Rethinking Schools: school design and students’ relationships with the natural world

by

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ABSTRACT

This thesis asks how are intermediate students’ relationships with the natural world mediated by the design of their school building? This question is explored by looking at students’ responses to two design features of their school building: the relationship of the school building to the school site and indoor/outdoor interfaces. In addition, students’ ideas about hypothetical school buildings that foster a relationship with nature were also investigated. The fieldwork for this project was conducted in the spring of 2009 at Bowen Island Community School, which is part of the West Vancouver School District, and located on Bowen Island, B.C. Data was collected from two focus groups using arts based inquiry as well as five semi-structured interviews, photographs and fieldnotes. Using thematic analysis, the research found that nearby nature and the presence of indoor/outdoor interfaces provided students with a sense of freedom, joy, social cohesiveness and aesthetic pleasure. In addition participants had valuable design ideas for creating a strong connection between students and the natural world at school. Results are discussed in terms of future school design and student impact.
PREFACE

I am wholly responsible for both the research and the writing of this thesis.

Currently there are no publications arising from this work. This research project, “Rethinking School Design”, was approved by the UBC Behavioural Research Ethics Board (BREB), the certificate number being H09-01000.
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1.0 INTRODUCTION

“School architecture needs to be radically re-thought...We need to design buildings and landscapes that resonate with our biological and aesthetic sensibilities, because the ways students experience schools will forever shape their paths on this precious and fragile planet.”

~Rena Upitis, “Tackling the Crime of School Design”

1.1 RE-ENGAGING WITH NATURE

Environmental issues are at the forefront of popular media: by the end of a typical day we will have destroyed close to 60 000 hectares of tropical rainforests (United Nations, 2003), we will have eliminated as many as 140 species of living beings (Ryan, 1992), and over 27 000 children will die from hunger due to environmental degradation (Bell & Renner, 2001). Clearly we are at a critical moment in our interaction with the planet and its natural environment.

In The Geography of Childhood, biologist Gary Nabhan claims that experiencing the natural world is the best way we can be in touch with ourselves (1994). Edward Wilson in The Biophilia Hypothesis echoes this sentiment by stating that, “the more we know of other forms of life, the more we enjoy and respect ourselves” (1993). Although experiencing the natural world is important, many people have argued that the modern world’s diverse and satisfying connections with nature have substantially diminished (Leopold, 1970; Muir, 1976; Mumford, 1970; Nabhan and Trimble, 1994; Thomashow, 1995).
David Suzuki, an environmentalist, reminds us that we are nature. However, “increasingly, nature is imagined ‘out there’... and usually it entails getting into a car to get there” (Suzuki, 2007). Children spend less unsupervised time outdoors than did their previous generation (Hern, 2007; Suzuki, 2007; Louv, 2008; Malone, 2003), often know a hundred more corporate logos than they do native plants or animals from their backyard, and spend more time in a digital/textual world than they do outside. It is not surprising that “the current generation of children is some of the most disconnected from nature ever in our history” (Suzuki, 2007). However, nurturing a connection to nature in young people is possible and has the ability to foster creativity (Moore, 1997), concentration (Taylor & Kuo, 1998, quoted in Louv, 2008, 89), a feeling of timelessness (White and Stoecklin, 1998), and improved cognitive ability (Wells, 2000).

Stewardship of our natural and built environments is essential. In Building for Life Kellert emphasizes that people without a strong connection with nature rarely “make good stewards or commit the necessary resources or energies needed to sustain their natural or built environments over the long term” (2005, 96).

Kellert further claims that:

One major cause of alienation from nature has been how we design and develop our built environment. We have constructed our modern buildings, communities, and cities by excessively consuming natural resources, significantly transforming natural landscapes, producing enormous quantities of waste and pollutants, and disconnecting people from positive contact with nature. The human built environment today consumes 40 percent of the world’s energy resources, 25 percent of its
freshwater resources, and 30 percent of its natural resources. Buildings further generate an estimated 20 percent of freshwater effluents, 25 percent of solid wastes, 40 percent of air emissions, 60 percent of ozone-depleting emissions, and 30 percent of greenhouse gas emissions. (2005, 90-91)

We need to begin to engage in positive relationships with nature. In order to do this we must study the existing built environment and seriously consider how we continue to alienate ourselves from nature by building in ways that negatively affect the natural world.

1.2 ENGAGING CHILDREN WITH NATURE

Children’s connection to nature is especially important, as childhood is the point at which humans develop lifelong habits.

Schools are formative institutions: children spend significant amounts of time in school buildings and often schools function as the heart of a community. School buildings, then, have the potential to be influential markers of what a community finds to be most important as well as have significant impact on how we teach and learn.

1.2.1 SCHOOL AND SCHOOL BUILDINGS

We learn about learning at school. We also learn in and from school buildings. American environmentalist David Orr notes that, “the curriculum embedded in any building instructs as fully and as powerfully as any course taught in it” (1999, 212). The built environment affects how we move through space, how we gather with
peers, and how we feel in a space. School buildings have the potential to move beyond supporting our daily needs; they can enhance educational pedagogy in critical ways. In addition, school buildings have the ability to support and foster occupants’ imaginations as well as occupants’ connection to themselves, peers, to the larger community, and to the immediate natural environment (Upitis, 2007; Alexander, 1977). Therefore, school buildings can inform our connection with the natural world.

Although there are exceptions, generally, school buildings have a standardized structure and aesthetic and are immediately recognizable as “schools”. In fact, many schools in North America look like factories or prisons (Thomas, 2006; Taylor, 1995). Every year North America spends billions of dollars building these “prison” schools. In fact, during 2008, the United States spent $19.5 billion on school construction projects (Abramson, 2009). To support this claim, in a small study at a local high school (Heritage Woods Secondary School, Port Moody) that was built in 2004, many students spoke about the school looking and feeling like a prison (Dutt, 2007). School design is subject to so many government regulations that concerns such as safety pervade rather than pedagogic styles or pedagogic sense (Symes & Preston, 1997). There is an untapped potential in school design to help reconnect adults and children to nature. The potential exists to reinvigorate education by understanding how architecture can be used to enhance learning and teaching. Designing schools in ways to create and foster positive connections between people and their natural environment is a step towards reconnecting young children in
safety will be in danger. We must be more far seeing in our understanding of safety. Safety is critical at schools, however, children’s connection to the natural world should be equally considered.

1.2.2 ENVIRONMENTAL AND PLACE-BASED EDUCATION

Although many schools do not foreground children’s connection to nature, there are, of course, schools that do. These exceptionally built schools, often also have an environmentally focused curriculum (Adam Joesph Lewis Center, IslandWood, Walker Elementary School). Relative to these schools teachers at conventional schools with traditional curriculum must work harder to foster connection of their students to the natural world.

There are two approaches to education that take children’s connection to the natural world into account:

1. Environmental education refers to “organized efforts to teach about how natural environments function and how human beings can manage their behaviour and ecosystems in order to live sustainably” (Environmental Education, 2010) and can be integrated into school curriculum. In fact there is a local document that “assists British Columbia teachers of all subjects and grades to integrate environmental concepts into teaching and learning” (Zandvliet & Kool, 2007). Although there are some facilities that specialize in
environmental education that have been designed especially to foster peoples relationship to nature there is a lack of research that explores how the design of these facilities connect their occupants with the natural world.

2. Place-based education (Gruenewald, 2003) is an example of a type of curriculum designed to pedagogically address students’ experience and relationship with their immediate environments. However, in many schools that promote place-based education children will often go outside of the school building in order to learn about place. The literature of place-based education rarely mentions how school buildings or school spaces can support teaching students’ about place. More studies of how school buildings inform and can support children’s connection to nature would be beneficial for the advancement of place-based education.

One aspect of design that can influence a sense of place and our relationship to the natural world is “indoor-outdoor relationships” (Taylor, Aldrich & Vlastos, 1988), which is an area of school design that is sometimes overlooked or minimized by school designers and educators (Taylor, Aldrich & Vlastos, 1988). Specific design features that create indoor-outdoor relationships include transition zones between classrooms and playground areas such as porches or features that provide connection to the outdoors such as windows or interior living walls. These aspects in schools are understudied. In fact there is no empirical research that shows how
indoor/outdoor relationships in school buildings affect students’ connection to nature.

1.2.3 SCHOOL DESIGN AND EDUCATION

Studies regarding school architecture have focused mainly on academic performance. Some have investigated how environmental design or elements of environmental design affect academic performance (Edwards, 2006). There have been many studies that determine the relationship between daylighting (Wu & Ng, 2003; Plympton, Conway, & Epstein, 2000; Heschong, Wright & Okura, 2002; Heschong, 1999), and indoor air quality (Heath & Mendell, 2002) and academic performance.

There are only a small number of studies of school design from an educator’s perspective that focus on school occupants. One such study is currently in progress. Rena Upitis, a professor at Queens’ University, is currently studying how school architecture shapes learning, both direct and indirectly, in six Canadian and two European schools. Upitis plans to use complexity theory and adapt Tanner’s Design Scale to include all of Chris Alexander’s patterns that relate to complexity in order to examine the architecture of eight schools. Upitis’s goal is to investigate from students’, teachers’, and parents’ perspectives how and what is learnt from school design.
It is critical to understand from students’ perspectives how school architecture influences their ideas about the world they live in, especially their ideas about the natural world. Given that this field is in its early stages it is not surprising that there has been only limited consideration of intermediate students’ perspectives. This study proposes to contribute this perspective to the field of architecture and education.

1.3 RESEARCH OBJECTIVES

The site for this study was Bowen Island Community School, a public elementary (K-7) school that has 267 students. Bowen Island Community School (BICS) has been recognized for their outstanding environmental and ecological stewardship initiatives. Throughout this study the researcher assumed that the Bowen Island Community School is distinctive and that the students’ experiences of both the natural world and their school building may be unique. This study bridges school design, education and ecosophy\textsuperscript{1}/deep ecology\textsuperscript{2} by asking the research question:

**How are intermediate students’ relationships with the natural world mediated by the design of their school building?**

The research had three principle objectives:

- To explore which parts of BICS school mediated intermediate students’ experiences of the natural world
- To ask how intermediate students’ experience their school building, especially the elements of BICS that mediate their relationship with the natural world

\textsuperscript{1} Arne Naess, in 1972, defined the term ecosophy as a philosophy of ecological harmony or equilibrium

\textsuperscript{2} deep ecology considers humankind an integral part of its environment
To ask BICS students to imagine, draw and discuss how they would design a school building that would foster an ideal relationship with the natural world in its occupants.

The work is intended for a broad audience engaged with designing schools, the discourse of school design and for those who occupy schools every day. It is hoped that this study will allow educators, architects, school board administrators and the general public to envision how building design might be adjusted to enhance students’ relationship with the natural world. School architecture might be more widely appreciated and connections to the outdoors may be embedded in future school design to facilitate stewardship.

1.4 SITUATING THE RESEARCHER

The researcher has had a long-standing interest in environmental issues as they relate to education both in and out of the classroom. Her decision to ask intermediate students about their relationships with the natural world in relation to the design of their school building was inspired by her work as both an environmental educator and a public school teacher.

During the time she spent as an environmental educator the researcher worked in a variety of settings that had a special focus on relationships to nature, and often the learning occurred in buildings and on properties that had been built specifically with nature in mind. Examples included living machines that purify wastewater, reused and local building materials, low energy and water consumption, composting toilets, and sustainable site development. The environmental curriculum of these
programs took the time to introduce these building features while addressing practices such as composting, garbage audits, and resource consumption. The environments, in which students were learning, reinforced the environmentally focused curriculum by their very design.

Form shapes content (Freire, 1999). Spaces where learning takes place shapes the learning that happens within those spaces. The researcher is interested specifically in school buildings and how the indoor classroom can support students’ connection with nature. Students are influenced by the environment in which they learn, whether that environment is a natural setting, architectural space, or some combination of both. There is an opportunity for students to learn from school buildings that respect nature, but this opportunity is not commonly realized. Instead, it is more common for school buildings to separate their occupants from the natural world. Given the amount of time students spend in school buildings this separation is significant.

With the rising concern for environmental decline, and research showing that children have less access to wild spaces (Nabhan, 1994) and spend less time in nature (Louv, 2008) it makes sense to investigate how school design contributes to these concerns. What are students learning from their current school buildings? If it is true that people are affected by their learning environments (Taylor, 1993; Orr, 2005) and the kinds of buildings they occupy (Orr, 1999), then how could school buildings be enhanced to connect their occupants to the natural world?
The researcher hopes the information gathered through an exploration of educational space will fuel active discussions about the effects of school design on their occupants and the opportunities schools have to encourage a deep connection to the natural world.

1.5 THEESIS STRUCTURE

The Literature Review contextualizes the research question within two disciplines, education and architecture, and specifically focuses on children’s relationship to nature as well as architecture and school design. The third chapter provides the reader with relevant context for the site of this research project, Bowen Island Community School (BICS). A tour of the physical space, the people who inhabit and shape this space, and information about the BICS curriculum are provided. Chapter 4 outlines the basis on which the researcher makes claims to knowledge as well as the methodology and methods for this project. Chapter 5 is a descriptive summary and discussion of the pictures students drew of an imagined school building that would foster their relationship with nature and students’ ideas about their current school building. Chapter 6 explores the results and discussion of the thematic analysis. In this chapter four major themes: sense of freedom, moments of joy, social cohesiveness and aesthetic response are discussed in relation to two design elements of BICS, first the relationship between the school building and the school property and second, indoor/outdoor interfaces. The final chapter summarizes the findings, and outlines the recommendations emergent from these findings. Photographs and maps of Bowen Island Community School are included to give the
reader a sense of the school building and school site. Images do not include people due to ethics requirements; as such they are rather hollow representations of active spaces. Study participants are referred to as Student 1-5. It is the researcher’s hope that this thesis will be of interest to readers who are active in the design of schools (educators, architects, and school board administrators) and to the general public interested in envisioning how building design might be adjusted to enhance intermediate students’ relationship to the natural world.
2.0 LITERATURE REVIEW

In order to situate this study and understand the strengths and limitations of the available literature pertaining to it, this literature review explores pertinent readings on the topics of children’s relationship to nature and the relationship of pedagogy to school architecture and design. The theorists in these two fields have contributed to the researcher’s theoretical framework for this study.

2.1 COMPLEXITY OF ‘NATURE’

‘Nature’, in particular is a very problematic concept (Soper 1995). Sometimes it refers to a metaphysical idea of “Nature”, often taken to be a consciously knowing agent – the ‘mind of nature’. At other times it refers to the physical world that is the ‘object’ of scientific study and material exploitation. Sometimes it is taken to be only that aspect of non-nature that has not been contaminated by ‘man’ – nature as wilderness. At other times it is taken to be the whole planetary ecosystem which includes human beings. (Mellor, 1997, 8)

Nature and addressing the natural world is problematic in multiple ways. Not only is the word nature used to mean various things within one culture but also different cultures have dissimilar and sometimes opposing concepts of nature.

Nature is used regularly and elusive in colloquial conversations. Nature is used to mean essential qualities by which something is recognized, a casual agent creating and controlling things in the universe, the natural physical world including plants and animals and landscapes, the complex emotional and intellectual attributes that determine a person’s characteristic actions and reactions, a particular type of thing,
the external world in its entirety, and humankind’s original or natural condition (Merriam-Webster and Google online). The word nature carries a complex symbolic load and is represented in various and contradictory ways.

In *The Value of Life* Kellert (1996) contrasts the Western view and Eastern view of nature. Kellert states that,

> From the Western view, nature is inanimate clay awaiting a higher transformation based on empirical knowledge and the application of technology. The natural world exists to serve human purposes, and the worth of nonhuman life is measured by its practical value. Increasing material affluence and technical control over nature seemed to corroborate the Western assumption of progress contingent on humans transforming and dominating the natural world. (Kellert, 1996, 133)

He also states that,

> The Eastern view is said to regard all living creatures as permeated with a similar life force, a fundamental kinship connecting all life in endless cycles of transformation and relationship. All creatures share a fundamentally similar experience, each striving after peace, harmony, and grace. All life, humans included, is thought to cohabit an analogous field of consciousness. People must respect and revere all living creatures, exercising kindness, practicing compassion, and avoiding harm to nonhuman life. Coexistence, rather than conquest, emerges as the hallmark of Eastern thought. (Kellert, 1996, 134)

Although it is not this simple, the dichotomy between the western and eastern views of the relationship between humans and nature reveals how ideas about what nature is and our relationship toward nature, is culturally embedded and further complicates both the meaning and the imagined meaning of nature.

In the course of this project it became apparent that nature and the natural world is perceived in particular and multiple ways. The Bowen Island Community School is a
school in the Western world, in a semi-rural community on an island with municipal parkland adjacent to the school grounds. BICS has the explicit goal to improve the environmental social responsibility of the entire school community in the school that is explained in detail in the school’s Action Plan for Student Learning (2009). The school works as a whole to promote conservation and stewardship through individual class “mission possible” tasks and school wide assemblies. Hence it is likely that imaginings of nature and the natural world emerge through shared meaning. As Stuart Hall states: “meaning does not inhere in things, in the world. It is constructed, produced. It is the result of a signifying practice - a practice that produces meaning, that makes things mean” (Hall, 1997, italics in the original, p24).

The meaning of nature is constructed, and the socially constructed meanings become so normative that they are assumed to be natural and inevitable (Hall, 1997) restricting the imagination to the limits of what already exists. The BICS curriculum, as well as teachers’ and students’ perception and construction of nature and the natural world are rich and change with new additions to the school community. Part of the work of this thesis is to engage with nature and the natural world as constructions that need to be deconstructed and reconstructed.

Schools teach cultural values to children. Within a set of cultural values are values about nature, and thus schools teach students about nature. They inherently embody a concept of what nature is as well as often impart acceptable attitudes toward and ways to engage with nature. Therefore, in addition to the built environment influencing students’ relationship to nature, teachers and school
curriculum do as well. With this awareness, before talking about these concepts or having students draw pictures of where they felt connected to the natural world or schools that they imagined would foster a connection to nature, the researcher asked students to define what they understood nature and the natural world to be. For each student interviewed the researcher asked further questions using their definition of nature and the natural world. This was done in the hope to discover the students’ working definitions and understandings. While some researchers define nature and the natural world in relation to their projects this researcher has chosen not to. In order to honour the students varying definitions, the researcher did not want to limit nature either to include or not include all of humankind’s creations and activities.

2.2 CHILDREN’S RELATIONSHIP TO NATURE

There are many studies that have addressed children’s connection to nature. These studies have explored if children have a deep connection to the natural world that gets severed by modern society over time (Kahn, 1999), what places are special to children leading to what is an important focus for students’ learning about the world (Sobel, 1993), and how values toward nature change during childhood (Kellert, 1996). However, these studies fail to examine the relationship between school and these phenomena.
2.2.1 BIOPHILIA

Edward O. Wilson defines biophilia as “the innately emotional affiliation of human being to other living organisms” (Wilson, 1993, 31). In this framework Wilson theorizes that humans have an affinity for the natural world and that biophilic behaviour, “like other patterns of complex behaviour, is likely to be mediated by rules of prepared and counterprepared learning” (Wilson, 1993, 31). In other words although biophilia is an innate quality, environment, culture and experience play a role in the strength of its presence.

