

“NO NATURE, NO HUMAN”: EXAMINING ENVIRONMENTAL LEARNING AT
AN EARTH EDUCATION SUMMER CAMP

by

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Abstract

Nonformal environmental education programs seek to educate youth about the natural environment while simultaneously engaging them with the outdoors. Although extensive research has analyzed the outcomes of such programs, an understanding of what environmental learning (EL) experiences are most meaningful to learners is lacking. Recognizing this need, this study investigated how *Sunship Earth*TM, an earth education summer camp program, contributes to participants' EL experiences in three learning domains: cognitive, affective, and behavioural. A secondary objective was to understand how these experiences influence participants after the program. Learning experiences were documented using surveys and parent interviews. Results suggest that *Sunship Earth*TM provides learning opportunities for children to enhance their knowledge about the environment through hands-on learning activities. Campers also reported feeling more connected to and concerned about the natural environment immediately after camp. Finally, some participants adopted environmentally responsible behaviours 2-3 months after the program.

List of Abbreviations and Symbols Used

AEC Halifax Regional Municipality Adventure Earth Centre

EC₁-DC₂-IC₃-A Energy Flow, Cycles, Diversity, Community, Interrelationships, Change,

Adaptation (seven ecological concepts taught at *Sunship Earth*TM)

EL Environmental Learning

ERBs Environmentally Responsible Behaviours

GRT Generational Replacement Theory

SDGs Sustainable Development Goals

SLT Social Learning Theory

UN United Nations

Glossary

Before introducing the study, it is important to define specific terminology that will be used throughout this thesis.

Natural environment: In this study, the term natural environment represents the opposite of the built environment as it refers to the outdoors (e.g. landscapes, forests, etc.) or the physical environment.

Environment: The term environment refers to factors that are external to the self or individual. For instance, one might be described as being in a ‘summer camp environment’. In this case, ‘environment’ refers to the camp setting and all its associated entities (e.g. counselors, activities, weather, etc.).

Cognitive: The term ‘cognitive’ is used to describe a learning domain that focuses on knowledge. In this context, ‘cognitive’ is used to describe an EL domain that focuses on the accumulation of knowledge and facts about the natural environment (Bell, 2005).

Affective: This term refers to another EL domain that involves feelings/emotions related to the environment. These can include feelings of environmental concern, awareness, and/or feelings of connectedness to nature (Bell, 2005; Brody, 2005).

Behavioural: This term represents another learning domain and refers to learning experiences that promote the adoption of ERBs. It is used in the context of this thesis to describe experiences that encourage behaviours that promote environmental protection and/or restoration (Bell, 2005).

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Chapter 1: Introduction

1.1 Motivation

It is well known that learning experiences in the outdoors during childhood can influence the development of environmentally responsible behaviours (ERBs) in adults (Chawla, 2007). Other effects of youth participation in outdoor activities and play include positive health outcomes such as reduced levels of obesity and increases in self-esteem (Barton & Pretty, 2010; Taylor & Kuo, 2012). Although these benefits exist, Louv (2008) and others (e.g. Box, 2006) have argued that children are severely disconnected from the natural world. Interestingly, Wells & Evans (2003) suggest that children prefer being outside, but due to numerous restrictions many youth currently lack the opportunity to learn and play in natural spaces. Some barriers include influences of technology (Jordan, Hersey, McDvitt, & Heitzler, 2006), perceived dangers (e.g. strangers, traffic) (Carver, Timperio, & Crawford, 2008), and lack of accessible green space in cities (Louv, 2008).

Environmental education has been presented as a potential solution to these issues and is widely described as essential in achieving sustainable development (Orr, 2004). Many environmental education programs are designed to introduce youth to the outdoors, educate them about the Earth, and encourage the development of necessary skills to respond to environmental issues (Biedenweg, Monroe, & Wojcik, 2015). These programs can range from brief one-day field trips to nature centers to participating in a week-long (or longer), overnight environmental-themed summer program (Biedenweg et al., 2015). The outcomes of such programs have been researched extensively within the environmental education literature (Dresner & Gill, 1994). The primary focus of such research is to understand how programs produce outcomes related to environmental

knowledge, pro-environmental attitudes, and ERBs. For example, Smith-Sebasto & Semrau (2004) explored how the outcomes of an overnight environmental education program in New Jersey impacted the attitudes of sixth-grade students and determined that environmental attitudes did not change, but ERBs were enhanced. Other studies such as Kuhar, Bettinger, Lehnhardt, Tracy, & Cox (2010), who measured long-term knowledge retention from an environmental education program, illustrate how participants are able to retain knowledge related to specific environmental education programming. These examples highlight a pre-dominant theme in the literature, an emphasis on measuring pre-determined program outcomes. That is, how participants measure up to a set of pre-determined criteria. Another example is Rakotomamonjy, Jones, Razafimanahak, Ramamonjisoa, & Williams (2015) who measured how well individuals could identify lemur species in a region of Madagascar one-year after learning about these animals during an environmental education program. In presenting an alternative to a focus on outcomes, Rickinson, Lundholm, & Hopwood (2009) have urged the scholarly community to begin researching how environmental education programs are able to contribute to an individual's life-long environmental learning (EL) process.

A focus on life-long EL, especially during childhood, is important for a number of reasons. First, it recognizes the complexity of learning and accurately views it as a process that is flexible, individual, and variable in time and space (Falk, 2005). Second, researching EL is necessary in order to understand and conceptualize how society will learn about and adopt sustainable development practices. As Sterling (2001) argues "the difference between a sustainable and chaotic future is learning" (p. 10). Third, investigating learning may assist researchers in understanding the key motivations and

specific learning experiences that contribute to the development of environmentally responsible characteristics (e.g. attitudes, behaviours, etc.; Chawla, 2007). Finally, EL is an important topic to study as it has been widely neglected in the broader literature and, unlike researching program outcomes or teachers, is able to provide insight into an individual's positive, negative, and accidental learning experience in a diversity of settings (Rickinson et al., 2009).

This study contributes to the EL literature by examining the EL *process* that occurs through participation in an earth education summer camp program, *Sunship Earth*TM. *Sunship Earth*TM is an internationally implemented overnight camp program created by the Institute for Earth Education. For the purposes of this study, a specific implementation of the program by the Halifax Regional Municipality Adventure Earth Centre (AEC) was analyzed. This research attempts to understand how the program contributes to campers' EL in three learning domains: cognitive, affective, and behavioural. In order to examine these variables, a mixed-method approach was employed. First, a pre- and post-camp survey method was used to measure the cognitive, affective, and behavioural EL experiences while at camp. To understand more about these factors, and to investigate the longer-term benefits of the program, interviews were conducted with parents 2-3 months after this specific implementation of *Sunship Earth*TM was completed.

1.2 Context

Scott and Gough (2003) have defined EL as any type of learning that educates individuals about the environment and/or environmental topics. Although this definition is left intentionally open-ended and simplified, Brody's (2005) theory of learning in

nature is more complex. He suggests that “meaningful learning in nature is a result of direct experience(s) over time in which personal and social knowledge and value systems are created through complex cognitive and affective processes.” (p. 610). Essentially, Brody (2005) suggests that EL experiences are most meaningful when the learner is actively engaged in the learning process, thinking about connections between themselves, nature, and society, while simultaneously developing new perspectives and understandings of the natural world. Similarly, Bell (2005) argues that effective EL is action-oriented and practical. In his view, EL should allow participants to (a) understand natural processes, (b) acquire new knowledge (both practical knowledge about the environment and a moral knowledge of environmental problems), (c) understand how to respond appropriately to environmental issues, and (d) feel motivated to complete actions that are meaningful in addressing environmental issues (Bell, 2005). Without emphasizing these learning domains, in particular action, Bell (2005) believes that it is impossible for EL to be truly effective.

In light of these many perspectives on EL, a clear and well-defined framework is required for any study to be conducted in this field. Rickinson et al. (2009) conceptualizes EL as experiences that educate learners about (a) natural processes, (b) the relationship between these processes and society, and (c) the individual, where learners are encouraged to “learn about themselves” (Rickinson et al., 2009, p. 18) and their relationship to nature and society (Figure 1). Given this, learning is viewed as interconnected where participants learn how an individual is able to shape nature/society and how societal norms/ecological processes are able to shape an individual. This framework aligns with others previously discussed as it emphasizes not only acquiring

knowledge about the natural world but also suggests that EL is important in developing pro-environmental attitudes and behaviours.

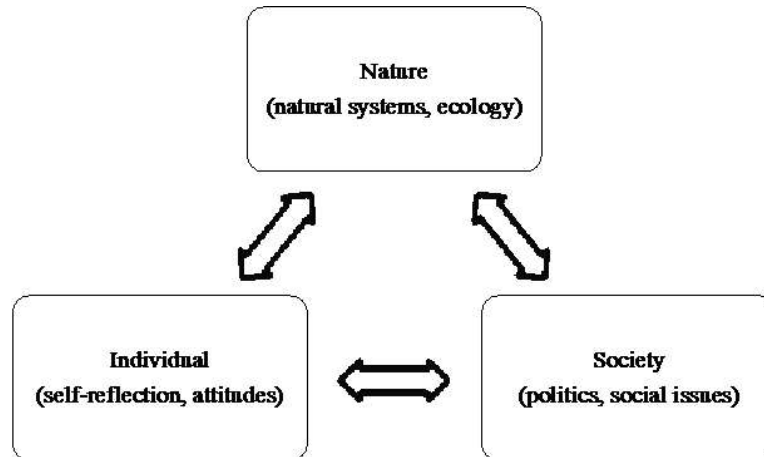


Figure 1: Conceptual framework for EL. The main components of EL involve learning about the individual (attitudes, ideas, learning about themselves), nature (natural processes, ecology), and society (political systems, social issues). The arrows connecting these concepts represent learning about the interconnections between these factors (adapted from Rickinson et al., 2009, p. 18).

This framework also suggests that an evaluation of EL needs to include an analysis of knowledge and changes in feelings, attitudes, and behaviours (e.g. personal relationship with nature) known as affective and behavioural learning. Other authors, including Cachelin, Paisley, & Blanchard (2009), share this view, suggesting that a comprehensive understanding of EL can only be achieved if all of these learning domains are considered.

Another important concept to introduce is program evaluation in the context of environmental education programs. Program evaluation is employed to determine a particular program's worth (Sechrest & Figueredo, 1993). Contrary to conventional interpretations of 'worth', evaluation does not measure the monetary benefits of a program. Instead, this process focuses on understanding a program's operations to reveal

whether or not it should be implemented or continue to function (Fitzpatrick et al., 2010). Although environmental education programs should be evaluated, there are significant barriers that currently restrict this work (Matiasek & Luebke, 2014). In many cases, barriers include a lack of expertise, money, and time necessary to undertake a meaningful evaluation (Taylor-Powell, Steele, & Douglass, 1996). In particular, time can become a constraining factor in evaluation as program developers worry that both staff and participants are too busy to create and/or respond to questionnaires, surveys, etc. Unfortunately, this creates a culture of potential evaluators who may understand the importance of evaluation, but are hesitant to complete this process (Bourke et al., 2014). As a result, further efforts are needed to produce meaningful evaluations that focus on various processes of programming using a variety of research methods and approaches (Bourke et al., 2014; Stern, Powell, & Hill, 2014).

This section has provided a description of EL and program evaluation, two concepts which underpin this work. Although these two topics have been featured in the literature, authors consistently discuss the need for further research to be conducted in these fields. Specifically, it is hoped that this project will advance an understanding of how (a) educational programs can contribute to youth's EL experiences and (b) these experiences can be provide a pseudo-evaluation focused on learning rather than outcomes that is able to benefit both researchers and practitioners.

1.3 Literature and Knowledge Gaps

Given this context, it is important to note that several specific knowledge gaps have emerged in these fields. First, many authors have noted a lack of focus on participants in environmental education programs as research subjects. Specifically,

Hopwood (2007) argues that environmental education research needs to address the participant experience more frequently when it comes to analyzing EL. In practice, this requires researchers to focus directly on the children (and/or others) who are participating in environmental education programming instead of the program developers, administrators, etc. As Hopwood (2007) states, “debates among adults are crucial to the continued development of environmental education as an academic field and a form of practice. However, it would be foolish to ignore findings relating to the way pupils experience and value environmental education” (p. 462). Additionally, Rickinson & Lundholm (2008) suggest that while learners need to be a direct focus of research studies, these participants also need to be viewed as active and engaged within their learning. This is a necessary perspective to take when analyzing EL, as we cannot expect to understand how learners perceive their experiences if they are viewed as passive agents in the learning process. Interestingly, there is minimal emphasis on understanding participant experiences in environmental education programs in evaluation literature. Specifically, it has been shown that since the 1980s, evaluations that assess school-aged youth programs are less likely to investigate participants’ perspectives and more likely to focus directly on whether or not the program meets its intended outcomes (Bourke et al., 2014). Similar to EL literature, this is a significant flaw in the evaluation field as little to no information is being provided to conceptualize a program’s strengths and weaknesses from the young people who are actually participating in it.

Another important knowledge gap to consider is the current emphasis on understanding outcomes in environmental education research. Throughout his works Rickinson (2001; 2006, Rickinson et al., 2009) has continually discussed the need for

researchers to focus on process-based EL experiences, rather than outcomes of educational programs. To conceptualize the difference between reporting on outcomes and processes consider Falk's (2005) description of research questions:

What did an individual learn as a consequence of this educational experience is an inappropriate way to frame the question. A more appropriate way to frame questions of learning would be to ask: How did this educational experience contribute to an individual's learning? (p. 207).

By asking these types of research questions, learning can be viewed as a constant, individualized, life-long process that may or may not be influenced by educational interventions throughout childhood and onwards. Through examining these processes, Falk (2005) and others believe that researchers will have greater opportunities to understand the contributions that different programs, experiences, etc. can have on environmental knowledge, attitudes, and behaviours throughout the life course.

In addition to these gaps, authors suggest that evaluations are completed with little variation in research methods and lack an emphasis on formative evaluation approaches. Here, formative evaluations can be described as assessments that seek to understand how a program could be improved by examining the processes (e.g. activities, lessons) used to achieve the final product of the program. On the other hand, summative evaluations assess outcomes and focus on the final product of a program, rather than its components and processes (Northern Illinois University, n.d.). Based on this lack of methodological variation, additional challenges restrict meaningful evaluations from being completed (Rickinson, 2001; Bourke et al., 2014).

Surveys both before and after a program (pre-/post-test method) are the most common research method employed in evaluation. This approach is typically used to measure the outcomes of a program immediately or soon after its completion. Although these measures are important, some authors worry that a sole focus on the pre-/post-test method eliminates the possibility of measuring long-term benefits. To address this issue, Stern et al. (2014) have suggested employing mixed methods studies where supplementary data collection tools (e.g. questionnaires, qualitative interviews) can be used in conjunction with the pre-/post-test method to produce a more robust dataset (Stern et al., 2014). Bourke et al. (2014) also discuss how summative or outcome evaluations are exceedingly common in this field. To complement this approach, formative measures are needed to (a) identify specific program processes that could be improved and (b) provide a more holistic understanding of how the audience is able to acquire the program's intended benefits (Scheirer, 1994, as cited in Rossi, Lipsey, & Freeman, 2004). This gap is similar to arguments made by Falk (2005) and Rickinson (2006) who suggest that EL needs to be viewed as a larger process, through the use of exploratory methods, instead of focusing solely on pre-determined outcomes that result from participation in environmental education programs.

1.4 Research Goals & Objectives

The objective of this study was to investigate how an earth education program, *Sunship Earth*TM, contributed to its participants' cognitive, affective, and behavioural EL domains. To complete this objective, a mixed-methods approach consisting of surveys with campers and interviews with parents/guardians was employed. The surveys (pre-/post-camp) provided an understanding of the various types of EL that occurred during

the program and were most meaningful for campers, while the goal of the interviews were to gain insight into what experiences were retained and/or applied by campers after the program's completion.

1.5 Research Questions

In keeping with Falk's (2005) suggestion of structuring learner-focused research questions, this study aimed to meet its objectives through answering the following questions.

- (1) How does *Sunship Earth*TM, as delivered by the AEC, contribute to the cognitive, affective, and behavioural EL experiences of participating youth? ;
- (2) Which experiences were most meaningful and impactful to campers' 2-3 months following the completion of a *Sunship Earth*TM program at the AEC?

1.6 Scope

Although EL, as a broad field, is poorly represented within environmental education research, this study focused on alleviating a distinct portion of the literature gaps related to this topic. Specifically, this research addresses the recommendations of both Rickinson et al. (2009) and Rickinson (2006) by exploring how *Sunship Earth*TM may or may not contribute to participants' EL experiences. In addition, while this study sought to investigate the impact of *Sunship Earth*TM on its participants, results are based on an analysis of a single application of this program at the AEC. Therefore, these results are not generalizable for other implementations of the *Sunship Earth*TM program. The AEC delivered two week-long sessions during the month of July 2015 for campers aged 10-12. The first and second sessions took place between July 18-23 and July 26-31,

respectively. Survey results were collected during each of these sessions, and interviews were conducted 2-3 months following the program's completion.

1.7 Research Approach

The research questions were examined using an in-depth mixed-methods case analysis of both campers attending *Sunship Earth*TM and their parents. These methods were informed by a variety of previous studies that have measured data from young participants in both formal and non-formal educational settings (Watson, 2004; James & Bixler, 2008, Cachelin et al., 2009; Seal & Seal, 2011). Specifically, participants were asked to complete a pre-/post-camp survey in hopes of determining how the program has contributed to their cognitive, affective, behavioural EL domains. To answer the second research question, participants' parents were interviewed after each camp's completion to determine how any learning experiences were retained and what was most meaningful for campers after the program.

1.8 Structure of Thesis

This thesis is structured in five chapters. Chapter 1 has provided an introduction to the literature related to environmental education and learning and also highlights the goals of objectives of this study. Chapter 2 provides an in-depth exploration of methods used in this study. Specifically, it presents an overview of theory used to inform methods, provides rationale for the selected methods, and discusses data collection and analysis procedures. Chapter 3 and 4 are two independent manuscripts that have been prepared for submission in relevant academic journals. Each of these chapters include their own abstract, introduction, methods, results, discussion, and conclusion sections and describe the results obtained through this thesis work. Chapter 3 was prepared for submission in

Environmental Education Research and reports on data collected from surveys highlighting participants' EL experiences at *Sunship Earth*TM. Chapter 4 was prepared for submission in *The Journal of Environmental Education*. It reports on parent interview data and explores the influence *Sunship Earth*TM has on campers and their families 2-3 months after the program. Finally, Chapter 5 summarizes these findings and discusses the contributions of this thesis, its significance, areas of future research, and recommendations for environmental education researchers and practitioners.

Chapter 2: Methods

In order to fulfill the objectives of this study, a mixed-methods approach was employed. First, pre-/post-camp camper surveys were used to understand how *Sunship Earth*TM contributed to participants' cognitive, affective, and behavioural EL experiences. Specifically, Survey #1 was developed to measure the contributions of the program to environmental knowledge, while Survey #2 was created to measure the contributions of the program to campers' affective and behavioural experiences. In addition, qualitative interviews with parents were included to understand how *Sunship Earth*TM contributed to participants' learning in the longer term and to explore what parents perceived to be most meaningful for campers.

2.1 A Blended Approach

While quantitative research has been used extensively in environmental and earth education studies (e.g. Eagles & Demare, 1999; Hilgers et al., 2008), others such as Henderson (1987) propose that qualitative research can play an important role in understanding the complex cultural and social backdrop inherent of summer camp programs specifically. As Watson (2004) suggests, summer camps create a distinct culture where learners and teachers live together and develop unique social connections all within a setting that is unlike school or home life. Although Watson (2004) provided this description to support the selection of ethnography as an ideal research approach in his own work, his view helps contextualize the importance of qualitative research more generally in helping account for the social and cultural interactions that occur within summer camp programs. In her study of *Sunship Earth*TM, van Wissen (1992) also suggested that qualitative research is helpful for investigating earth education programs

in particular as this educational approach “deals with emotions and experiences that cannot be measured by quantitative methods” (p. 26). Therefore, due to the extensive use of quantitative analysis and the utility of qualitative methods, this study combined these approaches to examine the learning experiences of campers participating in the AEC’s *Sunship Earth*TM program.

2.2 Methodology and Theory

2.2.1 Intrinsic Case Study Approach

This study adopted an intrinsic case study approach as it focuses on understanding the learning experiences of campers in a single season of the *Sunship Earth*TM program. This approach allows a researcher to explore a specific issue or phenomenon in the context of a single (or multiple) manifestation or case (Creswell, 2007). Given that this study seeks to investigate EL (the phenomena) at a specific case (the AEC *Sunship Earth*TM program), an intrinsic case study approach was deemed highly appropriate. Intrinsic case studies are used when the case itself is the primary focus of the research (Stake, 1995; Baxter & Jack, 2008). This approach is also suitable for this work because *Sunship Earth*TM itself is “unique” (Stake, 1995, as cited in Creswell, 2007) in its curriculum, setting, and delivery. Here, it should be restated that generalizing these results is not recommended due to the presence other programs operating in different contexts (Creswell, 2007). This is of importance as Rickinson (2006) suggests that, “small-*N* and non-random studies must be carefully interpreted within their methodological confines and contributions to avoid the fallacy of overgeneralization” (p. 464). Given this insight, it should be noted that results from this study should not be generalized to campers who participate in other *Sunship Earth*TM programs or similar

programs, as the diverse characteristics of each program may (or may not) contribute to childhood EL experiences in different ways than reported here.

