IMAGINATIVE ECOLOGICAL EDUCATION

by

Gillian Judson
M.A., University of Victoria, 2002
B.A., University of Victoria, 1996

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APPROVAL

Name:	**Gillian Claire Judson**
Degree:	**Doctor of Philosophy**
Title of Thesis:	**Imaginative Ecological Education**

Examining Committee:

Chair: Kieran Egan, Professor

Sean Blenkinsop, Assistant Professor
Senior Supervisor

Mark Fettes, Assistant Professor
Committee Member

David Zandvliet, Assistant Professor
Committee Member

Dr. Vicki Kelly, Assistant Professor,
Faculty of Education, SFU
Internal/External Examiner

Dr. Bob Jickling, Associate Professor, Faculty of Education, Lakehead University
External Examiner

Date Defended/Approved: November 24, 2008

ABSTRACT

This research investigates how school-based Ecological Education programs currently develop students' ecological understanding (an awareness of humankind's interconnectedness within the natural world) and how these programs may do so more effectively. Insight into how to support the development of ecological understanding may be found in Imaginative Education, an approach to teaching that situates engagement of the body, emotion and imagination at the core of all learning.

Three questions guide the research. The first seeks to clarify the goals of Ecological Education and to articulate the kinds of pedagogical practices currently in place to support their achievement. It becomes clear that, among other problems, the means and ends of Ecological Education are misaligned. Despite the fact that emotional and imaginative engagement with the natural world is considered important for nurturing students' relationships with nature, emotion and imagination play a limited role in the theory and practice of Ecological Education. Similarly, while one often sees students actively involved in experiential types of learning activities in Ecological Education programs, the kinds of activities students are participating in may not be contributing in meaningful ways to the body's understanding of a topic. How engagement of the body, emotion and imagination in learning may play a more central role in Ecological Education is the focus of the second research question. A description

of the theory and practice of Imaginative Education reveals an educational approach in which culturally-based learning tools bring engagement of the body, emotion and imagination together in practice. The principles of Imaginative Education may be used, with some adaptation, in the context of Ecological Education. The third research question asks what form a marriage of Ecological Education and Imaginative Education might take. I outline an ecologically imaginative pedagogy focused on the cultivation of students' close, personal relationships with the local natural environment and shaped by engagement of the body, emotion and imagination in learning. This framework for Imaginative Ecological Education may be used for teaching any topic and has the potential to support students in forming the kinds of emotional connections with the natural world that underlie ecological understanding.

Keywords: ecological understanding; Ecological Education; imagination; Imaginative Education; place; Place-Based Education

Subject Terms:
Education – Aims and Objectives; Environmental Education; Imagination in children; Place (philosophy); Place-Based Education; Teaching

Ella Adelle and Chloë Jai ~
May you never lose your sense of wonder.

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TABLE OF CONTENTS

Approval ii
Abstract iii
Dedication v
Acknowledgements vi
Table of Contents vii
List of Frameworks x
Chapter One: Introduction 1
Research Questions 7
Significance 8
Rationale 13
A Peripheral Educational Player 15
Staying Inside 17
Failure to Engage the Body 24
Neglect of Emotion and Imagination 25
Chapter Outline 32
Chapter Two: Mapping the Theoretical and Practical Terrain of Ecological Education 35
Defining Ecological Education 35
Purposes 39
Ecological Understanding 42
Ecological Literacy 46
Ecological Consciousness 48
The Role of Imagination 51
Principles 53
Ecological Principles: Nature's Lessons 54
Ecology Meets Education: Applications 56
Practices 66
Schoolyard Ecosystems 69
The Edible Schoolyard 73
Problems 81
Chapter Three: Mapping the Theoretical and Practical Terrain of Imaginative Education 88
Purposes 88
Principles 90
Imagination: The Heart of Learning 90

Learning and Culture 95
Practices 124
The Mythic Planning Framework 124
The Romantic Planning Framework 128
Problems: Incompatibilities 132
Differing Premises: The Purpose of Education 133
Differing Premises: Considering Alternatives to Anthropocentrism 136
Possibilities: Compatibilities and Contributions 141
Compatibility: Critiques of Schooling in the Western World 142
Compatibility: Attention to Language 143
Compatibility: Preserving the Cognitive Tools of Somatic and Mythic Understanding 149
Compatibility: Cultural Inclusion 151
Contribution: A Discourse for Understanding 154
Contribution: A Framework for Teaching 155
Contribution: Acknowledging the Educational Importance of the Body, Emotion, and Imagination 158
Conclusion 160

Chapter Four: Exploring Imaginative Ecological Education 162

Purposes 164
The Body 165
Emotion and Imagination 166
Context 168
Principles 169
Engaging the Body: Activeness 170
Engaging Emotion and Imagination: Feeling 173
Engaging With Context: Place and Sense of Place 177
Practices 231
Problems 241
Theoretical and Practical Understanding of Imaginative Education 242
Depth of Subject-Matter Knowledge 245
Concern for Nature 247
Additional Requirements for Successful Implementation 248
Conclusion 250

Chapter Five: Imaginative Ecological Education Across The Curriculum 252

Imaginative Ecological Education: Mythic Understanding 254
Take a Wiggle on the Wild Side: Exploring Soil 254
Exploring Movement 277
Developing Literacy Skills: The Subjunctive and the Technicolour Dreamcoat 288
Imaginative Ecological Education: Romantic Understanding 302
Decoding Patterns: Welcome to Training Camp 302
(un)Sung Heroes: Punctuation Marks 326
Exploration: The World As We Know It 339
Conclusion 355

Bibliography **361**

Appendix A: Tools of Imaginative Engagement **377**

Appendix B: The Cognitive Toolkits **378**

The Cognitive Toolkit of Mythic Understanding 378
The Cognitive Toolkit of Romantic Understanding 381
The Cognitive Toolkit of Philosophic Understanding 384

Appendix C: A Mythic Unit – Properties of the Air **386**

Appendix D: A Romantic Unit – The Amazing Life Cycle of the Eel **391**

Appendix E: Web Site Resources **401**

Appendix F: Brainstorming Charts **404**

LIST OF FRAMEWORKS

Framework 1 Imaginative Education – Mythic Planning 125
Framework 2 Imaginative Education – Romantic Planning 129
Framework 3 Imaginative Ecological Education – Mythic Planning..... 233
Framework 4 Imaginative Ecological Education – Romantic Planning..... 234

CHAPTER ONE: INTRODUCTION

"No man is an island." "We are all part of the great web of life." These commonly employed, even clichéd, statements reflect teachings of Ecological Education. Ecological Education applies principles of ecology[1] such as community and complexity to conceptions of the human-world relationship and to the theory and practice of education. It builds on a specific understanding of the relationship of mind, body and world; humankind is an interconnected part of both human and natural worlds.

Understanding ecologically refers to this union of mind, body and world. When one understands ecologically, or has an *ecological understanding*, one is aware of relatedness and one thinks and acts from a sense of interconnectedness.[2] To understand ecologically is to make sense of the human world as part of, not apart from, nature; it is to understand humankind's "implicatedness in life" (Orr, 2005, p. 105). Understanding ecologically has an emotional core (Bailey and Watson, 1998; Carlsson, 2001, 2002a/b; Drengson

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[1] Ecology, derived from the Greek *oikos* (household) is "the study of the earth's household" (Capra, 1996, p. 32). It examines the "reciprocal relations of living organisms with their total environments and with one another as living interdependent systems" (Cobb, 1977, p. 24).

[2] I explicitly use both noun (ecological understanding) and verb (understanding ecologically) forms in this thesis. The noun form tends to suggest that ecological understanding is a kind of possession; something static that one *has* or does not have. To counteract this interpretation, I also use the verb form. The active sense reinforces how ecological understanding represents a way of making sense of the world that is more or less developed during our lives and that changes shape throughout our lives. The premise underlying this interpretation is that the seeds of ecological understanding are innate and may be developed through education.

and Inoue, 1995). One's knowledge about ecological processes and principles is made meaningful and personal by an emotional attachment to the natural world. One of the implications of this attachment is a sense of care or stewardship towards the Earth (Traina and Darley-Hill, 1995).[3] How Ecological Education programs currently develop students' ecological understanding and how they may do so more effectively is the topic of this thesis.[4] Insight into how to improve the practice of Ecological Education, I will argue, may be found in Imaginative Education, a theory developed over the last several decades by Kieran Egan.

Imaginative Education is a theory concerned with the centrality of emotion and imagination in effective learning. Egan (1992), drawing on White (1990), describes imagination as the "capacity to think of the possible rather than just the actual" (p. 4). Imagination takes us to the new, the unusual, and the extraordinary. Sturrock (1988) notes how one can "transform humble and

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[3] As the literature review in Chapter Two reveals, the term "ecological" has descriptive and prescriptive dimensions; it implies a way of thinking that is tied up with values and behaviours that reflect concern for the world. These dimensions are not explicitly separated in the literature. One might argue that it is possible to have "ecological understanding" in the descriptive sense only: a disciplined way of thinking about complex systems based on the principles of Ecology without any personal sense of concern for nature. My use of the term "ecological understanding" reflects both descriptive and prescriptive dimensions. So, in other words, I build on the premise that a developed ecological understanding in the descriptive sense engenders values and behaviours that reflect concern for nature and a positioning of the self within the world.

[4] Consideration is also given to how it may be possible to develop and support ecological understanding at a cultural or collective level. Current educational practices in the Western world might lead one to conceptualize understanding in individualistic terms rather than as an ecological phenomenon (Bowers, 1997). Not surprisingly, this research builds out of an ecological understanding of understanding itself. Understanding is a relational and interactive process (Bowers, 1997). So, the notion of ecological understanding is seen to be developed and shaped by the individual as a member of both natural and cultural communities, by, for example, the cultural tools used to make sense of the world, and by one's relationship with other members of the natural and human world. I conceive of ecological understanding as having, thus, individualistic, cultural and environmental dimensions. The framework for Imaginative Ecological Education described in Chapter Four outlines ways to nurture these dimensions.

commonplace objects through the light of the imagination" (p. 62). Imagination allows different interpretations and perspectives:

> To imagine is to look beyond things as they are, to anticipate what might be seen through a new perspective or through another's eyes...the crucial point has to do with the capacity to break somehow with what is merely given, to summon up some absent or alternative reality. (Greene, 1988, p. 49)

Imagination is an opening to the realm of possibility.

Imagine. Using the imagination quickly engages human emotion. Warnock (1976) notes how imagination tends to implicate the emotions: "its impetus comes from the emotions as much as from the reason, from the heart as much as from the head" (p. 196). As we conceive of possibilities through imagination, we become emotionally engaged and connect value or significance to what we envision. It is rare to experience or encounter something—an object or a process for example—without having some emotional reaction to it. Consider the baby who falls into fits of giggles when he hears a popping sound. Consider your reaction upon seeing or hearing the baby giggling. Consider how the smell of a certain perfume or flower brings you back to a different time and place in which you have fond memories or, alternatively, negative associations. Consider your response to my invitation to imagine. What these examples aim to show is that it is through our emotions that imagination is engaged and the stimuli we perceive through our senses become meaningful and vice versa.

Egan (1988, 1992, 1997), Greene (1988), and White's (1990) conception of imagination as a means to envision possibility may not, however, support the goals of Ecological Education. As Sutton-Smith (1988) remarks, "Hitler was

imaginative and so was Shakespeare" (p. 19). Like thinking in general, then, imagination:

> is neither good nor bad in [itself] but become[s] so within the context of particular values...The difference doesn't lie in the function of "what if-ing" but in the ends to which it [is] devoted. (Sutton-Smith, 1988, p. 19)

Imagination is, thus, culturally bound. How we think and how we imagine are largely shaped by the cultural contexts in which we live (Blenkinsop, 2006; Evernden, 1992; Greene, 1988; Lopez, 1986).[5] Because being imaginative says nothing about the use to which one's imagination is put or the kinds of outcomes it may result in, this research considers if imagination of a certain kind or orientation needs nurturing as part of Ecological Education.

These theorists alert us to how the things we are predisposed by our cultural affiliations and assumptions to believe to be true and valuable actually influence our imaginings. Blenkinsop (2006) identifies "the limits of our collective consciousness and imagination and...the ways in which we are being influenced by the meanings instilled in us by our culture" (p. 162). Sutton-Smith (1988) describes the culturally relative nature of imagination. He points to a certain kind of imagination reflective of Western culture:

> In the Western educational tradition there has been a preference for the rational over the irrational usages [of imagination], for scientific imaginative knowledge over literary imaginative knowledge, for stable over flexible usages, for educational over entertainment usages, and for conformist over unique usages. (p. 18-19)

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[5] Lopez (1986) identifies the connections between what we know, what we imagine and how we are disposed to encounter the world: "What one thinks of any region, while travelling through, is the result of at least three things: what one knows, what one imagines, and how one is disposed" (p. 270).

He describes a "literate kind of free-floating, future-oriented, individualistic imagination that has become a part of the literacy of the Western world and has its source in inventors, novels, film makers, and so on" (Sutton-Smith, 1988, p. 19). Imagination that is contextual or "placed," present- and past-oriented, and collaborative is neglected if not missing altogether.