Although biophilia theory is not universally accepted there is over a decade of research that suggests that contact with nature, whether direct, indirect or symbolic, positively affects humans (Kahn, 1997; Kellert, 2005; Louv, 2008; Suzuki, 2007). Among the impressive number of studies conducted, some have shown that contact with nature “fosters physical and mental well-being and can even enhance productivity” in the workplace (Kellert, 2005, 22), “reduces the frequency of sickness in prisons” (Moore, 1982) and speeds the recovery from stress (Ulrich, Simons, Losito, Fiorito, Miles & Zelson, 1991). In addition experience with animals has been shown to positively effect human welfare (Katcher & Wilkins, 1993 quoted Louv, 2008, 45).

Kahn reviews and critiques the biophilia hypothesis in his article, Developmental Psychology and the Biophilia Hypothesis: Children’s Affiliation with Nature. Kahn
illustrates the difficulty of proving or disproving empirically that biophilia exists. One example he gives is a finding from Katcher et al.’s study (1983): “watching an aquarium resulted in significant decreases in blood pressure below the resting level in both hypertensive and normal subjects” (Kahn, 1997, 25). Kahn questions if this is really evidence for biophilia, as many different activities could lower blood pressure, such as listening to calming music or watching “slow-moving globs of multicoloured light” (Kahn, 1997, 25). Despite the difficulty in proving or disproving the biophilia hypothesis numerous studies show that contact with the natural world is beneficial.

Kahn concludes his critique with a statement of his belief, “the research literature speaks relatively strongly for the proposition that people have a need and propensity to affiliate with nature and that such affiliations can be both a positive or negative kind” (Kahn, 1997, 27). Kahn adds that the biophilia hypothesis needs to take evolutionary theory into account and points to the need for biophilia “to be investigated in ways that take experience, learning and culture seriously” (Kahn, 1997, 28).

If biophilia exists, and humans do have an innate affiliation towards living organisms it would follow that children, being younger, are more connected to and expressive of their innate qualities. One might expect that children would express affinity for other living organisms more than adults would, as they have had less experience, learning, and culture that diminish their innate sensibilities.
Especially if experience, learning and culture play a role in how children affiliate, negatively or positively, with the natural world it is critical to recognize the significance of students’ experience of the natural world at school, the role of educators, and the way that school culture regards the natural world.

Suzuki suggests that, “by teaching children to fear nature, we increase our estrangement and fail to satisfy our inborn biophilic needs” (Suzuki, 1997, 258) and “the degradation of this human dependence on nature brings the increased likelihood of a deprived and diminished existence. Much of the human search for a coherent and fulfilling existence is intimately dependent upon our relationship to nature” (Wilson, 1992 quoted in Suzuki, 1997, 259).

Biophilia and its need to be fostered points toward the importance of studying schools and how school buildings can support or work against children’s relationship to the natural world.

### 2.2.2. CHILDREN’S CONNECTION TO NATURE

Many researchers have found that bonding with and having affinity for the natural environment develops in early and middle childhood and requires regular interaction with nearby nature (Cohen & Horm-Winger 1993; Kellert 2002; Sobel 1990, 1996 & 2004; Wilson 1993). However, children are spending less time in nature than ever before (Suzuki, 2007; Louv 2008; Kellert 2002, Kuo 2003, Malone...
2004; Wilson 1996), giving them less opportunity to form strong bonds with the natural world, especially during the critical time of early and middle childhood.

Many studies have shown that people receive multiple benefits when they have access to natural environments. Having a relationship with the natural world can increase fitness (Louv, 2008) and one’s ability to concentrate (Taylor & Kuo, 1998, quoted in Louv, 2008, 89) as well as nurture solitude (Louv, 2008), sensory development (Moore, 1993), cognitive ability (Wells, 2000) and creativity (Louv, 2008). Spending time in nature also fosters a sense of wonder and a feeling of timelessness or infinity (White & Stoecklin, 1998) without which “we forget our place; we forget that larger fabric on which our lives depend” (Chawla, 1990).

These findings point towards the importance of children having access to nearby nature and the opportunity for school grounds to provide this regular access to the natural world. Many children spend a significant amount of time at school. If children could spend time in nature during the school day or simply before and after school children might be more likely to develop a bond and feel affinity with nature.

2.2.3 THE NATURE OF CHILDREN’S CONNECTION TO ‘NATURE’

Related to literature that addresses the importance and the changing relationship children have with the natural world is research that seeks to understand how children conceptualize and value the natural world.
In *The Value of Life* Kellert outlines nine values that he suggests, “reflect a range of physical, emotional, and intellectual expressions of the biophilic tendency to associate with nature” (1996, 26). A summary of these values is listed below.

1. **Utilitarian** – exploiting nature to satisfy various human needs and desires
2. **Negativistic** – feeling of fear and dislike humans have for nature
3. **Dominionistic** – desire to control or subdue nature
4. **Naturalistic** – the satisfactions people derive from spending time in nature
5. **Ecologist/scientific** – systemic study of biophysical patterns, structures and function on nature
6. **Aesthetic** – emotional response of pleasure from the physical beauty of nature
7. **Symbolic** – how humans use nature for communication and thought
8. **Humanistic** – the capacity of humans to care for animals
9. **Moralistic** – determination of right and wrong conduct toward nonhuman world

Using this framework Kellert studied differences in people’s values toward nature based on ethnicity, age, culture, education, income, gender, and rural/urban environment. Regarding age, Kellert found that children younger than six are egocentric, domineering, and self-serving towards animals and nature. Between the ages of six and nine children have an increased appreciation for the independence of other creatures. Between nine and twelve, Kellert found the most dramatic increase in children's factual knowledge and understanding of animals and the natural world. From ages thirteen to seventeen, Kellert found an increase in tendencies toward ecologistic and moralistic values.
These findings have informed this researcher’s understanding of the development of children’s views toward nature. This researcher expected that the intermediate students interviewed would have concrete ways of making sense of the world (i.e. classification), would be able to see different viewpoints, and have a stronger naturalistic than moralistic or ecologistic value for the natural world. The results of this study augment Kellert’s exploration of how people view nature. In addition, this study also addresses the missing link, being, how school design contributes to how children view nature.

Page Pulver completed doctorate research that considered how upper elementary students’ conceptualized the natural world for the purpose of informing teachers’ improvement of the science curriculum. Pulver investigated children’s perceptions through a combination of photograph sorting and structured interviews consisting of two questionnaires and a set of terms. In this study she found that many of the upper elementary students she interviewed had not had rich experiences with nature and that they did not have school instruction on what nature was or was not. Pulver found that 55% of the students she interviewed felt that humans were part of nature, while 40% said that people were not part of nature. She also noted students’ ideas on nature varied from being anything not man-made to nature being nice. Pulver concluded that, “these students lacked any real sense of connection to the natural environment even in their neighborhoods” (2002, 140). Her study took place at a city suburban school and it serves to contrast this study. It is possible that students who live on Bowen Island view nature differently.
This research is similar to Pulver’s work in that upper elementary students were interviewed and children’s relationship to nature was investigated. Pulver’s study shows that it is possible to interview elementary school students regarding this topic and obtain useful data. This research looks at intermediate students’ view of nature from a slightly different perspective. Pulver concentrated on how school science classes help to inform how students’ view nature, while this study’s focus is the influence of school architecture. She was most interested in rethinking school science classes. This researcher concentrated on how school buildings contribute to children’s relationship to nature.

2.3 BUILDINGS AND CONNECTION TO NATURE

Some researchers have linked one’s connection to the natural world with the impact of the built environment on our daily lives. Suzuki claims that, “our schism from nature is reinforced by the way we construct our habitat” (2007,261). Similarly, Kellert’s research has shown that “one major cause of alienation from nature has been how we design and develop our built environment” (1995, 90). The built environment can contribute to the divide between people and nature. With this in mind, thoughtful design can hopefully provide multiple opportunities for positive contact with nature, helping building occupants to feel and be connected to the natural world.

Suzuki also states that “the place where we spend most of our lives moulds our priorities and the way we perceive our surroundings. A human-engineered habitat
of asphalt, concrete and glass reinforces our belief that we lie outside and above nature, immune from uncertainty and the unexpected of the wild” (2007,261-262). This suggests that by spending a significant amount of time in buildings that separate us from nature our relationship with nature might be influenced. When thinking about the buildings that children in early and middle childhood occupy most regularly, schools come to mind. Children spend thirty to thirty five hours each week in school buildings. If Suzuki’s sentiments are true, the design of school buildings play a significant role in children’s lives and possibly affect how they relate to the natural world for the rest of their lives. Even though popular theorists have claimed that building design and people’s connection to the natural world are related there is a paucity of empirical research addressing how the built environment, specifically school design affects children’s connection to nature. There are studies that touch on this, such as Upitis’s study (2007) Four Strong Schools: Developing a Sense of Place Through School Architecture that is discussed in detail the next section but none that directly study this. This study hopes to address this gap by gathering empirical evidence in response to questioning students directly how the built environment of their schools can foster a connection to the natural world.

2.4 ARCHITECTURE AS PEDAGOGY

David Orr, in Architecture as Pedagogy, states that buildings teach. Orr emphasizes that if buildings do not somehow attend to or reflect the specific location and region in which they are situated they then teach its users that, “where they are is
unimportant” (1999). Orr also emphasizes that many buildings teach mindlessness. For example if a building wastes energy it indicates to the buildings users that they need not think twice about wasting energy. Orr has put his theory into practice by initiating the construction of the Adam Joseph Lewis Center at Oberlin College, a high-performance building that works to teach mindfulness in as many ways as possible. For example the Adam Joseph Lewis Center has a living machine, which purifies wastewater right next a hundred-seat auditorium. The living machine is in full view and is a constant reminder that water is a valuable resource and does not need to be wasted. In fact by cycling the water through an intricate system of plants it is ready for reuse. Another example that shows how this building teaches mindfulness is the plasma display in the foyer of the building that shows the “performance data gathered every five minutes from 150 sensors placed in the building and landscape” (Orr, 2006, 83).

Orr’s theory has significantly shaped this researcher’s thinking about school design. This researcher believes that buildings teach, and that wasteful, “unthoughtful” buildings do teach mindlessness. Many articles refer to and agree with Orr’s idea of architecture as pedagogy; however, there is very little empirical research supporting Orr’s theory. In addition, if buildings do teach there is no empirical research that addresses how buildings teach. This research will be one study that begins to address the need to test this theory. The researcher’s intention is to critically examine some of Orr’s valuable reflections and add to the body of research
that thinks critically about school design and researches how school design influences what students’ learn in school.

Anne Taylor, a professor in the School of Architecture and Planning and co-director of the Institute for Environmental Education at the University of New Mexico, like Orr, believes that buildings can teach. Taylor has developed a curriculum, Architecture and Children, which instructs teachers and parents how to interpret their environment and teaches children about design and the design process.

Taylor has studied how learning opportunities can be integrated right into the structure of schools. Taylor believes that all children can read their environments even though some children find it difficult to read books. In her model, teachers must learn to turn objects into thoughts and/or opportunities to learn from and architects can marry education and design by creating active spaces (Taylor, 1993). Students can learn about botany from a solar greenhouse on school grounds, or about physics from a doorway.

In her article, The Learning Environment as a Three-Dimensional Textbook, Taylor (1993) describes two case studies in which children were part of the design team, helped to imagine and create innovative multi-use school spaces, and learned about democracy through action. It is clear from this and other articles Taylor has written that she is invested in and advocates for collaborative school design. The design process of the primary wing of Bowen Island Community School was collaborative,
however, the primary focus of this research is how existing buildings inform their occupants. School buildings can be teachers and it is important to build curricula, which fosters awareness for the resources that buildings use, the pedagogy of space, and more generally for the Earth. It is important for students to be a part of place making and when possible, educational design. School buildings need to be more than cost-effective containers and that the hidden curriculum of buildings needs to be acknowledged and addressed. We need to be aware of the mindlessness we are encouraging in our children.

2.5 DESIGN THAT CONNECTS TO NATURE

2.5.1. PLACE-BASED DESIGN/REGIONALISM

Place-based design or regionalism is one kind of design that seeks to connect building users to their specific and immediate natural environment. There is a lack of research that studies either how building design can foster children’s connection to the natural world or how place-based school design can help facilitate place-based learning. However, Rena Upitis, a professor at Queens’ University who has studied school architecture for a number of years, has explored the architecture of place-based schools and the learning that happens in these schools.

In her article, *Four Strong Schools: Developing a Sense of Place Through School Architecture*, Upitis’s finds that “schools and curricula that focus on a sense of place are able to support the practical activities that lead to meaningful relationships between members of the community, and between people and the land” (Upitis,
Upitis’s research shows that place-based school design can contribute to people’s relationship to their community and to the land.

Upitis reviewed schools that have place-based architecture. In her review, she valued aspects of four particular schools that have mindful relationships with the Earth (for example one school treats its own sewage on the school grounds), or are attentive to the specific location they are in (for example a school building being designed around an imposing fig tree or to mimic the shapes of the mountains in the back ground) in some way. This research similarly examined aspects of BICS that are attentive to its specific location, and how BICS building does and does not provide connections from the inside world to the outside world.

Despite scant research on schools that use place-based design or regionalism, there are learning environments like the four schools Upitis highlights in her article or IslandWood, on Bainbridge Island, WA that have been specifically built in hopes of fostering users connection to the natural world.

Upitis’s beliefs that buildings teach and that different school design can contribute to occupants’ relationship to each other and the natural world are important. Education is a holistic process and the buildings and environment are significant in the learning process. Upitis focuses on school buildings as places that can allow certain kinds of activities that directly affect the relationships students have with each other, the community and the natural world. School buildings indirectly impact
students’ relationship to the land. Upitis highlights Dewey and Mumford’s idea of the importance of manual labour in the studies she has done about school buildings. Although the researcher believes that experiential learning is valuable this research does not use this framework.

Similar to Upitis, this study investigates how students experience their school building and hopes to provoke thought about the significance of school design. This study is a significantly smaller in scale: only students were interviewed and rather than focusing on all possibilities of what students’ learn from school design the focus was specifically on how school design informs students’ relationships with nature. This study, like Upitis’s study, contributes to the scant research on how students respond to school architecture in subtle ways and how architecture can help people develop affection for the natural world.

2.5.2. BIOPHILIC DESIGN

Biophilic design is another kind architecture that seeks to connect building users to their natural environment. Stephen Kellert in *Building for Life* proposes and describes Biophilic Design as a new architectural model that bridge people and the natural world. Kellert uses biophilia as a framework to buttress his ideas about buildings. Kellert asserts that humans have an affinity for nature and that buildings need to be designed to honour this affinity. Kellert believes that it is not enough for us to design buildings that minimize the negative impacts on the environment, rather buildings need to be designed that will also contribute positively to the
natural environment, which includes humans. Kellert outlines various elements of biophilic design all of which provide a direct experience with the natural world.

Even though there is empirical evidence that shows biophilic tendencies in humans, there is no empirical evidence that relates this to students in schools. In particular, there have not been any completed studies of how biophilic designed school buildings affect students. This gap is an important one to address in order to determine if schools that attend to school occupants’ relationship to the natural world make a significant impact. Even though there is no empirical research yet there is a study in progress. Kellert, Heerwagen and their graduate students are currently conducting a longitudinal study to assess the physical, emotional, intellectual and interpersonal impacts of biophilic design features on students, teachers, and staff at their school (Kellert, 2005a). The results from this study will be a necessary addition to the theory of biophilia. In the meantime, the researcher hopes that researching students at Bowen Island Community School will begin to address this gap between theory and empirical research.

The concept of biophilia has helped the researcher to understand her own affinity for the natural world and why she thinks it is important for buildings to incorporate elements of the natural world. In schools, places that children spend most of their daily lives, the researcher believes it is especially important to provide buildings that not only have low environmental impact but foster positive connections to the environment. Kellert’s belief in the importance of stewardship also has had an impact. Without a sense of connection to the natural world it is hard to imagine
being invested in its health. As a teacher the researcher works towards enlivening her students to a sense of wonder and connection to the natural world. This research investigates Kellert’s assertion that humans have an affinity for life by investigating if students are experiencing a connection to nature in parts of their school building that allow for direct or indirect experiences of the natural world.

Suzuki also addresses building design in *The Sacred Balance* in a section called “Restoring the Balance”, where, William McDonough is held as an example of a new kind of architect that thinks good design revolves around ecological thinking and sustainability and that redesign is necessary. With this example Suzuki advocates for the redesign of buildings and technology so that there are deliberate, intelligent and sustainable.

### 2.6 CONCEPTUAL FRAMEWORK

This literature review has explored pertinent theories regarding children’s relationship to nature and architecture as pedagogy. The work in these two fields have contributed to the researcher’s theoretical framework for this study, which explores the possibility of school design helping to foster a connection and commitment in school occupants to the natural world. In this study the researcher takes into account ideas regarding biophilia (Wilson, 1984), the importance of children’s connection to nature, and buildings influencing humans’ connection with nature. The framework for this study is grounded in the following:

- People have an affinity for the natural world that needs to be nurtured.
The most important time to nurture this affinity for the natural world is during early and middle childhood.

During early and middle childhood children spend a significant amount of time inside school buildings and at school.

Buildings can influence our relationship with nature.

Given these points this research proposes that school buildings mediate children’s relationship with the natural world when they are inside them. How school buildings are designed is important because children’s relationships with the natural world can be fostered or hindered as a result. Studying students’ experience of school buildings is critical in determining how school buildings mediate children’s relationship with the natural world. In addition, by studying students’ experience of school buildings and how school buildings foster and hinder their relationship with the natural world, school buildings could be best designed to optimize this powerful relationship between student and nature.
3.0 BOWEN ISLAND COMMUNITY SCHOOL

3.1 CONTEXT

3.1.1 LOCATION

Bowen Island Community School (BICS) is part of the West Vancouver School District that includes twelve other elementary schools and three high schools, all of which are in the wealthy cities of West Vancouver or Lion’s Bay. BICS is the only school in this district that is not on the mainland. Bowen Island is a twenty-minute ferry ride from Horseshoe Bay or eight nautical miles from Metropolitan Vancouver. Bowen Island has a rural setting. Apart from a few commercial areas most of the island is residential. Bowen Island is the permanent home of approximately 3,500 people. Bowen Islanders are predominantly white and generally more affluent than their BC counterparts, however, the average household income on Bowen Island is comparable to the average household income in West and North Vancouver. BICS is located in Snug Cove and is an eight-minute walk from the ferry. There is a community shuttle bus that travels from the ferry to various areas of the island and goes on the main road right past BICS. There are two schools on the island, one private (Island Pacific School-grade 6-9) and one public (BICS-grades K-7).