Baxter & Jack (2008) suggest that case study research typically involves the collection of data from a number of sources. Additionally, it is recommended that these multiple sources of data be analyzed as a whole and not as distinct parts since “each data source is one piece of the “puzzle,” with each piece contributing to the researcher’s understanding of the whole phenomenon” (p. 554). That is, without viewing the data as a collective whole, a holistic understanding of the case cannot be achieved. In recognition of this critical aspect of the intrinsic case study approach, multiple methods (e.g. surveys, interviews) were employed and analyzed simultaneously to best understand how *Sunship Earth*TM contributed to children’s EL.

2.2.2 Social Constructivism

Similar to the perspectives of Rickinson et al. (2009), this study views learning through the lens of social constructivism. Social constructivism is a worldview that places emphasis on understanding the various meanings that individuals ascribe to their experiences. This view is grounded in the idea that “individuals seek understanding of the world in which they live and work” (Creswell, 2007, p. 8). From a research perspective, Creswell (2007) notes that these types of studies typically involve open-ended, qualitative methods that attempt to emphasize participant voice and experience. In the context of this work, the idea of social constructivism is applied to the topic of EL. As Rickinson et al. (2009) argue “...learning [is viewed] as a product of the individual interacting with others in a social setting” (p. 14). Others suggest that social constructivism describes how learning is navigated and influenced by both everyday experiences and concepts that are

deliberately taught to the individual (Au, 1998). First developed by Vygotsky (1978) this perspective places emphasis on the need for learning to be collaborative and explores how teachers (e.g. parents, recreation staff, school teachers) are important in guiding learners to achieve the “zone of proximal development”. This zone is described by Vygotsky (1978) as a heightened level of understanding that can be achieved when individuals have the opportunity to collaborate with/learn from others to move beyond their “actual” level of development and reach their “potential” level of development. For example, a child may know what pollution is (actual developmental level) but through a learning experience on a field trip with her peers she is able to learn and discuss what causes pollution and the basic steps she can take to mitigate her personal impact, thus reaching a heightened level of understanding (potential developmental level). Social constructivism is important in the context of this study as the methods used within this view attempt to reveal how the unique educational setting of *Sunship Earth*TM is able to assist campers in developing a heightened level of understanding, appreciation, and connection to the natural environment.

2.2.3 Social Learning Theory

Social Learning Theory (SLT) suggests that individuals are directly influenced by “a three-way dynamic in which personal factors, environmental influences, and other responses...continually interact to influence behaviour” (Smith & Strand, 2008, p. 29). In other words, individuals learn how to behave through direct experiences and by observation. Through learning and watching others learn it is thought that individuals will be able to navigate their decision-making and determine what types of behaviours they should exhibit. Ultimately, this allows individuals to use both insight and foresight to

understand and conceptualize how to behave in a given situation in the future (Bandura, 1971). SLT lends itself to this research as it illustrates how parents, teachers, camp counselors, peers, and others may have significant influences on children's feelings and behaviours toward the environment. In particular, this theory was helpful in identifying the need to consider social factors (e.g. previous involvement with environmental issues, parents' career, etc.) and individuals (e.g. counselors) that may help contribute to children's affective and behavioural learning domains both at and externally to *Sunship Earth*TM.

2.2.4 Generational Replacement Theory

A final theory that has guided the development of this study is Generational Replacement Theory (GRT). Delli Carpini (2006) describes GRT as a form of social change that occurs with the eventual replacement of older human cohorts with those who are younger. Delli Carpini (2006) claims that this replacement can spur large-scale societal changes that reflect alternative values and interests expressed by the new cohort. Specifically, as youth age in different cultural, political, environmental, and technological contexts than generations previous to them, both formal and informal experiences (e.g. schools, media, etc.) shape their beliefs. These influences can then cause a new "generational identity" that separates the beliefs of one generation from another (Delli Carpini, 2006, p. 282). GRT has been studied in many academic disciplines including political science. For example, GRT was shown to influence political values across Western Europe during 1970s and 80s (Abramson & Inglehart, 1992), while a more recent study determined that GRT could not explain variations in electoral volatility (the measure of change of voter preferences between elections) in the Netherlands

(Dassonneville, 2013). Regardless of these studies' outcomes, these examples show that this relatively simple, interdisciplinary theory can help contextualize and investigate changes in values within human society.

By suggesting that the crucial formation of generational tendencies occurs early in life, GRT also highlights the importance of childhood and adolescence as a time when individuals can be encouraged to adopt new values, beliefs, or attitudes (Wray-Lake, Flanagan, & Osgood, 2010, as cited in Alwin & McCammon, 2003). In their study, Wray-Lake et al. (2010) use GRT to argue for the importance of researching environmental attitudes, beliefs, and values of adolescents. Specifically they argue that adolescents are important to research, as this group of individuals are actively influenced by a variety of social factors that may or may not impact their adoption of these attitudes or beliefs. GRT guides this research in a similar way by highlighting the importance of research studies focusing on the youth learners within educational programs such as *Sunship Earth*TM. Given that individuals are shaped by their social influences (both informal and formal), it is clear that research focusing on EL is necessary to help ensure programs are able to contribute to the development of a new generational identity that promotes strong pro-environmental attitudes, behaviours, and values.

2.3 Study Design

2.3.1 Tool Development

In following with the methodologies and theories described above, this study used a mixed methods approach to determine how *Sunship Earth*TM contributed to campers' EL experiences. A mixed-methods approach was selected for this study for a number of reasons. First, as discussed above, a mixed methods research design is ideal for studies

investigating summer camps as a combination of methods can shed greater insight on the complex social and cultural summer camp context. Second, this approach was taken to satisfy Creswell's (2007) criteria to use a variety of methods to acquire a thorough analysis of the intrinsic study case. Third, this selection was guided by Stern et al.'s (2014) suggestion that environmental education researchers and practitioners should develop mixed-methods studies to gain a richer understanding of learning experiences that occur from participation in such programs.

The pre-/post-test method has been used elsewhere when evaluating a range of different summer camps. For example, Seal & Seal (2011) used a similar method to measure health behaviours before and after a health and wellness summer camp program. Others have used the pre-/post-test to analyze how summer camp programs contribute to youth development outcomes from the perspective of participants' parents (Henderson Scheuler Whitaker, Bialeschki, Scanlin, & Thurber, 2007). Furthermore, Bexell, Jarrett, & Ping (2013) employed the pre-/post-test with a combination of other measures (e.g. student journals, participant observation, etc.) to capture a more holistic understanding of a program's impact. The flexibility of this pre-/post-test approach may be a large reason for its prominent representation in environmental education program evaluation research. In their review of outcome evaluations between 1999 and 2010, Stern et al. (2014) found that the most popular method of evaluation was the pre-/post-test. Another strength of the pre-/post-test lies in its ability to gather paired data. For instance, pre-test responses, which act as a "baseline", can be compared with post-test responses to measure potential change from the pre-intervention condition of participants. Although this method is well tested, Stern et al. (2014) encourage researchers to consider using alternative approaches

in conjunction with the pre-/post-test, such as Bexell et al. (2013) who supplemented their survey data using participant observation, student journals, and other methods, in order to gather a richer dataset.

Stern et al. (2014) have also noted that the majority of research in this field tends to focus on understanding how programs contribute solely to increases in environmental knowledge among participants. Although this measure is important, Cachelin et al. (2009) discuss other benefits that can result from participating in environmental education programs (e.g. development of pro-environmental attitudes and behaviours) that are equally important to measure. The call to better understand these contributions to EL may have stemmed from Hungerford & Volk (1999), and adopted by others in the field, who suggested that knowledge alone is not enough to educate and motivate individuals to make positive changes to address environmental issues (Chawla, 2007; Kennedy, Beckley, McFarlane al., 2009). As a result of the importance of measuring these various knowledge, affective, and behavioural domains of learning, two sets of pre-/post-questionnaires were created for this study. The first was designed to measure *Sunship Earth*TM's contribution to participants' environmental knowledge and the second to interpret how the program may (or may not) have influenced campers' feelings, connections to, and behaviours (affective and behavioural) toward the natural world.

Interviews were conducted with a subset of campers' parents/guardians 2-3 months after the completion of the *Sunship Earth*TM program. These interviews sought to understand what campers felt was most meaningful about the program, what they shared with their family, and how their knowledge, behaviours, attitudes, or interest had changed or impacted the family since the completion of the program. Although there seems to be

no consensus on the most appropriate amount of time to measure retention from an educational program, this time frame was selected as suitable for this study given the researcher's time restrictions. The use of a semi-structured interview methodology allowed parents to reflect and add relevant information to their responses (Lewis-Beck, Bryman, & Futing Liao, 2004), providing unique insight into changes or experiences the child had shared with them since the camp ended. The ideal sample size for the parents/guardian interviews was determined to be 7-10. This range of was purposively chosen, as it ensured individual results could be analyzed in as much detail as possible. Parent participants were randomly recruited from the larger group of participating campers.

Parents were interviewed in place of the campers for a number of reasons. First, this decision was made in response to past parent telephone calls received by the AEC. In these conversations, parents would describe how they thought *Sunship Earth*TM had impacted their child in a positive way and, in some cases, their family members as well (T. Peace, personal communication, January 15, 2015). As a result of this informal communication, the AEC and the researcher team were interested in understanding how the benefits of *Sunship Earth*TM were perceived from the parents' perspective. The decision to interview parents in place of children also reflects time, scheduling, and resource restrictions. For example, interviews would be difficult to schedule with child participants, as interview data was collected as campers were returning to school. Therefore, given their unique perspective (see detailed description in Chapter 4), along with adapting to limitations, parents were deemed the most appropriate to interview for the purposes of this study.

Survey and interview questions were developed with specific links to literature on effective EL. Specifically, many of the key features of EL discussed previously by Bell (2005), Brody (2005), and Rickinson et al. (2009) were considered when developing survey and interview questions. Questions used in these methods also reflect the input of program developers and the *AEC Sunship™ Earth Manual* (Warner & Taylor, 2013), which offered relevant context and an outline of key components that could be included in the surveys and interviews. Ultimately, these themes acted as scaffolding during the development of these methods by highlighting effective aspects of EL that would help reveal how *Sunship Earth™* contributed (or not) to its participants' various experiences with EL. The specific themes used to inform these methods are described in Table 1 below.

Table 1: Major themes describing effective EL from the literature and how they informed methods used in this study

<i>Theme</i>	<i>Survey/Interview Connection</i>
Understanding natural processes (Bell, 2005)	Cognitive survey, knowledge questions
Acquiring new knowledge (practical) (Bell, 2005)	Cognitive survey, knowledge questions
Acquiring new knowledge (moral) (Bell, 2005)	Affective, attitude scale, ERBs
Understanding how to respond (Bell, 2005)	Affective, ERBs
Completing meaningful actions (Bell, 2005)	Behavioural, parent interviews
Engagement and connection between learner and the environment (Brody, 2005)	Affective, favourite learning and playing spaces, feelings about the outdoors
Relationship between and understanding of participant, society, and the environment (Rickinson et al., 2009)	Affective, perception of outdoors, learning in different environments, ERBs

Levels of environmental involvement were also measured during the pre-test. Prior experience with EL or involvement with environmental activities has been shown to influence how children make meaning from and contextualize environmental education

programming (Eagles & Demare, 1999; Rickinson et al., 2009). For example Eagles & Demare (1999), in their study of *Sunship Earth*TM, determined that children who discussed nature with their family or watched television shows/movies about the environment had stronger attitudes towards the environment before camp than those who had lower environmental involvement. Although it is well known that previous environmental involvement can play such a role, some suggest that residential environmental education programs still struggle when attempting to measure and understand this relationship (Rickinson, 2001; James & Bixler, 2008), highlighting the need to study it further.

Pilot Tests. In order to prepare for data collection and test these tools, pilot tests were organized. Conducting a pilot study is critical in order to provide researchers with new information and perspectives regarding their data collection tools. Specifically, pilot tests have been found to reduce methodological errors and enhance reliability and validity (Isaac & Michael, 1981; Watson, 2004). The goal of the camper survey pilot study was to ensure that questions being administered to campers were age-appropriate for 10-12 year olds, could be easily understood by participants, and could be completed in less than thirty minutes. Meanwhile, the goal of the pilot interview was to explore the semi-structured interview process, identify specific questions that should be modified, removed, or added, and to gain experience working with an audio-recorder. The pilot studies were also valuable as the researcher was able to identify any issues and garner feedback from participants regarding the delivery of the surveys and interviews.

The survey pilot study was completed on May 31st 2015 at Dalhousie University in Halifax, Nova Scotia. Seven children aged 10 – 12 participated in the study. Four

environment-themed games/activities were played during the afternoon to ensure the pilot was enjoyable for participants. In between these activities, the surveys were completed. At the beginning of both surveys, instructions were read out to the respondents to ensure that they understood the format of the questions, knew how to ask for help, etc. Following this, each question was read aloud to the participants and one minute was given for participants to record their answer. Survey questions were distributed on paper and orally to assist children with different learning/reading comprehension levels. Participants were also asked to respond to open-ended questions by drawing and/or writing. If drawing a picture, they were asked to provide a caption (one or two sentences) to describe their image. Once these instructions had been given, these questions were read aloud. Participants were given five minutes to complete each written/drawing question. Following the completion of the surveys, time was taken to discuss and reflect with participants about the general surveying process, specific questions that were difficult for them to complete, and other relevant topics. Extensive notes were also taken to reflect on the delivery of the surveys in hopes of identifying how the data collection process could be improved.

A pilot study to test interview questions was completed in Halifax, Nova Scotia with a mother of a child who participated in the child survey pilot test. Although their child did not attend *Sunship Earth*TM, the same questions were asked to the participant but the context was changed from the camp program to her child's recent enrolment in a new school. Following the interview, time was taken to discuss questions that the participant had difficulty understanding or they felt would be difficult/uncomfortable to discuss with the researcher.

Ultimately, these pilot studies allowed for a practical review of the data collection tools that increased their reliability. More specifically, the pilot studies (a) ensured that the youngest campers attending *Sunship Earth*TM (age 10) would be able to understand all the survey questions, (b) identified difficult and/or challenging questions within the surveys and interviews that required review, and (c) showed that the data collection process was not overly cumbersome for both participant groups (children and parents). Other features of the surveys that were adapted due to the result of the pilot study include: shortening the amount of time given to complete written and drawing responses from five to three minutes and providing pictures and/or definitions for more challenging questions/terms.

Trustworthiness. In addition to efforts taken to enhance validity and reliability, the researcher used various techniques to ensure trustworthiness of the research design. First, Adam Cheeseman was present on multiple occasions both before and during camp to meet with both parents and campers to increase comfort and rapport. In addition, the research design included prolonged engagement and triangulation, two concepts described by James & Bixler (2008) used to enhance trustworthiness. Prolonged engagement was achieved through extensive research into understanding EL resulting in the creation of methods that were directly informed by the literature. Second, triangulation was facilitated through the use of both surveys and interviews, which increased the credibility of the research, as results were not dependent upon on a single research method.

2.3.2 Tool Description

There were two surveys used for this thesis: Survey #1 included fourteen multiple-choice questions to measure contributions to environmental knowledge. Specifically, Survey #1 contained questions relating to seven ecological concepts that were taught to campers during *Sunship Earth*TM. To measure the affective/behavioural domains, Survey #2 contained various open-ended questions that allowed participants to respond in writing and drawing. More specifically, the short answer questions investigated how campers (a) perceive their EL experience at camp versus their homes or schools, (b) express their pro-environmental attitudes, (c) describe their relationship with nature, and (c) discuss their desire to adopt ERBs.

These surveys were created by the research team in place of using a standardized measure of environmental knowledge, attitude, etc. for two reasons. First, interest was to assess the affective and behavioural domain in an open-ended way that included responses in both writing and drawings, making it difficult to use close-ended scales such as the New Ecological Paradigm (NEP). Secondly, the AEC were interested in understanding how the camp contributed to an understanding of the ecological concepts taught at the camp, resulting in the need to develop a survey that focused on analyzing these specific concepts.

Survey #1. Within Survey #1, two sets of questions were created. The first set of fourteen questions were delivered to participants during the pre-test while the other fourteen were delivered during the post-test. Questions were based on the seven ecological concepts taught at the camp: energy flow (E), cycles (C₁), diversity (D), community (C₂), interrelationships, (I), change (C₃), and adaptation (A) (represented

herein as EC₁-DC₂-IC₃-A). Adam Cheeseman developed questions based on Warner & Taylor (2013), which describes the lessons and examples used to educate campers about each concept. Once the questions had been created, they were circulated to the research committee and to Dr. Alan Warner, the developer of the AEC's chapter of the *Sunship Earth*TM program. This review checked the validity of the surveys and ensured the questions were able to measure knowledge of the desired concepts.

Each of these surveys (pre-/post-camp) consisted of two questions that related to each concept (see Appendix A & B). Having the campers answer two questions about each concept increased the reliability of responses. Originally, the survey was structured to have three questions per concept but due to time restrictions identified in the pilot test, some questions were removed. Certain questions identified as difficult to understand during the pilot study were revised to include a visual component (e.g. drawing/comic). This allowed participants to more easily interpret these questions. Drawings were also used in the survey as prompts to help: (a) researchers communicate more easily with participants; and, (b) children maintain their attention span during the research.

Survey #2. Survey #2 included various questions regarding campers' affective and behavioural learning domain and focused on their perspectives on EL, pro-environmental attitudes, and ERBs. Similar to Survey #1, two sets of questions were created, one for the pre-test and one for the post-test. The pre-test questions focused on how campers perceive their EL experiences, their feelings towards the natural world, etc. while at home or at school (see Appendix A). The post-test questions discussed similar topics but were directly related to experiences at *Sunship Earth*TM (See Appendix B). Once developed, these surveys were also shared with the research committee and with

Dr. Alan Warner to ensure validity. In addition, these questions were updated and revised following the pilot study.

Campers were asked to respond to questions in this survey in drawing or writing. Specifically, three questions in Survey #2 required written responses (approximately one paragraph each); three questions required drawings with a written caption, while one question required participants to select an answer to a rating question. The rating question was meant as a simplified measure of pro-environmental attitude while the written and drawing questions sought to provide a more in-depth qualitative look at how learners perceived their EL experiences at home, school, and *Sunship Earth*TM.

Although questionnaires are common in evaluation and educational studies, White & Gunstone (1992) and others used art elicitation to help reveal data that is “hidden from other procedures” (p. 99) and to allow “...the teacher to see—and the student to reveal—qualities of understanding that are hidden from other procedures” (p. 99). Additionally, art can be used in research as a medium to express concepts that may be difficult to discuss verbally or write in formal sentences (Barraza, 1999; Watson, 2004). Though art elicitation comes with its strengths, Grieve (1990), as cited in Barraza (1999) noted that children’s artwork does not always represent everything they know about a particular subject. In response to this criticism and to avoid misinterpreting features of children’s drawings, this study required each participant to include a caption to describe each drawing they created. The inclusion of a caption has been deemed beneficial by others working in the environmental education field (Baker, Loxton, & Sherren, 2013) as it (a) reduces the chance of misinterpreting a drawing or its specific features, (b) acts as an additional unit of data for analysis, and (c) can allow participants to discuss non-visible

aspects of their drawing (e.g. carbon dioxide).

Environmental Involvement. In order to assess levels of environmental involvement, an adapted version of Eagles & Demare (1999) was included in the pre-test (see Appendix A). In addition, this study takes into consideration van Wissen's (1992) approach to understanding the role of prior environmental involvement among campers' parents. In her study of the *Sunship Earth*TM program, van Wissen (1992) asked parents about their environmental involvement with organizations, careers, interests, etc. as well as what types of environmental issues, if any, they discussed with their children. Similar questions to van Wissen (1992) were adapted for the interview guide in this study (Appendix C). By attempting to combine these two measures, one directly from the camper and one from their parents, it was hoped that any relationship between previous environmental involvement and the contributions of *Sunship Earth*TM to campers' EL would be revealed.

2.3.3 Tool Use

Participant Recruitment. Participant recruitment occurred in three phases: Phase 1 consisted of advertising the study in an information pamphlet sent to parents whose children were attending *Sunship Earth*TM in the summer of 2015. Phase 2 consisted of a presentation to parents about the study lead by Adam Cheeseman during the camp's orientation nights on June 30, 2015 and July 2, 2015. Finally, during Phase 3 Adam Cheeseman was present during drop-off times on the first day of camp during both sessions of *Sunship Earth*TM (July 18-23 and July 26-31) to discuss the study and recruit campers and their parents. Originally, only Phase 1 and Phase 2 were to be included in the recruitment process, but due to low response rates from the first two methods, Phase 3

was introduced in hopes of encouraging more families to participate. The following describes in more detail each of the three phases:

Phase 1: Once parents register their campers to participate in the *Sunship Earth*TM program, the AEC mails out a registration package containing information about payment, the camp program and location, and other relevant paperwork. During the first stage of recruitment, a one-page research summary was circulated to parents within these registration packages. The summary introduced the researcher, outlined the research objectives and questions, and discussed briefly what would be expected of those who agreed to participate. A copy of this summary can be found in Appendix E.

Phase 2: During the next stage of recruitment Adam Cheeseman attended two *Sunship Earth*TM orientation sessions organized by the AEC. These sessions were created to help both campers and their parents feel more comfortable about the program and to reduce feelings of anxiety or insecurity about participating. During the session, campers had the opportunity to play games with their counselors, meet other campers who they will be going to camp with, etc. Meanwhile, parents were given a presentation regarding the details of the camp, introduced to the AEC staff, and briefed on safety procedures/protocols. Following this presentation, Adam Cheeseman was invited to discuss the research study with parents and encouraged interested individuals or those with any outstanding questions to come forward. Following the question period, parents were invited to review consent forms and discuss the details of the study with Adam Cheeseman.