If we accept that imagination is culturally-bound and that current beliefs in the Western world about nature and about the human-nature relationship have contributed to the Earth's ecological problems, then imagination informed by an understanding of human embeddedness in nature may be required to support more sustainable human-nature interactions. I propose thinking about imagination not in terms of distinct "kinds" but, rather, in terms of broadening or enriching the characteristics of imagination generally to include notions of relationship, connectedness, and context.[6] I propose an *ecological* conception of imagination.

The notion of *ecological imagination* has received only preliminary consideration (Daloz, 2004; Jardine, 1998; Orr, 1994, 2002; O'Sullivan and Taylor, 2004; Worster, 1993). This thesis contributes to understanding of what *imagining ecologically* means and what kind of education may support its development. I conceive of *imagining ecologically* as a way of paying attention to and making sense of the world that is attuned to relationships, connections and context. Imagining ecologically refers to flexibility of mind oriented to

[6] Egan and Nadaner (1988) refer to different kinds of imagination: the scientific imagination, the philosophic imagination and the historic imagination. What differentiates these kinds of imagination may simply be the topic of interest, but they may also be defined in terms of the kinds of possibilities being considered (the orientation of the imagination) and/or the ways in which imagination is engaged.

interdependence and pattern, to the diversity and complexity that characterize natural- and human-world relationships. This type of imaginative process is inspired, too, by context, emerging from place and adapting to specific features of the environment. It can support our understanding of society, culture, reality and the self in terms of relationship. It is likely that ecological imagination emerges out of students' participation with the world through activities and learning opportunities in which their bodies, emotions and imaginations are actively engaged. This thesis extends Egan's (1992) conception of imagination to acknowledge more explicitly the body's role in understanding the world and, thus, in imagination. Imagination involves both thinking and *feeling* what is possible.

A premise of this research is that while there is no harm in bringing forth the ecological imagination and thereby expanding the breadth, depth and orientation of how we make sense of the world, there may be harm in not doing so. We may limit our abilities to deal with ecological problems now and in the future if we do not consider how we may educate the ecological imagination. My use of the term "imagination" throughout the remainder of this thesis is, thus, ecological insofar as it refers to the capacity to envision possibilities that can support us in understanding the world from alternative perspectives and can facilitate our understanding of the web of relationships that connects human and natural worlds.

Research Questions

This research investigates what imagination in general and Imaginative Education in particular can contribute to Ecological Education. Three questions guide this research:

1. What are the objectives of Ecological Education?
2. How might engagement of the body, emotion and imagination play a more central role in Ecological Education?
3. How would a marriage of Imaginative Education and Ecological Education look in theory and practice?

With the aim of designing an educational framework that supports the development of students' ecological understanding, this project merges Ecological Education and Imaginative Education. The research focuses on pedagogy, on how school-based practices in Ecological Education support students' understanding of the human-nature relationship and how they may do so more effectively. To more effectively develop and nurture students' ecological understanding I propose reshaping Ecological Education according to principles of Imaginative Education: engagement of the body, emotion and imagination in learning.[7] To this I add an additional dimension: engagement with context. These and other dimensions come together to form a framework for Imaginative Ecological Education.

[7] In line with Hagen's (2007) model of Participatory-Affective Engagement, I conceive of student engagement in learning as involving two dimensions: participation and emotive response. In other words, in order to be "engaged" in learning students will need to both participate (either actively or passively) and have some kind of an emotional response (either positive or negative).

Significance

Two central premises of this research are that an ecological understanding of the human-world relationship is required to live sustainably within the natural world, and that nurturing personal relationships with nature will be required to support this ecological kind of understanding. If we are to resolve local and global environmental crises it is necessary to redefine the human-world relationship (Berry, 2006; Bookchin, 1991; Hutchison, 1998; Orr, 1992, 1994; Selby, 2000; Snyder, 1999). An anthropocentric or human-centred view of the world in which humankind considers itself separate from nature lies at the core of the current planetary crises (Biriukova, 2005; Bowers, 1999, 2003; Morris, 2002; Traina and Darley-Hill, 1995). Redefining how human beings understand and interact with nature is, of course, an immense task. For some it may seem impossible. However, big problems[8] require equally big solutions. I propose going to the source; addressing how human beings position themselves in relation to the natural world.[9] Adjusting our ontological positioning in a way that acknowledges the nature of our immersion in both human and natural worlds can be a starting point for change (Bookchin, 1991; Evernden, 1993; Orr, 1992, 1994; Selby, 2000).

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[8] Evernden (1993) differentiates between "problems" and "issues." Using the analogy of an iceberg, he suggests that ecological or environmental "issues" represent the tip of the iceberg; they are the visible symptoms of something that goes much deeper. Ecological "problems" lie below the surface and may not be immediately visible. Problems are the underlying causes and fundamental misconceptions of the human-nature relationship that create the "issues" receiving so much media attention. Evernden (1993) argues that resolving ecological crises requires attending to problems rather than issues.

[9] Individual changes, on their own, may not be enough to resolve global problems. They may be, however, the best place to start. Individual awareness of the interconnectedness of life can spur the larger social, cultural, political changes required to nurture sustainability (Morris, 2002).

Ecological understanding requires, first and foremost, developing and nurturing relationships of all kinds. Buber (1958) states that human beings are born relational; that is to say, they have an "instinct for communion." In order to realize our humanity and our sense of self, we need to form relationships with other human beings as well as with the natural world (Buber, 1965).[10] Attention is currently paid to developing and nurturing interpersonal relationships in schools. For example, many school mission statements include as a central aim the development of a sense of "community" in the classroom. This interest in relationship or "community"-building is seen to support students' sense of belonging in schools and, perhaps, in the larger context in which they live. My concern is that notions of relationship and community seem to be limited to the human realm. Formation of relationships with the natural world and cultivation of a sense of "community" that includes the natural world do not receive the attention they should if we are to take an ecological view seriously. Our efforts to develop a sense of community do not begin with nurturing students' relationships with *where* they are; the geographic places in which they reside and in which they are immersed. The educational approach described in this thesis represents a departure from common practice in schools because it pulls to the foreground the natural world as the "other" with which students can engage. In this way, one's "community" includes the natural world as much as the human world.

[10] While Buber's discussion of relationship focuses mainly on the human realm, he also experienced and wrote about engaging in relationship with the natural world. Blenkinsop (2005) notes that "near the end of his life, Martin Buber, in conversation with Carl Rogers, regretted not having discussed relationship beyond the one-on-one human interactions, and he referred specifically to our relationship with nature" (p. 285).

Cultivating an ecological perspective requires nurturing certain kinds of relationships (Evernden, 1993). Not all relationships are equal. Instrumental relationships with nature typical of an anthropocentric worldview are not the kind that can support a redefinition of humankind as *part of* nature. The kind of relationship required is one based on "openness, directness, mutuality, presence"; what Buber (1965) calls the "I/Thou" (p. xiv). Buber's (1958) notions of the "I/It" and the "I/Thou" —the twofold nature of the human being—describe two mutually exclusive ways of encountering the world.[11] The "I/It" encounter, located either internally or externally to the individual, is based on use or experience of objects (p. 5). In contrast, the "I/Thou" encounter is located *between* a person and another entity and is based on mutual relationship (p. 5). Entering into "I/Thou" relationship requires both willingness and intentionality, what Buber (1965), echoing Plato, refers to as a "turning of the soul" (p. 22).[12] This distinction is an important one for this research. We too often encounter the world as "It" rather than as "Thou." Engaging with the world as "It," as object for use is of course necessary for our survival. However, the problem we are currently experiencing is a lack of the "Thou" encounter. We are not necessarily

[11] It is beyond the scope of this thesis to describe all the dimensions of the I/Thou encounter. See Buber (1958) *I and Thou.*

[12] Buber (1958) emphasizes how the I/Thou encounter is a rare event, one marked by surprise and "grace" (p. 7). One cannot "force" or "will" an I/Thou encounter. The unpredictable, rare nature of the I/Thou contributes to the limited application of Buber's work in educational practice. Blenkinsop (2003) argues, however, that Buber's work is significant for educational practice. He delineates how teachers can help *prepare* students to encounter the Thou by facilitating and supporting students' senses of presence, openness, and intentionality toward the other. He states, for example, that the teacher can help prepare a student to encounter the Thou by being fully present to enter into relationship with the students. Teachers can also act in intentional and conscious ways so as to model for students how to live a life that is open to encountering the Thou. Moreover, teachers can reawaken a sense of wonder in students and may do so by offering them new experiences that "can open exciting vistas in possibility" (p. 108).

prepared to encounter the natural world in a way marked by presence, openness and mutuality. It is in this kind of encounter that broader understandings of self may emerge and it is by participating in this "in between" space that we may come to understand the other that is the natural world.

This research examines, thus, how pedagogical practices currently develop and nurture relationships and how they may be improved. The personal relationship of each student to nature is a central piece of this pedagogy. Extending the notion of relationship in this way can support a repositioning of humankind within the natural world. By outlining a pedagogy that can enrich students' relationships with the natural world, among other kinds of relationships, this research offers an educational approach that can support each student's ontological need for relationship.

Focusing on how to nurture and develop ecological understanding in children is particularly important and represents another level of significance of this research. Childhood represents a unique window of opportunity for nurturing ecological understanding. By virtue of the ways in which children encounter the world and make sense of their experiences, they may form much more intimate relationships with nature than do most adults (Biriukova, 2005; Cobb, 1977; Hutchison, 1998; Nabhan and Trimble, 1994). Carson (1965), Cobb (1977), Nabhan and Trimble (1994) and Orr (1994, 2005) are a few theorists who note that children have an innate affinity or sense of closeness to nature.[13]

[13] E. O. Wilson (1984) referred to this innate desire to relate to nature as "biophilia".

Children often encounter nature—animals, plants, insects, mud, or water for example—much more openly than do adults.

Children are more attuned to nature by virtue of the ways in which they make sense of the world. Hutchison (1998) describes the child as "a giant sense organ" (p. 105). Stemming from the body's physical encounters with the environment an immersive type of relationship often develops. The child experiences:

> ...an intimacy between self and world...so that *self* essentially becomes embodied by *world*. The child becomes earthbound in the most marked of sense, richly rewarded by a multitude of tantalizing sensations, cherished tastes, and treasured observations that are fed into the little child's organism for her to savour. (Hutchison, 1998, p. 105)

Children have a sense of being embedded in the world that compels them to touch everything, climb trees, and dig in the mud (Egan, 1992). This research considers how to maintain this sense of relationship to, and interest in, the natural world typical of childhood.

Consideration into how to more effectively educate children's ecological understanding is significant due to the impact childhood experiences have on overall ecological sensibility and concern for nature in adult life (Thomashow, 1995). Palmer and Neal (1994) discuss the findings of their study on the kinds of experiences that influence environmental interest and activism: "Without doubt, the single most important category of response at all levels of data analysis in the present project is experience outdoors, and particularly at a young age" (p. 9). Similarly Palmer (1993) and Tanner (1980) describe childhood experience in

nature as the single most important factor in development of an environmental ethic or concern for the environment.[14] Orr (1994) situates lifelong concern for the environment in childhood natural encounters:

> What Rachel Carson once called the 'sense of wonder' begins in the childhood response to a place that exerts a magical effect on the ecological imagination. And without such experiences, few have ever become ardent and articulate defenders of nature (p. 161).

Nabhan and Trimble (1994) suggest that through their interactions with wild places, children can create lasting relationships with nature that may support more harmonious, sustainable human interaction with the Earth. In terms of significance, then, research into how to improve Ecological Education for children seems particularly important for the development of ecological understanding.

