus on student participation in favour of significant learning. The Ontario EE framework (OME, 2009a) sets out goals for student learning, yet there is no accountability to ensure EE is actually being taught (Chowdhury, 2015). A recent study of secondary level *EcoSchools* and non-*EcoSchools* found that a majority of students (71%) did not achieve 70% or higher on an EL test (Igbokwe, 2016). Implementing a province-wide EL assessment of secondary school students would help educators understand the current level of comprehension and consider steps to enhance student learning based on the gaps in environmental knowledge. This call for accountability is supported by the literature. For instance, the urgency to measure student EL achievement outcomes on a system level in Ontario is identified by Igbokwe (2016) and the Working Group on EE (2007).

Future Research

Three main suggestions for future research have emerged from this study. These areas for further investigation centre on EE curriculum, stewardship projects, and student involvement in secondary school settings.

One research area that emerged from this study is the nature of curriculum connections that are occurring within *EcoSchools*. The findings from this descriptive case study led the researcher to consider whether or not the *EcoSchools* program could enhance environmental learning. This study focused on the strategies used to collect seven curriculum samples and therefore failed to uncover the extent and nature of EE taking place in the classrooms. This is a critical next step that is needed to understand what is occurring within Ontario *EcoSchools*. In other words, by determining the extent and nature of EE curricula, beyond the samples required for *EcoSchools* certification, we may ascertain a more complete picture of students' EL.

The second key area of future research focuses on the various types of environmental stewardship projects a school may pursue. As a researcher, I was intrigued by the projects that were repeated across multiple years. The EcoTeam relied heavily on collection events and sales. These types of projects may either help to maintain the dominant social order or challenge it. For example, the current mode of production may be superficially explored by encouraging ways for individuals to be "better consumers." In contrast, transformative EE would give students the opportunity to reflect on the power relations involved in production and consider ways to challenge the relations of production and over-consumption in society (Rathzel & Uzzell, 2009). In addition they either engage students as active citizens trying to make real change in their community, or they require passive participation such as donating used clothing for a drive. Investigating trends in *EcoSchools* projects in Ontario across multiple years and schools would be interesting. It could also be an opportunity for the *EcoSchools* program to adjust the stewardship section to require that at least one project involves active

citizenship skills and activism in the local community, were students take action on civic issues that can benefit the welfare of individuals and societies (Ontario EcoSchools, 2017).

The third future research opportunity that emerged from this study is the nature of student involvement in other secondary schools across Ontario. Some opportunities for student involvement included brainstorming for projects, advertising, completing energy and waste walkabouts and audits, participating in school and community greening projects. It would be important to discover whether these forms of student involvement are common in all Ontario *EcoSchools*. It would also be valuable to investigate how schools support meaningful environmental student leadership within the school and local community.

Final Words

The importance of EE is unequivocal given the environmental status of our planet. This thesis sought to provide an in-depth description of the implementation of the Ontario *EcoSchools* program within one Gold certified secondary school. The need for effective EE is crucial to the creation of a generation of youth who possess environmental literacy and the capacity to address growing environmental problems.

The research findings demonstrated some successful strategies and challenges that require further attention. Some successful strategies used at THSS are a democratic EcoTeam, supportive school leadership, recruiting student volunteers in the greening projects, and establishing a shared resource to build capacity among teachers to address EE. The challenges that exist, include a lack of engaging activities, low student involvement and few measures to ensure EcoTeam continuity and capacity, minimal emphasis on student learning, and no accountability for including EE across all grades

and courses, help the educational community identify areas that require reflection and action towards improvements.