Phase 3: After these recruitment procedures had been completed, it was clear that they had been unsuccessful in recruiting participants as only seven campers and six

parents had agreed to take part in the research. As a result, the research team collaborated further with the AEC and developed a final phase of recruitment. As parents registered and dropped their children off for their first day at *Sunship Earth*TM, the lead researcher was present to recruit individuals for the study. During this time, parents had the opportunity to review the consent forms and agree to participate, if interested. This method proved to be the most successful in recruiting both parents and campers to participate in this study (see Table 2).

Table 2: Description of recruited campers and parents

Phase	Campers (n=)	Parents (n=)
1: Research Summary	3	3
2: Orientation Event	4	3
3: Drop-off	17	8
Total Recruited	23	13
Total Completed Survey/Interview	23	7

Study Site Description. Since 1981, the AEC has been delivering numerous environmental-themed youth programs, focusing on hands-on leadership and EL (AEC, n.d.). Through these programs, this organization seeks to provide youth with education on a variety of topics including: an exploration of nature, promotion of personal development and reflection, community and leadership building, and ecological/environmental education (AEC, n.d.).

*Sunship Earth*TM is a six-day overnight residential camp program held at Camp Mockingee near Windsor, NS for 12-year-old children (see Figure 2).



Figure 2: Location of Camp Mockingee, Nova Scotia (Google Maps, 2016)

For over twenty years, the camp has operated for two week-long sessions in July (AEC, n.d.) and typically enrolls ~40 children per session (T. Peace, personal communication, January 15, 2015). The camp facility overlooks Lake Mockingee, an inland lake, and is surrounded by a 30-acre forest. A map of the property including pictures of some the camp’s key features/buildings can be found in Appendix F. Upon arriving to Camp Mockingee, campers are assigned a cabin supervised by one senior and one junior staff member. Campers completed activities throughout the week with their cabins and an assigned “crew”. Each crew consisted of five to six children led by various staff members and is named after an endangered species in Nova Scotia. During camp, campers were able to partake in a number of outdoor activities around the area including hiking along the forest trails and swimming/canoeing in the lake. The camp has a variety of buildings onsite including a dining hall, kitchen, cabins for campers and staff, multi-

purpose activity rooms, etc. Camp Mockingee also has a designated campfire space, which is used each evening during the *Sunship Earth*TM program.

Data Collection. Once participants had been recruited and informed consent forms were collected, data collection began. The pre-camp survey was administered at a number of locations both before and shortly after camp began. The pre-test was delivered in one of three scenarios: at the camper's home prior to camp (n=2); at the AEC prior to camp (n=5); or, at Camp Mockingee on the second day of camp (n=16). These various delivery methods were used to accommodate the needs of families participating in this study and to ensure that a reasonable number of participants could be recruited. Regardless of their location and date of completion, the pre-camp survey was administered in the same manner. That is, campers were read each question aloud, had the same time to complete each question, and were given the same instructions. Additionally, participants were reminded to keep answers confidential when completing the survey if they were in a group setting. Participants were also reminded that they had one minute to complete each of the multiple-choice questions and three minutes to complete the longer written/drawing questions. During Survey #2, campers were also reminded that written responses should be between 3-4 sentences and captions should accompany any drawings. Short breaks were taken between surveys and, when time warranted, refreshments were provided to help retain energy levels and reduce feelings of fatigue and/or boredom. At the end of the camp programming, an identical method was used to administer the post-camp surveys on the last day of *Sunship Earth*TM. Figure 3 visually outlines the timeline of survey data collection.

<i>Before Sunship Earth</i>		<i>Sunship Earth</i>					
Home	AEC	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Pre-test						Post-test	

Figure 3: Example timeline for survey implementation. The Pre-test and Post-test included both Survey #1 and #2, respectively. Pre-tests were delivered both before and during camp (before earth education component). Post-tests were delivered on the last day of *Sunship Earth*TM.

Interview data was collected two to three months after *Sunship Earth*TM's completion in September and October 2015. Consenting parents were contacted on September 1st 2016 to schedule a time and location for the interview. Care was taken to ensure that the interview could be scheduled in a way that was most convenient to the parent and to ensure that only the participant and the interviewer were present to avoid potential bias (e.g. presence of child participant or spouse). All interviews were audio-recorded and transcribed by Adam Cheeseman. After transcription, a copy of the interview was made available to the participant. Parents/guardians had one week to review the transcription and send any comments or concerns related to their responses to the lead researcher via email or telephone before analysis began. During the interview, questions were read aloud and participants were encouraged to add or share any other relevant information even if it did not seem entirely relevant to the question being asked.

Data Entry. Once the survey data had been collected, a number of steps were taken to prepare for data analysis. Responses to Survey #1 were input into *Microsoft Excel*. Answers to the demographic questions (e.g. environmental involvement, hometown, gender, etc.) found at the beginning of Survey #1 were also recorded in the spreadsheet. Results from Survey #2 were transcribed into *Microsoft Word* and then imported into *NVivo 10*, a qualitative data analysis program. Images drawn by campers were scanned to digital photo files (JPEG) and imported into *NVivo 10* as stand-alone

files. This method of importing assists researchers by providing a platform for both interactive coding of particular pixel regions of the photo and can also support memo linking, annotations, etc. Although these are key advantages that cannot be achieved through importing images into *NVivo 10* in other ways (e.g. hyperlinking or importing an image as a part of another document), this method is sometimes cumbersome and can be difficult to manage if a large number of images are being coded (Bazeley & Jackson, 2013). Given the number of images and file sizes analyzed in this study, this management issue was deemed negligible when compared to the benefit of being able to interactively code each piece of the stand-alone image files.

Finally, the researcher transcribed interview data into *Microsoft Word* after each meeting with parents. The software *Transcribe!* was used to manipulate the audio file to ensure that any responses provided by the participants were accurately recorded. Once transcribed, the interviews were imported into *NVivo 10* as stand-alone internal files for data analysis.

2.4 Data Analysis

Multiple-choice questions in Survey #1 were examined using descriptive and inferential statistics to determine the proportion of participants who best understood the ecological concepts taught at *Sunship Earth*TM. Given the structure of the pre-/post-camp method, individual results could be compared to detect how *Sunship Earth*TM impacted children's levels of environmental knowledge.

In order to understand the open-ended drawings and written responses associated with Survey #2, two types of coding methodologies were employed, one to understand the written responses and the other to analyze artwork. On a general level, a code is a

“researcher-generated construct that symbolizes and thus attributes interpretive meaning to each individual datum for later purposes of pattern detection, categorizations, theory building, and other analytic processes” (Saldaña, 2013, p. 4). This is a common method used in qualitative research to understand patterns and themes that arise from various sources of data. This method is also effective at categorizing and grouping together similar elements within data to understand common themes (Cope, 2010). Saldaña (2013) also notes that responses can be coded using various techniques assisting in data organization and providing further options for analyzing data from different perspectives. To begin the coding analysis, this study followed Saldaña’s (2013) recommendations and used inductive techniques such as descriptive, *invivo*, structural, and attribute coding. These techniques are summarized in Table 3 and were used to organize, reveal themes, and understand potential relationships in responses based on demographic data (e.g. gender, age) and levels of environmental involvement.

Table 3: Brief description of initial coding strategies (adapted from Saldaña, 2013)

<i>Code Type</i>	<i>Description</i>
Descriptive	Summarizes the primary topic of an excerpt (e.g. talking about fences and Beware of Dog signs = “security”)
In Vivo	A direct quote of what a participant said (e.g. “comfortable” comes from “I feel really comfortable around him”)
Structural	Structural coding acts as a “labeling and...indexing device” (p. 84) to categorize portions of data that may need to be reviewed further in subsequent coding processes.
Attribute	Attribute coding aims to discuss the: who, what, when, where, and how of the dataset. In other words, attribute coding is “the notation of basic descriptive information such as the fieldwork setting, participant characteristics, data format, timeframe, and other variables of interest,” (p. 70).

To analyze Survey #2, codes were used to allow for the categorization of learning experiences explicitly reported by participants. Such codes are described as: “themes or

patterns that are obvious on the surface or are stated directly by research subjects” (Cope, 2010, p. 283). Once this initial step was completed, responses were examined more closely to determine if they presented any latent themes. These latent themes represent less obvious codes that are not directly stated within a particular dataset (Treadwell, 2014, p. 216). Latent codes in textual data are described as “hidden meanings” within particular documents, yet there is still debate as to whether or not these codes rely too heavily on the researcher’s interpretation or biases and not enough on the actual content (Elo & Kyngas, 2008, p. 109). While this discrepancy is recognized, latent coding was still used, as it was able to yield different results that did not arise in the descriptive coding process.

Artwork included in Survey #2 was coded using a method adapted from Baker et al. (2013). Allowing children to respond using artwork is beneficial as it provides a chance for the presentation of responses that are (a) sometimes missed by other procedures and (b) difficult to communicate in writing or verbally (Watson, 2004; Baker et al., 2013). Drawings and paintings were coded for both content and perceived emotional message. In terms of content, the artwork was cross-referenced with the artist’s caption to account for certain parts of drawing/painting that were difficult to see or interpret (Baker et al., 2013). Ultimately, by employing this cross-referencing method, any missed content was sufficiently coded through artwork analysis.

After this cross-referencing procedure was completed, each image was coded for content and emotive tone in a combination of methods from Barraza (1999) and Baker et al. (2013). Emotive tone is categorized based on whether the drawing indicates a “positive learning experience”, “negative learning experience”, or “neutral learning

experience”. In other words, this analysis focused on understanding how each participant’s emotions and experiences relating to *Sunship Earth*TM are represented within their drawings/paintings.

Once feedback on the interview transcriptions was received from parents/guardians, these results were also coded. Interview data was compiled into *NVivo 10* and analyzed using a similar coding method as previously discussed to explore the contributions of *Sunship Earth*TM to campers in the longer-term.

2.5 Methodological Limitations

As with any study, the methods used to answer the proposed research questions come with their limitations. These limitations are important to discuss from an EL perspective as Meyers (2006) has suggested that:

It would help enormously if researchers made clear the limitations of their findings, and when they contribute to a large picture, so stakeholders in the field can be aware of the highly contingent nature of our knowledge about environmental learning. (p. 464)

In response to this call, the following section presents specific limitations that have the potential to affect the outcomes of this research.

First, it is clear that not all children have the opportunity to attend summer camp. Accessibility to these programs is especially difficult for families of lower socioeconomic status or those living far from the camp location. For instance, camp programs typically require a registration fee, excluding certain families who are unable to afford the costs, or those that require their children to stay home and work for the summer. Fortunately, a number of camps provide subsidies for those who would otherwise be unable to

participate; yet this funding cannot hope to reach every family/individual. For example, the AEC offers support to newly landed immigrant families, allowing access to their programming for this population. Regardless, distance is still an important limitation to consider. For those living long distances from summer camp locations, transportation to and from the camp can create barriers to participation. Additionally, those living in communities outside of the Halifax Regional Municipality may be unaware of available programming, resulting in a lack of participation. Other efforts to reduce costs associated with travel/registration in these types of program include federal/provincial tax credits (e.g. Children's Fitness Tax Credit, Nova Scotia Healthy Living Tax Credit) and external grants, such as The Toronto Star Fresh Air Fund which provides support to attend programs for underprivileged and children with special needs in Ontario.

While these limitations are present, it should be noted that this research is non-probabilistic and does not attempt to make statements regarding the general population of youth in Canada. Rather, this research focuses on understanding a sample of children who have the opportunity to attend summer camp. Although this research examines a summer camp that may not be accessible for all Canadian youth, results from this study will still be valuable in understanding the types of contributions that programs like *Sunship Earth*TM provide for children and their EL. As a result, it is hoped that these results can act as a meaningful evaluation of the AEC programming as well as indicating whether or not programs similar to *Sunship Earth*TM should be supported or expanded in the future.

Second, uncontrollable weather conditions (e.g. rain, thunderstorms, high winds, etc.) may have an impact on a participant's response. Previous studies (e.g. Spasova,

2012) have indicated that such weather conditions have affected certain learning characteristics among adults, such as an individual's ability to concentrate. A similar issue may also be true for the presence of insects, which could induce negative emotions towards nature/the outdoors due to the presence of flies and mosquitoes (Emmons, 1997).

Third, given that the pre-tests were unable to take place in the same location and time due to the staged recruitment process described above, further limitations exist. Specifically, the method was flawed as challenges from recruitment required the pre-test be administered to a large portion of the sample during the second day of the camp program. Although the campers had not formally begun the earth education portion of the program at this time (as the first day at *Sunship Earth*TM focuses on rules, swimming, and general games), the fact that the campers had been present at Camp Mockingee and had participated in some outdoor activities the day before the pre-test may have influenced some responses. In addition, although care was taken in the delivery of the surveys, campers may have been tempted to copy another participant's answer or drawing. This issue has been discussed as a limitation in other studies involving drawing methods (e.g. Baker et al., 2013) and while these external factors were controlled to the best of the researchers' ability, they may have had some impact on the data collected.

Finally, participating families may influence the level of systematic bias associated with this study. For instance, parents who were more inclined to participate in the project may carry pre-existing notions that *Sunship Earth*TM is beneficial for their child based on their previous experiences with the AEC or *Sunship Earth*TM specifically. Furthermore, families who are highly environmentally involved may be more willing to enroll in the *Sunship Earth*TM program than others, adding further bias to the sample.

Although little can be done to address this potential bias, it is worth recognizing as a potential limitation.

Chapter 3: “No nature, no human”: Examining environmental learning experiences at an earth education summer camp

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3.1 Statement of Student Contribution

Adam Cheeseman produced the original manuscript. Adam Cheeseman was also responsible for the creation and delivery of all data collection tools and data analysis. Tarah Wright provided assistance with pilot testing and data analysis. Multiple revisions of the manuscript were provided by Tarah Wright and incorporated into the manuscript by Adam Cheeseman.

3.2 Abstract

Many barriers restrict children’s access to nature causing numerous consequences, including a lack of EL opportunities. Fortunately, environmental education programs like summer camps can help counteract these difficulties. Although outcomes of summer camps are well understood, participants’ EL experiences are under-represented in the literature. Through pre-/post-camp surveys, this paper reports on results of a larger project exploring how an earth education summer camp, *Sunship Earth*TM, contributes to its participants’ EL experiences. Results suggest that *Sunship Earth*TM helps participants increase levels of environmental knowledge, strengthen environmental concern/connection with nature, and promotes feelings of optimism toward the environment.

Keywords: childhood EL; summer camps; nature exposure

3.3 Introduction

Research has indicated that the development of pro-environmental feelings and behaviours is greatly influenced by the degree to which children gain experiences in the outdoors (Chawla & Flanders Cushing, 2007; Cachelin et al., 2009). Although this is well established, children are becoming further disconnected from the natural world (Louv, 2008). For example, a recent survey in Canada concluded that 70% of sampled youth aged 13-20 spent little time outdoors (one hour or less per day) (David Suzuki Foundation, 2012). This disconnection has many potential consequences for children including impacts on their physical and mental health (Barton & Pretty, 2010), feelings of environmental responsibility (Louv, 2008), and opportunities for learning and play in natural spaces (Maynard & Waters, 2007). It is pertinent to note that children are not necessarily disinterested in spending time outdoors (Wells & Evans, 2003), but many competing interests and influences exist that restrict access, including technology (Jordan et al., 2006), perceived dangers (e.g. strangers, traffic) (Carver et al., 2008), and the increase in urban-dwelling families (Miller, 2005).

One way to circumvent these issues is through environmental education, which has been developed in part to respond to these needs. Environmental education not only focuses on the transfer of environmental knowledge and skills to youth, but often also aims to overcome limited access to nature (Biedenweg et al., 2015). In Canada, a wide variety of environmental education programming operated by various organizations exists both within and outside of schools (e.g. New Brunswick Grade 12 Environmental Science course, Project WILD™). For a comprehensive list of organizations involved in environmental education in Canada see Canadian Environmental Grantmakers' Network

(2006). Though many programs exist, there are challenges in the implementation of environmental education within the Canadian formal education system. For example, a recent study conducted in Nova Scotia, Canada, concluded that teachers are restricted in their implementation of environmental education due to a lack of time, resources, and clear links to pre-determined curriculum outcomes (Spence, Wright, & Castleden, 2013). These issues are deepened by the presence of larger-scale issues, such as a lack of pre-service education for teachers, that are representative of a resistance to environmental education at a broader, system level in Canada (Council of Ministers' of Education Canada, 2012). Fortunately, non-formal environmental education programs also exist to bypass the rigid institutional barriers of school systems. In addition, non-formal programs (e.g. summer camps, nature centers) and informal (e.g. interpretive signage) education are important to understand as children spend a small portion of their lives in school, but are exposed to various forms of environmental education throughout their lives (Ballantyne & Packer, 2005).

The outcomes of these environmental education programs (e.g. zoos, summer camps) have been researched extensively (Dresner & Gill, 1994). The primary focus of such research is to understand how programs produce outcomes related to environmental knowledge, pro-environmental attitudes, and/or ERBs. For example, Kuhar et al. (2010), attempted to measure long-term retention of various outcomes including knowledge of local biodiversity and environmental stewardship. Though there is great merit in understanding these outcomes, Rickinson et al. (2009) and other scholars have urged authors to research how environmental education programs are able to contribute to participants' EL experiences in place of pre-determined, teaching-based outcomes. EL is

an important concept to consider as it has been neglected in environmental education literature and can provide unique insights into the advantages and disadvantages of particular programs from the learner's perspective (Rickinson & Lundholm, 2008; Rickinson et al., 2009).

In this context, EL can be described as “learning that accrues from the engagement with the environment or environmental ideas” (Scott & Gough, 2003, p. 14). Although this definition is simplified, Brody's (2005) theory of learning in nature has similar tenets as he believes that EL experiences are most meaningful when the participant is active in the learning process, learning about connections between the individual, environment, and society, and conceptualizing their views and feelings of the natural world.

Understanding childhood EL experiences within environmental education programs is important as it places an emphasis on representing learning as a process and appreciates that different forms of learning occur in different contexts, such as time, location, and space (Falk, 2005). Additionally, it is argued that an understanding of learning is important as it can contribute to the development of more resilient populations. For instance, Sterling (2001) argues that: ‘...the difference between a sustainable and chaotic future is learning’ (p. 10) while Fazey, Fazey, Fischer, Sherren, Warren, Noss, & Dovers (2007) suggest that the “[development of] flexible learning...fosters knowledge generation, a proactive outlook, and the ability to change” (p. 378). This topic is also necessary to study as, unlike researching program outcomes, an EL approach can assist in identifying a range of learning experiences (e.g. positive,

negative, and accidental) that offer unique insight into the participant experience (Rickinson et al., 2009).

This study aims to explore learning processes that occur through participation in *Sunship Earth*TM, an earth education summer camp program in Nova Scotia, Canada. Specifically, this study seeks to answer the following research question:

How has *Sunship Earth*TM contributed to the EL experiences of campers aged 10-12 in three learning domains: cognitive, affective, and behavioural?

In this case, cognitive refers to experiences that contribute to an understanding of environmental issues and ecological knowledge and concepts. Meanwhile, affective and behavioural domains refer to experiences that have influenced campers' feelings, attitudes, and/or behaviours towards the outdoors and natural environment. This research is both necessary and timely as it focuses on investigating EL, which is under-represented in the literature. Additionally, this research gives space for participants to reflect on their experiences at camp, providing vital information for practitioners about the benefits and drawbacks of the program.

3.4 Case Study Program Description

*Sunship Earth*TM is an international camp program grounded in the pedagogy of earth education, developed by Stephen van Matre (1979; 1990). Earth Education was created in response to a frustration with formal environmental education in the 1970s and 1980s. Specifically, it acted as an alternative to environmental education when, in van Matre's view, educators were not sufficiently meeting the goals and objectives set out by key international meetings such as the Tbilisi conference in 1977. Specifically, earth education is a strategy, which "...aims to help people build an understanding of,

appreciation for, and harmony with the earth and its life,” (van Matre, 1990, p. 83).

Therefore, similar to other programming offered by organizations such as Project WILD or Forest School Canada, earth education programs attempt to develop a deep connection between individuals and the natural world while teaching about the interconnections between humans and the planet and how individuals can support ecological systems.

*Sunship Earth*TM was developed by The Institute for Earth Education and focuses on using earth education to connect children to nature and enhance knowledge of ecological concepts, with the ultimate goal of assisting in the development of ERBs (van Matre, 1990). The program is implemented throughout the world and is structured around similar programming. Specifically, the camp operates as a six-day overnight residential camp where campers participate in outdoor EL activities centered on seven ecological concepts; energy flow, cycles, diversity, community, interrelationships, change, and adaptation, traditionally shortened into the acronym EC-DC-IC-A (van Wissen, 1992), herein labeled EC₁-DC₂-IC₃-A. This study focused on an implementation of *Sunship Earth*TM delivered by the AEC near Windsor, Nova Scotia. This particular chapter of *Sunship Earth*TM has been in operation for over 20 years and runs two week-long sessions each July. Data was collected for this study during sessions held in July 2015.

3.5 Methods

3.5.1 Conceptual Framework

This study uses Rickinson et al.’s (2009) understanding of EL to conceptualize and interpret participants’ learning experiences. This framework depicts EL as a process that involves learning about (a) natural processes, (b) society, and (c) the individual and the interconnections between these themes (Rickinson et al., 2009, p. 18) (see Figure 4).