3.1.2 HISTORY

The Bowen Island Community School has a long history. For thirty years prior to 1956 the school on Bowen Island was a big wooden building on School Road that served twenty students in grades one through twelve. There was a wide staircase
that led to two classrooms on the second floor that overlooked Deep Bay. On the first floor there was a gym and a music room, which was also used by the community for concerts. A fire in the school building led to a temporary move to ‘The Tea Room’, a restaurant that overlooked Snug Cove. Once a new school had been built to replace the old school, students moved back into a new two-room utilitarian school building on Senior’s Lane. One classroom served students in grades 1-5, the other served students in grades 6-12. There was one teacher and approximately twenty students in total. In 1956 there were two additions to the staff: a second teacher and a principal. There was an extensive playing field on the school grounds and forest surrounded school property. In the 70’s the number of students increased to sixty children, making the school building too crowded for comfort and it was decided that a new school building would be built. In 1975 a group of community members, teachers, and parents succeeded in changing the charter so Bowen Island School could be recognized as a community school. The school has become over time a central hub and heart for the whole of Bowen Island.

The new expanded school, which started out as having five classrooms, was completed in 1981. This is the school building that still stands today, although since 1981 the building has had two additions consisting of administration offices and a multipurpose room and most recently a primary wing. On July 1, 1986 BICS was officially made part of the West Vancouver School District, before that BICS was considered to be part of the Sunshine Coast School District. Throughout BICS history the school has been located within Snug Cove, the only concentrated commercial centre of the island.
3.2 SIGNIFICANT FEATURES OF BICS

In the following description of the grounds, the building, and the curriculum of BICS seven areas or features that students’ addressed in their interviews and drawings have been highlighted in order to provide a detailed context for the findings presented in chapter five and six. The three tables below summarize the intentions, uses and significances of these designed, embellished, and natural features, which are the primary wing, windows, skylights, community garden, memorial garden, seaquaria, and forest.

Significant Features of Bowen Island Community School (as highlighted by students) Represented in Three Tables

<table>
<thead>
<tr>
<th>Designed Elements</th>
<th>Intention of Feature</th>
<th>Use of Feature</th>
<th>Significance of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Wing</strong></td>
<td>-Provide more space for classrooms -collaborative design -highlight natural materials (eg. wood) and use natural light -save as much of forest as possible -provide direct exits in each classroom</td>
<td>-six classrooms grades 1-4 -halls used to display artwork and occasionally used as additional learning spaces</td>
<td>-strong presence of wood and natural light -warm gathering spaces in hall -memorable views of forest and community garden -contributes to school pride and identity with Bowen Island and specific site -collaborative process of design was meaningful for occupants involved</td>
</tr>
<tr>
<td><strong>Windows</strong></td>
<td>-to provide natural light in classrooms</td>
<td>-allow occupants to see community garden, forest, or field from classrooms -used for mini-breaks to aid concentration</td>
<td>-highlights natural site of school -contributes to students’ sense of happiness at school -in primary classrooms, forest becomes integrated into classroom experience</td>
</tr>
<tr>
<td><strong>Skylights</strong></td>
<td>-provide natural light in school building</td>
<td>-used as classrooms/gathering spaces when there is a power outage -place for experiential lessons on weather -observation of bird movement when land on glass</td>
<td>-inspires curiosity -feeling of closeness to natural world (trees, birds, sky) -allows for celebration of natural weather events</td>
</tr>
</tbody>
</table>

Table 1: Significant Designed Elements of BICS
<table>
<thead>
<tr>
<th>Embellishments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Feature</strong></td>
</tr>
</tbody>
</table>
| Community Garden | -to have an edible garden on school grounds  
-to raise awareness of food and sustainability  
-to integrate growing, gardens and learning about plants into school curriculum  
-build a strong connection between community and school occupants | -science experiments with plants  
-math exercises (measuring growth of plants)  
-learning about butterfly life cycle and habitat  
-art classes  
-gardening as a class  
-each student every year plants at least one seed and harvests one thing from garden  
-community use(workshops, parent groups)  
-use veggies grown in student and teacher lunches | -connects students to where food comes from  
-allows for connection to parents, community members, teachers and fellow students  
-accessible place for experiential learning |
| Memorial Garden | -to build a memorial to a music teacher  
-to have community work with the students of the school to create garden  
-to beautify the school grounds  
-to have a place outside to sit and relax | -used in remembrance ceremonies to invite students to think about peace and the garden  
-used as a play space during recess and lunch and after school  
-benches used by parents and community for sitting | -provides community monument  
-provides a place of solace and a sense of privacy on busy school grounds  
-provides an additional kind of play space |
| Seaquaria | -to build a connection between students and ocean creatures in hopes of possible stewardship  
-for students to be able to see and learn about sea creatures from a depth beyond the tidal pools | -grade five students make observation notes daily from tank  
-inspiration for art and creative writing projects  
-calming resting or time out zone  
-viewing time on way in and out of school building  
-as inspiration for debate about capturing animals  
-students monitoring setup and maintenance of the tank | -exposure to local sea creature  
-opportunity for close observational learning  
-provides place of calm in busy school |

Table 2: Significant Embellishments of BICS
### Non-Designed / Natural Elements

<table>
<thead>
<tr>
<th>School Feature</th>
<th>Intention of Feature</th>
<th>Use of feature</th>
<th>Significance of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Forest (the building was designed to leave as much of natural Bowen landscape on property intact)</td>
<td>Municipal parkland that is located beside the school -to have a natural Bowen landscape for students to play and learn in</td>
<td>-play space (before and after school, recess, lunch) -observation journals -art: painting, tree rubbings -first nations studies (culturally modified tree) -orienteering -frisbee golf -build forts -see wildlife</td>
<td>-students love being in the forest -strong connection to forest which contributes to the students’ connection to the school -place for students to learn the alphabet of the natural world -students/teachers able to see change over time with trees &amp; plant life -students/teachers develop relationships with certain trees or forest as whole -provides accessible daily access for unstructured time in natural landscape</td>
</tr>
</tbody>
</table>

Table 3: Significant Non-Designed/Natural Elements of BICS

### 3.2.1 THE SCHOOL GROUNDS

The school building sits toward the back of the property and is surrounded by municipal property that is mainly forested with trails. Approaching the school the Bowen Island Community School Sign is visible at the front of the field. Further along the main road there is a turn off to the right into a medium sized parking lot. To the right of the parking lot is the playground, which has a sitting area and a few medium sized trees on one side of it. During the day there are often community members with small children playing on and around the play structures.
Figure 1: An Overhead Picture of the Bowen Island Community School Site (diagram originally from Bowen Island Community School Artificial Turf Field Site Plan, Catherine Berris Associates Inc., 2008, p5)

Figure 2: Site Plan for BICS
Directly in front of the parking lot, when facing the school building, and slightly to the left of the school is a memorial (also known as a peace) garden which was planted in 1982 in memory of a music teacher who taught at the school for many years. The intentions of this embellishment to the school grounds were to have the Bowen Island community plant a garden with BICS students, to create a contemplative place where people could relax, to beautify the school grounds, and to create a peace garden in order to commemorate peace activist, Muriel Neilson, the music teacher who funded the garden.

![Figure 3: The Memorial /Peace Garden](image)

The memorial garden or peace garden is a small feature located to the left side of the stairs that ascend from the parking lot to the school’s main doors.
It has a rectangular shape (approximately 14m by 4 m) plus a triangular shape (approximately 7m x 7m x 5m). There are two large cedar trees, a few rhododendrons, various bushes and mulch on the ground. There is a long wooden ledge that separates the rectangular part from the triangular part of the garden. Some times BICS students sit on this wooden ledge and often play at the base of the large cedar trees. There is also a small triangular green space on the right of the stairs that was planted at the same time as the memorial garden; however, this area is too small to play in.

There is one sitting area nestled into the garden that is mostly used by adults as a resting area when using the trails behind the school or when picking up students from BICS. During recess and lunch children will play in this garden area and until recently there was a little deck that was inset at the base of one particular tree that was used as a favorite sitting area. However, due to overuse this deck has been removed because of regulations.

Although this garden occupies a small area it provides an important place of solace for parents and students alike. The memorial garden is less occupied than the forest behind the school or the playground and there are multiple small pockets to occupy within the garden. This provides the possibility for more than one group to use this garden and at the same time maintain a sense of privacy. The memorial garden is significant because it provides the front of the school with beauty and a sense of
care, which is the first thing you see when approaching the school from the parking lot.

Behind the paved road that leads from the parking lot to the back of the school there is a triangular shaped forested area on a steep slope. This joins with the forested area behind the school that has community trails in it. On the slope that is directly behind the older part of the school building there is the storyteller’s or hillside garden. This has both a flat area shaded by a tree and a hill with indigenous plants and herbs in petal shaped cement containers. Both the primary and the intermediate grades use this area to read books aloud and have outdoor classes. There is also small shed on this hill that is used for gardening tools.

In the courtyard (the area in-between the two parts of the school building) there is a community garden.
The community or edible garden is small and rectangular (Approximately 13 m x 5.5m). The sides of the garden have cedar posts that are covered with deer fencing. The front gate is made with cedar that was milled on island and has a sign (made by a BICS parent) with the words BICS Community Garden on it. The windows of both grade 6/7 rooms and one primary class (grade 2/3) face out to this garden.

The current community garden was an embellishment that was added because of the initiative of BICS school parents. The intentions of the garden were to have a place where parents, BICS students and the greater community could all garden together, to bring the community into the school, and to increase awareness of and
students’ connection to food systems and sustainability. Each year every BICS class has the opportunity to decide if they want to have an area of the garden to plan and use as they wish. For example one year the graduating class chose to grow flowers for their grad ceremony while creating a butterfly habitat. Regardless of whether classes decide to have an area, each year, every student in the school plants one seed in the garden in the spring and harvests one thing out of the garden in the fall. Other garden activities include planting, weeding and composting; classes in art, math, and science; and community and individuals classes. The garden provides experiential learning opportunities and connects students to food sources. This is meaningful especially because many BICS students do not experience food gardening at home.

Figure 5: Interior of the Community Garden
After the primary wing addition was built courtyard mural was mounted on the outer wall. The artwork was done by a local artist and with participation of BICS’s students.

Behind the primary wing there is a play structure surrounded by a forested area. Even though the school community uses the forested area, it is actually municipal parkland. The forest is about a 50 m x 70 m area and is on the northeast side of the school building. The forested area is well used by students of all ages. Before school, during recess and lunch and after school there are many groups of children playing various games within the forest. These included tag, hide and go seek and many imaginative games. Additionally between April and June, when this research was conducted, there were forts being built, taken apart and rebuilt. The presence of this forest provides BICS students with a natural landscape that is extremely accessible and serves as an important place to learn about the natural world. The presence of the trees attracts wildlife adding richness to the curriculum of the school.

There basketball and tennis courts and a soccer field on the school property. At the time of this research project these were all on the southeast end of the property, in front of the school building. There was an artificial turf field added to the school grounds in the summer of 2009.
Figure 6: A fort that was in the forested area at time of study.
Figure 7 shows the vegetated areas on the schools grounds in bird’s eye view. The school site includes:

- Forested areas to the north and west of the school building and some patches of forest, and scattered native trees in the play area to the south.
- Two garden areas: a community garden with vegetable and native plant plots, and a Memorial or Peace Garden.

Vegetated Areas:

1) Forested Play Area
2) Community Garden
3) Memorial/Peace Garden
4) Forested Steep Slope
5) Forested Play Area
6) Specimen Trees

Figure 7: Site map highlighting vegetated areas on school site (diagram originally from Bowen Island Community School Artificial Turf Field Site Plan, Catherine Berris Associates Inc., 2008, p6)
3.2.2 THE SCHOOL BUILDING

The Bowen Island Community School (BICS) Building is basically a long rectangle with an adjoining T shaped section. Killick Metz Bowen & Rose Architects, currently named KMBR Architects Planners Inc., designed the original school in 1980. This has a non-combustible steel structure with masonry cladding. The multi-purpose room, administration space, change-rooms for the gym, storage rooms and an electrical room were added in 1990. BICS looks much like a typical school building, except for the two long skylights, the size of the windows and the view out of them.

As you walk into the main entrance of the school you enter into the foyer, which is adorned with a few plants; a bench that opens to provide storage; and signs that direct visitors to the office, carry the School’s mission statement and display a poem about the school. There are also pictures of the students from various years, a community bulletin board, and a showcase of students’ artwork. To the left of the foyer are the school office, the administration offices, a photocopier room, first aid room, staff room and staff washrooms, a multi-purpose room, and to the right of the foyer is the “intermediate hall”. There are eight classrooms, a library, a computer laboratory, three learning resources center rooms, two storage rooms, girls and boys washrooms, a book room, custodian’s closet and the community school coordinator’s office.
Figure 8: Overhead view of all rooms in School on upper floor

Figure 9: Overhead view of all rooms in School on lower floor
There are two skylights in the original section of the school. One is in the main foyer of the school and is 14 m by 2.8m. The second skylight is 28m by 2m and is located in the intermediate hall, just beyond the grade 6/7 classrooms, where the halls lead out to the side door on the west side of the building.

Figure 10: Picture of the skylight in the main foyer of BICS.
These skylights allow natural light to enter into the school building and provide a view of the sky and weather events, such as a heavy rainfall or snowfall, to building occupants. In addition to weather, birds land on the skylights, sparking teachers’ and students’ imaginations, initiating questions and discussions in classes about birds and how they travel and migrate. The length of the skylights also offers elementary students a sense of the expanse of the natural world from within the school halls.

The T shaped primary wing was added to the existing school building in 1998, designed by Nicolson Tamaki Architects. Don Nicolson, who lives on Bowen Island, was the principle architect on the design team. Members of the school board, school staff, and two grade six students were involved in the design process. Although this addition is not a LEED\(^3\) certified project, heavy timbers were salvaged from fallen Douglas Firs from the school site and milled on island and are a major feature of the design. The cedar ceiling finish and cedar trim in the center of the wing are milled from the same cedars.

As one approaches the primary wing, a large circular “tree cookie” mounted on a background of cedar panels is highlighted at the end of the hall. There is a window

\(^3\) Leadership in Energy and Environmental Design and is a green building rating system that has four possible levels of certification (certified, silver, gold and platinum) based on the total points received in five key areas of human and environmental health (sustainable site development, water efficiency, energy efficiency, materials selection and indoor environmental quality)
high on the wall that has a view of cedar and fir trees. Once in the primary wing hall, wood beams are visible and run the full length of the hall. One end of the hall has a view of the community garden and the other has a view of the forest. Part of the overall warmth and welcoming quality in this space is due to the rich colour of wood. The six classrooms in this section of the school building also have a cozy feel about them. There are exposed wood beams and natural light from the ample windows. Each classroom has electric heating, indirect lighting, operable windows and is wired for IT. Several have light from two sides and all enjoy views of the woods beyond.
Figure 11: Picture of Primary Wing Hallway looking south
There are many large windows in both the original and new sections of the school. Not only are these large (approximately 11.4 feet by 8.3 feet) but also many have views of green space whether it is the forest, the community garden, the field, or trees on the hill across the street from the school. The abundant vegetation that is visible from the windows gives an expansive feeling and allows for appreciation of the natural and constructed landscapes on the school site.
Community Use of BICS

BICS is a community school and there is a community recreation centre is a part of the school. In addition to the community recreation centre, there is a community coordinator office, a community use room, and a community computer room in the school. The community coordinator serves as a link between the school and the community.

The community use room is utilized daily before, during and after school time. Part of this space is an affordable day care for parents on the island and once a week a
lunch crew prepares lunch those who sign up for this service. In addition to the designated community rooms in the school:

- the gym, the multi-purpose room and the library are all used by different organizations and community members outside of school times
- the community garden is also used by both the school and members in the community

3.3 EDUCATIONAL CONTEXT

3.3.1 THE OCCUPANTS

The occupants of BICS include the principal, the staff, the students, parents and the wider Bowen Island community.

Students: In the student population (267 students at the time of study) there is a range of socioeconomic backgrounds and parental education levels. Ninety percent of the student population is white. There are sixty ESL students at BICS. Most students start at BICS in kindergarten and stay until they graduate in grade seven. In the grade 6/7 students’ that were involved in this project four out of the fifty-four students were not Caucasian. A few students had moved to Bowen in the last few years but the majority of them had started at BICS in kindergarten.

Staff: The BICS staff includes twenty-one teachers, four custodians, three bus drivers, two office staff, seven teaching assistants, the principal, vice-principal and a community school coordinator. Half of the BICS staff are “islanders”, or live on Bowen Island, and half of them live on the mainland. Ten of these staff are male
while the remaining twenty-seven are female. There are no visible minorities or staff members with disabilities. There is a range of experience in the school from twenty-seven years to less than one year.

*Parents:* Parents are an essential and active part of Bowen Island Community School. Each class has one or two volunteers for the year that take care of that classes needs. These class volunteers help to organize extra help when a class needs more parents to be involved and sometimes find people to come into the school to offer unique activities. Almost daily there are five or six parents in the school either helping out with regular classes, fieldtrips, or teaching special activities or projects.

*Community:* The Bowen Island community plays an active role at the school. Seventy-five to eighty percent of the community visit or use the school during a school year. There is day care offered in the community use room before the school day starts and an after school club in one classroom after the school day ends. The school building and site is very actively used. The gym especially is in high demand. The recreation center, which has a weight and fitness room, offers the community a wide range of recreation, art and educational classes.

### 3.3.2 THE CURRICULUM

The curriculum of BICS has been changing over the last four years to include both place-based education practices and to prioritize environmental social responsibility of the entire school community in the areas of conservation and stewardship. In addition to the provincially mandated curriculum, BICS have
introduced a number of additional studies. These include a Beach Bucket study, Seaquarium study, Watershed quest, Trail quest, Salmonid in the classroom program, and a Shoreline Clean-up project. Furthermore, all BICS classes have taken on a unique program for environmental sustainability, conservation or stewardship, such as engaging in energy audits, hallway litter patrol, making weed whackers to remove invasive species, and making school-wide composters.

Figure 14: Seaquaria in front foyer of BICS

The seaquaria houses creatures from the ocean (a few minutes walk from the school) and has a prominent location in the front foyer of the school. This aquarium
was partly funded through the Pacific Crystal project and is a teaching tool that supports the school wide place based learning curriculum. Teachers can use the presence of the seaquaria as an opportunity in science class to have students write detailed notes about what they observed in the aquarium. Students, often, without prompting stop at the aquarium on their way out of the school at recess and just stay to watch what is happening inside. Students seemed fascinated with the sea cucumber and how things change such as where the crab or starfish would be compared to where it was earlier in the day.