Rationale

Blenkinsop (2005) comments that programs aimed at developing students' relationships with nature "often bemoan what they perceive as limited change in those relationships by pointing to limited change in the students'

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[14] Palmer (1993) argues that Environmental Education should be based on deeper understanding of the kinds of learning experiences that help to develop not only knowledge, but care and concern for the environment. Her study, the first stage in an investigation called "Development of Concern for the Environment: Implications for Teaching and Learning" aims to fill a void in this type of understanding (p. 30). Building on Tanner's (1980) study, Palmer investigates processes of how environmental subject matter is learned and concern develops for children during their first three years of school (p. 26). She looks specifically at the kinds of life experiences adults recognize as formative in their ecological awareness. Participants were asked to "state what they considered to be their most significant life experience and to write a statement indicating which, if any, of the years of their lives were particularly memorable in the development of positive attitudes toward the environment" (p. 27). Longitudinally the study also looks at how people transition from knowledge to action. Her results confirm those of Tanner (1980): "childhood experience of the outdoors is the single most important factor in developing personal concern for the environment" (p. 29-30).

behaviour" (p. 286).[15] It is becoming increasingly clear that knowledge alone of ecological crises has not changed human behaviour in any significant way (Bowers, 2003; Orr, 1994; O'Sullivan and Taylor, 2004; Takahashi, 2004). My own encounters with young people have clearly suggested that they seem disillusioned as to how ecological crises have anything to do with them (*why bother recycling Ms. J?*). Nabhan and Trimble (1994) and Takahashi (2004) also note this sense of disconnection or "disaffection" students have with their environment despite increased ecological knowledge. Nabhan and Trimble cite Robert Michael Pyle's work on the "cycle of disaffection." Pyle argues that a sense of disaffection or disconnection increases as children develop vicarious views of nature. That is to say, rather than through direct experience, they come to know nature through television, videos, books etc. He characterizes the change as the "extinction of experience" or "the termination of direct frequent contact between children and wildlife" (Cited in Nabhan and Trimble, 1994, p. 86). While students are gaining a basic comprehension of what is going on (and going wrong) in the world, they have limited to no emotional attachment to what they are learning and commonly no commitment to do anything about it (Traina

[15] Hutchison (1998) argues that there are no research studies that investigate the overall effectiveness of Ecological Education programs for reforming students' values, beliefs and actions toward the natural world. My reading in the field of Ecological Education supports Hutchison's claim. Empirical research on the effectiveness of Ecological Education is sparse. I only found three studies—Bogner (1998), Johnson (2005), and Johnson and Manoli (2008)—that investigate how behaviours may be changing as a result of Ecological Education. (It is important to note that I am referring specifically to research in Ecological Education as opposed to Environmental Education or other related fields. There is, in fact, much more research on program effectiveness in Environmental Education than in Ecological Education. While it is beyond the scope of this project to investigate, it is interesting to note that Ecological Education may have emerged, in part, out of reactions to and concerns about the kind of research agenda emerging in Environmental Education.)

and Darley-Hill, 1995). Missing are relationships with nature out of which a sense of care for the Earth may grow.

Feeling connected to nature and experiencing this connection through a diversity of emotional responses that include joy, surprise, wonder, awe, mystery, humility, and even disgust or fear is a requirement for understanding and imagining ecologically. There are at least four pedagogical reasons for this lack of emotional connection to nature: the neglect of Ecological Education in schools generally, limited direct experience in nature, failure to engage the body, and routine neglect of emotion and imagination in learning.

A Peripheral Educational Player

First, for Ecological Education to have any kind of effect it needs to take a more central position in schools. Currently, Ecological Education receives only cursory attention in mainstream curriculum (Biriukova, 2005; Smith and Williams, 1999). Hutchison (1998) describes three general approaches to conducting Ecological Education in schools: a *supplemental* approach in which teachers are provided with curricular materials they may use in addition to regular teaching, an *infusionist* approach in which ecological themes and topics are integrated into curricular topics (usually in science or social studies programs), and an *intensive experience* approach in which students participate in short, outdoor immersive trips and experiences (p. 24-25).

In the *supplemental* approach the curricular materials are self-contained and require limited ecological knowledge or preparation on the part of the

teacher. Project Learning Tree is an example of this approach.[16] Project Learning Tree, a program affiliated with the American Forest Foundation, offers ready-to-use lessons and units teachers can integrate into the regular curriculum. These activities fulfill mandated curriculum objectives in ways that incorporate nature into classroom teaching and that get students working outside. In the *infusionist approach*, ecological principles or the environment generally become organizing concepts for an interdisciplinary curriculum. An example of this approach can be found in a document published by the British Columbia Ministry of Education (2007) entitled *Environmental Learning and Experience: An Interdisciplinary Guide for Teachers.*[17] In this document the environment is used as an "organizing theme" in interdisciplinary teaching. This approach stems from the belief that Ecological Education is not subject matter to be treated separately in the curriculum but is interconnected with everything we do as human beings (British Columbia Ministry of Education, 2007). It is hoped that an interdisciplinary approach to teaching about the environment will support students in understanding how their actions impact the environment at local and global levels (British Columbia Ministry of Education, 2007). The *intensive experience,* the kind of Ecological Education one might associate with Van Matre's (1979) Earthkeepers and Sunship Earth, is an outdoor type of program, several days or longer in length, in which students focus only on ecological issues. This approach reflects a belief in the need to immerse students in nature as a

[16] For more information on Project Learning Tree go to http://www.plt.org/

[17] This document is based on a 1995 publication entitled *Environmental Concepts in the Classroom.*

means to support their understanding of ecology through direct, hands-on learning, as well as to facilitate their building of emotional bonds with nature.

While these approaches vary in technique and degree, what they have in common is that they all include Ecological Education as an add-on to mainstream curriculum. As a peripheral player in the educational game, Ecological Education has limited opportunity to make much significant impact on children. There are also limitations in the Ecological Education students *are* receiving. Students' encounters with nature are often limited and their learning both in and outside the classroom often fails to engage the body in meaningful ways or tap into their emotional and imaginative lives.[18]

Staying Inside

Learning about nature inside rather than outside is, in my view, a lot like conducting a music class without instruments or song. It is one thing to talk about playing a trumpet or talk about singing and quite another thing to actually do it. Television and classroom teaching cannot replace the awareness and emotional attachments that develop from direct experience in nature (Traina, 1995b). Our students:

> ...may know from television about global warming and ozone depletion, but they don't know the smell of a spring rain and the

[18] While I have no doubt that there are teachers who, at the level of practice, stimulate their students' emotions and imaginations in meaningful ways through their teaching, I found no evidence of guidelines to support this in practice. My research has revealed a marginalization of emotion and imagination in theory and limited practical support for teachers wishing to position emotional and imaginative engagement more centrally in their teaching. In other words, Ecological Education teachers appear to have little to no practical support for teaching imaginatively. This work aims to fill these gaps by creating a theoretical framework for Imaginative Ecological Education with clear links to practice that may support more widespread and frequent engagement of the body, emotion, and imagination in learning.

> night sounds of the woods. They experience little to give them a deep feeling of awe and wonder towards the natural world. (Traina, 1995b, p. 19)

In order to develop a sense of connection with nature, students need to get outside (Blenkinsop, 2003, 2006; Bogner, 1998; Smith and Williams, 1999; Traina, 1995b, 1995c).

Smith and Williams (1999) discuss the benefit of short and frequent experiences in nature for developing ecological understanding: "the 'real world' experiences of a wide sample of educators show the vital importance of education *in* the environment as a prerequisite to a concern *for* it. The most valuable and readily available resource to all schools is the environment itself" (p. 33). Getting outside and encouraging students to get "up close and personal" with the land can engage the senses and allow students to learn about nature from nature. Dodge (1995a) refers to the information that students gain directly through their senses as "high quality information." High quality information, or first-hand information, is "direct, resonant and durable" (Dodge, 1995a, p. 117). Getting "up close and personal" means shedding the layers between each student and nature. Students who are asked to crawl instead of walk, walk without shoes or lie face down in a grassy field rather than sit on it have an increased possibility of experiencing different sensations than they are used to—potentially powerful sensations that can feed their understanding of how they are immersed in a natural world as much as a human one. So, in order to *feel* something for nature our students need to be immersed in nature's sights, sounds, smells, tastes, textures.

The reasons why teachers do not take children outside are varied. It does take effort and it does force the teacher to hand over more control of learning to students. It can also get pretty messy. Another factor may be that teachers in urban and suburban areas do not consider what exists outside school walls as "nature." While it is true that rural contexts have more natural surroundings, this thesis takes as a central premise that suburban and urban contexts also provide opportunities for students to engage with the natural world.

Connecting with the natural world in ways that support a sense of connectedness can happen anywhere (Thomashow, 1995). Context does not prevent the development of ecological understanding. Carson (1965) suggests that a sense of wonder at the world can be stimulated anytime, anyplace:

> Wherever you are and whatever your resources, you can still look up at the sky—its dawn and twilight beauties, its moving clouds, its stars by night. You can listen to the wind, whether it blows with majestic voice through a forest or sings a many-voiced chorus around the eaves of your house or the corners of your apartment building, and in the listening you can gain magical release for your thoughts. You can still feel the rain on your face and think of its long journey, its many transmutations, from sea to air to earth. Even if you are a city dweller, you can find someplace, perhaps a park or a golf course, where you can observe the mysterious migrations of the birds and the changing seasons. And with your child you can ponder the mystery of a growing seed, even if be only one planted in a pot of earth in the kitchen window. (p. 49)

More than "nature unaffected by human action," Traina (1995c) describes wildness as the nature that surrounds us and affects us no matter where we are. Nature, or *wildness*, exists all around us no matter where we live. Wildness infuses our daily life experiences: "our beating heart, our circulatory system, our outside weather, our destiny to die, our genetic dependence on air, food, water

and a healthy quality of habitat and environment " (Traina, 1995c, p. 8). What Traina is saying is that we *are* wildness and we encounter wildness daily if only we are able to perceive it as such.

Livingston (1994) asserts that wildness is a distinct feature of being human.[19] For Livingston (1994) wildness is:

> ...a state of being in which one is an autonomous organism, yet bonded and subsidiary to the greater whole. Of the miraculous, multitudinous life adventure, one is at once the end and the means, a unique expression and the totality. (p. 196)

He defines wildness in biological and ecological terms.[20] Unlike Traina (1995c), however, who seems to suggest that we may connect with the wildness around us and within us relatively easily, Livingston argues that our sense of wildness is buried beneath many layers of cultural beliefs that shape how we make sense of the world.

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[19] Livingston (1994) uses the notion of "domestication" as "a process and as a condition" as a lens to examine human alienation from nature (p. 176). He argues that human beings have been domesticated by culture. So, like a domesticated animal dependent on its master for survival, human beings are domesticated, dependent on ideology—or what he calls a *cultural prosthesis* with which to make sense of the world.

[20] Livingston (1994) describes wildness as the antithesis to domestication: "Wildness is not acquired through covenant or dispensation. Wildness *is*, and has been, from the beginning. It is not merely an evolved phenomenon; it is a quality of being, and precondition of having become. As such, it is beyond the reach of rationality; it is *previous*, and transcendent. It has no missing parts, either through mutation or amputation. It requires no prosthetic devices, no fixing, no reordering, no moral overlays. Wildness requires no organizational intervention, even of the purest and highest democratic sort. Wildness is whole. It is the antithesis of the domesticated human state, uncontaminated by power, claims to power, or the need for power" (p. 172).

Livingston's (1994) work informs this research in two key ways. First, it supports the premise that wildness is everywhere.[21] Wildness exists within every human being; feeling, even to a small degree, this wildness is part of what it means to be human. While Livingston is not optimistic that we may easily reconnect with the wildness within us, he does concede that it may be possible to do so. We all retain the capacity for wildness.

Second, his work articulates in an imaginative way the cultural dimensions of ecological degradation. Livingston (1994) describes how human interactions with nature are shaped by certain ideological beliefs about the human-nature relationship.[22] He likens cultural ideology to a "prosthesis" upon which human beings are completely dependent for survival:

> It is possible to see our accumulated ideas, our ways of entertaining them, and our usual unquestioning dependence on both as together constituting an artificial replacement part, a fabricated *prosthetic device*. The prosthesis is a surrogate or substitute mode of approaching and apprehending the world. It has been fabricated through accumulating tradition to stand in the place of natural, biological, inherent ways of being, those ways having been abrogated by the culturing process. (p. 10)

While I find Livingston's (1994) work useful for this project, I use it with some caution. What I find informative is Livingston's argument that it may be possible to change the shape and form of our cultural prosthesis; we may be able to change the kinds of beliefs about the natural world and our ontology that

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[21] Snyder (1999) is another theorist who identifies the ubiquitousness and permanence of wildness: "...wildness is not limited to the 2 percent formal wilderness areas. Shifting scales, it is everywhere: ineradicable populations of fungi, moss, mold, yeasts, and such that surround and inhabit us. Dear mice on the back porch, deer bounding across the freeway, pigeons in the park, spiders in the corner...Wilderness may temporarily dwindle, but wildness won't go away" (p. 175).

[22] Evernden (1992, 1993) puts forth a similar argument. He describes the cultural "shells of belief" that shape our interactions with the world.

currently alienate us from nature. He argues that the prosthesis we wear in the Western world is one form. Our beliefs about human kind and nature are not a cultural universal and, indeed, Indigenous cultures wear a cultural prosthesis (because all human beings are cultural beings and thus all wear a prosthesis) in which humankind is understood as part of, rather than apart from, nature (Cajete, 1994). Livingston (1994) suggests that, "we can at any time expunge the most blatantly destructive ideologies and beliefs from our cultural catalogue" (p. 180). So, for example, we can work to replace notions of domination and competition we tend to apply to the world with understandings of cooperation (Livingston, 1994). We have learned, in Livingston's (1994) view, to see competition rather than cooperation in nature. "Believing is seeing" after all (Livingston, 1994, p. 90). We have learned, moreover, to understand ourselves in individual terms. He describes broader notions of self as family or group, self as community and self as biosphere even that may be inherent in us, indeed, in our wildness, if we could access it. The cultural prosthesis worn in the Western Industrial world has led, in Livingston's terms, to sensory deprivation and "experiential undernutrition" (p. 134). Children require "quality experiences with heterogeneity" (p. 134). Through experiences with difference, with multiple species, in ways that engage the body and emotions, we may develop a sense of being connected to the world. Through rich sensory experiences in nature, Livingston argues, children in middle childhood especially can come to develop a sense of self that includes the non-human other they encounter in nature.