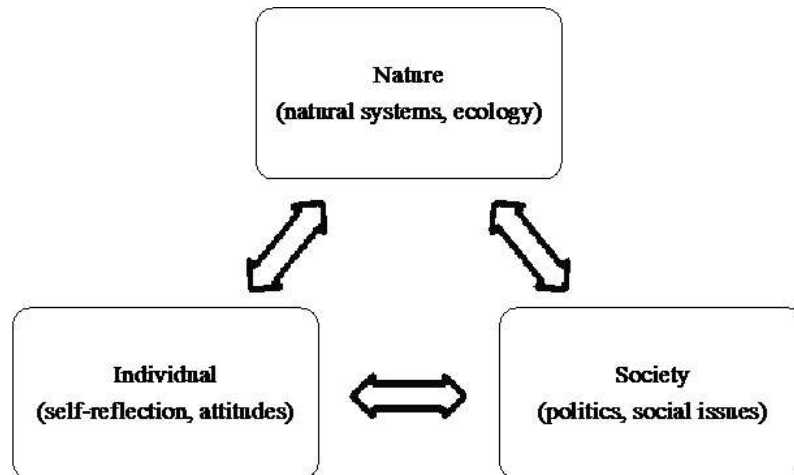


Figure 4: Conceptual framework for EL. Nature, Individual, and Society represent the foundations of the framework that describes EL. In addition, EL involves learning about the relationship between these concepts, represented by the arrows here (adapted from Rickinson et al., 2009, p. 18).

The ‘Individual’ aspect of the framework describes experiences that allow learners to learn about themselves (Rickinson et al., 2009). ‘Nature’ describes learning about natural processes, in this case ecological concepts taught at *Sunship Earth*TM. Next, ‘Society’ describes learning about societal structures and functions. Meanwhile, the interconnections (represented by arrows in Figure 4) describe learning about the relationships between these topics. Specifically, the relationships between ‘Nature and Individual’ and ‘Individual and Society’ refer to experiences that help learners to learn about their influence on nature and society and vice versa. The ‘Nature and Society’ interconnection describes learning about the impact broader society has on the natural environment. It should be noted that this framework is not meant to be a “direct depiction of reality” (Rickinson et al., 2009, p. 18), but rather provide the study with a framework to organize and interpret reported EL experiences at *Sunship Earth*TM.

3.5.2 Sample

This study employed a non-probabilistic purposive sampling method. Participants were recruited through *Sunship Earth*TM registration materials and an oral presentation to parents at a camp information meeting. A total of twenty-three campers were successfully recruited to take part in the study.

3.5.3 Instruments & Data Collection

To measure knowledge, affective, and behavioural EL experiences, pre-/post-camp surveys were administered to campers. This survey was divided into two sections: (a) questions that focused on knowledge (cognitive survey) and (b) questions that focused on feelings/attitudes/behaviours (affective/behavioural survey). Pre-camp and post-camp surveys were completed before and after the earth education programming at *Sunship Earth*TM, respectively. During the pre-camp cognitive survey campers were also asked about their previous levels of environmental involvement (adapted from Eagles & Demare, 1999) with the aim of understanding how previous involvement with the outdoors and environmental topics impacts EL experiences. These characteristics were used in the analysis to reveal potential relationships between levels of prior environmental involvement and survey responses. This relationship was investigated in this study, as EL is a personal process inevitably influenced by prior experiences (Brody, 2005).

During the affective/behavioural survey, participants were asked to respond in drawing/writing to open-ended questions relating to their environmental concern, feelings about EL, and their camp experience. When asked to provide a drawing, participants were also required to write a caption (one or two sentences) to describe their image.

Captions helped illuminate the general topic of each drawing, allowing for more accurate analysis (Baker et al., 2013).

3.5.4 Data Analysis

NVivo 10, *Microsoft Excel*, and *StatPlus* were used to analyze results. Results from cognitive surveys were analyzed using measures of central tendency to determine how well the sample understood relevant ecological concepts (EC₁-DC₂-IC₃-A). Paired sample t-tests were also used to reveal relationships within the data and test for statistical significance between pre-test and post-test scores.

Affective/behavioural survey responses were analyzed using a combination of inductive coding techniques. Various techniques were used during initial rounds of coding to descriptively explore both text and image data (Saldaña, 2013). Latent themes (Treadwell, 2014) were also investigated to reveal codes that were not represented during initial rounds of coding. While some argue that latent codes incorporate researcher bias (Elo & Kyngas, 2008), these codes helped yield insightful results that provided unique insight into participant's EL experiences. For instance, the idea that campers valued opportunities to learn about nature through hands-on activities was not explicitly discussed by participants, but was represented indirectly in their drawings and written responses. Coding continued until the point of data saturation where no new codes or ideas were generated while reviewing the data.

3.6 Results & Discussion

3.6.1 Demographics & Environmental Involvement

From the cohort of campers involved with the program, twenty three (N=23) participated in the study. In the sample, 57% of participants self-reported as male and 43% self-reported as female. As *Sunship Earth*TM is structured for 10-12 year olds, participants in this study were restricted to this age group, with 61% being age 11.

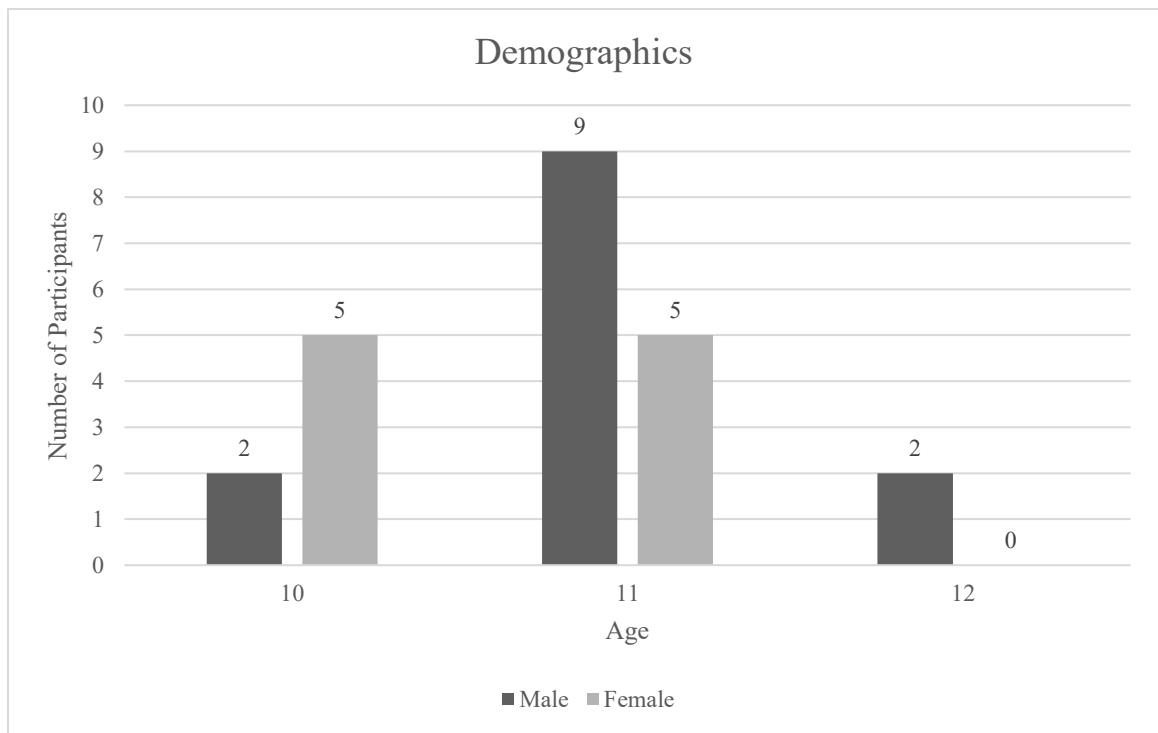


Figure 5: Demographic information of camper participants

Many participants reported that they had attended other camp programs (87%) or had gone camping with their families in previous summers (80%). Many campers had also read books about nature (83%) and watched television programs about nature (78%). Finally, many campers reported that they had talked about nature at home (78%) and/or school (74%) before the program.

3.6.2 Understanding Natural Processes: Environmental Knowledge

Reviewing trends, participants' knowledge of energy flow (E) decreased following the program from 96% to 89%. Here we assume this decrease is due to random chance or the survey method as decreases were not statistically significant. Adaptation (A) showed the largest gains (46% – 89%), while change (C₃) remained consistent (89%), and all other concepts (C, D, C₂, I) increased slightly in understanding. Diversity was the least understood concept following the delivery of the program (80%), replacing adaptation, which was the least understood concept after the pre-test (46%). The concepts cycles (C₁), interrelationships (I), and adaptation (A) showed statistically significant increases between the pre- and post-camp surveys. Interestingly, van Wissen's (1992) study, which explored the same *Sunship Earth*TM program, reported that campers best understood E and C₁ after camp, followed by C₂, C₃, and I. Additionally, D and A were found to be the most difficult concepts to learn and retain (van Wissen, 1992). A lack of understanding of adaptation is consistent with the pre-test of this study, while diversity remained the most poorly understood concept for campers in this study and van Wissen (1992). Although similar, comparison of these results should be done cautiously as van Wissen (1992) employed different methods and was analyzing retention of these concepts one-month and six-months after the program.

Table 4: Notable paired sample t-test results from the cognitive survey

Result		Average % Pre-camp	Average % Post camp	Direction of change	Paired sample t-test p-value ($\alpha = 0.05$)
Environmental Knowledge	Overall	76%	89%	+	(0.0002)
Gender	Male	77%	90%	+	(0.004)
	Female	75%	88%	+	(0.081)
Age	10	73%	83%	+	(0.122)
	11	78%	91%	+	(0.005)
	12	79%	100%	+	(0.205)
Concept	E	96%	89%	-	(0.083)
	C ₁	76%	98%	+	(0.001)
	D	74%	80%	+	(0.083)
	C ₂	78%	87%	+	(0.083)
	I	78%	91%	+	(0.011)
	C ₃	89%	89%	N/A	(no change)
	A	46%	89%	+	(1.34E-7)

The EC₁-DC₂-IC₃-A, excluding adaptation, concepts were well understood by campers before camp, which may be explained by high levels of environmental involvement such as discussing environmental topics at school. Specifically, the Nova Scotia Grade 5-7 Science Curriculum outcomes incorporate many of the EC₁-DC₂-IC₃-A concepts into the curriculum. For example, the Grade 5 Science curriculum presents an outcome related to cycles (C₁) where students are expected to “relate the constant circulation of water on Earth to processes of evaporation, condensation, and precipitation” (Nova Scotia Department of Education & Early Childhood Development, 2015, p. 194). For the older campers who may have completed the Grade 7 Science curriculum, all of these concepts were reinforced in the “Interactions with Ecosystems” Science Unit (Nova Scotia Department of Education & Early Childhood Development, 2014).

Campers increased their environmental knowledge after involvement with *Sunship Earth*TM (Table 4). Increases in environmental knowledge were shown to be statistically significant ($p=0.0002$). These results are consistent with previous research suggesting that students tend to learn effectively in outdoor spaces (Dillion, Rickinson, Teamey, Morris, Choi, & Sanders, 2006) and specifically when it comes to scientific concepts (Dhanapal & Yee, 2013). Similar studies, using various methods, have also reported increases in environmental knowledge through participation in non-formal environmental education programs (e.g. Dresner & Gill, 1994; Kuhar et al., 2010; Bexell, et al., 2013). Specific to *Sunship Earth*TM, Keen (1991) determined that campers in Australia exhibited similar increases.

While results discussed thus far are focused on outcomes, campers were also asked to reflect on their experience learning about nature. Common themes suggested that participants enjoyed learning about EC₁-DC₂-IC₃-A through various participatory activities (e.g. learning about photosynthesis using a giant leaf). This result is consistent with Ballantyne & Packer (2002) who found that children enjoy both learning *about* nature and learning *in* nature. Interestingly, males showed statistically significant increases in knowledge through the program, yet females did not. One possible explanation for this result is that males have been shown to be more responsive to education that is action-oriented and outdoors (Taylor & Lorimer, 2003; Carrier, 2009). Regardless of significance, both sexes exhibited similar increases in their scores, yet the average female score was slightly below males (Table 4). Another explanation for the difference in significance between females and males could be attributed to the standard

deviation of scores after the program where female scores (2.003) were slightly more dispersed than males (1.806) and may have influenced the statistical test.

3.6.3 Relationship between Knowledge, Environmental Involvement, and Pro-environmental Attitude

Results from this study indicate that specific environmental involvement characteristics were statistically related to higher environmental knowledge scores after the program. Specifically, exposure to summer camps, camping with family, reading books about nature, and learning about environmental topics at school positively contributed to the development of environmental knowledge (Table 5). These previous experiences at other summer camps and schools may have contributed to the development of a foundation that helped enhance levels of environmental knowledge at *Sunship Earth*TM. Reading books may have helped increase levels of knowledge after camp for similar reasons as Wells & Zeece (2007) suggest that literature is an ideal avenue to teach about environmental science and promotes feelings of environmental protection. Meanwhile, participating in camping activities may help expose children to the natural environment and similar learning experiences, which were then built upon during *Sunship Earth*TM. Additionally, children and parents have been shown to influence each other's environmental knowledge and/or attitudes (Eagles & Demare, 1999; Damerell, Howe, & Milner-Gulland, 2013; Pratt, Norris, Alisat, & Bisson, 2013). While this is true, talking about nature at home may have only had a slight influence on results as both campers who participated and did not participate in this activity increased their scores significantly (see Table 5).

Watching nature television programs did not contribute to increases in environmental knowledge, yet not watching television was a statistically significant contributor to knowledge increases. This result is interesting, as previous research has indicated that television watching can help in the development of pro-environmental attitudes and knowledge among youth (Zimmermann, 1996; Eagles & Demare, 1999). On the contrary, more recent research recommends restricting television is necessary to reduce feelings of apathy towards the environment among adults (Good, 2007). Regardless, while this result aligns with findings from more recent research, watching television may have varying effects of an individual's interest in and knowledge of the natural environment.

Table 5: Paired sample t-test results relating environmental involvement to environmental knowledge. Activities were deemed to have “significant influence” if the sample of campers who completed the activity statistically significantly increased their knowledge scores and those who did *not* complete the activity did *not* statistically significantly increase their knowledge scores. Activities were deemed to have “slight influence” if campers who did *not* participate statistically significantly increased their knowledge scores. Activities were deemed to have “inverse influence” if campers who did participate did *not* statistically significantly increase their knowledge scores and those who did not participate did statistically significantly increase their knowledge scores. Bolded values are statistically significant.

Activity	Participants involved in activity prior to camp (%)	p-value for campers participating in activity ($\alpha = 0.05$)	p-value for campers not participating in activity ($\alpha = 0.05$)	Influence of activity on knowledge scores
Camping with family	70%	0.00105	0.13	Significant influence
Attending other camp	87%	0.00015	0.808	Significant influence
Watching television about nature	78%	0.00528	0.01759	Inverse influence
Reading books about nature	83%	0.00251	0.05767	Significant influence
Talking about nature at home	78%	0.00234	0.01613	Slight influence
Talking about nature at school	74%	0.00139	0.08424	Significant influence

3.6.4 Learners' Reflecting on their Learning: Play & Learning Spaces

Qualitative responses suggest that campers enjoy playing in outdoor spaces (e.g. backyard, neighbourhood) and participating in outdoor activities (e.g. swimming, hiking, fishing). Following the completion of the camp, participants remained enthusiastic about outdoor play spaces and activities at *Sunship Earth*TM. For many campers, positive learning experiences included developing new skills (e.g. canoeing), participating in hands-on learning experiences, and learning about environmental topics not commonly discussed in their lives (e.g. decomposers). Further, an affinity towards participating in outdoor activities both before and after the camp is consistent with Wells & Evans (2003) conclusion that children greatly enjoy and actually prefer spending time outdoors than indoors. Enjoyment of outdoor activities could have also been influenced by the seasons, as children are known to spend more time outdoors during the summer months (Be'Langer, Gray-Donald, O'Loughlin, Paradis, & Hanley, 2009).

When describing their favourite learning spaces at school (pre-camp survey), the classroom was revealed to be a familiar and ideal place for learning. Explanations revealed that campers viewed the classroom as a space for them to connect with their peers and/or work in quiet. In some cases the classroom was also viewed as the only place children could learn (e.g. one camper said "my class because it is the only place where I learn") suggesting that some campers did not have experience learning in the outdoors previous to camp or did not recognize outdoor experiences as "learning". This perception shifted after the post-camp survey, as campers discussed how the forest was an ideal setting to learn in. Specifically, campers believed that the forest was beneficial as it was quiet, promoted concentration, included natural noises (e.g. birds chirping), and

provided opportunities for hands-on learning. In particular, hands-on learning was discussed as beneficial to the learning process as campers could directly engage with the learning material (e.g. seeing how insects decompose organic matter).

Participants were also asked to reflect on how they felt when parents or teachers (pre-camp) and camp counselors (post-camp) taught them about nature. Main themes from these responses suggest that campers felt positive (e.g. use of word ‘happy’ or drawing of smiling faces) about learning about nature both before and after camp. In line with responses relating to learning spaces, participants represented learning in different ways during the pre-/post- surveys. Before camp, learning was often represented in a classroom consisted of traditional, lecture-style learning with an adult standing in front of a seated student giving a lesson (see Figure 6a).

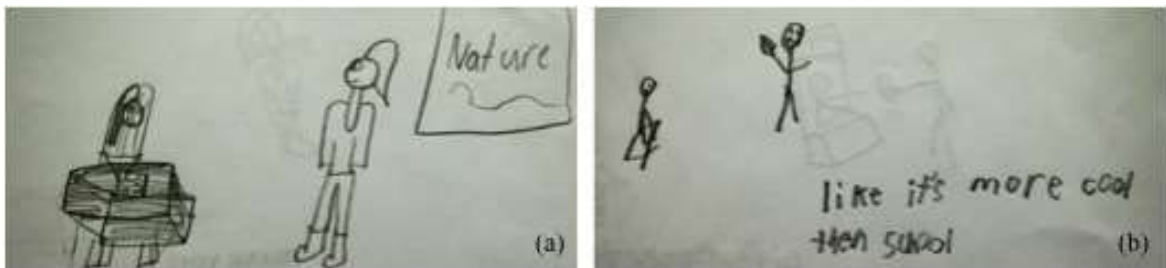


Figure 6: Participant drawings representing feelings when learning about nature. (a) was recorded before camp and depicts traditional classroom style learning and negative emotions. (b) was recorded after camp and depicts learning with props and positive emotions.

Though beneficial, classroom-style learning has not been found to be the most effective way for youth to learn about nature (e.g. Acar, 2014) as it limits students’ opportunities for learning through experience and direct observation. In comparison, when asked about learning at camp participants more frequently represented their learning as being interactive and engaging as students were standing upright, props such as leaves were present, and learning that took place outdoors (Figure 6b). Additionally,

captions written by campers to describe their pictures indicated that they were not bored with this form of learning. This represents a shift from the pre-test where a few participants explicitly wrote about feelings of boredom experienced when learning about nature from adults before camp. Finally, one camper described how learning from counselors was incredibly positive for her as it allowed her to learn about nature from people who she could tell were passionate about the topic they were teaching and cared for the environment.

Based on these findings, it is clear that these campers responded positively to learning in the outdoors at camp in similar ways to those studied in other outdoor learning environments, for example national parks or wildlife preserves (Ballantyne & Packer, 2002). Interestingly, these experiences also allowed campers to acknowledge outdoor spaces as potential learning spaces, which was inconsistent with responses from the pre-camp survey. Opportunities for hands-on learning were discussed by many campers as beneficial, which aligns with previous research indicating that children prefer when they are actively involved in their learning experiences (Hopkins, 2008).

3.6.5 Attitude toward Environmental Issues: Building Connections between Nature, Society, & the Individual

During the pre- and post-camp surveys, campers were asked to think about what they could do to help nature and draw a picture of their commitment. Responses from the pre-camp survey indicated that participants understood basic relationships between individual environmental impacts, society, and the environment. Specifically, campers drew images relating to large-scale issues, such as destruction of natural spaces (e.g. deforestation) and waste management (e.g. not littering, recycling). Other studies indicate

that these two ecological problems are well understood by children slightly younger (aged 7-9) than those involved in this study (Barraza, 1999). Additionally, Littledyke (2004) found that English school-aged children were primarily concerned about issues associated with pollution, waste, and wildlife loss when discussing the natural environment.

The post-camp survey indicated that some campers understood a greater variety of issues after the program and identified specific, manageable steps they could take to address these problems. This represents a shift from some responses in the pre-test, which were more basic and only briefly mentioned simple tasks such as ‘pick up litter’. Additional solutions proposed in the post-survey included: making new habitat for species, purchasing organic food, and educating/communicating environmental knowledge to family members, and protecting small plants. This increased complexity and presence of alternative solutions, may indicate that *Sunship Earth*TM has provided an opportunity for children to broaden their understanding of environmental issues and the interconnection between individual activities, nature, and society. For example, one camper discussed how she could assist family members by educating them about proper waste management, illustrating an understanding of how her individual actions can impact both the environment (reducing and recycling waste) and society (encouraging others to improve waste management).

To further understand environmental concern among participants, campers were asked “how important is it for you to help nature?” This question asked campers to respond using a ranked scale of five responses: not important at all, somewhat important, kind of important, very important, and the most important thing in my life. Table 6

depicts the change in pro-environmental attitude between the pre-/post-test. The number of respondents who reported that the environment was very important to help increased after the camp's completion along with individuals who indicated that helping nature was the most important thing in their life.