It was anticipated that transformative EE, where students develop resolutions to problems, reflect on changes to social conditions which have led to environmental degradation, and develop competencies to take collective action for change, would be observed within a Gold certified *EcoSchool*. Based on the data collected from THSS, opportunities for transformational EE were missed. The EcoTeam students never engaged in a conversation to reflect on the significance of their efforts in energy, waste, greening, or stewardship activities. After collecting data on the energy and waste practices in the school, they neglected to explore individual and collective actions the whole school could employ to improve the findings. The clothing drive stewardship project emphasized the resources saved by donating used clothing, but never deconstructed on the issues of over-consumption. The battery recycling stewardship project emphasized sorting batteries into the proper waste disposal stream, but ignored the issue of finding reusable alternatives to popular disposable products. The butterfly/pollinator garden project did not engage students in critical thinking about how declining butterfly/pollinator survival may impact whole ecosystems. Reflection on individual and collective resolutions and changing social conditions that contribute to environmental issues were not priorities of the EcoTeam at THSS. One critical limitation observed was that opportunities for transformational EE were left to a small number of individuals within a large school.

One of the most significant findings from this study was the lack of focus on student learning. EcoTeam teachers and students failed to articulate specific environmental learning outcomes as a result of their participation. In addition, the

Curriculum section of the program does not require EE lessons from a variety of school disciplines or emphasize professional development to support teachers addressing EE. It appears that the *EcoSchools* program has strong priorities to improve the sustainability of school operations in terms of waste minimization and energy conservation, which competes with the goals for student learning. It is essential that the Ontario *EcoSchools* program value student learning as much as they do the improvement to school operations.

The stakes could not be more significant: without an awareness of whether popular programs such as the Ontario *EcoSchools* program are contributing to the development of students' environmental literacy, environmental challenges will continue to persist. It is the hope of the researcher that the educational community will continue to take steps towards making EE the priority it demands. Teachers should continue to acquire knowledge, skills, dispositions, and model environmentally responsible behaviour to address EE in a meaningful way, school boards must hold schools accountable to developing School Improvement Plans after consulting with local communities, students should seek opportunities to participate in engaging projects within their school and community, and EE programs should reflect on their goals and capacity to support transformational EE within all school settings.

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Appendix A

Interview Questions for Lead Teachers of EcoTeam

Before each interview, the following script will be read by the researchers to the interviewee:

Before we begin, we would like to thank you for agreeing to participate in this research study, *Experiences of Secondary School Teachers, Students, and Administrators in One Exemplary EcoSchool: A Description of Successful Practices and Challenges*. We are interested in describing the involvement and experiences of individuals within an *EcoSchool* and those directly involved in implementing the program.

We appreciate your willingness to share your experiences with us, as a highly involved member of the EcoTeam. Before we begin this interview, we would like to remind you that participation is voluntary and you may withdraw from the study at any point without penalty. You may also choose to not answer a question or leave the session, and we will respect your wishes.

This session will be audio-taped for transcription and review. In addition, to protect your privacy, you will be provided with a pseudonym. To protect the privacy of others, please avoid using the actual names of all students, teachers, or schools.

We will ask you 13 questions in the interview. We will ask you one question at a time and allow you as much time as you need to respond. We have also prepared prompts to help you provide detailed answers. Please take your time to gather your thoughts before you respond. Do you have any questions or concerns before we begin? May I start the audiotape?

1. How did you come to be involved in the *EcoSchools* program?
2. What is the most rewarding part of your work with the *EcoSchool* program?
3. What challenges exist in implementing the *EcoSchools* program in a secondary school?
4. What strategies do you use to achieve the Curriculum Section of the program?
5. How do you approach the Energy Conservation Section of the program?
6. How do you approach the Waste Minimization Section of the program?
7. How is Teamwork and Leadership fostered in the EcoTeam?
8. What strategies are used to address the School Ground Greening Section of the Program?
9. How do you approach the Environmental Stewardship Section of the Program?
10. What factors do you consider helped the EcoTeam accomplish Gold Certification?
11. What do you think students learn from the program?
12. Based on your experiences, can you suggest any improvements to the *EcoSchool* program?
13. Do you have any other comments you would like to make regarding the *EcoSchools* program that we have not addressed in this interview?

Post-interview script:

Thank you for sharing your experiences with me today. As you have been made aware, I will use the audio-taping to transcribe your interview into a word document. It will be stored on a password protected device, which is locked in an office. Your confidentiality will be maintained through the use of a pseudonym in the interview transcription. Only myself and my supervisor, Dr. Xavier Fazio, will have access to your interview data.