BICS is different than many urban schools because of its rural location, interest in place-based education and environmental social responsibility, and because of the close proximity to municipal parkland. BICS students seem to spend a significant amount of time outdoors each day, are taught a curriculum that highlights local natural, social and cultural facts related specifically to Bowen Island and its natural environment, and are encouraged and rewarded for their environmental stewardship. It is possible that these students have a more integrated notion of the natural world than most students in a more urban environment. However, the school building itself is not necessarily much different than other school buildings in the lower mainland.
4.0 RESEARCH METHODOLOGY

Many studies have shown that contact with nature fosters creativity (Moore, 1997) concentration (Taylor & Kuo, 1998, quoted in Louv, 2008, 89) cognitive ability (Wells, 2000), productivity (Kellert, 2005), and physical and mental well-being (Kellert, 2005). Moreover, some academics believe that humans have an affinity for the natural world, which needs to nurtured especially in early and middle childhood (Wilson, 1993; Kahn, 1997; Sobel, 1993; Kellert, 2002). Over the last decade the amount of time children spend in nature has dramatically decreased (Malone, 2003; Suzuki, 2007; Hern, 2007; Louv, 2008). Humans spend much of their time in buildings and for good or ill these structures influence our connection with the natural world. They can separate us from the natural world or help to foster our connection with nature. However, there are very few studies of how school buildings mediate our relationship with nature. There is a need for empirical research in this area so that the impacts of school design can be fully understood. Furthermore, in the little existing research, there is a limited number, if any, of studies from an educator's perspective that focus on student voices. This research hopes to add this perspective to the conversation regarding both children's connection to nature and architecture as pedagogy.
4.1 QUALITATIVE RESEARCH

Qualitative research is the model by which voice informs life experience.

There is an unspoken dialectic between architects and the educators and students who occupy the buildings architects have designed. In this study this dialectic is viewed through the lens of student experience. This study gives voice to the experiences that intermediate students have in their school building(s) and draws meaning from the socially constructed context in which these students live.

Qualitative methodology allowed for a complex and holistic picture to emerge that allows readers to see the many dimensions within this study’s key question - how are intermediate students’ relationships with the natural world mediated by their school building.

Qualitative research has its roots in social science research and is different than quantitative research, which is more often used in the natural sciences. Quantitative methods are deductive while qualitative are inductive, deriving inference from the particular to the general. While not exclusively, the former uses numerical data while the latter typically relies on text to represent and communicate substantive findings. The additional distinct features of qualitative research include: researchers collect data within the natural settings of the information they seek (data is context dependent), they are concerned with the process rather than the outcome of an activity, and researchers analyze the data rationally rather than statistically
Hittleman & Simon (1997) state that, “the basic qualitative purposes are to describe, to interpret, to verify, and to evaluate” (42).

**4.1.1 THEMATIC ANALYSIS**

Thematic analysis is widely used in social science research. Though thematic analysis has been considered a generic skill used within a range of different qualitative methods (Hollway & Todres, 2003). Braun and Clarke have recently argued that, “thematic analysis should be considered a method in its own right” (Braun & Clarke, 2006). They claim that “through its theoretical freedom, thematic analysis provides a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex, account of data” (2006, 78). Due to this theoretical flexibility when a researcher uses thematic analysis it is important to situate one’s analysis within a specific theoretical framework. This is critical as it reveals the assumptions that informed the analysis, enabling the public to better evaluate the research undertaken.

To that end, while the researcher has a constructionist point of view with respect to the phenomena she is studying, she wanted to remain as true as possible to the experience of the participants she was interviewing. Thematic analysis offers a flexible approach to analyzing qualitative data, and as Braun and Clarke point out in their article dedicated to the methodology, thematic analysis is actually compatible with both essentialist and constructionist paradigms. Further, “thematic analysis can be an essentialist or realist method, which reports experiences, meanings and the reality of participants, or it can be a constructionist method, which examines the
ways in which events, realities, meanings, experiences and so on are the effects of a range of discourses operating within society. It can also be a ‘contextualist’ method, sitting between the two poles of essentialism and constructionism, and characterized by theories, such as critical realism, which acknowledge the ways individuals make meaning of their experience, and, in turn, the ways the broader social context impinges on those meanings, while retaining focus on the material and other limits of ‘reality’” (Braun & Clarke, 2006, 81). As this study was exploratory, the researcher chose a method of analysis suited to the data collected. And while not tied to theory generation like say, grounded theory, thematic analysis nonetheless focuses on developing themes and or patterns that are clearly grounded in the data, in a manner that rigorously describes and organizes the information collected from the participants.

4.1.2 IDENTIFYING THE RESEARCHER

It is imperative that the researcher is as transparent about her biases as possible because traditional objectivity cannot be assumed. In this project, the researcher has:

- Feelings of respect and care for the people at Bowen Island Community School
- A deep commitment to place-based learning and sustainable practices within schools and educational environments
In addition she sees:

- A strong ethic of care at BICS as well as an active commitment to the natural world, which the community fosters through various filed-trips, special events, assemblies and daily ‘mission possible’ tasks

It is also important that the researcher is clear about the theoretical position of the thematic analysis conducted as thematic analysis is flexible and can be rooted in various theoretical positions. The epistemological stance from which knowledge claims in this thesis are made is founded on Donna Haraway’s concept of situated knowledge (Haraway, 1991). Haraway envisions a web holding all people, technologies and life each with a knowledge base informed by, but not limited to, their situated positions on the web. Haraway states that, “the only way to find a larger vision is to be somewhere in particular” (Haraway, 1991, 96). The objective of this stance is learning to converse between positions in order to foster partial connections. The entirety of the web is beyond the grasp of any position, thus knowledge claims are always partial. In this model objectivity lies in the pursuit of knowledge claims that have increased resonance through the web.

During this study the researcher:

- Is situated with partial vision. She has made partial connections to the agents of knowledge, or study participants, at Bowen Island Community School who enhanced what the researcher was able to see and understand
• Attempted to leave space for the unpredictable and independent knowledges of these agents.

• Sought “the connections and unexpected openings situated knowledges make possible” (Haraway, 1991, 96)

• Assumes that meaning and experience are socially produced and reproduced as opposed to meaning, experience and language having a unidirectional relationship (Braun & Clarke, 2006). As a consequence,

• Believes that socio-cultural contexts and structural conditions are important elements to consider in participants accounts of their experience.

Originating from American Black and Chicana feminist academics who identified their own racialization as significant sources of knowledge to bring to the research process (Hill Collins, 1999) it has become common practice for qualitative researchers to position themselves as ‘insider’ or ‘outsider’. These terms refer to membership status about the group one is researching.

Patricia Hill Collins (1991) and James Banks (1998) both complicate and expand the insider/outsider binary. Though the terms Collins and Banks identify in their work do not suit the researcher’s position within this study, the ideas within ‘insider’ and ‘outsider’ are important to consider and are multi-layered depending on how many variables come into play in one’s study. In this study the variables include: the demographics of the people that attend, teach, and administrate the Bowen Island
Community School, the school building, Bowen Island, place-based schools and the educational system in general.

With these variables in mind the researcher is an informed outsider:

- She is a west coast resident and knows the landscape of the lower mainland well
- She works within the education system
- She has had experience teaching in place-based programs and is informed about place-based design
- She has experience as both a student and a teacher in multiple school buildings
- Her social status is akin to the predominate members of the group
- However, she is an outsider to the community of Bowen Island, the Bowen Island School Community, and to Bowen Island School
- She is not an architect and has never been directly involved in the design of a school building.

4.2 ETHICS AND PERMISSION

A formal invitation to conduct research was received from a member of a research team (the SFU section of the Pacific Crystal Project) at Bowen Island Community School (BICS). Formal consent from the West Vancouver School Board and the UBC ethical review board was granted. The principal agreed to oversee the researcher’s presence in the school.
The project was introduced at a BICS staff meeting. There was an interest in the research, especially to inform staff and community members of the results in relation to an outdoor classroom that will be built in the future.

Two visual inquiry sessions were conducted with the two grade 6/7 classes (52 students). After which optional assent forms for the products of the class to be used during the research project were handed out. Only a few students (17) completed them and handed them in. These students were given parental consent forms that requested their guardians to consent to the products of the students’ visual inquiry class to be used as data for this project and for a further interview to take place. Five students volunteered to be interviewed and returned signed parental consent forms. Those five participants were interviewed during the school day in the library in the following two weeks. Although participants were given the option of withdrawing from this project at any point none chose to do so.

During this study all documents including the products of the visual inquiry, the digital recordings of interviews, transcripts, and co-investigator’s notes were kept in a locked filing cabinet drawer in the co-investigator’s UBC office. Computer files were password protected. Information that was sent via email attachment to the principal investigator and other co-investigators were password-protected. The principal investigator and other co-investigators maintained all copies of study documents in locked filing cabinets. All the names in these documents are
Pseudonyms and students are referenced as Student 1, 2, 3, 4, and 5. The research makes no use of personal conversations or subjects outside of the study of the pedagogical implications of school design on students’ relationship to the natural world. The private social lives of participants are not a part of this study.

Interview participants had access to their own transcripts. Transcripts were only viewed by remaining co-investigators after approval from participant was given. Only the principal investigator and co-investigators had access to the data sources. All investigators were members of the researcher’s M.A. committee and are academic faculty and as such, they had reviewed privacy and confidentiality protocols for the study.

4.3. PARTICIPANTS

As this study’s focus was intermediate students’ participants from the senior grades of Bowen Island Community School were chosen. It was anticipated that students’ in grade six and seven would be best able to articulate their experiences and ideas. In addition, at BICS grade six and seven students are likely to have the most experience in the school building having been there the longest. It was hoped that this decision would contribute to the richness of the data collected.

The five research participants (three girls and two boys) were between eleven and thirteen years old and were all grade six and seven students:

- **Student 1**: A twelve-year-old girl who had attended Bowen Island Community School since kindergarten. *Student 1*’s mother worked as a midwife, while her
father was a woodworker. Her mother and father immigrated from Wales and England respectively. She was mature, articulate and enthusiastic during the focus group and interview.

- **Student 2**: An eleven-year-old girl who had attended Bowen Island Community School for three years. She had previously attended two schools in Port Coquitlam. Student 2’s mother was a telephone operator and her dad had a home business. Student 2 identified as “Cree Aboriginal”. She was thoughtful and involved both during the focus group and interview.

- **Student 3**: A twelve-year-old girl who had attended Bowen Island Community School since kindergarten. Student 3’s mother worked as a general manager in a grocery store and her father works with computers. Student 3’s parents are of Scottish decent. Student 3 was enthusiastic and cheerful during both the focus group and interview.

- **Student 4**: A thirteen-year-old boy who had attended Bowen Island Community School since kindergarten. Student 4’s mother was a stay-at-home-mum and his dad works as a bus driver. Student 4 was Caucasian and both his parents were Canadian born. Student 4 was enthusiastic during the interview but often his answers were succinct.

- **Student 5**: A twelve-year-old boy who had attended Bowen Island Community School since kindergarten. His father worked in project management and his mother was a gardener. Student 5 identified as a Christian and his parents were of Scottish decent. Student 5, out of all the interview participants was the most brief in his answers.
4.4. PROCEDURES

4.4.1 FIELD WORK AND DATA COLLECTION

The research was limited to the school grounds and its buildings as well as the information received from students during interviews and two focus groups at Bowen Island Community School. The researcher wished to focus on students’ perceptions and voices about their experiences in the built environment. Therefore the research did not include the ideas of teachers and community members who are integral to Bowen Island Community School.

Three data collection methods within the qualitative paradigm were used to address the question how are intermediate students’ relationships with the natural world mediated by the design of their school building.

Two focus groups or visual inquiry sessions with two grade 6/7 classes (fifty-two students) took place, five in-depth semi-structured interviews with volunteer participants were conducted, and fieldnotes were kept.

4.4.2 VISUAL INQUIRY/ TWO FOCUS GROUPS

Visual Inquiry is an arts-based methodology that uses nonverbal communication to investigate a topic of interest.

In the visual inquiry sessions the researcher asked students to:

1. Make a list of everything they defined as nature and non-nature, making sure to include humans on their list
2. Draw a picture of a school building that would foster their connection to the natural world.
3. Draw a place in the school building in which they feel the most connected to nature and explain why in one sentence
4. Draw a place in the school building in which they feel the least connected to nature and explain why in one sentence

As a result each participant produced:

A. A two column list
B. Three pictures:
   1. Depicting an ideal school that fosters students relationship to natural world
   2. Depicting where in school they feel most connected to natural world
   3. Depicting whey in school they feel least connected to natural world

In addition to being a means to collect data these two focus groups complemented the interviews by providing an opportunity for the participants to illustrate their knowledge and feelings about school design that they may not be able to articulate verbally (Sirin & Fine, 2007). A visual investigation was also conducive to having a class discussion about the natural world, school design, and the inter-relationship between the two, which helped to reveal how the researcher needed to structure the rest of the data collection. The researcher was well positioned to do visual inquiry, as she worked as an artist in a small gallery in Toronto, had taught art to elementary school children, and had experience in “a/r/tography”4 (Irwin, 2004).

Both the visual inquiry sessions lasted forty-five minutes, which is equivalent to one school period. The products of the visual inquiry of the five interview participants are included as data and discussed in Chapters 5 and 6. Topics that arose during the

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4 The practice of “a/r/tography means to inquire in the world through an ongoing process of art making in any artform and writing not separate or illustrative of each other but interconnected and woven through each other to create additional and/or enhanced meanings” (Irwin, 2005)
visual inquiry were used as a starting point in the interviews. The content of the drawings was also used to focus the discussions with students. In addition to this, the researcher referred back to the two-column list that interview participants had made during the interview while discussing how the participants defined the natural world.

4.4.3 INTERVIEWS

The interviews were conducted during school hours in the school library. Each interview lasted from 30 minutes to 1.5 hours. A semi-structured interview was chosen because it combined an agenda with the built in flexibility to ask subsequent questions (Creswell 2003). Each interview was digitally recorded and transcribed by the researcher. The transcripts were submitted to the interview participants for their amendment or deletion. Interview transcripts (or parts of interview transcripts) were included in the data analysis in their amended versions.

Questions for the interviews and the visual inquiry were developed by examining previous studies and by having discussions with grade 6 and 7 students about their school buildings. Some questions were added after a pilot visual investigation and two pilot interviews with volunteer participants. Additional questions were added as needed for the sake of clarity and comprehensiveness. The interview questions used are shown in Appendix E.
4.4.4. FIELDNOTES

As a complement to both the visual inquiry and the semi-structured interviews the researcher wrote and recorded audio fieldnotes. Although ideas about what constitutes fieldnotes are inconsistent (Sanjeck, 1990; Wolf, 1992) the researcher defined fieldnotes as a written account or “fieldwork descriptions of activities, behaviours, actions, conversations, interpersonal interactions, and organizational processes” (Patton, 2002, 4) were made in order to obtain “rich, detailed descriptions that included the context in which the observations were made” (Patton, 2002, 4).

During time in the field the researcher kept ‘mental notes’ and ‘jotted notes’ which were then expanded into ‘fieldnotes proper’ (Emerson et al., 2001). ‘Mental notes’ (Emerson et al., 2001) happen during the observation process without pen and paper. This researcher used mental notes to orient her mind towards what would be written later. ‘Jotted notes’ (Emerson et al., 2001) or ‘scratch notes’ (Sanjek, 1990) were written “more or less contemporaneously with the events depicted” (Emerson et al., 2001, 353). Every twenty to fifty minutes of observation the researcher would pause to write in the field notebook she carried with her. The jotted notes were mostly in longhand with some private abbreviations. At the end of each day in the field these jottings were used to recall and reconstruct significant scenes and events (Emerson et al., 2001, 356). These reconstructions are sometimes referred as ‘fieldnotes proper’ (Emerson et al., 2001). These notes served to record insights
about participants and the BICS community, BICS school building, school grounds, and possible relationships between these factors. It was hoped that these field notes and the researcher’s voice would be able to complement the data received via the interviews and visual investigation and add to the richness of the data collected.

In addition to the field notes the researcher took photographs of Bowen Island, the school site, school building, and particular places that the participants mentioned during focus groups and interviews.

4.4.5 ANALYSIS

The researcher analyzed the interviews first. Each interview was transcribed verbatim, a single interview transcript was read in its entirety several times and analyzed using Thematic Analysis methods as outlined by Braun & Clarke (2006) and summarized in the following manner:

In the right hand margin the researcher began to insert initial impressions, insights and comments. After the researcher was familiar with the transcript and these notes she reread each transcript and began to collate these insights and comments into potential themes and write emerging themes in the left hand margin. Once a set of themes within a transcript was established, patterns and connections between emergent themes were explored. Direct quotes illustrating themes were listed to verify the validity of the themes and patterns found. This process was applied to each transcript. Once this process for all the transcripts was complete, the researcher looked across the data set for the overall story, creating a thematic ‘map’ of the analysis. Each theme was refined and defined in this process.
The pictures that the five interview participants produced during the two visual inquiry classes were then thematically analyzed relative to the information gathered in the interviews. Finally, results were organized into lists that included the significant themes, corresponding quotes or drawings and page numbers.

This study used the inductive approach, meaning the specific research question evolved through the coding process. Though the researcher asked participants specific questions and had both preexisting knowledge and assumptions, the themes identified did not necessarily relate to the questions asked. The themes identified were primarily identified on a semantic level (Braun & Clarke, 2006) though the researcher was interested in examining underlying ideas and assumptions that informed the semantic content (Braun & Clarke, 2006). Data was organized into patterns based on semantic content, summarized and then interpreted by the researcher.

The next chapter shares a detailed descriptive summary and discussion of both the pictures that students drew depicting a school building that they imagined would foster a strong relationship with the natural world in its occupants and details from the students interviews about their current school building.

This chapter is followed with the presentation of an account and discussion of a group of themes, which are sense of freedom, moments of joy, social cohesiveness and aesthetic/emotional response, present within the data set. These themes
capture impacts study participants had in relation to the design of their school building.
5.0 DESCRIPTIVE SUMMARY AND DISCUSSION

5.1 INTRODUCTION

This chapter presents the key findings for some of the a priori questions gathered from the visual investigation and follow-up in-depth interviews of five grade 6/7 students.

During the interviews and visual investigation the researcher gathered information on students' ideas of an ideal school that would foster occupants relationship to the natural world compared to their thoughts about their current school building. Although this information is in some way separate from the results of the thematic analysis the researcher felt it was important to include it as this information enriches the story this data tells. These results are presented as a descriptive summary in this chapter with the following headings:

♦ Students’ ideas of an “Ideal” School Building that would Foster their relationship to the Natural World compared to their ideas about their Current School Building
  • Visual Representations: Schools that would Connect Students to the Natural World
  • Ideas Regarding Buildings and their School Building
5.2 IDEAS REGARDING HOW BUILDINGS CAN FOSTER A STRONGER RELATIONSHIP WITH NATURE

During the visual inquiry students were asked to think about a school building that would foster students’ relationship to the natural world. The researcher asked, “What would it look like, where would it be located, and what would be inside of it?”. They were also asked to label all the important parts of the diagram.