While Livingston's (1994) work helps to illuminate the cultural dimensions underlying ecological problems, it is not my intention to design a new cultural

prosthesis. Instead, Imaginative Ecological Education engages in a more ecological epistemological conversation, one that tries to think about knowledge and knowing in terms of experience and the body's engagement in context.[23] This thesis is concerned with addressing humankind's alienation from nature by altering our ontological positioning and by taking a more ecological epistemological stance. It is possible that through education of a certain kind we may be able to think more ecologically about the human-world relationship.

To summarize, this thesis builds on the premise that with the proper skills and disposition one can connect with nature, with wildness, anywhere. Being able to practice Ecological Education in areas relatively untouched by humankind—areas where nature's presence dominates—would be ideal. Needless to say, untouched nature is not the norm in terms of where students are living or where they are learning most of the time. Conceiving of nature as wildness and as accessible everywhere opens up the possibility for developing ecological understanding across contexts. This research also considers what may be required to nurture the wildness within us. If, as Livingston (1994) suggests, wildness involves a sense of inclusion in the living world, an urge to connect with one's world, then it underlies an ecological understanding of the world. It may be that the ecological understanding we seek to develop through ecological pedagogy is rooted in an innate sense of wildness. Through pedagogy of a certain kind we may assist students in connecting with wildness that surrounds them and that lies within them.

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[23] Although he does not state it explicitly, it is my sense that a more relational, somatic and contextual kind of epistemological understanding contributes to what Livingston (1994) sees as a requirement for reconnecting with the wildness within us.

Failure to Engage the Body

Simply *being* outside or *doing* things outside will not necessarily contribute to students' sense of connection to nature (Takahashi, 2004). In addition to not getting outside, Ecological Education may be less effective because the kinds of activities students are engaged in while outside are not necessarily contributing to their sense of connectedness with the natural world. This thesis builds on the idea that getting outside can be an excellent opportunity to engage the body meaningfully in the development of ecological understanding.[24] Dodge (1995a) describes how direct encounters with nature can allow us to learn to "pay attention":

> Paying attention is an exacting practice. Many consider it the art of consciousness, and liken it to dancing, often with thousands of partners at once, often to different songs. To wildly simplify, paying attention requires complete awareness in the here and now, beginning with the senses but immediately involving a dynamic perception of the connections among things, the transactions and transformations, flows, cycles and centerless mysteries. (Dodge, 1995a, p. 117)

Paying attention to the natural environment supports a principle of Imaginative Ecological Education that I refer to as "activeness" or the body's immersion in context. It is a state marked by emotional and imaginative engagement and use of the body's tools for making sense of the world. So,

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[24] Capra (2005b) emphasizes the role of nature as teacher in Ecological Education. I am not denying the role nature, without intervention by the teacher, can play in education aimed at cultivating ecological understanding, only suggesting that some groundwork may be required to support students' willingness to engage with nature in ways that support somatic or body-based understanding of nature. This is particularly true when students' outdoor learning opportunities are incorporated into a regular school day and may, thus, be short-lived. In these instances some guidance by the teacher may support learning activities aimed at engaging the body. If students are participating in more immersive learning experiences the proper "mindset" may already be established. Nature can teach because students are likely more willing and ready to listen and learn.

potentially more important than *where* students are (in the sense of living in rural or urban contexts) is *how* they are learning; the activities they are doing and the ways they are being taught must engage their bodies, emotions and imaginations with nature (Blenkinsop, 2006; Takahashi, 2004). Failure to engage the body meaningfully in learning, that is, in ways that activate students' emotions and imaginations, may limit the extent to which personal relationships can be formed with the Earth.

Neglect of Emotion and Imagination

Barrow (1988), Egan (1992, 1997, 2005), Egan and Nadaner (1988), Greene (1988), and Warnock (1976) all argue for recognition of the central role of imagination in education. For Greene (1988) all learning requires the ability to imagine possibilities: "To learn, after all, is to become different, to see more, to gain a new perspective. It is to choose against things as they are" (Greene, 1988, p. 49). Egan and Nadaner (1988) note that imagination is "the hard pragmatic center of all effective human thinking" (Egan and Nadaner, 1988, p. ix). It lies at the heart of learning:

> Any conception of rational inquiry or the foundations of education that depreciates imagination is impoverished and sure to be a practical failure. Stimulating the imagination is not an alternative educational activity to be argued for in competition with other claims; it is a prerequisite to making any activity educational. (Egan and Nadaner, 1988, p. ix)

Barrow (1988) considers "the fostering of imagination in students [to be] an important aspect of a satisfactory education" (p. 79). Warnock (1976) takes the argument one step further in her assertion that the "cultivation of

imagination...should be the chief aim of education" (p. 9). Despite a difference in emphasis, the underlying message remains the same: learning is an imaginative act.

Imaginative and emotional engagements are closely interrelated (Egan, 1992, 1997, 2005). Warnock (1976) notes the interplay of imagination's cognitive and emotional dimensions:

> Imagination is necessary for the application of thought or concepts to things...without such application to human discourse...no goal-directed activity would be possible. But it is also that by which, as far as we can, we 'see into the life of things.' (p. 202)

When imagination is tied to knowledge, a sense of value or pleasure associated with the knowledge may emerge that fulfills our human need to find significance in our experiences (Warnock, 1976). Egan (1992) situates imagination "at a kind of crux where perception, memory, idea generation, emotion, metaphor, and no doubt other labelled features of our lives, intersect and interact" (p. 3).[25] Both Warnock (1976) and Egan (1992, 1997, 2005) agree that the emotional and intellectual dimensions that constitute imagination are what situate it centrally in meaning-making and make it centrally important for how we conceive of and practice education.

Imagination is valuable in education because it aids in memorization, deepens understanding, contributes to the development of social virtues, stimulates senses of personal and intellectual freedom, and facilitates

[25] This conception of imagination does not set it at odds with reason. Egan (1992) suggests that the misconception that imagination and reason are somehow mutually exclusive tends to lead at best to the confinement of imagination in arts education and, at worst, its neglect in education overall.

comprehension of objective knowledge and the development of narrative thinking (Egan, 1992).[26] Warnock (1976) affords imagination an even more fundamental role in knowing. She argues that imagination, or the ability to create "mental images," is universal and contributes to all perception and interpretation and, thus, to all understanding (p. 10):

> Meanings spring up round us as soon as we are conscious. The imagination is that which ascribes these meanings, which sees them *in* the objects before us whether these are the ordinary three-dimensional furniture of the world, diagrams in a textbook, pictures, music, or images in the mind's eye or ear. At an everyday level we must use imagination to apply concepts to things. This is the way we render the world familiar, and therefore manageable. (Warnock, 1976, p. 207)[27]

This thesis focuses on imagination's educational value and, in particular, its value in the context of Ecological Education. While imagination may, as Warnock (1976) argues, contribute to all understanding in the sense that making sense of anything requires some flexibility of thought, its educational value lies in its ability to engage students' emotions, stimulate their interests and propel them into new intellectual terrain.[28] It can, moreover, assist them in making sense of the world more fully by allowing them to adopt alternative perspectives and, from these, develop a sense of the interconnectedness of the world that constitutes ecological understanding.

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[26] Chapter Three considers how narrative understanding, like imagination itself, is not necessarily ecological in nature. Narrative understanding is a human phenomenon that may support the goals of Ecological Education by connecting human emotion to what is being learned in ways that can evoke the imagination. That said, the kinds of narratives that have been embraced in the Western world to explain how the world works and the human position in the world also underlie ecologically destructive human behaviour (Bowers, 1997).

[27] Warnock's (1976) argument is that the imagination connects our everyday or commonplace perceptions and interpretations with our most outlandish, extraordinary notions. Imagination contributes, thus, to what we consider to be both familiar and unfamiliar.

[28] Chapter Three elaborates further on the educational value of imagination.

In addition to the overall importance of imagination for learning, it contributes to the goals of Ecological Education. As previously noted, imagination is valuable for understanding ecologically because it offers the possibility to transcend current understandings of the world and consider alternative possibilities (Hill, Wilson and Watson, 2004; O'Sullivan and Taylor, 2004; Sewall, 1995). Evernden (1992) argues that considering alternatives to the assumptions and beliefs provided by modern Western culture is an imaginative task. He argues that the means to re-imagine the world in broader terms (that is, those beyond the ones afforded to us by culture) and, in this way, more fully is through a sense of wonder. Imagination may help us become aware of and transcend the cultural beliefs that contribute now to a sense of dislocation from the Earth.[29] It may be argued, of course, that it is impossible to make sense of the world outside a cultural context insofar as the sense-making tools we have available to us such as language are cultural constructions. As the capacity to consider the possible, not just the actual, imagination may broaden the scope of what we perceive and how. Understanding an alternative perspective, another point of view, is an imaginative task.

[29] Evernden (1992) asserts that when we encounter the world in wonder we do not seek explanation to categorize our experiences. Wonder is, in this way, pre-cultural as it lies outside explanation and assimilation into cultural beliefs: "In wonder we accept the presence of something entirely distinct and self-possessed (1992, p. 118). The value of wonder, in my view, is its ability to shock us or leave us perplexed. We may see something familiar as unfamiliar (or vice versa) and it can take on new meaning. We can also simply wonder at the unfamiliar.

Although taking on different names in the literature such as empathy (Egan, 1992; Greene, 1988), inclusion[30] (Buber, 1968) or identification[31] (Fox, 1990; Naess, 1989, 2002), imagination seems to play a role in enabling us to take on alternative perspectives which, in the context of Ecological Education, represents an important step for establishing a new path for human interaction with, and conceptions of, the Earth. Egan (1992) and Greene (1988, 1995), for example, note the role of imagination in the cultivation of empathy. Egan (1992) argues that imagination is a prerequisite for empathy because it allows transcendence of one's perspective and comprehension of another's. Imagination opens up a theoretical space in which to broaden notions of self to include interrelationship with the natural world: "The world is not objects out there; in so far as we can know the world it is within us by means of the curiously reciprocal arrangement whereby we also extend ourselves, imaginatively, into it" (Egan, 1992, p. 60). When we learn, "the disciplines...become a part of us; we extend ourselves imaginatively into mathematical or historical or biological worlds and kinds of understanding" (p.60). While Egan and Greene focus largely on the human dimension, it is reasonable to suggest that imagination enables us to

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[30] Rather than "empathy" Buber (1958) talks about "inclusion" (p. 94). Whereas in "empathy" one "transposes" oneself over to, and into, the other's situation, inclusion represents "the extensions of one's own concreteness, the fulfillment of the actual situation of life, the complete presence of the reality in which one participates. Its elements are, first, a relation, of no matter what kind, between two persons, second, an event experienced by them in common, in which at least one of them actively participates, and, third, the fact that this one person, without forfeiting anything of the felt reality of his activity, at the same time lives through the common event from the standpoint of the other" (Buber, 1958, p. 94).

[31] In the Deep Ecology literature, identification is defined as a "process in which one feels a sense of similarity or commonality with the other" (Fox, 1990, p. 231). Naess (1995) argues that we achieve our potentialities through identifying ontologically, cosmologically and personally with the natural other in all its forms. Through identification the self evolves not as an atomistic entity encased in the skin, but as a relational field. Self-realization through identification creates the ecological self; a self defined by that with which it identifies (Naess, 1995, p. 15).

extend ourselves into features of the natural world. Imaginative engagement may, in the way Egan describes above, help students to visualize and internalize their relationships with the natural world around them.

Despite what seems like a pivotal role in developing ecological understanding, imagination has had a surprisingly negligible influence in the shaping of Ecological Education theory and practice. Many texts refer to imagination but do not explore or make explicit its significance for developing ecological understanding (Abram, 1996; Devall and Sessions, 1985; Drengson and Inoue, 1995; Hart, 2003; Hautecoeur, 2002; Jardine, 1998; Nabhan and Trimble, 1994; Orr, 1992, 2002; O'Sullivan, 1999; O'Sullivan and Taylor, 2004; Riley-Taylor, 2002; Roszak, Gomes, and Kanner, 1995; Roszak, 2001; Shepard, 1982; Smith and Williams, 1999; Sterling, 2001; Stone and Barlow, 2005; Thomashow, 1995; Wenden, 2004; Worster, 1993). Other texts dealing with Ecological Education make no reference to the imagination (Bowers, 1993, 2003; Devall, 1988; Evernden, 1992, 1993; Fox, 1990; Glendinning, 2002; Meeker, 1988; Naess, 1989; Reagan, 1996). O'Sullivan and Taylor (2004), Stone and Barlow (2005) and Smith and Williams (1999) are central texts in the field of Ecological Education. In each text, imagination receives marginal attention. It is mentioned in O'Sullivan and Taylor (2004) on seven pages, in Smith and Williams (1999) on two pages, and in Stone and Barlow (2005) on five pages. The neglect of imagination in Ecological Education at both theoretical and practical levels has, as we have seen from the previous discussion, both educational and ecological implications. Imaginative Education provides a framework that can situate imagination at the centre of Ecological Education

theory and practice. It affords a pedagogical approach to shaping teaching in ways that engage the body, emotion and imagination in learning.