I will be in touch once your interview has been transcribed into a word document. I will contact you at that time (approximately 4-6 weeks from today) to give you the option of reviewing your interview transcription and the conclusions based on it. If you wish, you can elect to review your data and conclusions to add any details or correct any misinterpretations. Thank you again for your time and effort.

Appendix B

Interview Questions for Less Involved Teachers

Before each interview, the following script will be read by the researchers to the interviewee:

Before we begin, we would like to thank you for agreeing to participate in this research study, *Experiences of Secondary School Teachers, Students, and Administrators in One Exemplary EcoSchool: A Description of Successful Practices and Challenges*. We are interested in describing the involvement and experiences of individuals within an *EcoSchool* and those directly involved in implementing the program.

We appreciate your willingness to share your experiences with us, as a teacher who is not directly involved with the implementation of the *EcoSchool* program. Before we begin this interview, we would like to remind you that participation is voluntary and you may withdraw from the study at any point without penalty. You may also choose to not answer a question or leave the session, and we will respect your wishes.

This session will be audio-taped for transcription and review. In addition, to protect your privacy, you will be provided with a pseudonym. To protect the privacy of others, please avoid using the actual names of all students, teachers, or schools.

We will ask you 11 questions in the interview. We will ask you one question at a time and allow you as much time as you need to respond. We have also prepared prompts to help you provide detailed answers. Please take your time to gather your thoughts before you respond. Do you have any questions or concerns before we begin? May I start the audiotape?

1. How do you become aware of the activities of the EcoTeam?
2. What are some suggestions for the EcoTeam to make their communication and visibility more evident in the school?
3. In what ways do you try to incorporate environmental lessons into your classroom?
4. In what ways do you try to conserve energy in your classroom?
5. How do you help reduce the waste your classroom produces?
6. Do you ever make use of outdoor learning opportunities?
7. In what ways do you offer support for the initiatives the EcoTeam implements in the school?
9. How do the lead teacher(s) and/or administrator(s) try to gain support of other staff members for EcoTeam projects?
10. Do you believe the school administrators make *EcoSchools* a part of the school culture?
11. Do you have any other comments you would like to make regarding the *EcoSchools* program that we have not addressed in this interview?

Post-interview script:

Thank you for sharing your experiences with me today. As you have been made aware, I will use the audio-taping to transcribe your interview into a word document. It will be stored on a password protected device, which is locked in an office. Your confidentiality will be maintained through the use of a pseudonym in the interview transcription. Only myself and my supervisor, Dr. Xavier Fazio, will have access to your interview data.

I will be in touch once your interview has been transcribed into a word document. I will contact you at that time (approximately 4-6 weeks from today) to give you the option of reviewing your interview transcription and the conclusions based on it. If you wish, you can elect to review your data and conclusions to add any details or correct any misinterpretations. Thank you again for your time and effort.

Appendix C

Interview Questions for School Administrators

Before each interview, the following script will be read by the researchers to the interviewee:

Before we begin, we would like to thank you for agreeing to participate in this research study, *Experiences of Secondary School Teachers, Students, and Administrators in One Exemplary EcoSchool: A Description of Successful Practices and Challenges*. We are interested in describing the involvement and experiences of individuals within an *EcoSchool* and those directly involved in implementing the program.

We appreciate your willingness to share your experiences with us. Before we begin this interview, we would like to remind you that participation is voluntary and you may withdraw from the study at any point without penalty. You may also choose to not answer a question or leave the session, and we will respect your wishes.

This session will be audio-taped for transcription and review. In addition, to protect your privacy, you will be provided with a pseudonym. To protect the privacy of others, please avoid using the actual names of all students, teachers, or schools.

We will ask you 12 questions in the interview. We will ask you one question at a time and allow you as much time as you need to respond. We have also prepared prompts to help you provide detailed answers. Please take your time to gather your thoughts before you respond. Do you have any questions or concerns before we begin? May I start the audiotape?