In the interviews the students were asked to share their ideas and speak about their drawings (from the earlier visual investigation). The drawings and explanations revealed what students knew in terms of sustainable building practices and technologies and what elements students believed to be vital to foster their relationship to nature. Reflections on information gathered from the drawings and follow-up interviews are presented below. After these reflections each participant’s drawing is presented in more detail.

5.3 VISUAL REPRESENTATIONS OF SCHOOL’S CONNECTION TO THE NATURAL WORLD

5.3.1 RESPONSE TO ASSIGNMENT IN FOCUS GROUPS

The researcher asked grade 6/7 students in two classes to draw in response to the following questions “what would a school look like that would help connect you to nature? What would it look on the inside? What features in it would be prominent?”. Students were also asked to label important places on the picture.
The two classes responded to this assignment differently. In the first class, students began drawing right away without asking many questions. All of the students the researcher saw were busily drawing their ideal school for approximately ten minutes. In the second class students were less focused. Some students responded by drawing their ideal schools while other students chatted to their friends and drew scribbles on their pages. The five students who volunteered to be interviewed after the visual investigation took the assignment seriously and produced detailed drawings. Amongst these drawings there are considerable variance on what the students focused on. Two drawings show that the students focused on the school building envelope and the school grounds and do not reveal what is inside the school. One student focused almost entirely on the interior of the school building and did not show what the school grounds would look like. Two of the students’ drawings show the school grounds and some interior features of the school.

5.3.2 VISIBLE TRENDS IN DRAWINGS

Elements of nature in and around the ideal schools are dominant in the students’ drawings. For example there are animals, plants, forests, gardens, and ponds in many of the images. All five drawings had live animals present. Four schools had live animals inside the school, whereas in one school animals were drawn just outside school doors but upon questioning the student imagined animals inside the school as well. Four students drew gardens on school grounds or in the school. Three drawings had gardens on school grounds while one student drew a garden inside his ideal school. Four students drew or talked about how there was a forest around
the school they imagined. In four of the drawings windows were emphasized and in two of these drawings students stressed that the windows in the school would be open. Two students drew aquariums inside their school buildings. Two students drew extensive skylights that would allow students to look up and see outside.

5.3.4 KEY ATTRIBUTES

*Student 3* was one of the only students that considered alternative transportation in her drawing. *Student 3* drew a skateboard and bike rack as well as an area for students to ride their bikes on school grounds.

The green roof used for classes depicted in *Student 2’s* drawing was unique. *Student 2* had never seen or been onto a green roof; however, she had seen a television program all about green roofs that explained their benefits to the environment.

*Student 3* was the only student to devote an entire classroom in her school as a nature classroom. She exclaimed, “it would be fun” (Student 3, page 11) to have a nature classroom and explained that “it would have solar panels and show how you can be good to nature” (Student 3, page 11).

*Student 4* clearly designated his school to be out of town, which was especially striking in relation to a comment *Student 2* made in her interview. *Student 2* spoke about a previous school that she attended which was in the center of her then
neighbourhood. She told the researcher that everybody walked to school, which was more environmental than driving or taking the bus. She also recalled fond memories of a crossing guard that helped her and her friends walk across the road to school. 

*Student 4*, unlike *Student 2*, felt that his ideal school would be separated from a busy town and right on a beach. This suggests that the ability for people to be connected with nature in the middle of a town seems unlikely for *Student 4*.

### 5.3.5 RESEARCH INTENTIONS

During the visual investigation sessions students were asked to visualize and draw a school building that would foster, in its occupants, an ideal relationship to the natural world. The research was interested in the students’ ideas about their relationships to the natural world, and what elements of a school affect that relationship. This activity was imagined as a starting point for discussion and as a means to explore how buildings can or cannot support a relationship with nature. It was also predicted that it might be easier for many students to draw their ideas than articulate them verbally.

The drawings produced did provide as a starting point for a short discussion in each focus group and then for individual discussions during the follow up interviews. This being said the focus group only lasted forty-five minutes in total, which meant that there was not time to discuss how architectural elements at BICS did or did not support their relationship with nature in great detail. The primary means of communication of these ideas were the drawings themselves. During the interviews
the drawings served an important role in revealing how students imagined an ideal relationship with the natural world and how a school building could support that relationship.

Some less verbal participants, such as Student 5, drew a detailed and imaginative picture, which lead the researcher to believe that some students did, in fact, find it easier to draw their ideas than to verbally articulate them.

The researcher was aware that the Bowen Island Community School had some features that seemed to complement the school’s goal of prioritizing environmental social responsibility and wondered if the students would include BICS features in their drawings or if they would draw a completely different school with features that their school did not have.

The drawings that BICS students drew were variable. Some students incorporated various features that could be found in BICS (such as skylights, windows that faced gardens, or school building right next to a forest) in their pictures while others imagined schools that looked completely different.

In addition, the researcher’s knowledge of how buildings can create “indoor-outdoor relationships” (Taylor, 1988) with the use of porches, windows, or living walls made her wonder if the students’ experience or imaginations of schools would lead them to include many of these building features in their drawings.
One can see indoor/outdoor relationships in many, if not all, of the students’
drawings. Each student has elements that bring the outside (plants, animals, etc.)
inside and/or placed their school within or beside some natural environment.
5.4 VISUAL REPRESENTATIONS: SCHOOLS THAT WOULD CONNECT STUDENTS TO THE NATURAL WORLD

5.4.1 STUDENT 1

Figure 15: Student 1’s drawing of a school building that would foster a connection to the natural world in its occupants
Student 1’s drawing of an ideal school is striking in its simplicity. The school building is small, in order to have a smaller footprint. There are continuous glass windows that can completely open which allow building occupants a view of the garden, the pond, and the forest (which she explained in the interview that she imagines surrounds this building). When describing her process of imagining an ideal school she said, “I kind of pictured the back of the school but differently where it’s all grass and there’s no concrete or drive or anything and there’s a garden which there is. It’s all grass and forest.” (Student 1, page 14).

In an ideal school having windows that could completely open is important to Student 1. She believes that in her current school building she is separated from the natural world because the windows only open a little. She feels that the current windows “just keep the breeze going through but it would be good to have windows for the smells and sights and all that stuff” (Student 1, page 9). Student 1 explained that in the current school building, “You can’t really smell anything. The windows are closed off. I think the windows should open because that’s basically what windows are supposed to do. Windows are supposed to allow you to be outside inside” (Student 1, page 10).

During the interview Student 1 emphasized how important the skylights in her current school building are to facilitate students relationship to the natural world. This drawing is consistent with that belief. Student 1 added that though the entire hall of the ideal school building would be made out of glass that “maybe some of it
could be solar panels or something so we don’t have to use energy we can just use energy from the sun” (Student 1, page 23).

*Student 1* also added “I would really like to have classes outside because I find it easier to work so I feel like they should have more classes outside” (Student 1, page 9). When she was remembering her drawing for this exercise she said, “there were a lot less man-made structures and a lot more nature and there were birdfeeders and stuff like that and there were people having classes outside just outside on the grass.” (Student 1, page 14). It is not true that she drew people having class outside but it is important that she imagined that she had. Obviously *Student 1* believes that classes taking place in nature are an important element that fosters students’ relationship with the natural world.

In the interview *Student 1* added, “It would be really cool if I could design a school. I would try to make it out of all like natural things that wouldn’t harm the environment ...there’s really no way that you could avoid harming the environment... it should be just better. Not completely unharmed to nature but it could be like better material. Material that’s newer and kind of natural or something like that” (Student 1, page 14-15). This shows that *Student 1* is also thinking that the material the school building is built with is important even if she does not know exactly what material she would use to build a school.
5.4.2 STUDENT 2

![Student drawing of a school building that would foster a connection to the natural world in its occupants](image)

*Figure 16: Student drawing of a school building that would foster a connection to the natural world in its occupants*

*Student 2’s drawing of an ideal school shows the school building surrounded by trees. There is a small garden at the front of the school and the building has vines growing all the way down it. Student 2 explained that, “it would be very good for the environment because there is a lot of nature. Things like birdhomes and trees. It’s really healthy for everyone because trees produce oxygen for us and the vines make it look really nice, and make it look hidden. Like a hidden building. Because lots of people like hidden buildings” (Student 2, page 10). The vines that Student 2 imagines would provide a thick boundary, which is a property that Chris Alexander*
addresses in his book *The Nature Of Order*. Not only do the vines provide a sense of thickness and a strong boundary that unites what is at the center of the boundary with the world beyond it (Alexander, 2001) but the vines would also provide a sense of intimacy. Gaston Bachelard reveals how intimacy and the imaginary are significant in causing joy in *The Poetics of Space* (1969).

There is a green roof on the school that has trees, bushes and grasses on it as well as a birdhouse. In this picture there is a class in progress on the roof as well. When asked about the green roof Student 2 said that it would help the environment and help the building.

In the students drawings they drew features that had personal meaning for them. For example, Student 2 envisions a window that opens right onto the grass. In the interviewed she explained, “that’s an open window. At Birchland, in the music room, along the ground we had windows. It was basically an underground room and it was our music room and you could just walk up and windows were about eyelevel so you could reach through and pull some grass and bring them in” (Student 2, page 10). The experience of nature that Student 2 describes having at Birchland was significant to her because she was interacting with the natural world experientially. Pulling grass out and bringing it inside the school is destructive. Not only that but grass is usually a highly manicured aspect of nature. It is interesting, then, that this experience is extremely meaningful for Student 2 and she thinks that a school building with a window at grass level would foster an attentive relationship to
nature in its occupants. This suggests that our interactions with nature are not always symbiotic, and even when they are destructive we feel connected to the natural world.

Being destructive to nature is a mindless thing humans do. A few students spoke about that in different ways. Student 2 felt being destructive was one element of her meaningful relationship with the natural world. Another student spoke about how it is good for humans to only be able to look at nature because otherwise nature gets hurt. Student 5 told a story about children littering on the BICS school grounds and other children making the litterers pick up their garbage. In society what constitutes taking care of nature and having a destructive relationship with nature is constantly changing based on what is known or popular at the time. For example, not so long ago plastic bags were considered an ecological alternative to paper bags. Paper came from trees, therefore, to use paper bags was destructive to trees. Currently, plastic bags are known to degrade very slowly and are considered to be more an environmental concern than a solution.

Student 2 includes live plants and a hamster inside the school, making the point that having what she considers to be nature inside the school building is important in order to foster school occupants’ relationship to nature. This suggests that for this student the design of the building and school grounds is not enough; daily interactions with the natural world inside school buildings are important element in having an attentive relationship to the earth.
5.4.3 STUDENT 3

Student 3’s drawing shows her ideal school has two floors, windows, an aquarium, and a nature classroom. When the researcher asked Student 3 why it would be important to have a classroom dedicated to learning about nature she said, “it would be fun” (Student 3, page 11). The nature classroom would “have solar panels and show how you can be good to nature and stuff” (Student 3, page 11). The inclusion of the aquarium shows that Student 3 thinks that having an aquarium inside the school provides an opportunity for students to learn about sea creatures and connect to their immediate environments (given that Bowen is surrounded by the ocean).
Student 3’s drawing also has a detailed school ground. These grounds have a forest “to play and get close to nature”, a garden, a bird fountain and bird feeders, and a fish pond. During the interview Student 3 explained having the bird fountain and bird feeders by saying, “You never see birds. It would be really cool to be able to see birds. They are always hiding from us” (Student 3, page 11). Like Student 2’s inclusion of the window at grass level Student 3 includes different elements from personal experiences with nature in her drawing. Student 3 drew pinecones with peanut butter on them in the trees in behind the school in her drawing because she had made this kind of bird feeders at school during the winter. This experience allowed her to interact with birds on the school ground in a meaningful way for her.

The other elements of design that Student 3 included in this drawing were areas relating to transportation. Student 3 included a parking lot but made sure to explain the parking lot at an ideal school would be smaller than the one that currently exists at BICS. Not only did Student 3 include a dominant bike and skateboard rack so that there would be space for people to bring and store their alternative and less-polluting forms of transportation but she also thought there should be designated space in the parking lot for students to be able to ride their bike with helmets on. In Student 3’s mind this would encourage students to bike to school because there would be a place to ride your bike at school once you were there.

Although Student 3’s drawing of her ideal school has many features that are different than BICS she exclaimed that when she imagines a school that is attentive to her
relationship to nature she said she imagined a school like BICS because “everybody all the teachers and everything are always talking about nature” (Student 3, page 11).

5.4.4 STUDENT 4

Figure 18: Student 4’s drawing of a school building that would foster a connection to the natural world in its occupants
Student 4 imagined a school that would foster his relationship to nature that was right on the beach and had an ocean in the front yard and a forest in the backyard. He drew a town in the distance, emphasizing the distance between town and this ideal school. Student 4 wanted lots of windows that could all open completely “so you could feel the nature come in you could hear and feel wind and stuff” (Student 4, page 15). Student 4 made sure to contrast the windows in his picture with the windows in his BICS school classroom by stating that they were open. He said, when speaking about the windows in his classroom, that, “only the top and some of the bottom windows open but if the whole window would open up when the wind would come in you could feel it and you could hear more things”. Student 4, in his drawing, also had sunroofs or skylights on all the ceilings inside the school “like the one up there (big skylight in front foyer)” (Student 4, page 14). He felt like the skylights fostered his relationship to the natural world. There are no live animals drawn inside the school but there are live fish in the ocean and birds in the sky just outside the school. In the interview Student 4 said that when he imagined a school that would be attentive to his relationship to nature he imagined a school to have “lots of windows and potted plants and things inside and maybe like a little animal or like a birdcage inside” (Student 4, page 14). Therefore Student 4 did imagine an animal inside the school building as well as having animals living close to the school, even though this is not evident in his drawing.

It is unclear why Student 4 drew vandalism on his school building. Perhaps it was a playful gesture in response to an assignment given by a person he did not know
well. It is interesting though because vandalism is a destructive action, a process that takes away from a building. Vandalism could be seen as an act that helps to decompose a building, breaking it down to a more natural state.

5.4.5 STUDENT 5

Figure 19: Student 5’s drawing of a school building that would foster a connection to the natural world in its occupants

*Student 5’s* ideal school building focuses on the interior of the school building.

*Student 5’s* ideal school is focused on themes based on different natural animal
habitats. For example the front office has vines and monkeys; the gym has trees, monkeys, leopard, a river, and piranhas; one classroom has deer, bears and firs; one classroom has a desert, snakes, scorpions, wombats and water snakes; and one classroom has an indoor saltwater tank with fish and sharks. In other words the interior of the school would be full of nature, most classrooms would have a natural habitat on either side and students, plants and animals would be interacting all the time. When the researcher asked how Student 5 thought this school would allow students to have a good relationship to nature, Student 5 said, “because there are animals everywhere” (Student 5, page 25). When the researcher asked, “what do you think you need to be aware of nature in a school building?” Student 5 replied “to have things like the sea aquarium that we have or like having all those animals, having nature around you like plants” (Student 5, page 25). For Student 5, the presence of live animals and plants inside the school was the most important factor in a school building’s ability to foster a relationship with nature in its occupants.

Although the materials Student 5 imagines this school to be made of are unclear from his drawing, during the interview Student 5 said that he imagined a school that was attentive to its students’ relationship to nature to have more glass so “you could have to see out in different angles” (Student 5, page 23), “a more earthy design rather than just a bunch of blocks” (Student 5, page 23), and would have additional kinds of shapes rather than a bunch of rectangles in order to add variety.
5.4.6 CONCLUSION

The study participants’ drawings of ‘schools designed with students’ relationship with nature in mind’ show elements that they believe make a difference in the lives of students. Students 1-4’s pictures include details that reveal and stress the importance of the relationship between the school building and the school site. The views from and the surroundings of the school building are important. Although that Student 5 verbally stressed this importance in the interview he focused solely on the interior of the school building in his drawing. All five participants also included various examples of indoor/outdoor interfaces such as windows, skylights, indoor plants and animals.

These drawings incorporate elements these students have experienced, enjoyed, and find meaningful as well as features that they have not experienced but imagine would connect them to the natural world. These drawings and the students’ ideas are important to reflect on as they show possibilities of what schools could be. School buildings can be envisioned in a new way. The actual school building can become a tool that is associated with learning and connecting students to the natural world. During the visual investigation, for the students of this study, school buildings became just that, if only in their imagination.
5.5 RELATING VISUAL REPRESENTATION FINDINGS TO THEMATIC ANALYSIS

The data collected during this study was analyzed using thematic analysis. Thematic analysis is a search for themes that emerge as being important to the description of the phenomenon (Daly, Kellehear & Gliksman, 1997). The main themes (sense of freedom, moments of joy, aesthetic response, social cohesiveness) found in the interview transcripts are also visible in the students’ pictures of schools that they imagine foster their relationship with the natural world. The presence of the themes in these pictures reinforces and adds richness to the story told by the data collected in this study. Additionally these pictures were the first the students drew during the two focus groups and only the second activity during these sessions. Students drew this picture very close to the beginning of the time spent with the researcher, before they were asked interview questions. The early presence of these themes, then, suggest that they are in fact a reflection of students unbiased ideas and experiences, rather than a projection of the what the researcher intended or desired. At the outset of the data collection, the relationship of school building with school site and indoor/outdoor interfaces (the two design elements found to impact students’ relationship with the natural world) were evident in these pictures, which reinforces the validity of this result as well.
During the interviews students were asked if they thought their school building taught them anything, how it helped and harmed nature, and if they thought it was possible for a school building to help nature. The students’ answers to these questions begin to show an idea of how they experienced their school building and how they view school buildings in general.

In summary, students’ answers to these questions only provided nominal information. Students indicated that they did not think that their school building taught them anything. Many students felt that buildings do not help the environment. Instead buildings harm the environment because in order to build them trees need to be cut down. However, a few students thought it would be good if buildings were designed to help the environment. The only way the BICS building was noted to help nature was the preservation of the forest behind the school. Students admitted that they did not often think about design, however, they did feel the effects of aspects of building design. Students specifically spoke about light and how levels of brightness seemed to affect their mood in a building, whether it was their home or their school.

5.6.1 SCHOOL BUILDING TAUGHT NOTHING

Although many of the interviewees thought that the people inside the school building or the school’s ecological attitude taught them things, many did not think
that the building itself taught them anything. Examples of students’ answers to the question do you think that this building teaches you anything include, “not really” (Student 3, page 10) and “not really. Not the building itself. But maybe the school attitude with the whole conserving water and they teach you what you can do at home to conserve water and energy and all that stuff and not to litter and be wasteful” (Student 1, page 12). When asked if buildings in general teach her anything, Student 2 replied, “not really. Unless they are designed to tell people about the environment. Like I heard on the news about greenroofs. Some buildings that are over this height and over this size have to have a green roof with plants and all that kind of stuff on it. It really helps the environment, it helps the building.” (Student 2, page 9). These examples show that though some students had ideas of how buildings could teach they did not feel that their school building taught them anything they could think of or articulate.