Table 6: Results indicating campers' desires to help the environment before and after camp. Numbers in parentheses indicate the number of responses that were emphasized (e.g. underlining, exclamation points, etc.) within the 'Very important' rating.

	Pre-camp Response	Percent	Post-camp Response	Percent
Totally not important	0	0%	0	0%
Not very important	0	0%	0	0%
Kind of important	1	4%	1	4%
Very important	21 (1)	96%	17 (2)	83%
Most important thing in my life	0	0%	3	13%

While no prompts were given to emphasize the response, some campers underlined, used exclamation points, or added quotes to their response. It is assumed here that this emphasis was used to reinforce the response. For instance, one camper wrote about why she answered “the most important thing in my life” in the post-camp survey: “It is my life. It is everyone’s life. We cannot live without it. No nature, no human”. Therefore, results suggest that some participants felt that protecting the environment was a major priority for them and, in this particular response, an understanding that helping nature is mandatory, as humans cannot survive without it. Although this result is not statistically significant ($p = 0.083$), a positive shift in responses revealed by qualitative methods could be described by an increase in outdoor time or by the educational components of the camp program (Louv, 2008; Collado, Staats, & Corraliza, 2013). It is anticipated that a lack of significance could be attributed to a “ceiling effect” as many participants began the program with high levels of pro-environmental attitude (Eagles &

Demare, 1999), making it difficult to detect change through these measures. This may also represent a potential bias within the sample as families with a high level of environmental involvement may have been more likely to participate in the program, omitting the ability to understand the contributions of *Sunship Earth*TM to those with lower levels of environmental involvement.

3.6.6 Learning about Relationships with Nature: Campers and the Outdoors

Responses to questions regarding campers' relationships to and feelings toward the outdoors indicate that campers associate it with positive emotions including happiness, interest, awe, and excitement. Additionally, their drawings suggest that campers perceive the outdoors as a place where they can interact with trees, birds or other animals. Although responses were similar in both the pre-/post-camp surveys, some post-camp drawings were more abstract and represented more complex feelings. For instance, one camper discussed feelings of empowerment as she believed that being outside reminded her that she had the skills and opportunity to make a difference, which varied greatly from her pre-camp survey result (Figure 7).

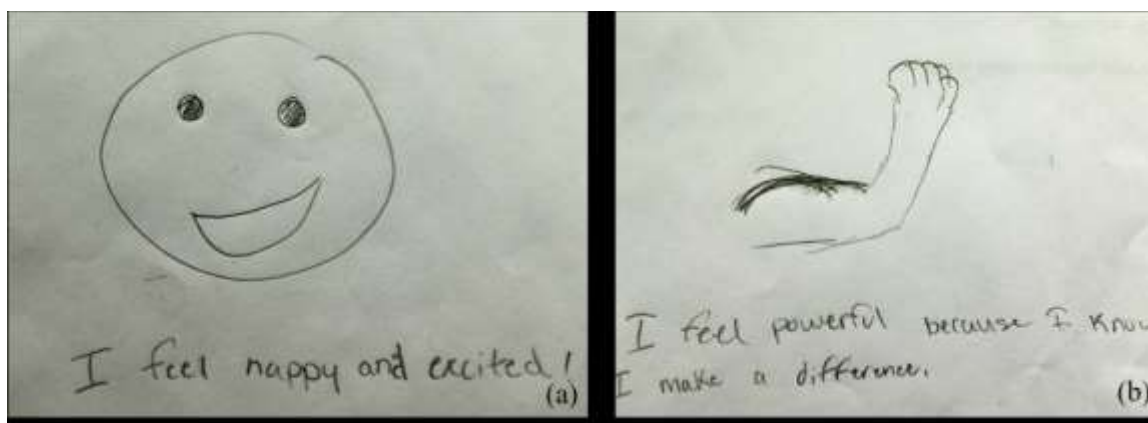


Figure 7: Drawings representing one camper's feelings about being outdoors (a) at home and (b) at camp, illustrating the development of feelings of empowerment through participation in the camp.

One explanation for these emotions could be related to the observation made by Maynard, Waters, & Clement (2013) that learning in the outdoors, in the context of child-initiated learning, can allow for greater freedom as children have more direction over their learning than in a traditional classroom. Not directly related to learning, these more complex feelings could have been developed through greater exposure to the outdoors, which has been shown to foster creativity and other emotions among youth (e.g. decrease stress levels, calming) (Louv, 2008; Nedovic & Morrissey, 2011). Feelings of participant empowerment after the camp program are also important to discuss as children typically report feeling powerless or pessimistic when asked about their feelings towards global-scale environmental issues (Strife, 2012). As a result, it seems as though *Sunship Earth*TM may be able to help children become more optimistic about the future of the environment.

Other emotional responses indicate that campers felt more comfortable being outdoors at camp than at their home. For example, during the pre-survey one camper drew a distressed, sad face and explained how she felt “sad because I can hear cars and see the road (but happy I am outside)”. These emotions shifted in the post-camp survey response as she described herself as “happy to see nature” at *Sunship Earth*TM.

3.6.7 Negative Learning Experiences

Although the majority of EL experiences reported by campers were positive, negative learning experiences were still present. These are important to report on as authors have discussed the need to understand both null and negative results from evaluations of environmental education programs (Stern et al., 2014). Most notable was an aversion to insects, which was commonly associated with feelings of annoyance or disgust. For example, one camper wrote that they were “annoyed because of the bad

bugs!” while another wrote “and – who invited the bugs!” when discussing their time outdoors at camp. These results are consistent with Bixler, Carlisle, & Hammitt (1994) who found that insects negatively impacted children’s outdoor experiences. Other research has also noted that the presence of unfavourable weather conditions can be a source of negative feelings towards outdoor experiences. For example, Spasova (2012) concluded that undesirable summer weather conditions (i.e. rain, thunderstorms, high winds, etc.) affect characteristics, such as working ability and concentration for adults. For children/adolescents, inclement weather conditions, both within and between seasons, can reduce the willingness of this group to participate in outdoor, physical activities (Be’langer et al., 2013; Ergler, Kearns, & Witten, 2013). While this has been found elsewhere, campers at *Sunship Earth*TM did not report these feelings. Interestingly, it is not the case that inclement weather was not present, as the majority of camping days in both weeks of data collection included a significant amount of rain and thunderstorms. One possible explanation for the lack of influence of weather on learning experiences at *Sunship Earth*TM is the emphasis placed by the program on bringing children to the outdoors regardless of the weather conditions and promoting the view that children can spend time outdoors in any conditions.

3.6.8 Alignment with Rickinson et al. (2009) Framework

This research has also shown that *Sunship Earth*TM can help foster positive learning experiences among participants that directly align with aspects of the Rickinson et al. (2009) framework (see Figure 8). Specifically, results support the ‘Nature’, the connection between ‘Nature and Society’, and ‘Individual’ aspects of the framework, as learning experiences increased participant’s environmental knowledge and allowed

camper's to 'learn about themselves' (Rickinson et al., 2009, p. 18). For instance, campers reported that they preferred learning outdoors and understood the benefits of hands-on learning. Additionally, campers described experiences that enhanced their desire to address environmental issues and deepened their connection with nature, aligning with the 'Nature' and 'Individual' portions of the framework. Features of the framework that were not represented in this research include 'Society' and the connection between the 'Individual and Society'. This suggests that it may be valuable for practitioners to review *Sunship Earth*TM programming to ensure that societal systems and their relationship to campers and their local environments are better established in this learning experience.

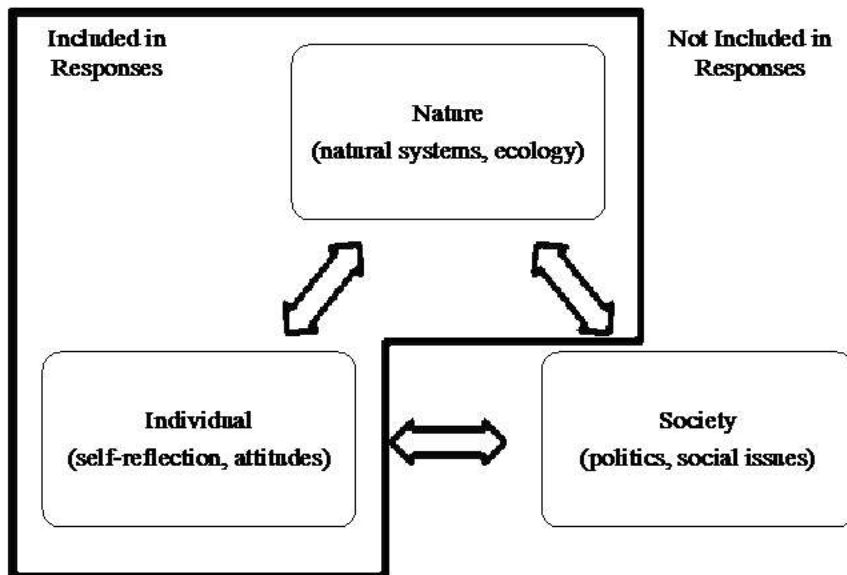


Figure 8: Components of EL framework included in campers' cognitive, affective, and behavioural survey responses. Those contained within the box were included in responses.

3.7 Conclusion

This research has examined EL experiences of children participating in a *Sunship Earth*TM program in Nova Scotia, Canada. Results suggest that children enjoyed learning about ecological concepts in the outdoors and exhibited statistically significant increases in environmental knowledge through participation. Consistent with previous studies analyzing *Sunship Earth*TM, this program was not found to statistically influence pro-environmental attitudes (Eagles & Demare, 1999). Certain types of environmental involvement such as reading books about nature, attending other summer camps, and talking about nature at school were key factors that assisted in the accumulation of knowledge concepts at camp. Affective/behavioural responses indicate that campers may have felt more concerned for, and deepened their connection with, the natural world after the program. Additionally, results indicate that the program may have promoted feelings of optimism and empowerment in relation to environmental issues among campers.

Moving forward, it is important that environmental education research continues to place emphasis on understanding the participant experience and to directly identify areas of programs that positively contribute to the cognitive, affective, and behavioural learning domains of children. This study was influenced by a number of limitations, which are important to discuss in reference to EL and environmental education research (Meyers, 2006). First, due to time limitations at camp, the cognitive survey was unable to investigate the cognitive domain in an open-ended way. Future research should emphasize exploring this domain further. For instance, studies could develop a survey that discussed ecological concepts not associated with EC₁-DC₂-IC₃-A to reveal if other knowledge experiences are present. Second, there was no measure in this study that could

isolate whether results were caused by the camp programming or by nature exposure itself. As a result, future work should explore this causal relationship to better understand whether the earth education components of the camp curriculum or simply being outdoors produced these positive EL experiences. This approach could help practitioners identify whether efforts should be taken simply engage youth with the outdoors or if structured earth/environmental education learning experiences are necessary. Finally, this research focused on a non-probabilistic sample of children participating in one *Sunship Earth™* program, thus results are not generalizable. Developing a larger research project focusing on other implementations of the *Sunship Earth™* curriculum (e.g. across Canada or internationally) could contribute to our understanding of how different contextual factors (e.g. location, seasons, counselors, etc.) impact learning experiences.

Chapter 4: Reinforcement and transfer: Long-term contributions of an earth education summer camp program to childhood EL experience

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4.1 Statement of Student Contribution

Adam Cheeseman produced the original manuscript. Adam Cheeseman was also responsible for the creation and delivery of all data collection tools and data analysis, which were reviewed by Tarah Wright. Multiple revisions were provided by Tarah Wright and incorporated into the manuscript by Adam Cheeseman.

4.2 Abstract

The United Nations (UN) recently released the Sustainable Development Goals (SDGs), which encourage communities to work towards sustainable development. As these goals are to be completed by 2030, the need for collective environmental action from both adults and children has never been more important. Although this need exists, children are becoming disconnected from the natural environment and thus the realities of environmental degradation. One way to facilitate learning about the environment is through environmental education programs and while a large amount of research has investigated these programs, a lack of explicit focus on learning persists. As a result, this paper reports on a sample of results from a larger project investigating children's learning at an earth education summer camp, *Sunship Earth*TM. Reported results were analyzed from parent interviews conducted 2-3 months after the camp. These results indicate that the camp can promote the reinforcement of pre-existing environmental knowledge and

attitude, the adoption of ERBs, and the transfer of environmental knowledge and ERB from children to their parents.

4.3 Introduction

The recent release of the UN SDGs emphasizes the need for societies to work collectively to achieve sustainable development (UN, 2015). The protection and restoration of the natural environment is a major theme of the SDGs, as many of the goals explicitly discuss the need to address global environmental issues (e.g. climate actions, protecting ecosystems, developing sustainable cities) (UN, 2015). As a new generation of individuals become leaders in realizing and promoting the SDGs, it is clear that positive attitudes and behaviours toward the natural environment are increasingly important to foster among individuals. Unfortunately, a deepening disconnection between youth and the outdoors is restricting children's ability to adopt ERBs later in life (Chawla, 2006; Wells & Ledkies, 2007; Maynard & Waters, 2007) which could have a significant impact on achieving the SDGs. By tackling this dearth of outdoor exposure, some environmental education programs (e.g. formal schooling as well as non-formal programs such as forest schools, summer camps, recreation programs) have been found to assist in increasing levels of environmental knowledge, facilitating affective connections to nature, and promoting ERBs (Kuhar et al., 2010).

Bogner (1998) suggests that long-term exposure to environmental education is needed to continue reinforcing these environmental characteristics, such as pro-environmental attitudes. Additionally, the benefits of exploring long-term benefits are significant as it can help practitioners and researchers understand the "sustainability and usefulness of such programs" (Farmer, Knapp, Benton, 2007). As a result, it is important

to measure how programs can continue to contribute to learners following their engagement with a program. Those who have included a long-term component to environmental education evaluations sample participants from as little as one-month (Kuhar et al., 2010) to fifteen years (Engels & Jacobson, 2007) after a program's completion. Yet, recent studies suggest that the relationship between EE programming and long-term benefits (e.g. knowledge, attitudes, etc.) is still underrepresented (Stern, Powell, & Ardoin, 2008; Bexell et al., 2013). Therefore, additional research is needed to alleviate this gap in the body of environmental education research.

While EE programs may be able to contribute to enhancing positive perceptions of the environment among young people, educating adults is also important if we are to address current environmental issues and achieve the SDGs by 2030. Uzzell (1999) suggests that children can play a significant role in enhancing adult environmental attitudes and behaviours by communicating environmental information learned in educational settings to their parents. Though this idea is supported by other studies (e.g. Damerell et al., 2013), concern remains that this relationship is still inconclusive (Duvall & Zint, 2007), representing a need to further investigate this emerging topic (Rickinson, 2001).

This paper is part of a larger study that examines how an earth education program, *Sunship Earth*TM, contributes to children's EL experiences. Cheeseman & Wright (2016) (see Chapter 3) explored the first research question associated with this study: how does *Sunship Earth*TM contribute to campers' learning experiences in three learning domains: cognitive, affective, and behavioural? This paper focuses on how learning about nature at *Sunship Earth*TM influenced campers and their families 2-3 months after the

programming. Specifically, it explores the role the program played in contributing to participants' knowledge, feelings, and behaviours towards the environment, including an exploration of "accidental and serendipitous" (Scott & Gough, 2003, p. 38) or unanticipated learning opportunities.

4.4 Sunship Earth™

The Institute for Earth Education created *Sunship Earth™*, a six-day residential summer camp program, which has been implemented on an international scale. The program focuses on educating children about ecology while promoting strong connections to the environment (van Matre, 1990). Earth education is a pedagogy that promotes understanding, appreciation and harmony between humans and the natural world. Although related to environmental education, this alternative pedagogy was developed at a time when, in Stephen van Matre's (1990) view, meaningful opportunities for children to benefit from environmental education were not being sufficiently considered.

The AEC is located in Nova Scotia, Canada and is one of several outdoor and environmental education organizations within the province. This organization operates the *Sunship Earth™* program analyzed in this study at Camp Mockingee, a 30-acre forested camp located on Lake Mockingee. Each summer campers aged 10-12 attend the six-day residential camp to learn about seven ecological concepts: energy flow, cycles, diversity, community, interrelationships, change, and adaptation, (EC₁-DC₂-IC₃-A) through various participatory outdoor activities (van Matre, 1990). In addition, *Sunship Earth™* offers unique outdoor activities, such as 'magic spots' where campers choose their own space in the outdoors that they visit each day and quietly observe the natural

world. The program also encourages children to share their knowledge and experiences after camp. Specifically, each camper receives a beaded necklace at the end of camp to remind them of the learning experience. As part of another transfer component, the program works with campers to select environmental habits that they want to adopt in their life after camp (Bires, 2013).

4.5 Methods

To measure participants' feelings about camp immediately after *Sunship Earth*TM, a pre-/post-camp survey method was employed. Specifically, this involved surveying campers both before and after the camp with questions highlighting each of the three learning domains: cognitive, affective, and behavioural. First, the cognitive surveys included questions related to the ecological concepts taught at *Sunship Earth*TM and used an adapted list of questions from Eagles & Demare (1999) in an attempt to understand previous environmental involvement. Previous involvement was included to help understand if previous environmental engagement impacted how or what campers learned at camp, an influence that is discussed extensively in the literature (Brody, 2005). The affective/behavioural survey included open-ended questions where children could respond in writing or drawing about their camp experience, feelings about EL, favourite camp programming, desire to help the environment, and their relationship with the outdoors. When asked to provide a drawing, participants were also required to write a caption (one or two sentences) to describe their image. Captions helped illuminate the general topic of each drawing, allowing for more accurate analysis (Baker et al., 2013). Surveys were conducted before and after the *Sunship Earth*TM program in July 2015.

Although these measures were useful in identifying immediate results, some scholars worry that a sole focus on the pre-/post-test method is problematic as it has stagnated methodological innovation in the field and cannot reveal long-term benefits (Stern et al., 2014). As a result, it is suggested that environmental education research include other data collection tools (e.g. qualitative interviews) that work in tandem with the pre/post-test to produce more robust datasets (Rickinson, 2001; Stern et al., 2014). In order to diversify methods, understand the long-term benefits of the program, and explore how children may have influenced their parents, one-on-one semi structured interviews were conducted with campers' parents 2-3 months after the completion of their *Sunship Earth™* experience. The use of a semi-structured interview methodology was an ideal approach as it allowed participants to reflect on their responses and offer additional information (Lewis-Beck et al., 2004). Although there seems to be no scholarly consensus on the most appropriate amount of time to measure retention from an educational program, this period was selected as suitable for this study given time limitations.

Interviewing parents rather than campers was a conscious choice for a number of reasons. First, parents traditionally act as 'gatekeepers' to their children's involvement in outdoor activities and programs (Kapsokafalou, 2014) and inevitably influence their children's learning (Rouse, 2015). Thus, given their inherent control over, and insight about their children's learning, it was thought that this group could provide unique perspectives on the contributions of the program. In addition, parents' perspectives were used to explore the potential influence between previous engagement with the environment and campers' EL experiences. Finally, parents were selected to explore how

children may have impacted their environmental characteristics (e.g. knowledge, attitudes, behaviours) following the camp (Uzzell, 1999).

4.5.1 Data Recruitment & Collection

To recruit participants, a non-probabilistic, purposive sampling method was used. Specifically, *Sunship Earth*TM staff circulated recruitment materials to all parents with children enrolled in the program, and an oral presentation was delivered to parents at a program information event. Twenty-three campers were successfully recruited to take part in the study (N=23) while seven parents/guardians completed these follow-up interviews (N=7). Interviews were audio-recorded and transcribed by Adam Cheeseman.

4.5.2 Data Analysis

Survey and interview data were transcribed and entered into *Microsoft Excel*, *StatPlus*, and *NVivo 10* for analysis. Descriptive and inferential statistics were used to investigate cognitive survey data. For greater depth of quantitative analysis of survey data refer to Cheeseman & Wright (2016) (Chapter 3). Affective/behavioural surveys and interviews were analyzed using various coding techniques to categorize and interpret responses (Saldaña, 2013). Once initial coding procedures were completed, codes from surveys and interviews were compared to understand relationships, connections, and differences between camper and parental responses. When campers or their parents are directly referenced in this manuscript, camp pseudonyms created by participants are used. For example “Green Frog” refers to a child participant, while “Mother of Green Frog” refers the parent of that participant.

4.6 Results & Discussion

4.6.1 Camper Surveys

Cheeseman & Wright (2016) (see Chapter 3) contains a full synthesis of camper survey results from the larger sample of participants involved in this study. For the purposes of this work, survey results from the sub-set of campers (N=7) whose parents were also interviewed are briefly discussed. Table 7 and Table 8 depict scores from the cognitive surveys, which will be discussed in the context of parent responses throughout this section. Interestingly, the majority of the sample increased or remained consistent in their levels of environmental knowledge following the camp, while one camper decreased their scores. Generally, mean scores increased a small percentage (7%) through participation in the program. Purple Cow scored the lowest on the pre-test (57%) and exhibited no change following the camp, while Blue Dolphin A's understanding of ecological concepts decreased after the camp. Other campers scored relatively high in the pre-test (>70%) and exhibited increases in their knowledge (except Green Squid who could not increase). This relatively high pre-test scoring could have been influenced by bias as participating parents', who had high levels of interest in the environment and/or outdoor activities, may be more likely to enroll their children in this type of program than families with low interest. On a finer scale, Table 8 demonstrates that campers did not increase their understanding of energy flow (E), diversity (D), and change (C₃) after the program, indicating that these concepts were poorly understood in comparison to cycles (C₁), community (C₂), interrelationships (I), and adaptation (A). Of these, adaptation exhibited the largest increase in knowledge (36%) among these campers. While the majority of campers enhanced their knowledge (or remained consistent) after the camp, a

paired sample t-test revealed that an increase in knowledge of these specific campers was not statistically significant ($p > 0.05$).