1. As an administrator of the school, how are you involved in the *EcoSchool* program?
2. How do you support the activities of the EcoTeam?
3. In what ways do you try to encourage staff to incorporate environmental lessons into the classroom?
4. In what ways do you try to use your leadership role to encourage the conservation of energy across the entire school?
5. How do you create a school environment that places an emphasis on reducing the waste the school produces?
6. Do you encourage the use of outdoor learning opportunities? In what ways?
7. How do the school administrators make *EcoSchools* a part of the school culture?
8. What do you think students take away from the *EcoSchools* program?
9. What factors do you consider helped the EcoTeam accomplish Gold Certification?
10. Can you share any tips for other administrators of Ontario secondary schools trying to support an EcoTeam in their school?
11. In what ways could the *EcoSchool* program be improved?
12. Do you have any other comments you would like to make regarding the *EcoSchools* program that we have not addressed in this interview?

Post-interview script:

Thank you for sharing your experiences with me today. As you have been made aware, I will use the audio-taping to transcribe your interview into a word document. It will be stored on a password protected device, which is locked in an office. Your confidentiality will be maintained through the use of a pseudonym in the interview transcription. Only myself and my supervisor, Dr. Xavier Fazio, will have access to your interview data.

I will be in touch once your interview has been transcribed into a word document. I will contact you at that time (approximately 4-6 weeks from today) to give you the option of reviewing your interview transcription and the conclusions based on it. If you wish, you can elect to review your data and conclusions to add any details or correct any misinterpretations. Thank you again for your time and effort.

Appendix D

Interview Questions for Student Members of EcoTeam

Before each interview, the following script will be read by the researchers to the interviewee:

Before we begin, we would like to thank you for agreeing to participate in this research study, *Experiences of Secondary School Teachers, Students, and Administrators in One Exemplary EcoSchool: A Description of Successful Practices and Challenges*. We are interested in describing the involvement and experiences of individuals within an *EcoSchool* and those directly involved in implementing the program.

We appreciate your willingness to share your experiences with us. Before we begin this interview, we would like to remind you that participation is voluntary and you may withdraw from the study at any point without penalty. You may also choose to not answer a question or leave the session, and we will respect your wishes.

This session will be audio-taped for transcription and review. In addition, to protect your privacy, you will be provided with a pseudonym. To protect the privacy of others, please avoid using the actual names of all students, teachers, or schools.

We will ask you 14 questions in the interview. We will ask you one question at a time and allow you as much time as you need to respond. We have also prepared prompts to help you provide detailed answers. Please take your time to gather your thoughts before you respond. Do you have any questions or concerns before we begin? May I start the audiotape?

1. How did you come to be involved in the *EcoSchools* program?
2. What encourages your involvement with the *EcoSchool* program?
3. How are you involved in the program? What role(s) do you play in the EcoTeam?
4. What is the most rewarding part of your work with the EcoTeam?
5. Are there any challenges of being a member of the EcoTeam?
5. How are you involved in the Energy Conservation Section of the program?
6. How are you involved in the Waste Minimization Section of the program?
7. How are you involved in the School Ground Greening Section of the program?
8. How much of the *EcoSchool* program is student-run?
9. How can more students become involved / take on more of a leadership role in the program?
10. What have you learned from your involvement in the *EcoSchool* program?
11. What projects have been especially influential for you?
12. Have you learned anything in the *EcoSchool* program that has changed what you think and/or how you act outside of school?
13. From your experiences, do you have any suggestions on improving the program?
14. Do you have any other comments you would like to make regarding the *EcoSchools* program that we have not addressed in this interview?

Post-interview script:

Thank you for sharing your experiences with me today. As you have been made aware, I will use the audio-taping to transcribe your interview into a word document. It will be stored on a password protected device, which is locked in an office. Your confidentiality will be maintained through the use of a pseudonym in the interview transcription. Only myself and my supervisor, Dr. Xavier Fazio, will have access to your interview data.