It is not surprising that the interview students felt that their school building did not teach them anything. This concept did not seem immediately accessible to these grade six and seven students. The idea that curriculum is embedded in every building and that that curriculum is powerful and instructive (David Orr, 1997) seems out of the awareness for the participants of this study. Although Orr’s argument that buildings teach, if a building uses energy wastefully, for example, “the building tells its users that energy is cheap and abundant and can be squandered with no thought for the morrow” (Orr, 1997, 597) is persuasive there are no empirical studies that show how buildings teach and what they teach. This study
began the work of gathering data from students’ lived experience to see how this argument is perceived from building users. Even though students spoke about their experience in their school building, this study was not able to show the relationship between the school building and what the students learn from the building. There could be many contributing factors for this. As it was difficult for students to articulate if or what they learned from their school building when asked directly because it is out of their awareness, other techniques might have yielded richer results. For example, if this had been an ethnographic study and the researcher was able to observe the students for an extended period of time it might have been possible to observe behaviour that might have indicated either that students learn from the building and how they do so or that they do not learn from this building. If it was possible to conduct a second interview with the same five BICS students after the initial data was analyzed perhaps the researcher could ask questions informed by the initial data that would yield more specific results. The lack of sufficient data could also be due to the age of the study participants. Perhaps if this study had focused on the teachers at BICS it would be more clear what this particular school “teaches” its occupants (in the way that Orr speaks about).

5.6.2 BUILDINGS AND THEIR ENVIRONMENTAL CONSEQUENCES

A few students thought it would be “cool” if they did learn things from buildings rather than just inside of them. When asked how they could learn from the school building itself students were unsure of what to say.
It became evident that study students felt that buildings did not help the environment. A few examples of students’ comments are, “it’s a building. It doesn’t really help nature.” (Student 3, page 9) and “Buildings just don’t help the environment that much. Buildings in general.” (Student 2, page 11). Student 3 expanded on her answer by saying that in order for buildings to be built trees are cut down (Student 3, page 20) and Student 2 said that the school building “took away a lot of nature because of how big it is” (Student 2, page 8). When asked if she thought the way that BICS school was designed helps nature in any way Student 2 said, “not really, except that it is surrounded by forest. Which is pretty cool. I like forests.” (Student 2, page 8).

Students’ ideas about how buildings affect the environment show their awareness that what humans do alters nature and the dominance of buildings harms the natural world more than buildings contribute to nature. It was interesting that the conservation of the forest behind the school, which was a clear intention of the design of the primary wing of BICS, was mentioned as a way that the BICS building helped the environment.

Although most of the students felt that buildings do not help nature in general, one student thought, “buildings should be built to help nature” (Student 1, page 21) because “the entire world is focused around global warming and everybody talks about doing stuff but nobody ever really does anything. Some people do of course but I think that would be a good idea because without actually having to put in a
huge effort which a lot of people do not have time to do they can just make their home more energy efficient like use better products and put in better light bulbs and stuff like that” (Student 1, page 21). Student 1 feels that if buildings were built to help nature it would demonstrate that people actually cared about global warming because they were willing to take action by building better buildings. This student also feels that having buildings that help nature would allow people to treat the environment better without having to apply much effort.

It is interesting that this student wants both architects and builders to take action and reduce global warming by designing and building better buildings and realizes that people do not want to put effort into changing their habits in order to benefit the environment. If more resource efficient buildings existed, people could use these efficient buildings and continue their non-active attitude. The building, by being efficient would do the work for them.

5.6.3 DESIGN OF SPACES WITHIN SCHOOLS

Once it became apparent it was difficult for students to speak about building design the researcher asked students if they thought about the design of spaces (for example the way classrooms are built or the way that the lights turn on and off). One student replied, “not really. Sometimes I’ll just notice something like, ‘those are really bad lights for saving energy or whatever’ but I don’t really think about it. I don’t really make an effort to think about it.” (Student 1, page 20). Over the study it seemed that students did not think about the design of their school much, however, occasionally students would refer to specific things that related to school design. For
example when *Student 1* was speaking about the classroom in which she felt the most connected to the natural world in she said, “it also has this door that you can go outside. I think that’s good so you can just go through the door and you are outside instead of going through the school and getting outside” (Student 1, page 13). Here *Student 1* is clearly pointing out that she likes that the classroom she is speaking about has its own door (which is a designed feature) that goes to the outdoors. Instead of asking students directly about the design of the school building, the researcher found that asking indirect questions revealed more of the students’ ideas about their school building.

When asked if students thought that the design of their school building was neutral or did not matter, some students did admit that they felt differently in different buildings. *Student 3’s* answer to this question included “some buildings if they are more bright then you feel more cheerful” (Student 3, page 20). *Student 1*, also described feeling differently in two different houses depending on levels of brightness, sunlight, and air circulation as well as amount of space. In one house that was “really bright and airy” (Student 1, page 13) she felt she could “be free and jumpy and excited” (Student 1, page 13) and “it’s more fun” (Student 1, page 13). In another house that did not allow sunlight in and felt tight, although it was a bigger house, she said she “was always feeling uhhhh and so sad” (Student 1, page 13). When asked how she felt in the school building compared to the two feelings she was describing *Student 1* said, “I think it’s somewhere in the middle but more towards the happy side because it’s really big and open and high ceilings, big hallways, it’s
always really bright because of the windows and everything but still it’s like school right so I’m not my happiest here because you can’t interact with nature much more than seeing it in this school and so it’s like in between” (Student 1, page 13).

Both Student 3’s and Student 1’s answer primary addresses the amount of light and how that contributes to their happiness. However, Student 1 adds that the sense of openness is also important to her.

These are examples of what students said about their current school building and their ideas of buildings in general. It would be important to conduct further studies in order to expand on this work and come to a deeper understanding of how school buildings affect their occupants.
6.0 THEMATIC ANALYSIS AND DISCUSSION

6.1 INTRODUCTION

This chapter presents the key findings of the thematic analysis of the visual investigation and follow-up in-depth interviews of five grade 6/7 students. There were two aspects of the design of Bowen Island Community School that clearly informed the intermediate study participants’ relationships with the natural world. These two design aspects were:

1. *School site and the presence of nearby nature*
2. *Indoor/outdoor interfaces* such as windows, skylights, computers, the seaquaria, natural building materials and transition zones (e.g. stoops or covered porches).

The themes present in the data collected were: sense of freedom, moments of joy, social cohesiveness, and aesthetic/emotional response. These themes point towards impacts of students’ experience of both aspects of BICS design, having access to natural places on the school site and outdoor/indoor interfaces.

The thematic analysis is organized in the following sections:

A. Students’ Responses to *School Site* (or *Having Access to Natural Places on the School Site*)
   1. Sense of freedom
   2. Moments of joy
   3. Social Cohesiveness
   4. Aesthetic/emotional response

B. Students’ Responses to *Indoor/Outdoor Interfaces*
   1. Sense of freedom
   2. Moments of joy
   3. Social cohesiveness
   4. Aesthetic/emotional response
6.2 STUDENTS’ RESPONSES TO SCHOOL SITE

6.2.1 SENSE OF FREEDOM

Students expressed having a sense of freedom in relation to having access to natural places such as the forest, memorial garden and the community garden.

There were many different kinds of freedom related to the design of the school site expressed during the interviews and in their drawings. These freedoms included freedoms from (e.g. freedom from work, freedom from the noise of traffic) as well as freedoms of (e.g. freedom of solitude, freedom of expression, freedom of imagination).

*Freedom from other people or freedom of solitude*

*Student 1* expressed that the memorial garden provided her freedom, more specifically solitude, when she was asked where she had her best ideas at school. Her answer included being outside in the memorial garden. She explained that, “it’s right next to a garden, there’s cherry trees there and there’s plants again and then over there there’s a big tree and there’s a little ledge out by the office. I like sitting there because nobody ever goes out there so it’s right there and it’s very calming and nobody bugs me there or anything.” (Student 1, page 3-4).

This quote highlights the proximity of the garden to the school and the calm and privacy *Student 1* feels when she is on the ledge within the memorial garden. The garden has a concentration of plants and their presence is important to *Student 1*. 
She emphasizes she feels both calm and inspired around plants. Earlier in the interview Student 1 mentioned that she liked designing clothes and the plants gave her ideas, which indicates that like Moore (1997) suggests the natural world fosters her creativity.

School is often busy, noisy, and chaotic and it is important for children to have an easily accessible place on school grounds that is relaxing and even inspiring. Perhaps natural spaces can more easily offer students a place of beauty and solitude.

The phrases “nobody bugs me there” and “nobody goes out there” also stand out. It is clear that Student 1 feels that when she is in the memorial garden she does not get disturbed. She feels free to be, think, and do as she pleases. This freedom can be contrasted to times in classes where she is not free either because she needs to complete a task that a teacher has assigned to her or because people will disturb her in one way or another. In Last Child in the Woods Richard Louv presents a study of Finnish teenagers in which a student describes the importance of going into nature so she didn’t have to deal with anyone else. Being in nature was her way “to escape without fully leaving the world” (Louv, 2008, 52). Student 1 similarly felt like she did not have to deal with anyone when she was in the memorial garden.

In expressing “nobody goes out there” Student 1 also shows that she feels the memorial garden is hers and nobody else’s. This is interesting because other students did speak about the garden, indicating how they went and played in the
garden often. However, *Student 1*, has a sense that nobody goes there. It is important to *Student 1* to have her own private space and to feel ownership of this natural space. The ownership that she feels connects her to her school and possibly reinforces her relationship with nature.

Similarly, though expressed slightly differently, when *Student 3* was talking about why she liked being in the forest on the school grounds she said one of the reasons was that it was quiet and she couldn’t hear the cars (*Student 3*, page 2). *Student 3* feels freedom from noise when she is in the forest, which also can be seen as a kind of solitude.

**Freedom of expression**

Although several students referred to the fact they felt freer outside in the forest than in the school building the best example that illustrates the freedom of expression that students seem to feel in the natural places on the school site is elaborated below.

*Student 1* exclaimed that, “Not outside on the playground but more like the forest places I can be me, by myself kind of, you know, where it’s not all like construction and architecture. It’s just natural.” (*Student 1*, page 4)

The forest is a place that *Student 1* feels she can be herself; this is a powerful feeling. She feels free to be herself in the forest, which is natural, and she does not feel free
to be herself on the playground, which is constructed. Both the playground and the forest are supervised at Bowen Island Community School. Is there something about natural spaces that allow people to accept themselves or gives them permission to be more of themselves?

One commonality the playground and buildings share is that there is a code of behaviour when one is on or in these kinds of environments. This code of behaviour is more restrictive than the less defined code of behaviour for being in a forest. This could be one reason it is easier to Student 1 to feel free in this kind of space.

Perhaps too, although supervised, one can easily feel less under surveillance in the forest. One reason for this is that there are more variations and loose parts\(^5\) than there is on the playground. There are more objects, such as trees, to feel hidden by, and therefore it is easier to feel free to do as one pleases. Student 5 stated that he tried to “stay within the tree parts” as he liked “the trees more than the open space” (Student 5, page 13). Unfortunately this student did not say what he liked about being in the trees compared to being in the open, however it is possible that he feels more protected and more hidden.

\(^5\) “Loose parts have infinite play possibilities and their total lack of structure and script allows children to make them whatever their imaginations desire” (White and Stoecklin, 1998)
Freedom of imagination

One of Student 2’s favourite places in the world was the forest on the school site. She spoke about how her and her friend would often play imaginary games there (Student 2, page 6). Similarly, one of Student 3’s favourite places at the school was the memorial garden. Student 3 revealed how she would imagine branches of certain bushes and trees in the memorial garden to be a jail and play with her friends there (Student 3, page 2). These two students felt free to use imaginations, while being in relationship with others in natural places on the BICS school grounds. When students are in nature all their senses are excited which could contribute to the imaginative freedom they feel both in the forest and in the memorial garden.

The experiences that these two students describe support Moore & Wong’s statement in Natural Learning that states, “natural spaces and materials stimulate children’s limitless imaginations and serve as the medium of inventiveness and creativity” (Moore & Wong, 1997). There are also studies that support Nicholson’s “loose-parts” theory which suggest that children are more imaginative in nature than in manufactured play areas. The “loose-parts” theory can be summarized by “in any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of variables in it” (Nicholson, 1971 as quoted in Louv, 2008, 89). Nature is considered to have “the richest source of loose parts” (Louv, 2008).
6.2.2 MOMENTS OF JOY

There were many descriptions in students’ accounts of their experiences in the natural places on BICS school site that stood out as specific moments where they felt joy or delight.

_Student 1_ expressed joy when she spoke about visiting the community garden during recess and lunch. She said, “I just like looking at it and stuff. Cause it’s fun to watch everything because you go in the beginning of the year and there is little sprouts and then you go later and there’s big shoots and stuff.” (Student 1, page 8)

The garden is _Student 1’s_ favourite space at school. _Student 1_ does not actively garden there, though she is an active gardener at home. Instead she goes there to watch the garden. She specifically speaks about seeing the same plants grow over time. As _Student 1_ observes the life cycle of plants she most likely has feelings of respect and awe. She is engaging in observation and perhaps noticing details about the plants that she is watching which might be fueling other questions.

_Student 1_ also told the researcher that she loves to be in this garden because it “makes me feel really good”, “it calms me down and relaxes me and all my fears, worries, stress just goes away and I can relax and have fun” (Student 1, page 5). The researcher asked _Student 1_ what she was stressed about and her reply was, “well, usually homework or projects that I have to do or I take singing lessons and
sometimes if I have a concert coming up and I haven’t memorized my song or
whatever there are just little things like that but especially homework because
homework is a huge one and I’m always struggling to get everything done because
there is so much” (Student 1, page 5).

The school community garden is an important de-stressor in Student 1’s life. It is
important to have this calm place at school because schoolwork and social
pressures are major influences of stress in children’s lives. Feeling relaxed
contributes to Student 1’s ability to have fun.

This finding is not surprising, as many studies have found that contact with nature
can help people handle stress. One study with children in grades two to five found
that “more [nature] appears to be better when it comes to bolstering children’s
resilience against stress or adversity” (Wells and Evans, 2003, 327). Student 1’s
comments that the garden helps her feel more relaxed reinforces Wells and Evans
findings that nature can bolster children’s resilience against stress.

Another student, Student 2, also expressed experiencing moments of joy while in the
community garden. When Student 2 spoke about the garden she said that she
especially enjoyed the garden, “when it’s sunny. And right after it rains. Definitely.
Because you can smell the dew and there is raindrops. And it makes everything
sparkle”(Student 2, page 7).
Student 2 spoke about the garden her eyes lit up, her voice got louder and she spoke more quickly. Talking about the garden after a rain got Student 2 excited and her joy was palpable. Although the literature regarding children’s connection to nature does not necessarily address the joy children feel as a result of contact with nature there is support that shows that “most adults looking back on their childhood cite the natural world as an emotionally critical aspect of their youth” (Kellert, 2005, 71). It is not surprising then that BICS students’ stories of their experiences with the natural world were joyful.

6.2.3 SOCIAL COHESIVENESS

When students spoke about their experiences in the natural places on the school site many of their stories involved being in the forest or gardens with other people they cared about. It seemed that one of the impacts of these natural spaces was that they fostered the growth of relationships.

One of Student 2’s favourite places in the world was the forest on the school site. She spoke about her and her friend often play imaginary games there (Student 2, page 6). Similarly, one of Student 3’s favourite places at the school was the memorial garden. Student 3 revealed how she would play within the garden with her friends (Student 3, page 2). Student 3 also talked about the forest as one of her two favourite places at school. When the researcher asked her what she liked about the forest she said, “It’s just quiet. And you can build forts in it. We always build forts in it. And we play in them and stuff.” (Student 3, page 2). When asked to elaborate the student
said, "Wood, and tree branches that have fallen down and everything. Just pile them and we build little shelters." (Student 3, page 2).

Building forts in the forest is one way that Student 3 and her friends are showing industry and competence by creating something from the natural materials they find. At the same time they are in relationship with each other, somewhat away from the world of adults. For children at this stage in their development, establishing a self that is separate from adult control (Erikson, 1968) is a meaningful activity and is written about extensively in literature about children and nature. Having access to natural places at school that allow for activities such as collective fort building and collective play seems to build social cohesiveness among students.

There are studies in the related literature that also suggest that nature may encourage social interaction. Louv, in Last Child in the Woods states that, “one reason for the emotional benefits of nature may be that green space fosters social interaction” (Louv, 2008, 51). Louv notes that a Swedish study conducted by Huttenmoser showed “that children and parents who live in places that allow for outdoor access have twice as many friends as those who have restricted outdoor access due to traffic” (Louv, 2008, 51). The information gathered in this study, though it was not comparative, seems to be in agreement with the results.
6.2.4 AESTHETIC/EMOTIONAL RESPONSE

Students also expressed an aesthetic or emotional response for the natural places on the school site.

When asked where she had her best ideas at school Student 1’s answer included being outside in the memorial garden. She said, “I like sitting at the base of the stairs. I don’t know why. I just like it (Student 1, page 3). When asked what she liked about the memorial garden, she explained that, “it’s right next to a garden, there’s cherry trees there and there’s plants and then over there there’s a big tree and there’s a little ledge out by the office. I like sitting there because nobody ever goes out there so it’s right there and it’s very calming and nobody bugs me there or anything.” (Student 1, page 3-4).

The garden offers her a space that has an aesthetic quality. The garden has a concentration of plants and their presence is important to Student 1. She emphasizes that she feels both calm and inspired around plants. Earlier in the interview Student 1 mentioned that she liked designing clothes and the plants gave her ideas.

Student 3, named the memorial garden among her favourite spaces in the school. When asked what she liked about the memorial garden, she replied, “It’s really pretty. There are lots of flowers and people make it hard to make it pretty” (Student 3, page 2). When asked where in the garden she prefers to be, she responded: “just
underneath the branches and stuff. Me and my friend were playing police captures and we were pretending it was a little jail thing. It was really fun” (Student 3, page 2).

Student 3 has an aesthetic response to this natural space. For Student 3, the beauty of the garden is important. This beauty inspires Student 3 to want to be in this space and use her imagination. She also mentions the effort the school community puts into the maintenance of the garden and sees that people at her school care about the garden and perhaps feels cared for because of it.

Unlike Student 1 who spoke about sitting at the edge of the garden Student 3 talks about playing right under the trees and bushes that are in the garden. The beauty of the garden attracts her. This student can be inside of the garden and it is a place that enables her to be social with others because it provides a place to play. Through play, she makes this space hers by imagining and making it her own with her friend.