Table 7: Results from knowledge surveys by participant. Direction of change indicates whether knowledge increased (+), decreased (-), or remained the same (N/A) after the program.

Participant	Pre-camp	Post-camp	Change	Direction of Change
Marine Tiger	86%	100%	14%	+
Blue Dolphin A	71%	64%	-7%	-
Green Dolphin	71%	86%	14%	+
Green Frog	86%	100%	14%	+
Green Squid	100%	100%	0%	N/A
Neon Yellow Fox	79%	93%	14%	+
Purple Cow	57%	57%	0%	N/A

Table 8: Results from knowledge survey by ecological concept. Direction of change indicates whether knowledge increased (+), decreased (-), or remained the same (N/A) after the program.

Concept	Pre-camp	Post-camp	Change	Direction of Change
E	93%	86%	-7%	-
C ₁	71%	93%	21%	+
D	86%	79%	-7%	-
C ₂	71%	86%	14%	+
I	79%	86%	7%	+
C ₃	93%	79%	-14%	-
A	57%	93%	36%	+

Affective/behavioural surveys suggested that this sub-sample of participants enjoyed EL activities at camp and preferred them to learning about nature in other settings, such as the classroom. For instance, Figure 9 depicts a shift in the camper's view about learning. Specifically, before camp learning is represented as 'boring' and takes place in a classroom with a blackboard and teacher. Meanwhile after camp, this camper reports feeling as though learning about nature is more enjoyable or 'cool' and involves the use of props.

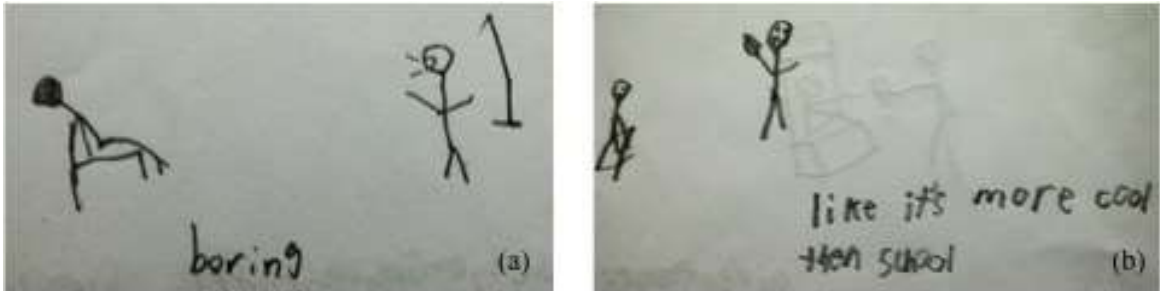


Figure 9: Campers' representation of learning about nature (a) at home and (b) at camp.

Results from an environmental attitude question indicated that campers both before and after camp considered helping nature to be very important. Only one camper increased his rating from 'kind of important' to 'very important' while all others recorded the same results, 'very important', after both the pre- and post-camp survey. Further, there was an indication that campers felt better equipped and empowered to address environmental issues after spending time outdoors at camp as indicated by Figure 10.

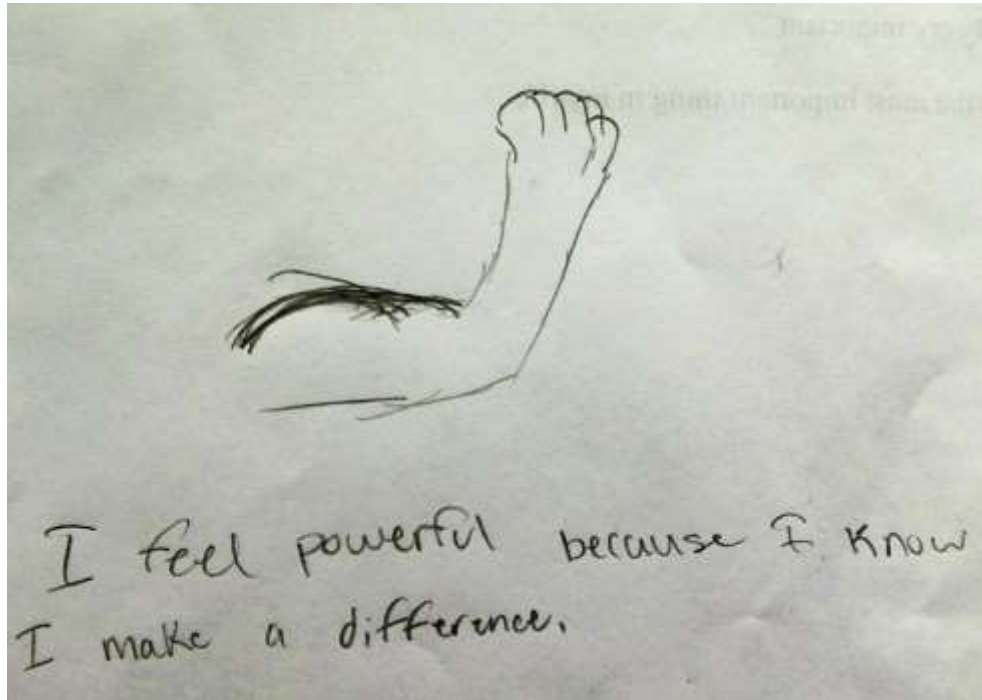


Figure 10: Green Dolphin's representation of her feelings while outdoors at camp

Survey results also suggest that campers preferred learning from their counselors about nature in a wooded setting. Finally, campers commonly discussed EC₁-DC₂-IC₃-A concepts and activities as their favourite learning experiences at camp.

4.6.2 Long-term Interest in EL

An analysis of parent interviews indicated that all participants viewed the camp as a positive experience for their child as they believed it provided their children with various benefits including opportunities to increase their social networks, learn new skills (e.g. canoeing), and/or learn about nature. Additionally, responses suggest that campers actively shared what they learned at camp, but also continued to seek out opportunities to learn about other environmental topics after the program. For some parents, an increased interest in accumulating environmental knowledge among campers was attributed to *Sunship Earth*TM's unique approach that encourages long-term learning:

... I think the other camp was just a week camp whereas this might have been presented as something you could continue on [with]. (Father of Green Squid)

Essentially, this result indicates that *Sunship Earth*TM may be able to provide campers with the motivation to extend their EL opportunities after camp. If this motivation is consistent among other educational interventions, this may offer an explanation for the presence of elevated levels of environmental knowledge over the long-term among children who have participated in other programs. For instance, Kuhar et al. (2010) measured enhanced knowledge of conservation after a program in Uganda, while another study experienced similar results when exploring children's knowledge of lemur species in Madagascar (Rakotomamonjy et al., 2015). Regardless of its effect, no results from surveys or interviews indicated which aspects of the *Sunship Earth*TM program actually facilitated this increased motivation.

Although not definitive, an increased motivation to learn about nature beyond the camp may be attributed to a general increase in interest or curiosity about the natural environment, prompted by participation in the camp. For example, two parents commented on their child's increased interest about natural features (e.g. plants and animals) after camp.

She's more curious about the specifics of it [the environment]. Instead of that's a tree its now well do you what kind of tree it is and same thing with birds and things. (Mother of Green Dolphin).

We [were] walking along...[and] there was a piece of eggshell that had fallen out of a tree. She picked it up and took it inside and built a little nest for it...and we talked about the life cycle of a bird...then we went up and tried to look in the tree so... (Mother of Neon Fox)

Interestingly, an increase in feelings of curiosity is consistent with previous research indicating that outdoor, environmental focused programming can produce these types of

emotions (Dresner & Gill, 1994). Thus, one explanation for a desire to learn more about nature may be connected with specific programming that enhance feelings of curiosity.

4.6.3 Long-term Interest in Continuing with Camp

Interview results also indicate that campers remained interested in *Sunship Earth*TM after their experience and shared these feelings with their parents. For instance, all parents involved in this study discussed their child's intentions of returning to the AEC in some capacity:

...And like I said he's excited to go back next year. (Father of Green Squid)

Will she go again next year, I'm sure she absolutely will. (Mother of Blue Dolphin)

Yes. Yes. She's definitely looking forward to Explorers [another earth education program operated by the AEC]. (Mother of Green Dolphin)

[Referring to counselors] For [her]...it would be in her element, so I think it left an impression 'Oh I want to do that' (Mother of Marine Tiger).

Ultimately, it is apparent that these children were interested in returning to the program in some capacity to not only participate in other activities, but to take on a leadership role in the program. The theme of leadership is particularly interesting as Dahl (2009) noted that residential summer camps have been known to provide children with an avenue to experiment with and develop leadership skills, a result also supported here. In addition, Nichols (2013) described how summer camp counselors tend to develop a strong feeling of attachment to their camp, which is believed to contribute to the high rate of employment retention among this group. Applying that concept to this study, these results may indicate that place attachment also occurs among campers in this program and influences their desire to return to camp. Campers may also be interested in returning to *Sunship Earth*TM because they have developed a greater connection to nature. This is

important to consider as recent research has linked connectedness to nature with a desire to participate in nature-based recreation activities (Cheng & Munroe, 2012).

Current counselors were frequently described as positive role models and possessing exceptional leadership capabilities. These feelings were so strong for some parents that they cited it as one of their primary reasons for enrolling their child in camp. Counselors were also seen as responsible, respectful, and environmentally knowledgeable/aware. In some cases, these leaders were also identified by parents as key contributors to their child's development of ERBs following the camp. For instance, one mother described how her daughter became more interested in purchasing environmentally and socially friendly clothing after *Sunship Earth*TM through the influence of her counselor.

And I don't know if this came from the camp *per se* but maybe more of the leaders or the people involved with the camp but there's a push in my house about clothing. Where the clothing has come from and things like that... (Mother of Neon Fox).

Although not explicitly related to the outdoors, Emmons (1997) also found that teachers who acted as strong role models, encouraged children participating in an environmental education program to reduce negative perceptions of the environment. In addition, Chawla (2007) suggested that role models who provide children with meaningful access to or education about nature significantly influence their interest in environmental topics and protection later in life. These results are consistent with this previous work and emphasize the importance of role models and their ability to influence long-term environmental feelings and behaviours among children.

4.6.4 Knowledge

Interviews and surveys highlighted the impactful role that EC₁-DC₂-IC₃-A activities had on campers. For instance, five parents discussed times after camp when their camper recalled the acronym and explained its meaning. In addition, all parents discussed the importance of their camper's necklace (given to them at the end of camp as a reminder of their experience and commitment to the environment), and the attachment their children have to it (e.g. wearing it all the time, talking about its meaning). Specifically with the necklace, responses suggest that the tangible reminder of what campers learned at *Sunship Earth*TM continues to leave a lasting impression on them 2-3 months following the camp program. In some cases, parents even reported that their child felt responsible to continue working on sharing their knowledge of these concepts to others:

...She's a little bit concerned about her necklace...[as it reminds her of her commitment to help the environment]...so that's definitely something that she wants to continue to work on... (Mother of Neon Fox)

It is apparent that the necklace represents a tool that assists in reinforcing a long-term commitment among campers to remain knowledgeable of these concepts and to share their learning experiences with others. Interestingly, Salmon (2001) highlighted in the importance of 'real props', described as items that were present during an activity, in helping children retain and share events that have happened to them. While Salmon's (2001) research focuses on forensic/clinical events, the value of 'real props' (e.g. necklace) is still relevant here as campers are able to have a tangible item to help them recall memories of camp.

Most parents also noted that campers shared facts relating to the acronym EC₁-DC₂-IC₃-A concepts long after the camp. One anomaly to this trend was Blue Dolphin A, who did not discuss any facts or information about the environment with her family. Given that her knowledge score also decreased slightly through participation in the program, it can be assumed that she did not gain any additional knowledge about the environment. Interestingly, the three concepts that were not positively influenced by participation were among those not mentioned explicitly in the interviews. These include: energy flow (E), diversity (D), and change (C₃). This is somewhat consistent with van Wissen (1992) who found that adaptation (A), diversity (D), and change (C₃) were some of the more difficult concepts for campers' to recall after the same *Sunship Earth*TM program. However, knowledge of adaptation (A) was found to have increased greatly among camper surveys and was mentioned briefly by one parent in follow-up interviews.

All parents discussed the camp's role in reinforcing environmental knowledge, facts, and information that their children had learned at home or school. The theme of reinforcement is particularly interesting as it also suggests that parents perceive their campers having extensive environmental knowledge before participating in the camp. The idea of the camp reinforcing knowledge rather than contributing new knowledge is also consistent with relatively high scores in the pre- and post-camp knowledge survey as well as two campers who remained consistent in their scoring before and after camp. Therefore, while some parents described some new knowledge gains, in most cases it seems that *Sunship Earth*TM may have acted more as a reinforcement or contributed to a more substantial understanding of concepts understood by participants prior to the program. For instance, one father stated:

I think the camp just a put a different spin on it with the acronym...but I think it was reinforced in a different way and I don't think he really realized that he was learning...[or] reinforcing what he already does at home (Father of Purple Cow).

The ability for environmental education programs to contribute to knowledge has been found in other studies (e.g. Kuhar et al., 2010). Although this is true, others have suggested that high levels of previous environmental knowledge or attitude can make it difficult to detect change (Stern et al., 2014). Known as the ceiling effect, this phenomenon could help describe why some parents did not believe their camper learned new concepts at camp and why there was little change between pre-/post-camp survey scores (Eagles & Demare, 1999). Therefore, it may be necessary to focus future studies on campers who have a low prior involvement in order to understand how environmental education programs contribute to this group of children.

In terms of actual learning processes, survey and interview results suggest that hands-on learning experiences at camp were most meaningful for campers when learning about various topics (e.g. microclimates).

I know that they did a lot of, examination of different areas in the woods. You know down close to the ground and searching for different creatures and things like that. (Mother of Blue Dolphin)

Similar to results here, comparable research suggests that children enjoy being outdoors (Wells & Evans, 2003) and prefer when they are actively involved with their learning (Hopkins, 2008).

4.6.5 Attitudes & Awareness

Campers reported feeling that helping the environment was very important to them following the camp (Cheeseman & Wright, 2016). This is consistent with pre-camp attitudes, except for one camper (Green Frog) who indicated that he thought helping

nature was 'kind of important' before camp. In line with these results, most parents did not report notable increases in attitudes towards nature or environmental issues.

Interestingly, there was no indication from campers or parents that the camp did not promote these values. Instead, parents referred to their child's previous positive appreciation and attitude towards nature, suggesting that, like knowledge, these feelings were reinforced or built upon rather than introduced to campers for the first time. This may indicate that parents perceived their campers as having strong environmental attitudes before camp, making it difficult to identify changes 2-3 months after the camp. For example, two parents discussed their children's attitudes towards appreciating nature and committing to sorting waste properly.

Again, I think its more of a reinforcing his appreciation for it so...he's very aware of the external environment when it comes to different types of birds, like he's watching for the osprey to fly over, he's in tune with what's going on...[but then] how you attribute the camp... (Father of Purple Cow)

So I can't say there's been difference maybe a slight awareness where she's a little more careful. (Mother of Blue Dolphin)

It is clear that a large proportion of campers were already highly concerned about the environment before camp, making it difficult to measure how attitudes changed after camp. In similar ways to perspectives on knowledge, this measure of attitude may also be impacted by a 'ceiling effect', which was experienced by Eagles & Demare (1999) in their assessment of another *Sunship Earth*TM program in Canada. Regardless, the theme of reinforcement also described by parents in terms of their child's gains in knowledge continues to be prominent here.

Continuing, responses from Green Frog and his parent highlight an increase in environmental attitude (from 'kind of important' to 'very important') immediately after camp, which is supported by the following description given by his mother who discusses

his desire to appreciate and value nature more after arriving home from camp.

One thing he said was that he wanted to spend more time outside to appreciate the outdoors. So that was interesting. (Mother of Green Frog)

Ultimately, responses from both parents and children indicated that environmental concern and awareness of issues were primarily reinforced, yet may have also been slightly enhanced through *Sunship Earth*TM for certain individuals. Albeit minimal, parents and campers highlighted the importance of the forest as a space to foster positive perceptions of the environment and gain meaningful experiences in the natural world. Other environmental features (e.g. oceans, arctic) not found at Camp Mockingee were not discussed, indicating that learning may have primarily focused on local environments. For example, one camper discussed how they are more engaged and motivated to tackle environmental issues since spending time outdoors at camp specifically (Figure 10).

Therefore, while most parents could not discern a change in their child's attitudes, this research provides one example of a case where a child with lower levels of environmental concern prior to camp was able to enhance their pro-environmental feelings through participation in various outdoor/nature-based activities at *Sunship Earth*TM. This instance is consistent with previous research which has shown that an increase in outdoor time and the development of a connection with nature can help enhance feelings of concern about the environment, among other benefits (Chawla, 1998; Louv, 2008, Cheng & Monroe, 2012). While this is true, the ability of *Sunship Earth*TM to influence environmental attitudes is not confirmed or rejected within the literature as Eagles & Demare (1999) found no change while Bires (2013) measured positive long-term changes.

4.6.6 Environmental and Social Behavioural Change

When asked if their child's ERBs changed after completing the *Sunship Earth*TM program, most parents indicated that they were unsure. Further, some parents said that while there were changes to their child's behavior after completing *Sunship Earth*TM, they were uncertain if these could be directly attributed to the camp. Regardless, a few parents discussed various behaviours that their campers either initiated or enhanced following the camp including: water conservation, electricity use, nature appreciation, and purchasing local food. Interestingly, behaviours discussed by parents did not align with behaviours that campers identified as important to address in survey responses, but distinct connections still exist. For instance, while Marine Tiger responded in the survey that she wanted to create signs to save small plants from being trampled (Figure 11), which was taught to her as a direct part of earth education curriculum at *Sunship Earth*TM, her mother indicated that she had placed signs around the house reminding everyone to turn off lights. Although these are two different behaviours, the idea of using signs to encourage pro-environmental practice remained with this camper 2-3 months after the program completion. This may suggest that *Sunship Earth*TM can provide learning opportunities that can help campers identify specific strategies to enhance their ERBs.

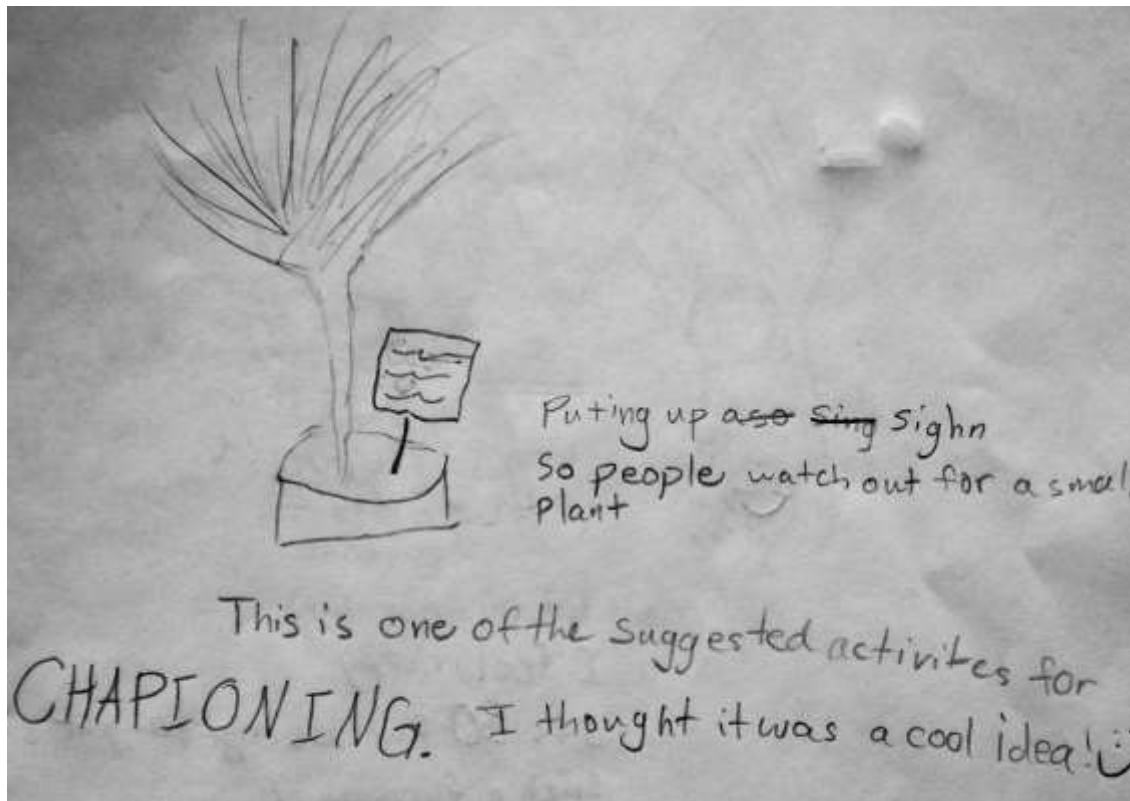


Figure 11: Example of post-camp environmental behaviour drawn by Marine Tiger

In some cases parents discussed learning experiences external to the earth education component of the camp (e.g. nature exposure and counselors) that contributed to campers' adoption of personal ERBs (e.g. conserving water, purchasing environmentally friendly clothing). This is an interesting result, as it highlights a strength and difficulty of this work in the context of environmental education research. First, this result may not have been revealed without the presence of both survey and interview methods, highlighting the importance of using a variety of learning-centered approaches in this discipline (Rickinson, 2001). Although this is beneficial, the difficulty here is identifying which learning experience, for example learning from counselors, experiences outdoors, or earth education activities, can offer the most meaningful influence on campers' behaviours. This challenge is also highlighted in the literature, yet recent

research into summer camps suggests that spending time in nature may be a more valuable attribute in the development of both attitudes and behaviours than the environmental-focused programming (Collado et al., 2013). Given the responses by parents in this study, results support this view as parents, when possible, were more likely to attribute changes in behaviour to the influence of counselors or time spent outdoors than the camp programming itself.