I will be in touch once your interview has been transcribed into a word document. I will contact you at that time (approximately 4-6 weeks from today) to give you the option of reviewing your interview transcription and the conclusions based on it. If you wish, you can elect to review your data and conclusions to add any details or correct any misinterpretations. Thank you again for your time and effort.

Appendix E

Observation Guide

This guide will be utilized to focus the observation notes on important aspects of the *EcoSchool* certification guide. These aspects are areas that *EcoSchool* assessors look for as they conduct school assessments at the end of each school year. The approach for implementing the six sections of the *EcoSchool* program will be the emphasis of school observations. Document analysis will also be conducted using the observation guide.

TEAMWORK AND LEADERSHIP

Does the EcoTeam meet regularly and have defined goals?	
Does the EcoTeam reflect all parts of the adult school community? (teachers, parents, community members, custodial staff, principal/administrator, office support staff)	
Does the EcoTeam include diverse representation from the student population?	
Does the principal or other administrators make <i>EcoSchools</i> a part of the school culture?	
Does your EcoTeam nurture student leadership and/or team building within your school (e.g., develop communication skills by using the P.A. system; deliver classroom presentations and/or school assemblies; take the lead in developing campaigns; foster mentoring of younger students by older students)?	
To what extent is your environmental program visible throughout the school (e.g., use of bulletin boards; signs for proper recycling, lights off, monitors off, garden areas, communicating feedback, inspiration; eco-themed displays in classrooms and in the halls; <i>EcoSchools</i> and enviro awards in prominent areas)?	
Does the EcoTeam communicate successes and areas for improvement with the whole school community on a regular basis? Portfolio requirement: copy of newsletter, announcement, agenda item for staff and/or parent/student council meetings, picture of bulletin board, poster, or assembly, etc.	
Did staff and/or students develop environmental knowledge or skills through participation in workshops, mentoring, presentations, or a webinar series?	

ENERGY CONSERVATION

Do staff and students turn off lights when they are not required (e.g., when classrooms are not in use, in stairwells and corridors with extensive natural lighting, outside lights adjusted seasonally)?	
Are electronics (monitors, LCD projectors, smartboards) turned off when not in use?	
Are printers, scanners, and photocopiers on standby when not in use and turned off at the end of the day ?	
Has your school's equipment been consolidated to ensure that energy is not wasted by using more equipment than is necessary (e.g., reducing the number of computer printers through networking)?	
Do students and staff ensure that windows and curtains (if present) are closed at the end of the school day (especially important in the winter to minimize heat loss)?	
Do students and staff consistently monitor to ensure that the space around vents on walls, ceilings, or window sills is kept clear (to ensure effective cold air return)?	
Do students and staff ensure that doors to the outside of the building are not left open unnecessarily (to reduce energy/heat loss)?	
Does your school adhere to board standard room temperatures and make maximum use of its computer-controlled temperature system (HVAC/BAS, if available) (e.g., ensure that heating/cooling equipment is adjusted/maintained to minimize the school's energy consumption)?	
Are regular inspections of mechanical equipment and water faucets conducted and problems reported promptly (e.g., fix broken valves; check roof vent seals, dampers, louvers, filters for school and portable motors, window/door seals)?	
Do students monitor energy conservation practices throughout the school? Portfolio requirement: copy of completed Energy Conservation Walkabout Worksheet or equivalent monitoring sheet displaying a minimum of three tracking dates.	

Did students communicate the results of the Energy Conservation Walkabout Worksheet or equivalent monitoring system to the whole school community?	
To what extent do students actively explore energy use and energy conservation behavior within the school? Portfolio requirement: copy of a completed Classroom Lighting Assessment sheet OR School Energy Consumption Assessment sheet or equivalent worksheet.	