When Student 1 and Student 3 spoke about the memorial garden the prepositions they used for their activities caught the researcher’s attention. Christopher Alexander, Douglas Paterson and Robert Irwin all point towards the importance of examining prepositions in relation to how people encounter and occupy spaces.

According to this line of thought, one of the things that make a place special is its’ prepositional possibilities and the more prepositional possibilities that a place has the better the design. For example Granville Island is special because of its’
“under”ness. If Granville Island were simply an island, as opposed to an island under a bridge, Granville Island would feel less special. Both Student 1 and 3 have a strong response to the memorial garden. Student 1 speaks about being “beside” the garden and Student 3 speaks about being “under” the branches or “within” the garden. This implies that the garden is a space that has different prepositional possibilities, which adds to its attractive quality.

*Student 5* described the forest as “special”. The fact that BICS had a natural play space, the forest, embedded into the school grounds differentiated the students’ school from other schools. When asked what he liked about the forest, “occasionally a deer actually wanders in there so it’s good to see that and it’s just a change from what most schools are it’s just a big grounds without any trees on it. It’s just special” (Student 5, page 2). *Student 5* felt that it was special for a school to have a forested area on its grounds. It is possible that *Student 5*’s sense of pride regarding the forest connects him to the school. It is likely that the presence of the forest at school increases the possibility that *Student 5* has a daily relationship with the natural world. He sees wildlife and enjoys being in and having access to the forest.

When comparing these findings to the literature it is interesting to note that Heerwagen and Orions suggest that an aesthetic or emotional response to a landscape is an important habitability cue. In fact, “the sense of aesthetic pleasure and emotional enticement associated with nature is, in Wilson’s view, the “central issue of biophilia”” (Heerwagen & Orions, 1993, 142). This initial aesthetic or emotional response if positive can trigger a process of exploration that can lead
people to remain in an environment for either a brief amount of time to conduct certain activities or for extended amount of time. The participants in this study, at least in regards to the natural spaces on the school site showed positive aesthetic and emotional responses. This means that they are attracted to these spaces and have decided to explore them repeatedly.

6.3 STUDENTS’ RESPONSES TO INDOOR/OUTDOOR INTERFACES

Indoor/Outdoor interfaces are the points, areas, or surfaces that can be considered to be a juncture between indoors and outdoors. There were several indoor/outdoor interfaces at Bowen Island Community School. For example the most prevalent indoor/outdoor interfaces that students both discussed and drew were the windows, which provided a view to the outdoors. Other indoor/outdoor interfaces at BICS were the two skylights, the natural building materials used in the primary wing, the seaquaria, computers (in certain circumstances), and the covered area that connects the front of the school building and the stairs.

6.3.1 SENSE OF FREEDOM

Students indicated that certain indoor/outdoor interfaces gave them a sense of freedom. The specific freedom that seemed most prevalent in relation to interfaces seemed to be a freedom from the interior, both the interior of the school building and the interior of a students mind.
**Freedom from the interior**

One student felt he did his best work at school in his classroom when he could look out the window. He liked looking out the window because “lots of times there’s something new to look at. It’s not the same thing” (Student 4, page 5). The view out the window offered variety. When students were asked what they could see out the window they replied, “you can look outside and see animals and plants outside” (Student 4, page 11), “the windows let you see out” (Student 5, page 17), and “our classroom has a really big window that overlooks the forest and sometimes we see deers and squirrels and all the time the forest is there and it’s right near the garden so we can always see the nature outside the window” (Student 1, page 8). In addition to variety, though, looking out the window offered students something else as well.

*Student 4* felt that if he couldn't look out the window when he was working he “wouldn't feel as concentrated and [he’d] get bored pretty often” (Student 4, page 5). *Student 4* explained that looking out the window helped him concentrate because this activity afforded him a short respite from both his work and the inner workings of his mind to some extent. Looking out the window in his classroom focused his attention on the external world, which helped him when he was “stumped” on his work. The indoor/outdoor interface or window provides a useful means of escape. The window gives the student the opportunity to take his consciousness somewhere else. This is important to this student and he describes this opportunity as
extremely helpful to him specifically because he feels this ability contributes to his productivity.

Although other students said that the window or the view out the window was their favourite part of their classroom no one else mentioned that looking out the window aided their concentration. These students however did say that they looked out the windows “all the time” (Student 3, page 13), “most of the time” (Student 5, page 19), “quite a bit” (Student 1, page 19) and “an enormous amount” (Student 2, page 13). When these students shared why they liked looking out the window their answers revolved around what they saw out the window, such as a particular plant they liked, animals, the garden, the forest, etc. The ability to look out the windows allowed students to visually interact with nature as well as gave them a sense of freedom. The window expanded the classroom in a sense to encompass the world right outside the school walls. One of things that became apparent as students spoke about the windows in BICS was the relationship of the school building on the school site. This relationship, the fact that much of the forest was left intact on the school grounds and the location of the community garden in the courtyard has a significant impact on the building occupants. There is a feeling of the “muchness” of the windows at BICS – there are many windows of considerable size and from almost every window one can see a natural landscape. Other school buildings have windows but often these windows face concrete landscapes, houses or school fields. The view out of the windows of BICS provides a different experience. The view at BICS is a constant reminder of natural world that is just outside the school's doors.
The BICS student’s comments regarding the windows in their school can be compared to studies that have focused on positive effects of exposure to nature in the workplace. Although this study was qualitative and focused primarily on five students, Student 4’s comments suggest that he felt more productive when he could look out the windows that faced the natural world. Various researchers (Heerwagen & Hase, 2001; Boubekri, 1991; Browning & Romm, 1998; Fisk & Rosenfeld, 1997; Heerwagen & Orians, 1986; Kaplan, 1995; Katts, 2003) have studied how viewing of nature at work effects workers and found results suggesting that productivity was increased as a result. Although none of these studies used elementary students as a study population the same benefits might apply to students in school. In addition to studies relating productivity to views of nature, Faber, Kuo and Sullivan’s (2002) study shows a relationship between the naturalness of window views and girls ability to concentrate.

6.3.2 MOMENTS OF JOY

Indoor/Outdoor interfaces provided students with moments of joy and celebration. Looking out windows not only helped some students concentrate but also made some students happy. For example Student 5 said that looking out the window at the forest from the primary wing made him “feel happy” (Student 5, page 19). Another student said that she was happier when her desk in her classroom faced the window because she could see plants in the community garden. She said, “I like looking at the tree that’s growing in the middle and there is all the all the giant sunflowers and
stuff (Student 2, page 13). Later she said, “well it just reminds me of nature and how lucky we are to live in such a beautiful place” (Student 2, page 15).

Being able to see the garden at school made Student 2 feel lucky and acknowledge the fact that she lives in a beautiful place. She felt most aware and connected to nature when she was in or looking at the community garden. For this particular student this was significant because she spoke about how she did not feel connected at school. Student 2’s experience of the garden is a multi-sensory one, she takes in smells, sights, and sounds and they tie her to Bowen Island, the school site, which she calls “her place”. She cares about the garden, and feels nurtured by it.

Indirect contact with nature via the windows in their classrooms benefited these BICS students’ emotional well-being. Within the research of Human and Natural Systems some of the same studies that found workers with windows facing nature can increase productivity the results also found that workers had higher levels of satisfaction and emotional well-being (Kellert, 2005). The interviews suggest that this could also be true for students in school.

Students also spoke about their experience looking at nature through the skylights at BICS. These skylights did more than bring natural light into the hallways. They highlighted or celebrated natural weather events, which became meaningful experiences for the students.
In addition to the windows, skylights were mentioned as attributes of the school building that fostered awareness of the natural world in students. The students could see “the sky, birds, lots of trees” (Student 3, page 19), “nature” (Student 3, page 19), “snow” (Student 1, page 9), “leaves” (Student 1, page 9), and “rain” (Student 4, page 11) through the skylights. The students noticed that it was darker in the hallway in the winter, especially when snow was piled up on the skylight. Students also noticed that sometimes birds would land on the skylight and they would be able to see how a seagull walked just above them.

The rain on the skylights was something that more than one student highlighted as an event in particular that made them most aware of nature inside the school building. In the following example Student 4 speaks about the rain: “sometimes out there in the main hall you look up and there’s the glass things it rains and you can hear it a lot” (Student 4, page 11). Skylights accentuated the rain and allowed the building occupants to celebrate natural weather events. Student 1 revealed that the skylight was one way she could tell the seasons in her school building. She said, “The skylight. Well snow lands on it and it’s really weird because it’s dimly lit. Because they don’t usually have that many lights on in that hall because of the huge skylights so it’s all like dim and weird kind of looking.” (Student 1, page 18) Snow is another event that the skylights celebrate. Snow gathers on the skylights and creates a remarkable dimness because the hall lights are rarely turned on. Other students also referred to the grandeur of the skylights. Student 3 exclaimed, “there’s that HUGE window in the immediate hall that just goes on and on” (Student 3, page 8).
Although the skylights were referred to less than other features in BICS, students were captivated by the experiences of the natural world that the skylights created. Some teachers at BICS use the skylights explicitly in their lessons about weather, which possibly reinforces students to notice and delight in what can be seen from them.

6.3.3 SOCIAL COHESIVENESS

When students spoke about interacting with indoor/outdoor interfaces often they described solitary experiences. Only occasionally students mentioned events that suggested how these interfaces contributed to social cohesiveness.

However, one student singled out a transition zone as a place in the school building she felt most inspired. She often occupies the sheltered space just outside the front door of the school. She said when she’s there she is “with [her] friends so [she is] all happy” and that from there she could “see the entire playground” (Student 3, page 5). This transition zone provides shelter from the rain, a gathering place, and a view from of the entire playground. All three of these characteristics of this interface contribute to its attractiveness to the school occupants.

*Student 3’s recollection of her experience highlights the positional power she and her friends feel when they occupy this transition zone. She and her friends have the ability to see a large area where other children are playing which is important and gives this group of students’ power. Being able to spend time in this spot together also allows these students to develop relationships. This relates to the idea of*
prepositions and how good places have many prepositional possibilities (Paterson, 1993). In this instance Student 3 is feeling “above it all” but also very much “with” her friends. These prepositional realities contribute to her enjoyment of this interface.

The other indoor/outdoor interface that the researcher observed fostering social cohesiveness was the seaquaria. On three different visits to BICS students were gathered round the seaquaria. Once the researcher saw that students were crowded around the tank just after the recess bell had rung. They were on their way outside but lingered and stopped to look at the identification chart that rested on the top of the tank. Another day students were sitting in front of tank at the beginning of the school day making observation notes in their journals. A group of five students would come and stay for five minutes and then the next five students came. Later that same day another class was using the seaquaria as inspiration for creative writing and illustrating their stories with pictures of sea creatures from the tank. However, none of the study participants spoke about their experience of the seaquaria in relation to other students, parents, or teachers during the interviews. Some students, did however, draw the seaquaria as the place in the school that they felt most connected to the natural world.

6.3.4 AESTHETIC/EMOTIONAL RESPONSE

The seaquaria was one interface that inspired a strong aesthetic and emotional response in students. Similarly to Student 5’s feeling about the forest, Student 2 felt
the seaquaria was special. During the interview Student 2 exclaimed, “you don’t see a seaquarium everyday. It’s my favourite, sea cucumbers. Yeah, they spit out their guts for protection. You can still see its guts.” (Student 2, page 9). This interface was potent for this student. She was learning about the sea creatures from her experience of watching them and felt that the seaquaria taught her that “nature can be really really really pretty” (Student 2, page 9). The positive emotional and aesthetic response in relation to the seaquaria Student 2 had attracted her to the seaquaria and fostered her learning about the sea creatures inside it. The pride that she feels about having the tank in her school most likely contributes to her positive feelings about the school in general as well.

The natural materials, particularly the wood beams, tree cookie, and cedar planks, used in the primary wing of BICS acted as an interface that brought the outdoors inside the school building. Although three participants (Student 1, Student 2 and Student 5) pointed out how they preferred either the classrooms, the views from the windows or being in the hall in the primary wing one student in particular articulated how she felt about this particular indoor/outdoor interface. Student 2 said that she felt really “really close to nature” (Student 2, page 22) when she was in the primary wing, “because they made the whole place out of trees that were standing there and it’s really pretty” (Student 2, page 7). She said that seeing the wood “tells me the world is really beautiful” (Student 2, page 22). When the researcher asked if it would make a difference in her school day if the whole school building was built that way she said, “probably. It would make this place look SO
much nicer and it would put so many people closer to nature” (Student 2, page 22). This student enjoyed being in the primary wing more than in the older part of BICS school building. One of the biggest impacts of the natural wood for this student is an appreciation of both the particular beauty of the wood featured in the design and the general beauty of the world. The presence of the wood also fosters Student 2’s connection to the natural world, particularly her connection to the forest on the school property.

It is difficult to know if the whole school was built using natural materials whether students would have a different experience of school, themselves, or the natural world. However, Student 2 prefers to be in this part of the building, wants the entire school building to be designed using natural materials and thinks that if the entire school was designed that way people using the building would feel closer to nature.

It was hard for Student 2 to articulate what was happening inside of her when she was in the primary wing. Perhaps if there was more time the researcher could ask her more questions to try to determine if she is learning something particular from the use of natural materials in this designed space and if so, what it was. However, Student 2’s strong affinity for the space suggests that there is an internal reaction happening inside of her when she is in the primary wing. In Environment and Children Christopher Day claims “appearance speaks of underlying values” (Day, 2007, 137). The primary wing at BICS is not sterile and the use of the natural materials shows a relationship to nature. Perhaps the values that are passed on to
building occupants include sterility is not necessary and that relationship to nature is important. The wood is touch-friendly, warm and alteration tolerant, providing a welcoming enclosure for the occupants. The scale of the primary wing is noticeably smaller than the original part of BICS. This enables students to feel valued and welcomed because both their size and perspective is considered.
7.0 CONCLUSION AND RECOMMENDATIONS

7.1 SUMMARY OF FINDINGS

The initial research questions were how are intermediate students’ relationships with the natural world mediated by the design of their school building and which parts of BICS school mediated intermediate students’ experiences of the natural world? In this section, the findings will be discussed briefly in relation to these initial research questions.

7.1.1 WHICH ELEMENTS OF BICS MEDIATE STUDENTS’ RELATIONSHIP WITH THE NATURAL WORLD

As described in Chapter 6, there were two design features that mediated students’ experience of the natural world. First, the relationship between the school building and the school site both emphasized and allowed for the presence of natural environments such as the forest, memorial garden and community garden. The presence of these nearby natural environments was critical in providing spaces for students to regularly encounter the natural world at school. The relationship of the school building to the larger property highlighted the existence of these natural environments. Second, the indoor/outdoor interfaces such as the windows, skylights, natural building materials, seaquaria and occasionally computers, invited student interactions with nature inside the school building. The transition zone was the exception, providing students with an element of the indoors, shelter, while they were just outside the school building.
7.1.2 HOW STUDENTS EXPERIENCE THE ELEMENTS OF BICS THAT MEDIATE THEIR RELATIONSHIP WITH THE NATURAL WORLD

The question of how students’ experience the elements of BICS that mediate their relationship with the natural world was broad in its scope. The data showed there were many factors working simultaneously. The findings then, cannot stand on their own but only in relation to each other.

Throughout this study students revealed experiences of BICS that were important to them. In relation to their experiences in the natural environments on school grounds and interacting with the indoor/outdoor interfaces, students often had an aesthetic response and felt a sense of freedom, joy, and social cohesiveness.

Several students’ experiences of BICS reinforce the findings of various related studies. For example the findings of this project reinforce that: children in middle childhood have a strong preference for outdoor places (Moore, 1986); nature can bolster children’s resilience against stress (Wells & Evans, 2003); views of nature can affect productivity (Heerwagen & Hase, 2001); well designed places have multiple prepositional possibilities (Paterson, 1993); and contact with the natural world can improve one’s concentration (Taylor & Kuo, 1998, quoted in Louv, 2008, 89) and stimulate creativity (Moore & Wong, 1997).

In addition to the connections to related literature, this study found that BICS students felt cared for and special as a result of having access to natural environments on school grounds. BICS students had a sense of ownership and
investment in BICS as a school and as a place because of their sense of freedom and joyful and aesthetic responses to the forest and gardens. As well as providing joy, students felt that access to windows in their classrooms allowed them to take mini-breaks, which contributed to their productivity. Additionally, the windows and skylights were significant in connecting students to the seasonal changes of nature. Teachers at BICS work with the indoor/outdoor interfaces, incorporating the skylight in lessons about clouds, or using the view of a raven out the window, to connect to class curriculum.

Having wooded and planted areas on BICS school grounds provided a place for students to build a meaningful daily relationship with the natural world and their peers during their middle childhood years. The positioning of the skylights and windows at BICS highlighted the natural surroundings as well as providing students with daily learning opportunities. Permeability to the outdoor green space provided BICS students with a sense of freedom, happiness, and aesthetic pleasure.

7.1.3 A SCHOOL BUILDING THAT FOSTERS AN IDEAL RELATIONSHIP WITH THE NATURAL WORLD

The drawings in which students illustrated “schools they imagined would foster a relationship with the natural world in their occupants” revealed important elements, both grounded in personal experience and their imagination. In their drawings students provided very specific examples of significant connectors between themselves and nature, such as peanut butter pinecones used as
birdfeeders or windows at grass level. These details would not necessarily have been revealed through the interview process and served as important data relevant to how students connect with the natural world at school. Students also improved on existing elements of BICS in their drawings. A few students included windows that opened all the way rather than ones that simply opened at the top or bottom, as the windows at their school do. The students’ illustrations also drew on their imaginations, including elements such as skateboard racks, monkeys in the office, schools adjacent to beaches in front of the ocean, vines covering the school, fountains, and a green roof for classes. These drawings show some of the multiple possibilities for educators and architects to consider when thinking about designing schools that connect students to nature. The visual investigation process was an indication that school building occupants have a wealth of ideas about their schools and school buildings in general and could be valuable resources in the design process.

7.2 IMPLICATIONS OF STUDY

7.2.1 IMPLICATIONS FOR EDUCATORS

The results of this study indicate that the design of schools, especially in regards to the presence of nearby nature and indoor/outdoor interfaces, might play a more significant role in children’s relationship with the natural world than has been widely recognized. Many studies have examined the nature of children’s relationship with the natural world but have neglected to consider how school buildings play a role in that relationship.
Access to nearby nature at school can have positive impacts on children, including nurturing solitude, creativity, imagination, expression, social interaction, delight, and relaxation. These findings are relevant for educators and those in the field of education. These positive impacts affect children’s well-being at school. There are many schools that have naturalized their schoolyards in some way, and these design embellishments help children receive previously mentioned benefits. However, it often takes a great deal of time, energy and financial resources to complete even a modest school naturalization project. Many schools do not have forests or gardens on their property and due to various geographic or socioeconomic realities cannot undertake the addition of trees or plants.