Finally, in their survey responses one camper discussed how they planned to find a ‘magic spot’ at home, while their mother also described how her daughter recreated other activities from the program in their backyard after returning home. This result indicated that campers are interested in incorporating camp programming into their daily lives. Similar results were found in an evaluation of a forest school program for younger children in the United States, which indicated that some participants explored forests near their home by replicating activities completed during the program (Powers, 2004).

There was also an indication that campers have attempted to influence family behaviour. For example, one mother reflected on her experiences with washing her hands with her daughter after the program and discussing the need to conserve water. Another camper encouraged her family to purchase environmentally friendly lunch containers to reduce food-packaging waste. This influence of children on their parents’ habits is consistent with some research (Uzzell, 1999; Ballantyne, Fien, & Packer, 2001). Interestingly, this influence was found to be bidirectional. That is, parents also discussed moments when they would suggest ERBs (e.g. turning off lights, re-using paper) or discuss issues related to the environment (e.g. misuse of hiking trails, elections) both before and after camp. This supports the notion that family values are also a significant

predictor of interest about the environment and environmental concern among children (Cheng & Munroe, 2012). Therefore, while campers may have developed high levels of environmental knowledge and attitudes before going *Sunship Earth*TM through their parents, some exhibited a newfound ability to translate knowledge and ideas to their parents when returning from camp. This deviates from results from other studies, which have shown that children are sometimes opposed to attempting to change their parents' behaviours for various reasons including a fear of them becoming angry (Fell & Chiu, 2014). Regardless, parents believed that *Sunship Earth*TM strengthened their child's level of confidence in communicating ERBs among family members and their peer groups. For instance, one participant suggested that her daughter's expression of her learning has been the largest change she's witnessed:

...That's been the biggest behavioural change and...I mean that goes along too with her willingness to say "I've learned this" and sharing that "you should do this too" "And these are the reasons why you should do this too" Um you know...turn the tap off, or drink your water, don't put as much water in that cup. (Mother of Neon Fox)

This response further demonstrates that campers participating in *Sunship Earth*TM feel both committed to addressing environmental issues on personal level while also attempting to influence the behaviours of their family and peers. This is of particular importance as an understanding that collective action can be achieved to address environmental problems has been described as an effective way to eliminate feelings of disempowerment and promote optimism in relation to environmental issues (Chawla & Flanders-Cushing, 2007; Strife, 2012).

In summary, camper surveys and parent interviews revealed a number of positive themes discussed above. Though this is true, it is important to note that some parents had

a difficult time identifying which specific experiences caused changes in their children’s attitudes and behaviours. Regardless, responses from both methods indicate that *Sunship Earth™* may be able to provide various positive, long-lasting, and meaningful EL opportunities for children. Figure 12 presents a word cloud summarizing the key themes discussed in parent interviews.



Figure 12: Word cloud summarizing major themes discussed in parent interviews. Created in NVivo 10.

4.7 Conclusion

This study explored the contribution of an earth education summer camp program to campers' EL through pre-/post-camper surveys and parent interviews. Results suggest that *Sunship Earth*TM did not necessarily provide learning experiences that enhanced participants' environmental knowledge or attitudes. Instead, parents reported that the camp helped reinforce knowledge through the use of props (e.g. necklace) and attitudes previously held by campers. This is supported by the surveys, which identified a potential 'ceiling effect' for knowledge and attitude, where high scores of both factors prior to camp made it difficult to detect potential changes. This research has also illustrated, once again, the value of outdoor, hands-on learning experiences in promoting life-long EL. Interestingly; many parents described how the camp contributed to their child's willingness to share what they learned and also influence the behaviours of their family and peers. This result is important to discuss, as it contributes to Duvall & Zint's (2007) discussion of this concept by illustrating that environmental education programs outside of the classroom may also play a role in enhancing intergenerational learning and thus warrants future research. Ultimately, this research supports the notion that environmental education programs may contribute to children's' EL experiences and promote the dissemination of both environmental knowledge and behaviours to others, including family members. Given these results, it is hoped that children attending programs like *Sunship Earth*TM may be more likely to feel committed to addressing environmental issues and helping achieve the UN's vision of the SDGs moving forward.

Future studies should continue to explore whether outdoor time, environmental education programming, or a combination of the two is creating the most impactful

learning experiences for children. This will help to better understand whether educators should be using more resources to promote outdoor time for children or if it is beneficial to create structured environmental-based programming. Longer-term monitoring of campers following the completion of the program and the creation of highly sensitive instruments is also recommended to eliminate the ceiling effect and help reveal whether changes in campers' ERBs are related to their learning experiences at camp. Finally, future research should focus on comparing these findings to other implementations of *Sunship Earth*TM to understand how results may vary in different social, cultural, and geographical contexts.

Chapter 5: Conclusion

This study was conducted to examine how an earth education summer camp, *Sunship Earth*TM, contributes to its' participants EL experiences. A secondary objective was to understand how these learning experiences impact participants and their families when they return home from camp. This research is valuable as it helps illuminate the participant voice and focuses on learning experiences within environmental education programs, an under-represented concept in the literature. Furthermore, while many attempts have been made to evaluate the effectiveness of similar programming, studies focusing on EL and their impact on children over the long-term are also lacking. Given the need for this research, this thesis sought to answer the following research questions:

- (1) How does *Sunship Earth*TM contribute to the cognitive, affective, and behavioural EL experiences of participating youth? ;
- (2) Which experiences were most meaningful and impactful to campers' 2-3 months following the completion of *Sunship Earth*TM?

5.1 Main Findings

In reference to the first research question, it was determined that *Sunship Earth*TM did contribute to campers' EL experiences in all three learning domains. First, results from surveys suggest that campers believed the camp contributed to their knowledge about the environment as activities related to EC₁-DC₂-IC₃-A were regularly cited as meaningful and enjoyable. Scores from the cognitive survey depicted a statistically significant increase in knowledge, further supporting the notion that *Sunship Earth*TM provides valuable ecological knowledge to children. While survey responses saw an accumulation of new knowledge among campers, many parents discussed how they

believed the camp reinforced, rather than added to, their child's knowledge about the environment. This result may be attributed to the campers' scores whose parents agreed to participate in the interview as no statistically significant increase in knowledge was found within this subset of campers (n=7) (see Chapter 4). Therefore, this study has shown that *Sunship Earth*TM may be able to provide new knowledge for some campers, but can also reinforce concepts previously understood by campers. This lack of statistical significance could also be explained by the ceiling effect (Eagles & Demare, 1999), as many of the campers participating in the study exhibited high pre-test scores making it difficult to detect changes in knowledge following the camp.

The contribution of *Sunship Earth*TM to participants' environmental knowledge has been studied elsewhere. First, Keen (1991) found that the program was able to incur significant increases in knowledge. This is consistent with other research that has found residential environmental education programs to have positive effects on participant knowledge (Dettmann-Easler & Pease, 1999; Bexell et al., 2013). Interestingly, Rickinson's (2001) review of environmental education research suggests that children older than those sampled here generally tend to have low levels of environmental knowledge. While this knowledge is influenced by a number of factors (e.g. gender, schooling, family) in ways that are not fully understood (Rickinson, 2001), this study illustrates the importance of programs like *Sunship Earth*TM in helping reverse this trend and encourage higher levels of childhood environmental knowledge.

In relation to the affective and behavioural domains, quantitative measures used to explore attitudes, did not yield statistically significant results. Although this may be true, written and drawn responses suggested that, after the camp, participants felt more

concerned about the environment, understood more complex environmental issues, and felt motivated to create positive environmental change. For instance, when asked what they could do to help the environment, a few campers transitioned from discussing basic, large-scale environmental problems common of other children in the literature (e.g. picking up litter) (Littledyke, 2004) to a greater variety of specific, individualized solutions that they learned about at camp (e.g. educating family, protecting small plants). Others wrote about feelings of optimism and empowerment in relation to addressing environmental issues, which is uncommon for other school aged-children who typically are pessimistic and feel powerless when considering environmental issues (Barraza, 1999; Strife, 2012). While the quantitative analysis associated with this study did not detect statistically significant increases in attitudes or concern for the environment, the ceiling effect could also explain this result as the majority of campers rated helping the environment as “very important” before camp, making it difficult to detect a change in attitude after the camp. This lack of quantitative representation is common among studies focusing on *Sunship Earth*TM as both Keen (1991) and Eagles & Demare (1999) concluded there to be no significant increases in pro-environmental attitudes after camp. Regardless, qualitative analysis did indicate that some campers strengthened their feelings towards the environment and understood new actions that they could undertake to help the environment. These qualitative results are consistent with other literature on the development of environmental concern and attitude through participating in environmental education programming (Turtle, Convery, Convery, & Huang, 2015). Interestingly though, while this result is positive there is no indication whether the

environmental-themed programming itself or simply the presence of outdoor time led to these gains (Collado et al., 2013).

When assessing these EL experiences, Rickinson et al.'s (2009) framework was used to conceptualize what types of experiences were occurring at *Sunship Earth*TM. Through applying this framework it was determined that the camp provided a number of positive experiences related to nature, the individual, and the interconnections between these two entities. While this is positive, this study found that the camp did not provide experiences that allowed campers to learn about society and the connections between societal factors (e.g. culture, norms) and the individual (see Chapter 3). As a result, it is recommended that practitioners adapt programming to include these factors in order to offer a richer EL experience for campers.

The second research question associated with this thesis attempted to explore what experiences were most meaningful for campers after *Sunship Earth*TM and how the program influenced campers' 2-3 months after its completion. Parent interviews indicated that campers returned home with a reinforced knowledge of the environment, connection to nature and, in some cases, adopted ERBs. The concept of reinforcement is particularly interesting as the presence of this theme may indicate that parents, as well as the tools used in this study, were subjected to the ceiling effect where change was difficult to attribute to the camp as their children were already knowledgeable and felt concerned about the natural world. While this may be true, it is important to note that reinforcement is not indicative of a negative learning experience for campers. For instance, many parents discussed how their camper returned from camp more willing to share the knowledge they had learned or further developed. Parent interviews also suggested that

*Sunship Earth*TM might have enhanced children's desire to learn about nature following the camp. While this could be attributed to an increase in curiosity resulting from increased outdoor time, as has been found elsewhere (e.g. Dresner & Gill, 1994), it could also be related to *Sunship Earth*TM's emphasis on transfer. For instance, the use of physical props, such as a necklace, and activities such as 'earth harmonies', which inspires campers to commit to environmental responsible behaviours, may help encourage children to continue their connection with the program and remind them about their learning experiences.

In terms of affective/behavioural domains, some parents believed that their campers returned with stronger feelings and an appreciation for the natural world. This was pre-dominantly described as a heightened interest about nature (e.g. asking questions about plants) or a desire to recreate camp experiences at home. This is consistent with other literature which has found that children participating in similar outdoor programming can enhance their concern about the environment (Cheng & Munroe, 2012), while Powers (2004) found that children attending a forest school often recreated activities or lessons from the program at home. While some parents reported that behaviours remained unchanged or, if changes occurred, that it was difficult to attribute to the camp, others suggested that their children adopted ERBs such as water conservation, and purchasing ethical clothing after *Sunship Earth*TM. Interestingly, counselors who modeled such behaviours were cited as a major influence in encouraging the adoption of ERBs. This is consistent with other work conducted on role models indicating that teachers and other adults can have a profound influence on children's desires to take interest in environmental issues and protect the planet later in life

(Emmons, 1997; Chawla, 2006). It is also consistent with learning theories such as SLT and Vygotsky's concept of proximal development, as campers seemed to have gained a heightened understanding (cognitive domain) and concern for the environment through observing counselors and participating in activities with their peers. Finally, there was an indication that *Sunship Earth*TM's emphasis on transfer also encouraged campers to extend their behaviours to their families and peers. While there was no explanation for which experiences at camp led to these behavioural changes, these results contribute to the view that children can have significant influences on their parents' environmental attitudes and behaviours (Uzzell, 1999; Ballantyne et al., 2001).

Both campers and parents also described negative learning experiences associated with *Sunship Earth*TM. Some of these include: (1) the presence of insects, (2) homesickness, (3) and participation in the research process. While homesickness has been discussed as having negative impacts on children's time at residential camp programs more generally (Thurber & Walton, 2007), insects have been shown to negatively effect children's experiences in the outdoors (Bixler et al., 1994). While little can be done to address these issues they are important to recognize as impactful on campers. In terms of the research process, results suggest that feelings of boredom were common among campers participating in the survey process. The presence of these results supports the need to continue producing innovative, learner-centered research methods that actively engage participants to ensure the research process is beneficial for all involved (Barratt Hacking, Barratt, & Scott, 2007).

A final significant result that is worth discussing is weather. Commonly, inclement weather is cited as a barrier to enjoyment of and learning in nature (e.g.

Be'Langer, et al., 2009; Ergler et al., 2013). While this is true, it was not found to be the case in this instance as campers enjoyed their experience and made no reference to inclement weather, which was prevalent during both weeks of sampling. This indicates that *Sunship Earth*TM may help alleviate these feelings among children by encouraging positive attitudes towards weather and promoting outdoor activities regardless of the conditions.

5.2 Limitations

Similar to all research, this study includes a number of limitations. First, due to time and resource limitations, this study focused on a small sample size. This limitation has implications in the context of advancing environmental education research, as Meyers (2006) has called for more generalizable, representative studies. Therefore, future studies with a more flexible timeline should focus on developing a larger sample size in order to shed light on the impacts *Sunship Earth*TM has on a broader population.

Second, the research timeline did not allow for the cognitive survey to be structured in an open-ended way. Future work should extend measures of knowledge to include concepts other than EC₁-DC₂-IC₂-A to reveal whether unanticipated knowledge experiences are contributing to participants' EL. The implication of this limitation is believed to be minimal as questions relating to learning about nature and knowledge (e.g. asking campers about their favourite learning experience) were also included in the affective/behavioural survey. Regardless, future research should address this concern. In addition, research limitations required the pre-camp surveys to be delivered at different times before the camp began. A lack of control in this delivery may have allowed for some campers to be exposed to certain experiences (e.g. family trip, summer school, etc.), which may have influenced their pre-test scores and responses.

In terms of interviews, some parents may have inflated responses to produce socially desirable responses and depict *Sunship Earth*TM as an overwhelmingly positive experience for their child during interviews. Three parents had also sent their other children to participate in *Sunship Earth*TM and thus may have a hard time distinguishing between the experiences of the child involved in this study. Moreover, a number of

parents had a difficult time answering questions relating to attitudes and behaviours and how the program aided or hindered these characteristics. Specifically, problems arose when trying to attribute change to camp because of:

1. Children's personalities: One father described how his son only focuses on day-to-day activities, so he had difficulty recalling memories or discussing what he enjoyed about the camp with his father.

2. Recalling memories: All parents during the interview process described difficulties in remembering specific conversations or events regarding their child's experience at *Sunship Earth*TM given that interviews took place 2-3 months after the program.

3. Pace of life: One mother described on several occasions how the summer months are very busy and made it difficult for her to reflect with her daughter on the *Sunship Earth*TM experience with their child and answer questions in detail.

A final limitation caused by finite time and resources dealt with learners' perspectives on their EL after the program. This was a limitation as interviews took place shortly after campers returned to school and were involved in other activities, making it difficult to interview the campers themselves. While parents were targeted for specific reasons (see Chapter 2 & 4), a lack of focus on learners may have limited our understanding of their perspectives on the impact that *Sunship Earth*TM has in the long-term.

5.3 Implications

The theoretical implications of this research are twofold. First, this study supports the notion that EL “does not take place in a vacuum” (Rickinson et al., 2009, p. 16) and varies between individuals, time, and space (Falk, 2005). That is, results suggest that campers participating in the study interpreted their learning differently and labeled different activities and lessons as meaningful. Thus, this research aligns with current theory and enhances the argument that EL needs to be viewed as a complex, individualized process in and of itself. Second, while developed as a heuristic tool, this study has shown that Rickinson et al.’s (2009) EL framework can be used as a tool to conceptualize the types of EL experiences that occur within environmental education programs. As a result, future studies could adopt a similar framework to identify where programming is lacking and provide the opportunity for comparisons among different programs to extend our knowledge of how environmental education currently fosters meaningful EL experiences.

When considering future policy and practice, this study has further implications. For instance, results support the view that summer camps are meaningful for youth and can contribute to their own and their families’ life-long EL. While these are significant benefits that have also been found elsewhere (Collado et al., 2013), more needs to be done to improve access to such programs. Therefore, it is recommended that government, non-government organizations, and others distribute greater amounts of funding to create similar programs to ensure that as many children as possible are being offered meaningful outdoor learning experiences. This funding is especially important in this context because results suggest that *Sunship Earth*TM may also have a cumulative effect

by facilitating the adoption of ERBs by family members who are influenced by their children returning from camp.

In addition, this research could be used to alter future evaluation practices by promoting the value of focusing on learners and their experiences, in place of pre-determined program outcomes. Specifically, it is suggested that focusing on learning experience can help identify “serendipitous and accidental” (Scott & Gough, 2003, p. 38) experiences that were unanticipated, but still provide meaningful influences on cognitive, affective, and/or behavioural EL domains. In other words, by ignoring learners, evaluators run the risk of missing results and are ultimately unable to explore how all aspects of a program can contribute to children’s learning experiences.

5.4 Significance

While the results of this study contribute to our knowledge of the importance of environmental education and outdoor time for childhood development, this research also contributes to under-represented concepts in the literature. For instance, as this study focuses primarily on learners and their experiences, this study has contributed to alleviating this gap within environmental education research. In addition, while nonformal environmental programs have been discussed extensively, summer camps do not seem to have been discussed in as many cases (some examples include Collado et al. (2013), Dresner & Gill (1994)), and thus this research provides a greater focus on this type of program. More specifically, this research adds to our understanding of *Sunship Earth*TM and builds on previous studies such as Keen (1991), van Wissen (1992) and Eagles & Demare (1999) by providing an updated and unique perspective on the importance of this program.

This project has also helped illustrate the value of addressing Stern et al.'s (2014) recommendation to include additional methods to the pre-/post-tests when assessing environmental education programming. Specifically, it was found that the use of parent interviews helped supplement survey data and provided a richer view of the kinds of experiences campers found most meaningful both directly and 2-3 months after the program.

From a more practical view, this research is significant, as it provides the AEC with an understanding of how certain aspects of their program can greatly contribute to children's EL experiences focused on in this study. In addition, this research highlighted null results (e.g. no statistically significant increases in attitude) and negative learning experiences (e.g. the presence of insects) that could help inform how programming can be adapted in future years to ensure that children gain as much as possible from the program.

5.5 Recommendations for Future Research

In the future, this research project could be developed further to incorporate other variables and strengthen its results. First, as mentioned in the previous section, efforts should be taken to ensure that the cognitive domain is assessed in an open ended way. That is, surveys or other tools should be structured to measure knowledge unrelated to EC₁-DC₂-IC₃-A and be more explicit in asking children about new knowledge they accumulated through participation. Future research should also attempt to recruit more children and parents to take part in this research. With a larger sample size, potentially taken over a few years of the camp's operations, more generalizable results could be achieved, satisfying Meyers (2006) recommendation. It would also be beneficial to avoid

using methods that do not actively engage participants. For instance, including campers and parents in the research method development process, and catering the study to their needs could help reduce feelings of boredom in relation to participation. On the topic of research methods, it is recommended that future research also include a participant observation component, as this method would be ideal in understanding what campers experience on a day-to-day basis at camp. Participant observation could also allow for a richer dataset and provide greater contextual information needed to analyze surveys and interviews. In addition, the inclusion of a control group of campers who attended a similar environmental education program, or do not attend any program, could allow for an exploration of the differences between those who participate in environmental education programs and those who do not. This comparison could also be extended to focus on groups of children who participate in outdoor environmental-based programming and those who participate in other types of outdoor programming. If this was included in the study design, it could help identify whether significant EL experiences were influenced by environmental education or exposure to the outdoors (e.g. Collado et al., 2013).

Finally, it is recommended that, if possible, efforts be taken to attract participants with low levels of environmental engagement before camp. This effort could help reduce the ceiling effect and acquire a more accurate depiction of how *Sunship Earth*TM contributes to children's EL experiences who are not knowledgeable or connected to the environment before camp. Although important, this could prove to be difficult as the twenty-three campers participating in this study all exhibited high levels of

environmental involvement perhaps suggesting that highly environmentally involved families are more likely to enroll their child than those with lower involvement.

5.6 Summary

While a large quantity of research has been completed to assess the outcomes of environmental education programs, little research has focused on learners who are directly involved in such programming. As a result, this study focused directly on learners to understand how *Sunship Earth*TM contributes to their EL experiences. Results both support and contradict other work and indicate that experiences at *Sunship Earth*TM may contribute to EL in three learning domains: cognitive, affective, and behavioural. Specifically, it was found that *Sunship Earth*TM might help reinforce campers' levels of environmental knowledge and positive feelings towards the natural world, while simultaneously encouraging the adoption ERBs on a personal and family level.