WASTE MINIMIZATION

Do staff and students reduce paper consumption by photocopying/printing on both sides of paper whenever possible?	
Does your school regularly use electronic methods (email, website) to communicate with parents or, if printed communication is necessary, use a sibling list?	
Has your school established systems and regular routines to reduce food-related waste (e.g., composting cafeteria/lunchroom organics and/or school-wide waste-free or boomerang lunch program at least one day per week)?	
Has your school put in place systems to reuse paper with “reuse it/Good On One Side [GOOS]” boxes placed in key locations throughout the school (e.g., classroom, office, library, copy room)?	
Do staff and students have waste-free events/meetings , ensuring reusable dishes/serviceware are used?	
Does your school reuse and/or recycle computers and other surplus goods (e.g., through internal board postings or by using an environmentally responsible recycling company)?	
Has a school-wide paper recycling system been effectively implemented (i.e., bins strategically placed throughout the school containing minimal contamination from non-recyclable items)?	
Has a school-wide container recycling system been effectively implemented (i.e., bins strategically placed throughout the school containing minimal contamination from non-recyclable items)?	
Does your school recycle photocopier toner bottles and printer cartridges?	
Do students check for contamination in the garbage and recycling bins using the Waste Minimization Walkabout Worksheet or equivalent monitoring system? Portfolio requirement: Copy of a completed Waste Minimization Walkabout Worksheet or equivalent monitoring sheet displaying a minimum of three contamination tracking dates.	
Did students communicate the results of the Waste Minimization Walkabout Worksheet or equivalent monitoring system to the whole school community?	
Have students participated in a school-wide waste audit (must include a breakdown of contents of both garbage and recycling) and communicated the results to the whole school? Portfolio requirement: Ontario <i>EcoSchools</i> School Waste Audit or comparable audit analyzing both garbage and recycling. Please note: Classroom and lunch waste only audits do not meet criteria.	

SCHOOL GROUND GREENING

Were students actively involved in one or more of the following phases of your project during the current school year? Portfolio requirement:	
Were members of the wider school community (e.g., parent council, conservation authority, landscaper) actively involved in the design, implementation, or maintenance of the project during the current school year and summer months?	
Does the planted material in your school ground greening project: • improve biodiversity (e.g., provide habitat, include diverse plant species, establish a nature study area) and/or • encourage ecological sustainability (e.g., include native plant species, drought-resistant perennials, food-producing plants)? Portfolio requirement: Site plan/landscaping drawing that clearly identifies plant species and/or how biodiversity is being improved or list of native or drought-resistant species. Please note: Beautification/bulb planting is not accepted in this section.	
Is your school actively involved in a school ground greening project that provides or will provide useful shade in areas accessible to students (i.e., schoolyard) or energy conservation benefits for	

<p>the school building? Useful shade = shade provided by plants/trees in active play/learning areas or shade for the school building Portfolio requirement: Copy of detailed site plan (can be student drawn) indicating useful shade and/or a shade survey of your school ground. For tips on how to conduct a shade survey, see pg.15-17 of School Ground Greening: Designing for Shade and Energy Conservation.</p>	
<p>Do students and teachers use the school ground greening project to enrich student learning and recreation (e.g., outdoor experiential education)? Please note: Projects in the planning/design phase are not eligible for this question.</p>	

CURRICULUM













<p>How do students learn in, about, and for the environment as a regular part of teaching and learning? To qualify, curriculum must meet all of the following criteria: Include environmental learning: Demonstrated learning in/about/for the environment. Taught over at least two periods Include completed student work: One copy of one student's completed work per submission. Student work is not needed for off-site field trips.</p>	
<p>Portfolio requirement: One copy of one student's completed work for each submission, except for field trips. Non-paper student work (presentations, 3D art, videos, online work, etc.) can be captured in a photo or screen capture.</p>	

ENVIRONMENTAL STEWARDSHIP

<p><i>Guiding Question:</i> How does your school foster environmental stewardship through whole school and community engagement?</p>	
<p>To qualify, stewardship activities must meet all of the following criteria: 1. Environmental learning: Clear, well-communicated connection to learning about an environmental issue (e.g., conserving resources, mitigating the impacts of climate change). 2. Environmental action: Engage the whole school community in active participation focused on a specific environmental issue (e.g., campaigns/presentations/assemblies with action initiatives). 3. Above and beyond: Include school-wide initiatives that go beyond other sections of the <i>EcoSchools</i> program (i.e., cannot be initiatives that have already been allocated points – for example, lights and electronics off, general recycling or contamination, and GOOS paper campaigns).</p>	
<p>Portfolio requirement: One supporting document that verifies that a specific environmental issue has been the focus of student learning and action for each submission (e.g., announcement, newsletter, or poster sharing information about an environmental issue).</p>	