Perhaps in these circumstances taking advantage of the existing indoor/outdoor interfaces or creating additional indoor/outdoor interfaces are more realistic options. This study found that indoor/outdoor interfaces fostered learning and appreciation of beauty as well as connected students to weather events and seasonal changes. Students indicated that indoor/outdoor interfaces gave them a sense of freedom, which increased their happiness at school.

In every school building there are indoor/outdoor interfaces, however, there is a systemic idea that educators and students should be solely focused on academic activities during class time. Sometimes because of this systemic notion, which finds its way into the curriculum and teachers’ attitudes, interfaces such as windows are
seen as distractions and are covered up in some way, using blinds or construction paper. The potential for these interfaces to foster students’ relationships with the natural world are therefore obstructed. Perhaps if the benefits of indoor/outdoor interfaces were more widely accepted educators would utilize existing windows and skylights differently. For example, teachers could link curriculum to outside activities, encourage students to observe something visible from a window, or turn off the lights and use natural lighting available to them. Taking note of natural occurrences may serve to connect students to the natural world as well. Creating more indoor/outdoor interfaces might also be a viable option for many schools that wish to foster students’ connection to the natural world. The addition of indoor plants or an aquarium can be significant to students’ school experience.

The implications for this work may be particularly relevant to educators in urban schools. Students feel cared for and have a sense of ownership as a result of the sense of freedom, joy, aesthetic pleasure and social cohesiveness in relation to the presence of multiple indoor/outdoor interfaces and nearby nature. If these two elements are absent or diminished, urban students might feel less cared for and have less of a sense of ownership at school.

### 7.2.2 Implications for Those Who Influence the Design of Schools

The products of the visual investigation showed participants had valuable design ideas for schools that could provide opportunities for students to relate to the natural world. This implies that students could be important contributors to the school design process.
Additionally, BICS students found that the relationship of the school building to the school site and the presence of multiple indoor/outdoor interfaces were of primary importance in terms of fostering their relationship to the natural world. These two design aspects of schools are not unconsidered by school designers, however, often these elements are thought of as secondary. It is interesting then that school building occupants are strongly influenced by these features. When the positioning of the building on the school site allows for and highlights the presence of natural elements students’ enjoyment of school increases. Indoor/outdoor interfaces, such as windows, skylights, natural building materials and transition zones, are significant to students’ ability to connect to the natural world at school. The position of these interfaces plays a role. Windows that face a naturalized space and skylights in hallways are significant connectors to the natural world that highlight weather and seasonal changes. Transition zones that have many prepositional possibilities hold added enjoyment. Hopefully, the results of this study serve as a reminder that designing schools that enable, even encourage, students to interact with the natural world makes a critical difference in children’s lives.

7.3 LIMITATIONS OF STUDY

There were several limitations to this study that can only be considered in relation to the location, time frame, participants and investigative methods employed in the research. The study was conducted at Bowen Island Community School primarily during the month of June 2009. The five study participants were intermediate
students aged eleven to thirteen. Two focus groups, lasting forty-five minutes each, and five semi-structured interviews, lasting half an hour to an hour, were conducted.

Although a pilot study was conducted at Windsor House School with intermediate students aged eleven to thirteen the researcher had limited prior experience interviewing children. During this study the researcher learned a lot about doing research with young children. The researcher found that during the interviews these study participants could tell stories about their experiences however, often they needed to be asked numerous clarifying questions. There were times during the interviews the researcher felt hesitant to ask participants to elaborate or clarify a statement due to a fear of being intimidating or taking too much of their time.

In addition the length of the interviews can also be seen as a limitation. Due to the age of the participants, interviews needed to be kept within a time limit students’ could manage. However, given more time there might have been a chance to ask further clarifying questions and pursue lines of thought in which individual participants were interested. For example in Student 5’s interview he said that he “liked the tree parts more than the open space” (Student 5, page 13). Had time permitted, asking for more details about the student’s preferences may have resulted in useful additional data. A second interview with each participant could have provided this extra time, however, due to the proximity to the end of the school year, a second interview was not conducted.
During the process of analyzing the data the researcher realized additional questions that could potentially further clarify the results. As the researcher was interested in factors that triggered students’ awareness of nature she asked the study participants what being aware of nature meant to them and where in the school building they were most aware of nature. However, it might have been useful to ask students, “Is being aware of nature important? If so, why? If not, why not?” Answers to these questions could further inform the research data that was collected during this project.

Similarly although the participants surprised the researcher by talking about the school grounds when she asked them about their experiences inside the school building the researcher did not ask “Is it important to have natural spaces on school grounds? If so, why? If not, why not?”. A second interview with study participants, with these questions in mind, might have enriched the results. However, as the students in this study were in the last two grades at Bowen Island Community School, some of them would have been in new schools, which might have complicated or obscured the data.

The age of the participants might have influenced the articulation of their experiences of school buildings as the cognitive and language skills of grade school children are not as developed as adults. It is possible that teachers would be good additional indicators of how children experience their school building and what they
learn from it. This study focused on a single population, intermediate students, and therefore the voice and perspective of adults is missing from this work. A longer study over an extended period of time could address some of these issues. Additional interviews could be conducted, or alternatively more ethnographic observation of students in their school building and on their school grounds might have added to the data. This study focused on students’ experience in their school building. Research was conducted at the end of the school year on the assumption that students would have had a sufficient time in the school building freshly in their minds and bodies upon which to draw. However, it is possible that a longer study could begin with observation of students and later, toward the end of the year, interviews could be conducted. With the additional time to observe students in the school building, it would be possible for a researcher to experientially have a sense of how students interact with and respond to both indoor/outdoor interfaces and access to nearby nature.

Despite these limitations, this project begins to provide much needed empirical research about how children experience their schools, how school buildings mediate students’ relationship with the natural world and how students imagine schools could foster their relationship to the natural world. This study is a starting point and the results spark interesting questions that strongly suggest there is much more to discover in this field.
7.4 FUTURE RESEARCH

Further exploration of how intermediate students’ relationships with the natural world are mediated by school design is necessary.

Researching this with a higher number of study participants might provide a greater understanding of the commonalities and unique characteristics of students’ experience within the intermediate student population. Similarities and differences between gender, age, and cultural background of the present findings could be examined.

This study focused on students’ experience of a school located in a semi-rural environment. The presence of a forest and two gardens on school property is an uncommon occurrence. A similar study in an urban school could provide valuable comparative data. It would be interesting to see if the relationship of the school building with the school site played a role in mediating students’ relationship to the natural world in an urban school. It would be telling if the school field or other parts of the school grounds were experienced as nature for students in urban schools or if nearby parks played a more significant role in urban students’ experience of the natural world at school. Perhaps this design element, the relationship between the school building and the school site, would not appear in data from urban schools. Perhaps an additional design feature would appear as an important mediator. It would also be critical to explore how indoor/outdoor interfaces acted as mediators
in urban schools with smaller windows or windows facing “non-nature” and an absence of skylights. This study’s findings suggest that students feel cared for and a have sense of ownership as a result of their sense of freedom, joy, aesthetic pleasure and social cohesiveness in relation to the presence of multiple indoor/outdoor interfaces and nearby nature. If these two elements are absent or diminished, do urban students feel less cared for and have less ownership for their schools? This is an important question to consider, especially in relation to students’ productivity, creativity and ability to concentrate in school.

In addition, longitudinal work would be valuable. First, it might create richer qualitative study. Second, it could provide insight into the impacts of both nearby nature at school and indoor/outdoor interfaces over multiple seasons or the course of being a student. Research over the course of a year might explore questions such as, “How does a school building mediate students’ relationship with the natural world change in winter versus summer?” whereas research over the course of a few years might explore questions such as, “How do students’ needs change over time in relation to their relationship with the natural world and how does the school building mediate that relationship?” or “How do the presence of design features that foster students’ relationships with the natural world at school affect their relationship with the natural world later in life?”. Longitudinal research exploring how school design mediates students’ relationship with the natural world over time and during various periods of life would be a valuable contribution to our understanding of how school buildings affect our relationships with nature.
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APPENDICES

Appendix A: Guardian Interview Consent Form

Research Project:

Rethinking School Design: how school design mediates students’ relationships with the natural world

GUARDIAN INTERVIEW CONSENT FORM

I understand that the reason my child is invited to participate in this interview is because s/he is a member of Bowen Island Community School. And is between the age of 12 and 16. I understand that because my child is under 18 years of age, for the purposes of this study, guardian consent must be obtained prior to the interview.

I understand that my child’s participation in the study of “Rethinking School Design: how school design informs upper elementary students’ conceptions of the natural world” is voluntary. S/he may refuse to participate or withdraw from the study at any time. I understand that as a guardian, I may withdraw my child from this study at anytime. I understand that unwillingness to participate or deciding to withdraw from the study will not bear any consequences for me or my child’s social or academic life. I understand that exclusion from the study will not be made visible or remarked on by co-investigator Indira Dutt.

I understand that as a guardian, Indira is available to meet with me to review the consent form in further detailed if desired. My child is being asked to dedicate a maximum of three hours in total to this project: one half hour to review the consent form, one hour to conduct the interview, one half hour for a follow-up interview if needed, and one hour to review, amend, or delete the interview transcript. The interview will occur at Bowen Island Community School no less than one week after the consent form has been signed. The entire process will occur between May and December 2009.

I understand that a pseudonym will be used in all instances where this interview is referred to within or about this project. I understand that Bowen Island Community School will be named in this project.

I understand that the person conducting the research will be Indira Dutt, and that this project will be used for her MA thesis in the Department of Cross-Centre Faculty Inquiry in Education at the University of British Columbia (UBC). I understand that Dr. Ray Cole of UBC supervises this thesis and that the thesis committee of this
project includes Dr. Mary Bryson and Dr. David Zandvliet, who is himself a member of the Bowen Island Community School community. I understand that the initial interview transcript will only be available to Indira Dutt and my child. I understand that the modified transcript will be available to those on the project committee. I understand that this thesis will be a public document made available through UBC and Bowen Island Community School. I understand that Indira Dutt intends to write future articles based on this thesis.

I understand that if in the course of the interview process any information divulged which leads co-investigator Indira Dutt to believe that a child may be abused, neglected, or for any other reason is in need of protection, this will be reported to the appropriate official services.

I understand that if at any time my child or I would like to contact Indira Dutt or Ray Cole about any aspect of this project we are welcome to do so at the above contact information. I understand that if my child or I have any concerns about my treatment or rights as a participant, we may telephone the Office or Research Services at the University of British Columbia at 604-822-8598.

I have read and retained a copy of the handout “Research at Bowen Island Community School” and of this youth interview assent form for my records. I understand my role and participation in this study. I understand my child’s role and participation in this study.

I DO DO NOT (circle one) CONSENT to and approve of ____________________________ (child’s name) participation in this study as an interview participant and I have a copy of this letter for my files.

Signature: __________________________ Name: __________________________

Date: ____________________________

I DO DO NOT (circle one) CONSENT to have the products of ____________________________ (child’s name) in-class visual inquiry [see attached sheet] be used as data for this project.

Signature: __________________________ Date: ____________________________

Co-investigator Indira Dutt can contact me (check all that apply):

- Through Bowen Island Community School
- By email __________________________
- By phone __________________________
- By mail __________________________
Appendix B: Youth Visual Inquiry Assent Form

Research Project:

Rethinking School Design: how school design mediates students’ relationships with the natural world

YOUTH VISUAL INQUIRY ASSENT FORM

I understand that the reason I am invited to participate in this visual inquiry is because I am a member of Bowen Island Community School. I understand that because I am under 18 years of age, for the purposes of this study, guardian consent must be obtained prior to allowing the products of this visual investigation to be used as data.

I understand that my participation in the study of “Rethinking School Design: how school design informs upper elementary students’ conceptions of the natural world” is voluntary. I may refuse to participate or withdraw from the study at any time. I understand that unwillingness to participate or deciding to withdraw from the study will not bear any consequences for my social or academic life. I understand that exclusion from the study will not be made visible or remarked on by co-investigator Indira Dutt.

I understand that I am being asked to dedicate a maximum of one hour during class time to complete the visual investigation. The visual inquiry will happen in class time under the supervision of my teacher.

I understand that a pseudonym will be used in all instances where the products of the visual inquiry class are referred to within this project. I understand that Bowen Island Community School will be named in this project.

I understand that the person conducting the research will be Indira Dutt, and that this project will be used for her MA thesis in the Department of Cross-Centre Faculty Inquiry in Education at the University of British Columbia (UBC). I understand that Dr. Ray Cole of UBC supervises this thesis and that the thesis committee of this project includes Dr. Mary Bryson and Dr. David Zandvliet, who is himself a member of the Bowen Island Community School community.

I DO ______ DO NOT ______ (circle one)

ASSENT to have the products of my in-class visual inquiry be used as data for this project.

Signature: ___________________________ Name: ___________________________

Date: ___________________________
Appendix C: Youth Interview Assent Form

Research Project:

Rethinking School Design: how
school design informs upper elementary
students’ conceptions of the natural world

YOUTH INTERVIEW ASSENT FORM

I understand that the reason I am invited to participate in this interview is because I am a member of Bowen Island Community School. I understand that because I am under 18 years of age, for the purposes of this study, guardian consent must be obtained prior to the interview.

I understand that my participation in the study of “Rethinking School Design: how school design informs upper elementary students’ conceptions of the natural world” is voluntary. I may refuse to participate or withdraw from the study at any time. I understand that unwillingness to participate or deciding to withdraw from the study will not bear any consequences for my social or academic life. I understand that exclusion from the study will not be made visible or remarked on by co-investigator Indira Dutt.

I understand that I am being asked to dedicate a maximum of three hours in total to this project: one half hour to review the consent form, one hour to conduct the interview, one half hour for a follow-up interview if needed, and one hour to review, amend, or delete the interview transcript. The interview will occur at Bowen Island Community School no less than one week after the consent form has been signed. The entire process will occur between May and December 2009. I understand that my guardian has seen this consent form and has been given the opportunity to meet with Indira for half an hour to review it if desired.

I understand that a pseudonym will be used in all instances where this interview is referred to within or about this project. I understand that Bowen Island Community School will be named in this project.

I understand that the person conducting the research will be Indira Dutt, and that this project will be used for her MA thesis in the Department of Cross-Centre Faculty Inquiry in Education at the University of British Columbia (UBC). I understand that Dr. Ray Cole of UBC supervises this thesis and that the thesis committee of this project includes Dr. Mary Bryson and Dr. David Zandvliet, who is himself a member of the Bowen Island Community School community. I understand that the initial interview transcript will only be available to Indira Dutt and myself.
I understand that the modified transcript will be available to those on the project committee. I understand that this thesis will be a public document made available through UBC and Bowen Island Community School. I understand that Indira Dutt intends to write future articles based on this thesis.

I understand that if in the course of the interview process any information divulged which leads co-investigator Indira Dutt to believe that a child may be abused, neglected, or for any other reason is in need of protection, this will be reported to the appropriate official services.

I understand that if at any time my guardian or I would like to contact Indira Dutt or Ray Cole about any aspect of this project we are welcome to do so at the above contact information. I understand that if my guardian or I have any concerns about my treatment or rights as a participant, we may telephone the Office or Research Services at the University of British Columbia at 604-822-8598.

I have read and retained a copy of the handout “Research at Bowen Island Community School” and of this youth interview assent form for my records. I understand my role and participation in this study.

I DO  DO NOT  (circle one)

ASSENT to and approve of my participation in this study as an interview participant and I have a copy of this letter for my files.

Signature: ___________________________  Name: ___________________________

Date: _____________________________

I DO  DO NOT  (circle one)

ASSENT to have the interview audio recorded and transcribed. I understand that I will be given a copy of the transcript to amend or delete. I understand that only the modified transcript will be shown to project members other than co-investigator Indira Dutt. I understand that only the modified transcript will be used as data.

Signature: ___________________________  Date: _____________________________

Co-investigator Indira Dutt can contact me (check all that apply):

○ Through Bowen Island Community School

○ By email  _____________________________

○ By phone  _____________________________

○ By mail  _____________________________
Appendix D: Visual Inquiry for Research

Rethinking School Design: how school design mediates students’ relationships with the natural world

Visual Inquiry for Research:

To be conducted in a single class block with grade teacher present in two grade 6/7 classes at Bowen Island Community School.

Part A:
Draw a line down the middle of your paper. Make a list of as many things you can think that relate to nature on one side and to non-nature on the other side.

(After some time…Have you put “people” or “humans” on your sheet yet? Please add them where you think they belong and write one sentence that explains why.)

Part B:
What would a school look like that helps you to connect with nature? What would it look on the inside? What features in it would be prominent?
Please label important places on the picture.

Part C:
a) Draw a place in the school building that you feel the most connected to nature. Please label important places/points on your picture. Write one sentence about why you feel that way.

b) Draw a place in the school building that you feel least connected to nature. Please label important places/points on your picture. Write one sentence about why you feel that way.
Appendix E: Interview Questions for Research

Rethinking School Design: how school design mediates students’ relationships with the natural world

Interview Questions for Research:

Context of participant:
- Do you live on Bowen Island?
- How long have you lived on Bowen Island?
- How long have you been at BICS?
- Have you ever attended other schools? If yes, which schools?
- How would you like to be described for the purposes of this project? / How would you describe yourself?

What are the participants’ views on their school building?
- What are your favourite spaces in this school and why?
- Where are your least favourite places in the school and why?
- Are there spaces in the school that you are allowed to change in some way?
- Are there spaces in the school that change during the school year?
- Where do you have your best ideas at school?
- Where in the school building do you feel most energetic?
- Where in the school building do you do your best work?

What is the participants’ relationship to nature?
- How often do you spend time outdoors? Per day? Per week?
- What do you do outdoors?
- How do you feel about spending time outdoors?
- What does nature mean to you? What immediately comes to mind?
- What places on Bowen do you consider to be nature?
- What places on Bowen do you consider to be non-nature?
- On a scale of 1 to 10 how important do you think nature is? Why?
- How often do you spend time outdoors during the school day?
- Are classes ever held outside? If so, where?
- Do you enjoy being outside at school?
- What is your favourite outdoor space? What do you do there? Who is usually with you when you are in that space?
How is the relationship between school building and relationship to nature understood:

- What does it mean to “be aware of nature”?
- When or where are you in the school when you are most aware of nature?
- What aspects of this school support you being aware of nature?
- How are they support you being aware of nature?
- Are there any aspects of this school that separate you from nature?
- How do they separate you from nature?
- How does your school help nature?
- How does your school building harm nature?
- How does your school provide you with views of nature?
- What would your school day be like if you didn’t get to look outside?
- How are you able interact with nature inside your school building?
- Do you think the school building is neutral?
- Do you think that buildings teach you anything?
- What does this building teach you?

What is the imagined potential of school buildings to foster a connection to nature in participants?

- How could your school building help nature?
  What do you imagine a school that is attentive to your relationship to nature to be like, look like, etc.?