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Appendices

Appendix A: Pre-camp Survey

Name: _____

Demographics

Do you identify as a boy, as a girl, or something else?

- (a) boy
- (b) girl
- (c) other

What town or city do you currently live in? _____

When is your birthday (month, day, and year)? _____

If you had to choose one, what is your favourite colour: _____

If you had to choose one, what is your favourite animal: _____

Please circle the answer that applies to you:

Do you go camping with your family at least once a year? **Yes / No**

Do you go to summer camp during summer vacation? **Yes / No**

Do you watch films or TV programs about nature with your family? **Yes / No**

Do you spend time in class talking about nature with your teachers? **Yes / No**

Do you read books/magazines about nature? **Yes / No**

Do you ever talk about nature with your family? **Yes / No**

Questions

Please circle the letter (a, b, c, or d) that best answers each of the following questions:

1. What does sunlight do for plants?
 - (a) makes their leaves to turn yellow
 - (b) gives them the energy they need to grow
 - (c) helps them move their seeds from one place to another

2. Where do plants get their energy from AND what is the process called?
 - (a) the sun AND chemical process
 - (b) the moon AND plant energy conversion
 - (c) the sun AND photosynthesis
 - (d) animals AND photosynthesis

3. What type of living thing is able to return nutrients [parts of plants/animals used by other species for energy] to the ground from dead plants and animals?
 - (a) garbage-eaters
 - (b) decomposers
 - (c) plants
 - (d) birds

4. Humans breathe in _____ while plants breathe in _____.
 - (a) oxygen, carbon dioxide
 - (b) carbon dioxide, oxygen
 - (c) monoxide, oxygen
 - (d) polylyode, carbon dioxide

5. An example of an area that has a lot of diversity is:
 - (a) a desert with no plants or animals
 - (b) a forest with many different types of trees and plants
 - (c) a forest that has recently been burned down
 - (d) none of the above

6. It is easier to find food if you are an animal that eats many different types of food (e.g. nuts, berries, and meat) than it is if you are an animal that relies on one source for food (e.g. an animal that eats only nuts)
 - (a) True
 - (b) False

7. Which pair of animals needs similar types of food and shelter to survive?
 - (a) fish, grasshopper
 - (b) bear, frog
 - (c) salamander, bird
 - (d) none of the above, these animals all need different types of food and shelter

8. A community is a group of plants and animals all living in the same area.
 - (a) True
 - (b) False

9. Is it true that some animals help other living things by offering shelter, sharing water, spreading seeds, and other things?
 - (a) No. Animals don't help others, just their own species (e.g. a squirrel will only help another squirrel)
 - (b) Yes. Animals do help others, BUT they do it on purpose. So, both animals/plants know that they are helping one another
 - (c) Yes. Animals do help each other, BUT they do it on purpose AND sometimes they do it without knowing

10. In their habitat, foxes have to compete with _____ when hunting mice
- (a) other foxes also hunting mice
 - (b) other animals (i.e. hawks) that are also hunting mice
 - (c) both a. and b.
11. The surface of the Earth (e.g. oceans, mountains, fields, lakes, rivers) has always looked the same and it will never change.
- (a) True
 - (b) False
12. Making soil is a long process and it requires changing one thing into something else. What things do you need to make soil?
- (a) worms, bugs, decomposers
 - (b) erosion (the breaking down of rocks, old soil, cliffs, etc.)
 - (c) old soil
 - (d) all of the above
 - (e) none of the above, soil never changes it is already all over the Earth
13. Over time, what do most plants/animals do to make sure their habitat works best for them?
- (a) The animal or plant changes the habitat to live there
 - (b) The animal or plant changes itself to live there
 - (c) They ask other animal's what it's like to live there
14. What does a rabbit need to do to survive?
- (a) eat plants in open fields near predators
 - (b) find their food when there is a low amount of light (e.g. early in the morning or late at night)
 - (c) use its large ears to constantly listen for predators
 - (d) all the above

THANK YOU – TIME FOR A BREAK!

Remember to write a paragraph for each question. Also, for some of the questions you will get to draw your responses! If you do, remember to write a sentence or two about what your drawing is! Remember to write “why” for questions that ask you too!

Questions

Write a paragraph about what you are most excited about doing this summer.

Write a paragraph to answer to the following: Where is your favourite place to play where you live (e.g. in your neighbourhood or at home)? Why?

Write a paragraph to answer the following: Where is your favourite place to learn at school? Why?

Circle one answer: How important is it for you to help nature:

- (a) the most important thing in my life,
- (b) very important
- (c) kind of important
- (d) not very important
- (e) totally not important.

In **drawing:** What is one thing you could do to help nature?. How does your idea help nature? Remember to write a caption!

Draw about how you feel when adults (e.g. your parents, teachers) teach you about nature. Remember to write a caption!

Draw your answer to the following: What emotions do you feel when you are outside at home? Why do you think you feel this way? Remember to write a caption!

THANK YOU!

Appendix B: Post-camp Survey

Name: _____

Please circle the letter (a, b, c, or d) that best answers each of the following questions:

- Hummingbirds have long beaks so they are able to reach deep into flowers for food. This is an example of _____?
 - energy loss
 - a physical adaptation
 - camouflage
 - a behaviour change
- Why do hawks need to eat many mice, and not just one?
 - because mice have bones
 - because mice are easy to hunt
 - because the hawk has nothing better to do with its day
 - because not all of the mice's energy can be used by the hawk, so it needs to eat many of them to survive
- If in the spring no grass grew in Nova Scotia, grasshoppers would have nothing to eat and die, which would mean that there wouldn't be enough food for a robin to survive, etc. This example shows that:
 - animals and plants are not connected to one another, if one species dies it does not effect other species.
 - grasshoppers are weak
 - animals and plants are connected to one another, if one species dies it does effect other species.
 - animals should live in habitats where there is grass
- What would happen if ALL plants were destroyed on the entire Earth?
 - the planet would go dark
 - the air would have more oxygen for animals to survive
 - the air would have less oxygen for animals to survive
 - both a. and b.
- An example of a process that changes the Earth's surface is:
 - water dripping down in a cave and dissolving rock
 - lightning striking the ground
 - an earthquake
 - all the above
- A forest would have a high diversity if...
 - many different species of trees lived there
 - many different species of plants lived there

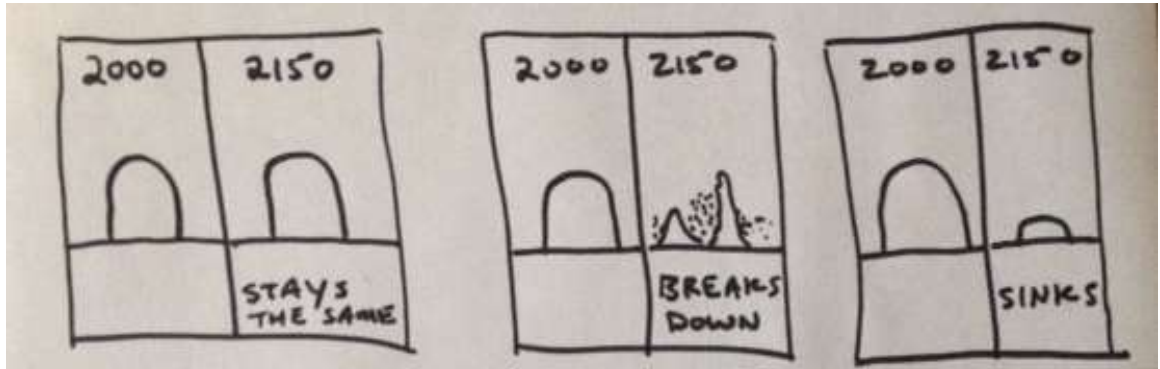
- c. the forest would be less likely to be completely destroyed by disease
 - d. all the above
7. Imagine that the whole Earth turned into one large field. Why it would be impossible for all animals to survive? Remember choose the letter that best answers the question.
 - a. because not animals can survive in the same place. They need different food, water, air, etc.
 - b. because there would be no space for animals to hide and move around
 - c. because humans could hunt them more easily
 8. How is it possible that one small section of soil is able to grow different plants year after year?
 - a. the soil's nutrients are recycled by bacteria, earthworms, and others
 - b. the soil is very deep
 - c. plants would grow without it, the soil just happens to be there
 9. Sometimes different plants and animals share and compete over the same food, shelter, and water. This collection of living things is called _____.
 - a. job sharing
 - b. a habitat
 - c. a species
 - d. a community
 10. Imagine that Nova Scotia has two types of rabbits. One type can swim, while the other type can't swim. Imagine a huge rainstorm that flooded Nova Scotia, and the rabbits that can't swim moved to New Brunswick, but the rabbits that can swim survived. After a week, the flooding went away. What would happen to coyotes that ate both types of rabbits?
 - a. The coyotes would have no food
 - b. The coyotes would have less food, but still have some food.
 - c. Humans could more easily hunt coyotes



11. What makes it difficult for squirrels to collect nuts during the year?
 - a. competing with other squirrels that also need food
 - b. competing with other animals that also eat nuts
 - c. that there are only so many nuts in particular area and once they are eaten, it takes time for them to grow again.

d. all the above

12. What might happen to a large boulder by the ocean over time if it was left there?
- Nothing. Rocks are hard so it will stay the same forever
 - It will slowly break apart and turn into sand
 - The rock will not change at all, but it will sink into the ground after many years



13. What would a white rabbit most likely do to survive if it moved into a forest where it could easily be seen?
- change which animals it goes close too
 - change its fur colour
 - change a part of the forest to make itself less visible
14. What happens to the energy inside of a plant when an animal eats it?
- The animal gets ALL of the energy from the plant
 - The animal gets SOME of the energy
 - The animal gets NONE of the energy

Remember to write a paragraph for each question. Also, for some of the questions you will get to draw your responses! If you do, remember to write a sentence or two about what your drawing is! Remember to write “why” for questions that ask you too!

Write about the most exciting thing you did at Sunship Earth™.

Write your answer to the following: Where is your favourite place to learn at Sunship Earth™? Why?

Write a paragraph about your favourite thing your counselors at Sunship Earth™ taught you about nature?

Draw and write a caption about what you are going to do to help nature. Why did you choose this?

Draw about how you feel when your camp leaders and counselors are teaching you about nature. Remember to include a **caption!**

Draw your answer to the following: What emotions do you feel when you are outside at Sunship Earth™? Why do you think you feel this way? Remember to include a **caption!**

Circle one answer. How important is it that you help nature. Please circle one.

- (a) totally not important
- (b) not very important
- (c) kind of important
- (d) very important
- (e) the most important thing in my life

THANK YOU!

Appendix C: Parent Interview Questions

Into the Wild: An Examination of Environmental Learning at the Halifax Regional Municipality Adventure Earth Centre

INTERVIEW QUESTIONS

Parent Name: _____

Child Name: _____

Location of Interview: _____

Date/Time: _____ am / pm

Note: These topics are meant to act as guidelines, instead of closed-ended questions, during the interview process. This semi-structured environment will allow the participant to respond in an open-ended way to ensure that both their own and their child's experiences are appropriately represented.

Script: Thank you once again for participating in this study. These interviews are important for this study, as they will provide a unique insight into how your child has retained specific benefits from participating in the Sunship Earth™ program. Additionally, with this data we can continue to learn more about what is effective and more likely to be retained by campers, providing new opportunities to evaluate and improve the educational impact of this camp.

Please do not feel pressured to answer any of the following questions. If at any point you become uncomfortable or wish to stop the interview please let me know, as there will be no consequences as a result.

If you would like a question repeated or asked in a different way to better understand please feel free to let me know. Additionally, if you have any other relevant experiences you would like to share with the interviewer that may not be directly connect to the question being asked, please do not hesitate to discuss it.

Finally, as you have agreed to upon signing the consent form, this interview will be audio recorded for data analysis purposes. If you have changed your mind and are not comfortable with this interview being audio recorded please let me know immediately.

Topic 1: Parent/guardian perspectives on Sunship Earth™ :

- a. How did you first hear about the Sunship Earth™ program offered through the Adventure Earth Centre?
- b. What made you want to enroll your child in this program?
- c. What, if any, do you think the benefits of the program are for its participants?

Topic 2: Child's general perspectives on Sunship Earth™ :

- a. In your opinion, to what extent did your child enjoy camp?
- b. What positive things, if any, about camp did your child share with you? (Prompt: For example, how they felt about food, accommodations, bathrooms, games, leaders, etc.)
- c. And what about negative reviews, if any? (Prompt: For example, how they felt about food, accommodations, bathrooms, games, leaders, etc.)

Topic 3: Child's knowledge after Sunship Earth™ :

- a. In your opinion, was your child knowledgeable about the environment or environmental issues before participating in Sunship Earth™? What areas (e.g. ecology, animals/plant ID, recycling, energy, etc.) topics do you think they were most knowledgeable about?
- b. Has your child shared with you/other family members any interesting facts or knowledge that they have learned at Sunship? If so, what have they discussed?
- c. Had your child ever discussed these topics at home before?
- d. Are there any topics they discuss that are specific to ECDCICA (Energy Flow, Cycles, Diversity, Community, Interrelationships, Change, Adaptation)?

Topic 4: Child's feelings/emotions/behaviours after Sunship Earth™ :

- a. To what extent (if any) has your child changed their behaviours since finishing Sunship (Prompt only if needed: e.g. recycled more, used less water, not waste food, etc.)? Is there an example(s) of a specific time when you noticed this change?
- b. To what extent (if any) has your child discussed with you any changes that they would like to make, but are unsure how to do so? (Prompt: e.g. wants to use less water but not sure how?)
- c. To what extent (if any), has your child tried to influence your/your family's behaviours since returning from camp (Prompt only if needed: e.g. encouraging you to buy local food)? Is this ongoing?
- d. To what extent (if any) do you think your child changed their willingness/desire to go outdoors after camp? Is this ongoing?
- e. Have you noticed changes to your child's understanding of environmental issues since Sunship? Please describe.
- f. Have you noticed changes to your children's interest or appreciation for nature since Sunship? Please describe.

Topic 5: Environmental Involvement

- a. Is your/your spouses career in an environmentally-related field?
- b. Do you, your spouse or anyone living in your home volunteer for an environmental organization?

- c. To what extent would you say your family follows the garbage recycling/composting regulation system at home?
- d. To what extent do you spend time outdoors as a family during a regular weekday? Weekend? What activities in general and for approximately how long?
- e. How often do you watch TV shows/movies/read books with your children about the environment? What are some examples of shows/books you've watched/read?
- f. Do you ever talk about the environment/environmental issues at home? If yes, what types of issues? How often are these topics discussed? In what forum (i.e. dining room table, in passing, during family activities, etc.)
- g. Has any of these habits or behaviours changed since your child completed Sunship Earth™?

Topic 6: Additional Comments

- a. Is there anything else you would like to add regarding your child's experience with Sunship Earth™?

Appendix D: Research Ethics Approval

Social Sciences & Humanities Research Ethics Board

Letter of Approval

April 15, 2015

Mr. Adam Cheeseman

Management\Resource & Environmental Studies

Dear Adam,

REB #: 2015-3514

Project Title: Into the Wild : An Examination of Environmental Learning at the Halifax Regional Adventure Earth Centre Sunship Earth™ Camp

Effective Date: April 15, 2015 **Expiry Date:** April 15, 2016

The Social Sciences & Humanities Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on *Ethical Conduct for Research Involving Humans*. This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,

Dr. Valerie Trifts, Chair

Post REB Approval: On-going Responsibilities of Researchers

After receiving ethical approval for the conduct of research involving humans, there are several ongoing responsibilities that researchers must meet to remain in compliance with University and Tri-Council policies.

1. Additional Research Ethics approval

Prior to conducting any research, researchers must ensure that all required research ethics approvals are secured (in addition to this one). This includes, but is not limited to, securing appropriate research ethics approvals from: other institutions with whom the PI is affiliated; the research institutions of research team members; the institution at which participants may be recruited or from which data may be collected; organizations or groups (e.g. school boards, Aboriginal communities, correctional services, long-term care facilities, service agencies and community groups) and from any other responsible review body or bodies at the research site

2. Reporting adverse events

Any significant adverse events experienced by research participants must be reported **in writing** to Research Ethics **within 24 hours** of their occurrence. Examples of what might be considered “significant” include: an emotional breakdown of a participant during an interview, a negative physical reaction by a participant (e.g. fainting, nausea, unexpected

pain, allergic reaction), report by a participant of some sort of negative repercussion from their participation (e.g. reaction of spouse or employer) or complaint by a participant with respect to their participation. The above list is indicative but not all-inclusive. The written report must include details of the adverse event and actions taken by the researcher in response to the incident.

3. Seeking approval for protocol / consent form changes

Prior to implementing any changes to your research plan, whether to the protocol or consent form, researchers must submit them to the Research Ethics Board for review and approval. This is done by completing a Request for Ethics Approval of Amendment to an Approved Project form (available on the website) and submitting three copies of the form and any documents related to the change. Please note that no reviews are conducted in August.

4. Submitting annual reports

Ethics approvals are valid for up to 12 months. Prior to the end of the project's approval deadline, the researcher must complete an Annual Report (available on the website) and return it to Research Ethics for review and approval before the approval end date in order to prevent a lapse of ethics approval for the research. Researchers should note that no research involving humans may be conducted in the absence of a valid ethical approval and that allowing REB approval to lapse is a violation of University policy, inconsistent with the TCPS (article 6.14) and may result in suspension of research and research funding, as required by the funding agency.

5. Submitting final reports

When the researcher is confident that no further data collection or analysis will be required, a Final Report (available on the website) must be submitted to Research Ethics. This often happens at the time when a manuscript is submitted for publication or a thesis is submitted for defence. After review and approval of the Final Report, the Research Ethics file will be closed.

6. Retaining records in a secure manner Researchers must ensure that both during and after the research project, data is securely retained and/or disposed of in such a manner as to comply with confidentiality provisions specified in the protocol and consent forms. This may involve destruction of the data, or continued arrangements for secure storage. Casual storage of old data is not acceptable.

It is the Principal Investigator's responsibility to keep a copy of the REB approval letters. This can be important to demonstrate that research was undertaken with Board approval, which can be a requirement to publish (and is required by the Faculty of Graduate Studies if you are using this research for your thesis).

Please note that the University will securely store your REB project file for 5 years after the study closure date at which point the file records may be permanently destroyed.

7. Current contact information and university affiliation The Principal Investigator must inform the Research Ethics office of any changes to contact information for the PI (and supervisor, if appropriate), especially the electronic mail address, for the duration of the

REB approval. The PI must inform Research Ethics if there is a termination or interruption of his or her affiliation with Dalhousie University.

8. Legal Counsel The Principal Investigator agrees to comply with all legislative and regulatory requirements that apply to the project. The Principal Investigator agrees to notify the University Legal Counsel office in the event that he or she receives a notice of non-compliance, complaint or other proceeding relating to such requirements.

9. Supervision of students Faculty must ensure that students conducting research under their supervision are aware of their responsibilities as described above, and have adequate support to conduct their research in a safe and ethical manner.

Appendix E: Research Summary

Hello,

My name is Adam Cheeseman, and I am currently a student in the School of Resource and Environmental Studies at Dalhousie University pursuing a Master's degree in Environmental Studies. My passion and research interests are in environmental education and encouraging people (both adults and children) to spend time outdoors and create a life-long connection with nature. Acting on this passion, I have pursued jobs at numerous summer camps where I have had the opportunity to develop nature/environmental programming for youth across the country. As a result of this interest and practical experience with camps, I came to Dalhousie University in hopes of developing a research project that could allow us to better understand the benefits of these environmental camp programs. After consulting with the Adventure Earth Centre, the following research project has been created, and we hope that you are interested in taking part!

This study aims to understand the types of environmental learning outcomes and experiences that result from participation in the over-night Sunship Earth™ camp program. Here, environmental learning is simply defined as learning that occurs from engaging with the environment and environmental issues. By completing this study, we hope to identify where changes can be made to ensure that Sunship Earth™ provides positive and impactful learning opportunities for as many youth as possible. Additionally, a secondary goal of the study is to provide unique insight into how youth learn about the environment at summer camps, a research topic that needs to be addressed in environmental education research.

If your child agrees to participate in the study, they will be asked to fill out four surveys (two directly before camp begins, and two directly after camp ends) that will measure their knowledge and emotions/feelings about the environment. These surveys will be administered at Sunship Earth™, with each survey taking no more than 30 minutes to complete. There is also an opportunity for you, as your child's parent/guardian, to get involved in this study. If you agree to participate, you will be contacted between three (3) to six (6) weeks after Sunship Earth™ for an in-person or telephone interview that will last ~45 min. These interviews will be held at a location that is most convenient to you.

Throughout the entire research process your child's name and any other information pertaining to their identity will be kept both anonymous and confidential. Please find attached consent form and contact the lead researcher should you have any questions. After signing the consent form you do have the opportunity to remove yourself and your child from the study with no consequences. In addition, if your child becomes uncomfortable during the survey process they are encouraged to tell the lead researcher and they will be removed from the research setting. Please see the attached consent form for more details on the ethical considerations associated with this study. I will also be attending the Sunship information meeting held later this month to provide more information about this study.

Thank you for your interest,
Adam Cheeseman

Appendix F: Photos of Study Site



Bottom Left: Entrance to Camp Mockingee
Top Left: View of Lake Mockingee from forest
Top: Trail leading towards Lake Mockingee