In summary, this thesis examines actual and possible processes of Ecological Education. My first research question examines the overall goal of Ecological Education: the cultivation of ecological understanding. I examine what this goal entails and how pedagogical practices currently support its achievement. What emerges is, among other problems, a failure to routinely engage the body, emotion, and imagination in learning. It seems that the means and ends of Ecological Education are currently misaligned. It may be that pedagogy that brings emotional and imaginative engagement to the core of practice may address this limitation.

How the engagement of the body, emotion and imagination in learning may play a more central role in Ecological Education is the focus of my second research question. Traina (1995b) argues that in order to "inspire children to relate more deeply to all parts of the natural world and convey to children a profound sense of being part of the Earth system, the Earth family," education of a certain kind is required (p. 19). This research outlines an approach to teaching that situates engagement of the body, emotion and imagination at the core of all learning and that may support students in forming the kinds of emotional connections with the natural world that underlie ecological understanding.

The third research question asks what form a marriage of Ecological Education and Imaginative Education might take. What emerges is an ecologically imaginative pedagogy focusing on the cultivation of students' close,

personal relationships with the local environment and shaped by engagement of the body, emotion and imagination. It is possible that by making all education imaginative and ecological, we may resolve some of the limitations of Ecological Education in its current form. Imaginative Ecological Education can make the development of ecological understanding part of everything students are learning. Through opportunities to learn outside, in direct contact with nature and in activities that engage the body, students' emotions and imaginations may be engaged in ways that support an ecological understanding of the world.

Chapter Outline

Following this introduction, **Chapter Two** provides an overview of Ecological Education in terms of its central purposes, principles, practices and problems. In addition to examining the nature of the field, this review aims to provide some clarity around its objectives, something currently missing from the literature. The use of multiple terms in Ecological Education to describe its central aims obscures the cognitive, emotional and behavioural components of the objectives themselves. A review also of the principles and practices of Ecological Education describes and demonstrates, with examples, central features of the field that can be re-imagined in terms of emotional and imaginative engagement. These are foundations of Ecological Education that, if envisioned and implemented differently, may more effectively support students' capacity to understand ecologically.

Chapter Three describes the purposes, principles, practices and problems of Imaginative Education. It considers central tenets of Imaginative

Education including the imaginative core of education, "cognitive tools" and "kinds of understanding." The practice section outlines templates in which these ideas come together and may be used by teachers of any topic. The possible incompatibilities between the two fields are also discussed. Articulation of how Ecological Education and Imaginative Education are compatible and what Imaginative Education can contribute to Ecological Education concludes the chapter.

Chapter Four reframes Ecological Education according to the principles of Imaginative Education. I outline a framework for *Imaginative Ecological Education* that maintains key features of Ecological Education but takes a new educational direction. While sharing with Ecological Education an emphasis on teaching students about the Earth and its processes in ways that enhance students' sense of relatedness within human and non-human worlds, it couples all learning with emotional and imaginative engagement. Imaginative Ecological Education also centralizes the body in the learning process in a way that may enhance students' sense of embeddedness in the natural world. The imaginative ecological educator will employ "new" cognitive tools in the development of ecological understanding. I argue that cognitive tools that develop students' sense of place or sense of closeness with the natural world (what I call place-making cognitive tools) should be included along with the cognitive tools Egan (1997) describes for Somatic, Mythic, Romantic and Philosophic understandings.

Chapter Five demonstrates how the principles of Imaginative Ecological Education translate into practice. The examples provided in this chapter have a

dual purpose: first, to show in sufficient detail what Imaginative Ecological Education can look like in practice and, second, to support teachers of any subject in the creation of imaginative and ecological lesson and unit plans.[32]

[32] While theorists such as Cajete (1994), Jardine (1998), Orr (1992, 1994), O'Sullivan and Taylor (2004) and Smith and Williams (1999), provide significant theoretical influence in the field, they offer little practical support for classroom teachers.

CHAPTER TWO:
MAPPING THE THEORETICAL AND PRACTICAL TERRAIN OF ECOLOGICAL EDUCATION

This chapter maps the theoretical and practical terrain of Ecological Education. I begin by identifying characteristics of Ecological Education. Next the central purposes of Ecological Education are described. In order to add clarity to the overall goals of Ecological Education, I aim to identify what the multiple terms used in the field have in common. Following this clarification of overall purposes, the ecological principles underlying these goals and infusing Ecological Education programs (either partially or fully) are discussed. Next, in order to illustrate how theory is being translated into practice, examples of lessons from two approaches to implementing Ecological Education in schools are described.[33] The final section of the chapter addresses possible limitations of current practices. Weaknesses at the level of theory and practice are revealed that may be limiting the effectiveness of Ecological Education.

Defining Ecological Education

Educational programs interested in planetary wellbeing come under many headings including Ecological Education, Environmental Education, Environmental Learning, Bioregional Education, Nature Education, Place-Based

[33] In the previous chapter I described three models of Ecological Education: supplemental, infusionist and intensive. Because this thesis focuses on Ecological Education practiced in schools as part of a school day (and not, therefore, on Ecological Education that takes place away from school over longer periods of time), my practical examples draw on the first two categories.

Education, Education for Sustainability, and Education for Sustainable Living. All of these pedagogies share an axiological stance characterized by interest in the health of the Earth and all its inhabitants (Mikelskis, 1990). However, close reading of the Ecological Education literature indicates that using these terms interchangeably ignores subtle but important differences between them. O'Sullivan and Taylor (2004), Smith and Williams (1999), and Stone and Barlow (2005) are a few theorists who argue that it is the relational and contextual focus of Ecological Education that set it apart.

Ecological Education stems from the ontological position that human beings are inescapably interconnected with nature:

> Ecological Education connotes an emphasis on the inescapable embeddedness of human beings in natural systems. Rather than seeing nature as other—a set of phenomena capable of being manipulated like parts of a machine—the practice of Ecological Education requires viewing human beings as one part of the natural world and human cultures as an outgrowth of interactions between our species and particular places...There is no way to disentangle human beings from the earth, and as long as our species exists, no way to separate the earth from humans. (Smith and Williams, 1999, p. 3)

This emphasis in Ecological Education on the symbiotic relationship between human beings and nature shapes what is taught and how. Pedagogical content and the teaching practices employed are influenced by the principle of interdependence. In terms of content, students learn about the interconnectedness of processes and features of nature. In terms of process, they learn in ways that encourage personal understanding of interdependence. So in addition to learning about nature from books or media, they learn experientially. For example, in line with instilling the sense of human immersion in the natural

world, cultivating a sense of closeness with nature through the development of personal relationships is a characteristic of Ecological Education (Mikelskis, 1990). Students are given opportunities to get to know the places in which they live by learning in ways that engage their senses and that support emotional connections (Stone and Barlow, 2005).

Theoretical and practical emphasis on relationships is another defining feature of Ecological Education. More than simply a *relational* pedagogy Ecological Education focuses on the relationships between humankind and the Earth.[34] The term *ecological*, stemming from ecology (the study of the Earth's household or *oikos*), reveals Ecological Education's interest in Earth-centered kinds of relationships. Evernden (1992), Laidlaw, Davis, Sumara (2001), Quinn and Scott (1997), and Smith and Williams (1999) argue that this interest in recognizing how human beings are connected within the Earth in both the theory and practice of Ecological Education set it apart from Environmental Education.

Evernden (1992) suggests that the term "environment" focuses our attention on the Earth as separate from humankind rather than on the connectedness between humans and the Earth. Moreover, he argues that in industrial society, the term "environment" evokes economic language of resources and development etc. that is antithetical to the symbiotic kind of human-world relationship at the core of ecological thinking. Whereas

[34] The terms "ecological" and "relational" are not used interchangeably in this thesis. They are used synonymously, however in some of the literature in the field (Beckett and Shaffer, 2005; Boyce-Tillman, 2004; Di Norcia, 1986; Hoffman, Cummings, and Leschied, 2004). While "ecological" always implies "relational," the reverse is not the case. The term "relational" does not necessarily lead us to consider possibilities for understanding the human-nature relationship.

"environmental" may turn our attention outward to an external surrounding and in this way imply separation, "ecological" draws our attention inward to relationships between all organisms and their contexts (Laidlaw, Davis, Sumara, 2001).

An ecological focus brings together holistic and contextual pedagogies.[35] Ecological Education is a holistic form of learning that considers the whole individual (hands, head, heart) within a particular cultural and natural environment. More than holistic in the general sense of the term, then, Ecological Education is *placed*; it is contextual. Ecological Education connects learning to specific places and allows learning to emerge from places (Hautecoeur, 2002).

Not surprisingly, Ecological Education is inherently interdisciplinary (Abram, 1996; Evernden, 1993; Orr, 1992, 1994; O'Sullivan and Taylor, 2004; Smith and Williams, 1999). Relating learning *to* context and learning *in* context in ways that engage the whole person transcends traditional "discipline" boundaries and results in a more holistic learning experience. In practice, project-based learning is often used in Ecological Education because it allows students flexibility to explore topics in multiple directions and demonstrate their learning in diverse ways (Stone and Barlow, 2005). Projects based on active, hands-on learning also support the engagement of the whole child. Projects can also focus on place and can address issues unique to each child's context. So,

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[35] Holistic education is not necessarily concerned with human-nature relationships. In the context of Ecological Education it is, however, as education of the whole child includes a focus on place and the cultivation of a sense of place.

students may work to create or maintain a garden on school grounds, they may convert some part of a school lawn back to a more wild state, or they may participate in larger projects of significance to their community as a whole such as park or wetland restoration.

Purposes

In addition to general knowledge acquisition, Ecological Education programs of varying shapes and sizes all aim "to develop students' awareness and concern about the total ecosystem and its associated problems and to shape students' behaviour concerning the environment and conservation" (Bogner, 1998). That this general aim is being expressed in multiple ways may represent a theoretical and practical weakness in the field. For example, there are references to developing ecological consciousness (Abram, 1996; Biriukova, 2005; Bowen, 1979; Devall, 1988; Devall and Sessions, 1985; Drengson and Inoue, 1995; Morris, 2002; Naess, 1989, 2002; O'Sullivan and Taylor, 2004; Senkevich, 1991; Smith and Williams, 1999; Wenden, 2004; Zverev, 1981); ecological insight (Jardine, 1988), ecological thought or thinking (Bowers, 1993; Devall, 1988; Devall and Sessions, 1985; Fox, 1990; Orr, 1992; O'Sullivan and Taylor, 2004; Smith and Williams, 1999; Sterling, 2001; Stone and Barlow, 2005; Wenden, 2004; Worster, 1993), ecological knowledge (Bowers, 2003; Drengson and Inoue, 1995; Naess, 1989; Orr, 1992; Smith and Williams, 1999), ecological sensitivity (Devall, 1988; Fox, 1990), ecological wisdom (Drengson and Inoue, 1995; Orr, 1994; Smith and Williams, 1999), ecological competence (Hart, 2003; Orr, 1992, 1994, 2002; Smith and Williams, 1999; Sterling, 2001), ecological literacy

(Capra, 2002; Dennison, 1992; Orr, 1992, 1994; Quammen, 1994; Root, 2002; Sherlock, 2003; Smith and Williams, 1999; Stone and Barlow, 2005;), ecological understanding (Bailey and Watson, 1998; Beckett and Shaffer, 2005; Boyce-Tillman, 2004; Caduto, 1998; Carlsson, 2001, 2002a/b; Devall and Sessions, 1985; Di Norcia, 1986; Drengson and Inoue, 1995; Fox, 1990; Hoffman, Cummings, and Leschied, 2004; Johnson, 2005; Johnson and Manoli, 2005; Linney, 1994; Linsky, 1971; O'Sullivan and Taylor, 2004; Schoenfeld, 1971; Smith and Williams, 1999) and ecological intelligence or ecological design intelligence (Orr, 1994; Riley-Taylor, 2002).

The use of different terminology suggests that these goals are more different than they are alike. A lack of clarity around what the various terms mean obscures the goals further. (I review shortly Ecological Education literature on three of the main terms in the field. Most other terms are used but are not defined.) Clarification of the main components of the goals of Ecological Education is important for two reasons. First, clarification of the goals of Ecological Education may serve to illustrate what makes it distinct as a field of study. Second, defining the central features of what Ecological Education programs aim to achieve may facilitate the construction of pedagogy in line with these goals.

Missing from Ecological Education literature is comprehensive practical support for teachers. The multiple terms being used as well as a limited amount of clarification as to what these terms actually mean, may explain why the field lacks a comprehensive approach to practice. While there are many examples of

lessons and units ecological educators may use, there does not seem to be a detailed planning framework for teachers to employ that aligns with the goal of supporting deeper understanding of humankind's position in the world and that may support a sense of concern for nature. This work offers one approach that may fill this gap.