Appendix F

Sample Points System for Program Section

SECTION II.		POINTS
ENERGY CONSERVATION		
Guiding Question: How does your school make decisions and follow daily routines and operational practices that significantly reduce the use of energy and its impact on the environment?		
Please note: The Follow-up EcoReview should be completed <u>three months</u> after the Initial EcoReview.		
LIGHTS AND EQUIPMENT		
2.1 	Do students and staff turn off lights when they are not required (e.g., when classrooms are not in use, in stairwells and corridors with extensive natural lighting, outside lights adjusted seasonally)?	3
2.2 	Do students and staff turn off electronics (monitors, LCD projectors, smartboards) when not in use?	3
2.3 	Are printers, scanners, and photocopiers on standby when not in use and turned off at the end of the day ?	1
2.4 	Has your school's equipment been consolidated to ensure that energy is not wasted by using more equipment than is necessary (e.g., reducing the number of computer printers through networking)?	1
HEATING AND AIR CONDITIONING		
2.5 	Do students and staff ensure that blinds and curtains (if present) are closed when appropriate to minimize heat loss?	1
2.6 	Do students and staff consistently monitor to ensure that the space around vents on walls, ceilings, or window sills is kept clear (to ensure effective cold air return)?	1
2.7 	Do students and staff ensure that doors to the outside of the building are not left open unnecessarily (to reduce energy/heat loss)?	1
SPECIALIZED PRACTICES OF CARETAKERS/CUSTODIAL STAFF		
2.8 	Does your school adhere to board standard room temperatures and make maximum use of its computer-controlled temperature system (HVAC/BAS, if available) (e.g., ensure that heating/cooling equipment is adjusted/maintained to minimize the school's energy consumption)?	1
2.9 	Are regular inspections of mechanical equipment and water faucets conducted and problems reported promptly (e.g., fix broken valves, check roof vent seals, dampers, louvers, filters for school and portable motors, window/door seals)?	2
STUDENT MONITORING AND COMMUNICATION		
2.10 	Do students regularly monitor Energy Conservation practices throughout the school? Portfolio requirement: <i>Energy Conservation Walkabout Worksheet</i> or equivalent monitoring sheet [Level 4 = a completed <i>Walkabout Worksheet</i> with a minimum of three tracking dates across ten classrooms].	2
2.11 	Do students use campaigns and communication strategies to effectively share Energy Conservation goals, successes, and areas for improvement (e.g., through posters, announcements, assemblies, presentations, awards, lights-off campaign, energy hog, etc.)?	2
2.12 	To what extent do students actively explore energy use and energy conservation behaviour within the school? Portfolio requirement (provide one of the following): copy of a <u>completed</u> <i>Classroom Lighting Assessment</i> , <i>School Energy Consumption Assessment</i> , <i>School Appliance Audit</i> , or equivalent worksheet.	2
TOTAL POINTS IN THIS SECTION		20

Retrieved from Ontario *EcoSchools*, 2017.

Appendix G

Sample Lesson Submission for Curriculum Section

This is a sample lesson taken from the 2015-2016 academic year portfolio for the THSS EcoTeam. This lesson earned full marks from the *EcoSchool* assessment process. The curriculum submission requires one copy of one student's completed work as evidence. (which is not included). The lesson handout is included below. A lesson plan is only required instead of student work if the lesson is not completed by the application deadline of April 29.

Lesson Description:

Lesson was an off-site field trip	
Grade	Gr. 11
Subject	Secondary – The Arts
Number of periods for instruction/assignment (min. 2 periods)	
Lesson completed before application deadline?	Yes
Describe the environmental lesson and what students learned about the environment.	Students learned about environmental art which seeks to inform, educate and inspire the public to engage in activities that reinforce a more sustainable lifestyle. Students learned about the impact of waste on our landscape.

Lesson Handout is included on the page below.

Name of Student: _____

AVI 3M “ECO” SCULPTURE

What is “Eco” or Environmental Art?

It is basically art that improves our awareness and relationship with our environment.

Some Environmental art also:

- Informs and interprets nature and its processes, or educates us about environmental problems
- Is concerned with environmental forces and materials, creating artworks affected or powered by wind, water, lightning, even earthquakes
- Re-envisions our relationship to nature, proposing new ways for us to co-exist with our environment
- Reclaims damaged environments, restoring ecosystems in artistic and often aesthetic ways

http://greenmuseum.org/what_is_ea.php

This assignment requires you to create a sculpture mainly out of:

- **natural materials** such as the work of Andy Goldsworthy (eco friendly)

or

- **recycled materials** such as in the art of Robert Bradford (essentially something that would have been thrown out or put into the recycling bin).

The idea is to raise public awareness while you also create a new purpose for the materials used. You must use the steps of the Creative Process for this piece. For this project you are encouraged to work in partners or groups of three to create a more elaborate/detailed sculpture.

Due Date of Rough ideas: _____

Due Date to have ALL materials gathered: _____

Final due date of Artwork: _____

Appendix H

Sample Platinum Action Plan

This Action Plan was created for the 2013-2014 academic year by the THSS EcoTeam to fulfill the Platinum certification requirements for the Energy Conservation section. Full marks were awarded.

TARGET ONE
List one target that your school would like to achieve to conserve energy.

Reduce # classroom lights left on when classes are empty. We would like 100% Compliance

Actions
What steps will your school and EcoTeam take to achieve your target?

- Monitoring
- Announcements + Reminders
- Awareness Week - Earth Week.

Indicators
How will your EcoTeam know that it has been successful in achieving this target? (counting participants, collecting feedback, research, etc.)

We will examine tally sheets throughout semester and compare results.

Resources / Responsibility
What resources does your EcoTeam need to achieve the target? (people, materials, funding, etc.) Who will be responsible for different phases of the action plan?

Auditors will need tally sheets. Promotional materials will ~~not~~ get through Art. This is a responsibility for all Eco-team members

Timeline

Audits in fall, winter + spring to compare ~~results~~ results.

Results (to be filled out near the end of the school year)
Did you achieve your target this year? Why or Why Not? How will these results impact your future campaigns?

We feel we were successful in the lighting campaign. We ~~were~~ need more consistent audits. We may add prizes next year to increase participation. We struggle with people listening to announcements. We had about 80-85% compliance rate towards the end of campaign.

TARGET THREE

List one target that your school would like to achieve to conserve energy.

We would like to increase the number of classes participating in EARTH HOUR. This is our 6th year running the hour and we'd like 100% participation.

Actions

What steps will your school and EcoTeam take to achieve your target?

Increase awareness leading up to Earth Hour.
Appeal to individual classes + teachers.
Encourage "lights-off" lessons/outdoors that day.

Indicators

How will your EcoTeam know that it has been successful in achieving this target? (counting participants, collecting feedback, research, etc.)

Eco team will count # classes participating

Resources / Responsibility

What resources does your EcoTeam need to achieve the target? (people, materials, funding, etc.) Who will be responsible for different phases of the action plan?

Announcements - Students will write
Staff discussion → Teacher Moderators will present @ staff meetings.
No additional funding required.

Timeline

Earth hour is in March.

Results (to be filled out near the end of the school year)

Did you achieve your target this year? Why or Why Not? How will these results impact your future campaigns?

We did not reach 100% of our target. We did not begin advertising early enough to allow all teachers enough time to modify plans. Next year we will begin before March break. We had about a 70% participation rate. Bad weather also reduced ability to go outside, limiting our success.

ONTARIO
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