This section examines three of the most widely discussed, and theoretically developed, ideas: *ecological understanding*, *ecological literacy*, and *ecological consciousness*. Their meanings range from understanding the world relationally (with and without reference to nature) (Bailey and Watson, 1998; Beckett and Shaffer, 2005; Boyce-Tillman, 2004; Caduto, 1998; Capra, 1996; Carlsson, 2002a/b; Di Norcia, 1986; Hoffman, Cummings, and Leschied, 2004; Linney, 1994; Linsky, 1971; Schoenfeld, 1971), to understanding the central ideas of ecology (Devall and Sessions, 1985; Drengson and Inoue, 1995; Fox 1990; Johnson, 2005; Johnson and Manoli, 2005; Smith and Williams, 1999), to being able to understand "nature's language" (Capra, 2005; Orr, 1992, 1994), to developing a worldview based on ecological concepts (Abram, 1996; Bowen, 1979; Devall, 1988; Devall and Sessions, 1985; Drengson and Inoue, 1995; Naess, 1989, 2002; O'Sullivan and Taylor, 2004; Senkevich, 1991; Smith and Williams, 1999; Wenden, 2004; Zverev, 1981). All of the ideas have a common axiological stance in regards to the intrinsic value of the natural world and the need for human beings to demonstrate a sense of stewardship towards the Earth. They also share cognitive, emotional, and behavioural dimensions.

Ecological Understanding

Ecological understanding is used in three ways in the literature: as a relational or holistic kind of understanding, as an understanding of human relationship to the natural world, and as comprehension of ecological concepts. The first sense of the term emphasizes relation in general and is not necessarily concerned with the natural world. The term "ecological" is used synonymously with "relational" (Beckett and Shaffer, 2005; Boyce-Tillman, 2004; Di Norcia, 1986; Hoffman, Cummings, and Leschied, 2004). Someone with ecological understanding is cognizant of relationships; he or she is able to comprehend the notion of interconnectedness in relation to some subject matter.

The second usage of ecological understanding refers to one's ability to understand the world in terms of relationships and context. Carlsson (2002a), one of only a few theorists investigating ecological understanding, breaks the term in two. She notes how "understanding" refers to the meaning of one's experiences and "ecological" refers to the "relations between organisms and their environment" (p. 683). Bailey and Watson (1998), Caduto (1998), Capra (1996), Linney (1994), Linsky (1971) and Schoenfeld (1971) use ecological understanding in the same way: in reference to an awareness of humankind's interconnectedness within both natural and cultural worlds.

The third way in which ecological understanding is used is to describe knowledge of the science of ecology and its principles. Ecological understanding is, thus, synonymous with understanding ecology (Devall and Sessions, 1985; Drengson and Inoue, 1995; Fox, 1990; Johnson, 2005; Johnson and Manoli,

2005; Smith and Williams, 1999). One might have ecological understanding if one is knowledgeable about the concept of adaptation or competition just as one might have historical or mathematical knowledge based on understanding concepts associated with these subject areas (O'Sullivan and Taylor, 2004; Smith and Williams, 1999). In this third sense of the term, one might also have different ecological understandings based on comprehension of different ecological concepts (Johnson, 2005). Carlsson (2001, 2002a/b) and Johnson (2005) fit into this third category.[36]

Carlsson (2002a/b) looks at the structure of the cognitive aspect of ecological understanding. She defines ecological understanding in terms of comprehension (to varying degrees) of principles related to the function of any ecosystem: photosynthesis, cycling of matter, and flow of energy. She argues that how one conceives of these principles influences the form or degree of the ecological understanding achieved.[37] Johnson (2005), similarly, equates ecological understanding with understanding ecological principles. His research looks at the nature of students' ecological understanding (what they know about

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[36] Carlsson (2001, 2002a/b) and Johnson (2005) were the only studies I located that investigated ecological understanding specifically.

[37] These principles are: photosynthesis, cycling of matter, flow of energy (2002a, p. 683). Carlsson discovered a gradient or a hierarchy of ecological understanding where higher levels of ecological understanding were characterized by increasing inclusiveness of complex ideas. Specifically, she notes the importance of understanding transformation, the "process in which one form turns into qualitatively new ones" (2002b, p. 702): "the general pattern is that the most inclusive category embraces the...idea of transformation. Inclusiveness of critical aspects is the foundation on which the hierarchical order among the categories is built. An increased level of complexity allows for, or opens up, more and more inclusive, or general, ways of understanding the world" (p. 693). Transformation is, thus, the "overall gatekeeper" to more advanced forms of ecological understanding" as it "establishes fundamental links in the understanding of the interrelations and mutual dependencies within, as well as between, living and non-living spheres" (2002b, p. 712).

ecology), how their understandings develop over time, and how education contributes to their understanding.[38]

The three different uses of ecological understanding described above share a cognitive dimension. They also involve emotional engagement and behavioural change (Bailey and Watson, 1998; Carlsson, 2001, 2002a/b; Drengson and Inoue, 1995). It is believed that in learning about nature and its principles, one comes to understand how one is also implicated in the world. A personal involvement is revealed. Carlsson (2002a) notes how ecological understanding is composed of both "ecosystem insights" (what she describes specifically as "ways of thinking about photosynthesis" "recycling" and "energy" p. 685) and "human's relationship to nature" (what she describes as "ways of thinking about the human-nature relationship").[39] So learning about ecological principles also informs one's own sense of immersion in the world. Emotional connections:

> are developed through first-hand contact with natural places. Specific activities help instill a joy at being in touch with the elements of life, a kinship with living things, a reverence for natural communities, and a love for the earth. (Johnson and Manoli, 2005, p. 3)

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[38] Johnson (2005) is involved in a long-term research study of Earth Education programs: Earthkeepers (Van Matre, 1979), Sunship Earth (Van Matre, 1979), Lost Treasures, SUNSHIP II (Van Matre and Johnson, 1997). Through interviews and written assessments conducted before and after participating in Earth Education programs, students' ecological understandings are determined. See also Johnson and Manoli (2008) for research on the effects of Earth Education on students' environmental perceptions.

[39] Carlsson (2001) investigates how photography may be a useful medium for examining ecological understanding. How individuals relate to nature is, for Carlsson, one dimension of ecological understanding (p. 131). She found that the subjects in her study related to nature in two qualitatively different ways: some situated themselves in nature and others situated themselves apart from nature. According to the first view "humans are seen as fully integrated into an environment characterized by mutual interdependencies" (p. 133) whereas according to the second "Nature is commonly thought of as a *place* in which to experience and perform activities. No connection is made to its function or role in survival" (p. 133). Carlsson notes, thus, diversity in terms of how people relate to nature within an ecological understanding.

This emotional dimension not only makes learning meaningful and underlies a sense of connection to nature, but is also believed to support behavioural change (Biriukova, 2005; Dodge, 1995/b; Naess, 2002; Traina, 1995a/b).

Together, the cognitive and affective dimensions of ecological understanding are seen to influence people's "judgments about and...personal sense of responsibility for the environment" (Bailey and Watson, 1998, p. 139).[40] Like Bailey and Watson (1998), Johnson and Manoli (2005) and Johnson (2005) identify the interplay of perception, feeling, and action in ecological understanding:

> We believe that in order to make decisions and take actions that will help us live more sustainable lives, people need to understand how the natural systems of the earth work. But there is more to it than that. They also need to care, to connect emotionally with the natural world. And they need to process all of that to see how their lives are tied to these natural systems and impact them. (Johnson and Manoli, 2005, p. 3)[41]

I use the term *ecological understanding* and the active form, *understanding ecologically*, throughout this thesis to describe the sense of being embedded in the natural world and the kind of understanding of the world that emerges from this perspective. I find the term "understanding" (as opposed to literacy or consciousness which I discuss next) useful for this discussion because it acknowledges the cognitive dimension (comprehending ecological concepts such

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[40] Bailey and Watson (1998) study how drama and role-play may develop younger students' comprehension of basic ecological concepts. They argue that the affective dimension may be more fully developed through active learning strategies such as the "Ecogame" in which children become different features of an ecosystem. Their study revealed that students' comprehension of ecological concepts increased when their emotions were engaged through role-play.

[41] Johnson and Manoli (2005) define "processing" as what people actually do with what they have learned about Ecology and what they have experienced; processing is action (p.3).

as how the world is interconnected) and it also implies a broader worldview. Egan (1997, 2005) uses the term "understanding" in this global sense; one's understanding represents how one makes sense of the world. "Understanding" is also useful because it refers to both individual and collective dimensions. Ecological understanding has individualistic, cultural and environmental dimensions. It exists among individuals within human and natural communities and is shaped by our encounters with the natural world.[42] The cognitive, affective, and behavioural dimensions of ecological understanding overlap with the notion of ecological literacy.

Ecological Literacy

Ecological literacy is most often traced to the work of David Orr, professor at Oberline College and Director of the Center for EcoLiteracy in Berkeley.[43] In 1992 Orr published *Ecological Literacy: Education and the Transition to a Postmodern World.*[44] The notion of developing children's ecological literacy has been a central theme in education concerned with the wellbeing of the Earth ever since (See Capra, 2002. 2005a/b; Dennison, 1992; Government of Canada, 2002;

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[42] Chapter Four considers how we might develop and support the individual child's ecological understanding as well as how, at the collective level of the classroom and school, ecological understanding might be nurtured systemically.

[43] The Center for EcoLiteracy is a public foundation founded in 1995 by Peter Buckley, Fritjof Capra and Zenobia Barlow that supports education for sustainability (Stone and Barlow, 2005, p. 1).

[44] Orr (1992, 1994) argues, "the ecological crisis represents, in large measure, a failure of education" (1992, p. x). Environmental problems are "not merely an intellectual failure to recognize our dependence on natural systems...[but] rather, a deep failure in the educational process to join intellect with affection and loyalty to the ecologies of particular places, which is to say a failure to bond mind and nature" (1994, p. 95). Orr's argument is that education for ecological literacy represents a "leverage-point" for a shift toward sustainability (1992, p. 84). This represents an underlying premise at the Center for Ecological Literacy in Berkeley.

Quammen, 1994; Root, 2002; Sherlock, 2003; Smith and Williams, 1999; Sobel, 1998; Stone and Barlow, 2005).

Orr defines ecological literacy in cognitive, affective, and behavioural terms. Ecological literacy is that "quality of mind that seeks out connections" and is based on "knowing, caring, and practical competence" (Orr, 1992, p. 92). Orr (1992) asserts that someone who is ecologically literate:

> ...has the knowledge necessary to comprehend interrelatedness, and an attitude of care or stewardship. Such a person would also have the practical competence required to act on the basis of knowledge and feeling (p. 92).

In terms of comprehension, ecological literacy:

> ...implies a broad understanding of how people and societies relate to each other and to natural systems, and how they might do so sustainably. It presumes both an awareness of the interrelatedness of life and knowledge of how the world works as a physical system. (p. 92)[45]

The emotional dimension makes the learning meaningful and inspires action.

Orr (1992) notes the emotional, personal connection to place that informs ecological literacy. He describes how someone who is ecologically literate is intimately aware of and attuned to the places in which they live (Orr, 2005). The inspiration to live differently in place stems from one's knowledge of place and one's emotional connection to it. Ecological understanding and ecological literacy emphasize, thus, a combination of knowledge of ecological processes and

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[45] In his 1994 publication *Earth in mind* Orr refers to "ecological design intelligence" rather than "ecological literacy." The premises are, however, the same. In 2002 he argues: "Environmental problems...are mostly the result of a miscalibration between human intentions and ecological results, which is to say that they are a kind of design failure" (p. 14). He suggests the resolution of environmental problems represents "a design challenge like no other" (p. 12). It requires "a largeness of heart, breadth of perspective, practical competence, moral stamina, and the kind of intelligence that discerns ecological patterns" (Orr, 2002, p. 4)

principles and emotional connection to nature. However, some people argue that more is required. It is being increasingly argued that nothing short of redefining how human beings understand the world generally can address planetary crises (Abram, 1996; Bowen, 1979; Devall, 1988; Devall and Sessions, 1985; Drengson and Inoue 1995; Naess, 1989, 2002; O'Sullivan and Taylor, 2004; Senkevich, 1991; Smith and Williams, 1999; Wenden, 2004; Zverev, 1981). This brings us to the notion of ecological consciousness.

Ecological Consciousness

Ecological consciousness focuses on the realm of perception. The term is used most often in reference to a worldview or belief system in which human beings are understood as inextricably linked to the natural world (Abram, 1996; Devall, 1988; Devall and Sessions, 1985; Drengson and Inoue, 1995; Naess, 1989, 2002; O'Sullivan and Taylor, 2004; Smith and Williams, 1999). The philosophical foundations for ecological consciousness can be linked to the Deep Ecology movement and the work of Norwegian philosopher Arne Naess in the 1970s.[46] Naess (1995) argues that we achieve full humanity through identifying ontologically, cosmologically and personally with the natural other in all its forms. The cognitive, affective, and behavioural dimensions come together in

[46] An ecological consciousness implies an ecological view of self that Naess associates with Self-realization. Self-realization is a process of opening the self to others and of letting relationships with others define the self (Naess, 1995). For discussion of the ecological self (a sense of self defined by that with which it identifies) see Devall (1988), Devall and Sessions (1985), Drengson and Inoue (1995), Naess (1989, 2002), and Roszak, Kanner and Gomes (1995).

this all-encompassing notion of making sense of the world as beings embedded in the world.[47]

More than an understanding that we reside within a larger, relational system of awareness (although this is a vital component), ecological consciousness represents "a profound and intimate sense of relatedness with the nonhuman other" that informs all that we do (Devall and Sessions, 1985, p. 86). When one is ecologically conscious, one feels an "inescapable affinity, or affiliation" between the natural other and the self (Devall and Sessions, 1985, p. 37). This powerful emotional connection reveals an ontological statement about humankind's connection to nature, indeed, our need for nature. Lopez (1986) captures this immersive sense. Lopez suggests that to be ecologically conscious is to:

> ...engage in a wordless dialogue with [the land], one so absorbing that you cease to talk with your human companions. It means to release [one's understanding of] self from rational images of what something 'means' and to be concerned only that it 'is.' And then to recognize that things exist only insofar as they can be related to other things. (Lopez, 1986, p. 199-200)

The places where we live, the world that surrounds us, are not external to us; they make us. Our views of the world and of the self are infused, thus, with the biological reality that all things are interdependent. When the natural world is understood as an extension of one's self, one does not harm it. Doing so may be likened to harming one's own body (Naess, 1995). Ecological consciousness is

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[47] In some instances the human-nature dimension of ecological consciousness is downplayed if not missing completely (See Ettling and Guilian, 2004; O'Neill, 2004). "Ecological" refers to a relational perspective that does not include the human-nature relationship. This use of the term is not the norm. In this thesis, and in most cases, "ecological consciousness" is used to denote a worldview based on a sense of embeddedness in the natural world.

about knowing, feeling and doing from a profound sense of connection with the natural world.

This section aims to clarify what three terms most often used in Ecological Education to express its goals have in common. I note three common dimensions: cognitive or intellectual aspects of understanding ecological principles, the emotional or affective aspects of relating to nature, and the psychological implications of ecological insights shaping our belief systems and our actions. More than simply a dimension of Ecological Education goals, the emotional or affective core of these aims is revealed. Emotional connection is a requirement for learning and for action:

> Feelings and emotions are the glue that inextricably marries 'facts' to 'values.' They bind the world that is, with all its splendour and terror, to the world of our hopes, dreams, and imaginations. Feelings and emotions are the source of our ideas, inspiration, and creativity: they are what enable us to reason deeply and they are what impel us to act. (Glasser, 2002, p. xviii)

Given the role of emotion in ecological understanding, it stands to reason that Ecological Education should focus on cultivating students' affective bonds to knowledge of nature and to nature itself. Nabhan and Trimble (1994), Carson (1965), Traina and Darley-Hall (1995) and others note the value of engaging students' emotions in learning about nature. However, there is little explicit consideration of emotional engagement in learning and what is discussed is located at the theoretical level rather than linked to specific practice. This thesis adds to the conversation around the role of emotional engagement in Ecological Education and ties it to pedagogy. A central piece of the conversation is the notion of imagination, something missing from discussion of ecological

understanding, ecological literacy and ecological consciousness. To neglect imagination's role in these objectives and also, thus, the importance of imaginative engagement in learning in general, may move us further away from their fulfillment.

The Role of Imagination

Tied up with our emotions, as Glasser (2002) notes above, is imagination. And yet, Ecological Education literature says very little about imagination's role in Ecological Education. Of interest in this research is the imaginative dimension of Ecological Education goals. Because, as Egan (1997) notes, imagination is at play when human emotions are engaged, it is reasonable to define the core of Ecological Education in both emotional and imaginative terms.

Imagination is often identified as a useful "tool" for achieving the aims of Ecological Education we have been discussing because it represents a necessary flexibility of mind to go beyond current understandings of the human-world relationship and human-world interactions (Daloz, 2004; Devall and Sessions, 1985; Evernden, 1992; Hart, 2003; Hill, Wilson and Watson, 2004; Nabhan and Trimble, 1994; Naess, 2002; Orr, 1992, 1994, 2002; O'Sullivan and Taylor, 2004; Riley-Taylor, 2002; Roszak, 2001; Roszak, Gomes and Kanner, 1995; Sewall, 1995; Shepard, 1982; Sterling, 2001; Stone and Barlow, 2005; Worster, 1993). This is where discussion of imagination tends to stop. Its status remains a useful, but optional, aid to teaching. Its role in learning is not considered nor is its involvement in ecological understanding. Bookchin (1991) and Orr (1994) are the only theorists I am aware of that note the imaginative *requirements* of Ecological

Education's objectives. They discuss specifically, the role of imagination in ecological consciousness. Bookchin (1991) states:

> What we crucially lack is the consciousness and sensibility that will help us achieve such eminently desirable goals—a consciousness and sensibility far broader than customarily meant by these terms. Our definitions must include not only the ability to reason logically and respond emotionally in a humanistic fashion; they must also include a fresh awareness of the relatedness between things and an imaginative insight into the possible. (p. 19)

Bookchin (1991) considers imagination as part of this new consciousness, not just one possible way to get there.

For Orr (1994) imagination is not some optional human capacity distinct from our interactions with nature. He considers it, rather, an innate feature of humanity, tied in with our innate affiliation for nature. Orr (1994) also suggests that current forms of imagination are limited and limiting (Orr, 1994, p. 142-143).[48] He asserts that "more, not less, ecological imagination" is required to resolve ecological issues (Orr, 2002, p. 195). The notion that imagination is a requirement for understanding human immersion in the natural world is a topic explored in this thesis for two reasons. First, I, like Bookchin and Orr, note the imaginative and emotional core of what Ecological Education aims to achieve. Second, understanding human beings as part of nature requires an expansion of our imaginative capacities to include imagination stemming from, and alert to, relationships, connections and context. Developing our ability to imagine ecologically represents a means of expanding, and thus enriching, our imaginative capabilities in ways that current ecological problems require. From

[48] Orr (1994, 2002) refers to both explicit pedagogy as well as the implicit teachings of our school buildings and campuses.

this perspective, the development of ecological understanding requires centrally, not peripherally, the imagination.

Principles

For the principles informing Ecological Education we turn to nature itself. It is beyond the scope of this thesis to provide a comprehensive overview of ecology. My aim in this section is to identify some basic principles considered essential for ecological understanding, and how they are being implemented in educational theory and practice. These principles are not only topics Ecological Education tends to teach about, but represent characteristics that Ecological Education programs also aim to emulate. Capra (1996, 2002, 2005a/b), O'Sullivan and Taylor (2004), Smith and Williams (1999), and Stone and Barlow (2005) highlight how nature can teach us vital lessons about what sustainable systems are and how they function.[49] Capra (2005b) argues that by comprehending the basic principles of ecology we can equip ourselves with the understandings that underlie sustainability. With these understandings we can then move toward more harmonious and sustainable human-world interactions:

> By applying systems thinking to the multiple relationships interlinking the members of the earth household, we can identify core concepts that describe the patterns and processes by which nature sustains life. These concepts, the starting point for designing sustainable communities, may be called principles of ecology, principles of sustainability, principles of community, or even the basic facts of life. We need curricula that teach our children these fundamental facts of life. (Capra, 2005b, p. 22-23)

[49] Stone and Barlow (2005) describe education for ecological literacy as education for sustainability.

Ecological Education is not only concerned with teaching ecological principles to students, but also models them. This section describes what these principles are and how they are being translated into practice.

Ecological Principles: Nature's Lessons

The basic building block of nature is the relationship:

> All members of an ecological community are interconnected in a vast and intricate network of relationships, the web of life. They derive their essential properties and, in fact, their very existence from these relationships. (The Edible Schoolyard, 2006k)

The image of a web or network captures the relational, symbiotic message at the heart of ecological teachings. Each strand in the web or link in the network connects to another in a way that holds the others in place, and that ensures a dynamic stability. Thinking ecologically, or in ways that reflect how nature functions, involves thinking in terms of relationships, connectedness and context.[50] Certain connective, integrative patterns of organization emerge: the community and system.

Capra (2005b) suggests that it is through creating and nurturing communities that nature sustains life. The community is nature's "fundamental pattern of organization" (p. 23). Entities (themselves relational) form communities; communities connect to other communities forming networks and systems. From a single cell engaged in symbiotic relationship, through community, the world is composed of living systems. Any one thing, or collection

[50] Capra (1996) describes "systems thinking," a way of thinking necessary to live sustainably, as understanding in terms of relationships and context: "to understand things systemically literally means to put them into a context, to establish the nature of their relationships" (p. 27).

of things, is viewed as a system; each part of a thing, or collection of things, exists in relation to, and through, another part:

> At all scales of nature, we find living systems nesting within other living systems—networks within networks. Their boundaries are not boundaries of separation but boundaries of identity. All living systems communicate with one another and share resources across their boundaries. (p. 257)

The network, along with notions of system and community, reflect a relational view of the world; the relationship is a basis to all life. It is through dynamism and diversity that these communities or systems find their stability.

In addition to relationship and community organization, Capra (2002, 2005b) notes the role of dynamism or change in nature. He notes cycles (the exchange of energy and resources between members of ecological communities at multiple levels), flows (movement of energy through organisms and communities that sustain them), development (the succession and co-evolution of organisms at multiple levels) and dynamic balance (the flexibility and self-organizing tendencies of organisms at multiple levels of systems) as basic ecological lessons. These principles demonstrate that stability and sustainability require change:

> An ecosystem is a flexible, ever-fluctuating network. Its flexibility is a consequence of multiple feedback loops that keep the system in a state of dynamic balance. No single variable is maximized; all variables fluctuate around their optimal values. (Capra, 2002, p. 257)

Given this dynamism, Selby (2002) suggests a dynamic metaphor for nature. Rather than conceiving of it as a web or network, he suggests thinking in terms of dance. The dance captures both the interconnectedness of the web image and the

dynamism of nature as a living system. An additional lesson we can take from nature is the role of diversity in sustainability.

When we think about how the world works in systemic terms we are faced with complexity well beyond the scope of the human mind. "Complexity builds on complexity; diversity begets more diversity" (J. Bowers, 1993, p. 69). J. Bowers (1993) reminds us that in "diversity lies the preservation of the world" (p. 72). Diversity is "the most powerful survival principle of life... there is no single right way that works—there will be hundreds or thousands" (Suzuki, 1997, p. 7). Sustainability requires diversity: "Just as genetic diversity confers resilience on a species, diversity of species within any ecosystem is also a factor in maintaining balance and equilibrium within that community of creatures" (Suzuki, 1997, p. 135). Bookchin (1991) describes the ecological wholeness of nature in terms of heterogeneity:

> [It is] not an immutable homogeneity but rather the very opposite—a dynamic *unity of diversity*. In nature, balance and harmony are achieved by ever-changing differentiation, by ever-expanding diversity. Ecological stability, in effect, is a function not of simplicity and homogeneity but of complexity and variety. The capacity of an ecosystem to retain its integrity depends not on the uniformity of the environment but on its diversity. (Bookchin, 1991, p. 24)

These principles—relationship, community, systems, change and diversity—shape the practice of Ecological Education.

Ecology Meets Education: Applications

Infusing educational theory and practice with the ecological principles described above has radical implications. This section looks at how ecological

principles of relationship, community, systems, change and diversity can influence the shape of school-based Ecological Education. While these principles are closely interconnected as they play out at the level of educational practice, I discuss them separately here for the sake of clarity. The means by which ecological principles are translated into educational practice (to be described shortly) reveal possible ways through which to support ecological understanding at the collective level. Ways of conceiving of teaching and learning, of organizing students in schools, of assessing student progress, of connecting the school with the larger community, and of embarking on educational reform according to ecological principles, may support ecological understanding systemically in schools.

Relationships

The notion of relationship infuses Ecological Education at multiple levels. Relationship shapes core educational values, the content and pedagogy that students encounter in Ecological Education, as well as the nature of the school organization itself. This section considers how relationship shapes pedagogical practice. It looks first at interrelationships between topics and the relationship between the student and the topic being learned. Next it considers how pedagogy supports relationships between thinking, feeling and doing; how Ecological Education aims to educate the whole child. Relationships to place, or the cultivation of a sense of place, are part of this process. Discussion next of interpersonal relationships, and how these are nurtured through various

pedagogical practices, finishes the section and leads into a discussion of how the notion of community informs Ecological Education.

Interdisciplinary Learning

Ecological Education is, by definition, interdisciplinary. From an ecological perspective, an interdisciplinary approach to learning reflects the way the world is. Interdisciplinary approaches to learning recognize that the world is not segmented into the disciplines we tend to create in order to be able to cognitively study them (Orr, 1992, 1994). The danger of teaching about the world through rigidly defined disciplines such as biology or chemistry, history, or language arts, is that students may come to believe that the world is somehow segmented in such a way—that biology or chemistry have nothing (or little) to do with history or language arts. This is antithetical to ecological understanding. Focusing on context in Ecological Education, on place, is one way in which multiple "disciplines" come together. Students learn about biology and chemistry, history, and language arts while they get to know the cultural and geographical dimensions of the places in which they live. Project-based approaches to learning allow students freedom to explore these multiple dimensions (Stone and Barlow, 2005).

Connecting the Head, Heart, and Hands

Relationship also informs a holistic approach to learning. Ecological Education addresses the whole child, attending, thus, to cognitive, emotional, practical, and spiritual dimensions. The Center for EcoLiteracy describes the competencies required for educating ecological literacy in terms of the head, the

heart, the hands, and the spirit (The Center for EcoLiteracy, 2008b).[51] Cognitively, students need depth of ecological knowledge and the ability to think systemically, critically, and creatively. Emotionally, students need to feel connected to nature. They require "a deeply felt, not just understood, concern for the well-being of the Earth and of all living things" as well as a sense of "empathy and the ability to see from and appreciate multiple perspectives" (The Center for EcoLiteracy, 2008b). Commitment to care for the Earth and to act in ways reflective of this requires certain skills; this is the education of the "hands." Students require skills that allow them "to apply ecological knowledge to the practice of ecological design" (The Center for EcoLiteracy, 2008b). With the proper skills, students may "create and use tools, objects, and procedures required by sustainable communities." They may, in short, "convert convictions into practical and effective action" (The Center for EcoLiteracy, 2008b). Attending to the spirit reflects the imaginative dimension of ecological understanding. Educating the spirit involves nurturing the sense of wonder, awe, and reverence for place. The sense of holistic education is taken a step further in Ecological Education insofar as the whole child is considered contextually; he or she is immersed in place. The child's relationship to place is a defining feature of Ecological Education.

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[51] The Center for EcoLiteracy in Berkeley, California, is "dedicated to education for sustainable living" (The Center for EcoLiteracy, 2008d). It is engaged in multiple projects aimed at "developing a system of education for sustainable living based on ecological literacy, at the primary and secondary school levels" (Capra, 2002, p. 232). It works with schools and community organizations to support learning that nurtures the development of sustainable communities.

The Student-Context Relationship: A Sense of Place

Cultivating students' personal relationships with the natural context, or place, in which they are learning is another dimension of Ecological Education. Ecological Education is, thus, holistic education that connects the child to where they are as part of their learning. Place-Based learning, in which students focus on the characteristics of the places in which they live and learn, can nurture students' sense of place, their emotional connection to particular places (Smith and Williams, 1999). The kinds of activities that support this holistic education of the child include hands-on activities that develop students' skills and apply in context the concepts they are learning about, as well as direct experiences with nature that engage students' senses and support their emotional attachments with nature. This research takes this dimension of Ecological Education further. By examining the sense of place in terms of the ways in which it may develop, and incorporating these activities into a framework for practice, we may more effectively support students' understanding of their natural context and situate place more centrally in Ecological Education.

Interpersonal Relationships: Involvement in the Human Community

Inclusion and collaboration become core educational values from an ecological perspective (Sterling, 2001). Ecological Education aims to educate the child in an environment that nurtures a sense of community--a sense of being implicated in cultural and natural worlds. The kinds of interpersonal relationships that support a sense of community or inclusion at both classroom and school levels include student-student relationships, student-teacher relationships, teacher-teacher relationships, and school-community

relationships. The next section on community illustrates how these relationships are nurtured through collaboration at the level of teaching and learning.

Community

The Center for EcoLiteracy understands the school in terms of community: "Schools are systems, and they are communities. Schools are themselves important nodes in the web of institutions that constitutes society. Whatever happens in schools will have profound effects on the rest of society" (The Center for EcoLiteracy, 2008g). From this perspective, learning is viewed in the context of the whole school community. It is believed that "children's ability to learn, and what they learn, is greatly affected by the vibrancy and health of the culture of the school and the quality of the relationships within it" (The Center for EcoLiteracy, 2008g). Developing a sense of community in the school and viewing the classroom in terms of community, is not unique to Ecological Education.

The role of relationship in meeting the child's safety and belonging needs, and thus, its role in supporting students' learning, recalls Maslow's influential hierarchy of needs. Noddings (1992, 2001) identifies the cultivation of the "caring relation" between student and teacher as a requirement for learning. In a similar vein, Sidorkin (2002) argues that the teacher's main objective should be to establish relationships with students: teaching is a secondary responsibility and is only possible once relationships have been established.[52] Through student-teacher relationship formation, a sense of community can take shape. Most work on relationship in education or in "relational" pedagogy focuses on

[52] Judson (2002) considers how students' relationships to various places in the school contribute to their sense of belonging and to individual and collective identity formation.

inter-human relationships (Bingham and Sidorkin, 2004; Noddings, 1992, 2001; Sidorkin, 2002). In Ecological Education, the notion of community extends beyond the human dimension. The application of an ecological perspective to the community-building project makes Ecological Education distinct. Learning opportunities that nurture students' sense of relationship with place aim to increase students' understanding of how they are part of both cultural and natural communities. Cultivating a sense of community has educational and ecological value (The Center for EcoLiteracy, 2008a).

Ecological Education focuses on developing and nurturing a sense of community at three levels: within the school between students, teachers and staff, between the school and the larger human community, and, as discussed previously, between students and nature. A sense of community in the classroom is nurtured through cooperative approaches to learning and an emphasis on partnerships. Students are encouraged to work together through collaborative projects and cooperative learning activities. Teachers collaborate through team-teaching. Teachers are considered learners. Students are also considered teachers. Networks of student support are created that include parents, teachers, and community members (Stone and Barlow, 2005). Because the school community is understood within a larger context, processes of community-building extend beyond school walls. Boundaries indicating where "learning" can occur are fuzzy; learning occurs in multiple contexts and multiple ways. School-community partnerships contribute to students' understandings of place. Moreover, getting students working and learning out in the community engages the whole child as they learn concepts and apply them in practical contexts.

School-community partnerships also make more resources and support available to students supporting overall learning (Honig, Kahne, and McLaughlin, 2001). An excellent example of school-community integration in learning is The STRAW project—Students and Teachers Restoring A Watershed (The Bay Institute, n.d.). These projects are valuable not only for cultivating in students a sense of their membership in human communities, but also of their membership in natural communities.

Projects and activities that provide students with direct experiences in nature, and that are of relevance to their particular contexts, support the bonds of the human community and can also enhance students' sense of being part of a larger natural community. Place-Based learning can reinforce students' understanding of their interdependence in natural communities by nurturing their personal relationship with place (Smith, 1993, 2002). When students are immersed in sensory experience, encountering the world in multiple ways, they can develop a broader understanding of what community means (Traina, 1995b, 1995c). Thinking in community terms emphasizes relationships, connections and context; it is systems thinking. The next section describes how systems thinking, like relationships and the notion of community, shapes Ecological Education.

Systems Thinking

The Center for EcoLiteracy considers systems thinking as a requirement of education for sustainability (The Center for EcoLiteracy, 2008c). Capra (2005b) describes six perceptual shifts necessary to think systemically: from parts to whole, from objects to relationships, from objective knowledge to contextual

knowledge, from quantity to quality, from structure to process, and from contents to patterns (See Capra, 2005b, p. 20-22; The Center for EcoLiteracy, 2008c). The implications of thinking about education systemically—of applying Capra's perceptual shifts to education—are far reaching.

For example, focusing on the whole, relationships, context, process, and pattern results in different ways of teaching and learning. Thinking about learning as a whole recognizes that the culture of the whole school, not just the individual classroom, influences learning. Integration of topics in learning, often described as interdisciplinary approaches to learning, represents another way in which focusing on the "whole" plays out in Ecological Education. Focusing on relationships in Ecological Education, as noted above, involves cooperative processes, collaboration, and collective decision-making. Ecological Education aims to involve students in projects in which they work with others and take part in decision-making about the nature of the school community. Focusing on context brings the actual places in which learning is occurring into focus.

To reflect the value of quality not just quantity (which tends to be the focus of much standardized student assessment, for example), Ecological Education employs forms of assessment that consider more comprehensively the nature of student work. Considering process as well as outcome involves giving students the opportunities to demonstrate how they do things, and how they come to conclusions, rather than simply whether they have the "right" answer. Finally, Capra suggests recognition of pattern is a perceptual shift necessary for systems thinking. Rather than focusing on content alone, then, students will look for

pattern in what they are learning. "Understanding how a pattern works in one natural or social system helps us to understand other systems that manifest the same pattern" (The Center for EcoLiteracy, 2008c).

Thinking systemically also influences school organization and processes of change. Educational reform is being increasingly discussed in systemic terms (O'Sullivan and Taylor, 2004; Selby, 2000; Smith and Williams, 1999; Stone and Barlow, 2005). Stone and Barlow (2005) assert that for school reform to be sustainable, not just another answer to educational problems, reform must be considered systemically. So rather than addressing specific problems, a systems approach involves "solving for pattern" (Capra, 2005). The Center for Ecological Literacy supports sustainable educational reform by establishing networks connecting schools with communities, organizations etc., for "whole-system" solutions and approaches (Stone and Barlow, 2005, p. 7).

Change and Diversity

Ecology teaches that nature is characterized by change and diversity: cycles and flows of energy, development and dynamic balance of diverse components. In effect, sustainability is made possible through dynamism and in the richness of diversity. In Ecological Education, change and diversity are embraced in practice through flexibility in planning, and a willingness and preparedness to take advantage of emergent issues and teachable moments. Diversity is supported in learning through teaching strategies attuned to different learning styles, flexible assignments and assessment processes. Project-based

learning offering students choice in relation to what they study and how they present their learning also supports the principle of diversity.

At a general level, then, it is clear that the shape of Ecological Education reflects, in multiple ways, principles of relationship, community, systems thinking, change and diversity. The next section looks at pedagogical practice more closely, describing two ways in which Ecological Education is being implemented in schools.

Practices

The purpose of this section is to describe how ecological principles are being translated into practice in schools. Rather than discussing specific pedagogical content or subject matter, my interest is in what students are actually doing as part of their Ecological Education; what teaching and learning strategies are used, and what activities the students are undertaking to support the development of ecological understanding.[53] The degree to which Ecological Education shapes what and how students are learning varies greatly in scope.[54] For example, Ecological Education may be linked to specific subjects such as science or social studies.[55] In this single-subject model the ecological perspective may be part of the mandated curriculum or may be an addition (Biriukova,

[53] Given my interest in creating an approach to making all teaching imaginative and ecological, *what* students are learning may not be as important as *how* they are learning.

[54] In Chapter One three common approaches to Ecological Education were introduced: the supplemental, infusionist and intensive (Hutchison, 1998). With the exception of students in schools specifically focused on ecological issues, Ecological Education plays a peripheral role in the overall curriculum.

[55] When linked to a single-subject, Ecological Education is obviously not interdisciplinary. This does not mean, however, that principles of relationship and community are not modelled in other ways. For example, within a single-subject model students can still work collaboratively, and engage in hands-on or experiential types of learning activities that support both their sense of personal relationship with nature and their sense of membership in the school community.

2005).[56] The Ecological Education of other students may be more interdisciplinary. Multiple subjects may address ecological issues or the entire curriculum may be "ecologized" (Biriukova, 2005). In other words, ecology may serve as the integrative theme for several subjects or, perhaps, the entire curriculum.[57] Students may also experience an "intensive" Ecological Education in which they participate in outdoor, immersive programs several days in duration (Hutchison, 1998). In this approach, learning occurs away from school grounds, often at parks, nature centres or nature reserves. Because this thesis is concerned with the Ecological Education students are receiving in schools, this section focuses on the educational practices of programs in the first two categories described above: the single-subject model (supplemental approach) and the multiple-subject model (infusionist approach).[58]

In making my selection of programs for this section I considered those modelling the ecological principles described above. [59] I also sought programs fulfilling some, if not all, of six practices the Center for EcoLiteracy considers

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[56] Hutchison (1998) refers to this sort of independent ecology-focused unit or lesson as the "supplemental" approach. Hutchison's supplemental model could, presumably, be interdisciplinary if the module provided draws on various disciplines. However, as a "supplement" Ecological Education remains a self-contained unit or lesson implemented by one teacher, not a more widespread integrative theme. This approach to Ecological Education is typical of the secondary school level where disciplinary boundaries are more fixed.

[57] Hutchison (1998) refers to this approach as the "infusionist" approach. This integrative approach is more common at elementary and middle school levels.

[58] My intention is to present examples of ways in which Ecological Education is being taught in schools. It is not to provide a comprehensive overview of all educational programs, a task extending far beyond the scope of this thesis.

[59] It stands to reason that the frequency and quality of these experiences and the extent to which ecological principles inform the child's overall education influence the overall impact the program can have on the development of students' ecological understanding. Moreover, more ecological principles can be incorporated into a multiple-subject model where ecology infuses a broader scope of a child's curriculum than in a single-subject model. Therefore, in the examples described below it becomes clear how the multiple-subject approach is much more comprehensive than is a single-subject approach.

important for effective Ecological Education (The Center for EcoLiteracy, 2008f): First, children have direct experiences with the natural world outside the classroom. Second, education focuses on the cultural, historical and natural features of students' local community and region. Third, effective Ecological Education is project-based. It involves students in projects that make a difference in the local community. Fourth, in-class learning is integrated with hands-on experiences outside the school and also within the school (for example, participation in planning school activities, involvement in school lunch preparation). Fifth, the whole child is educated. The psychological and physical health and wellbeing of the child is tied to the natural world. Sixth, cognitive, emotional, aesthetic and physical dimensions of learning are addressed (The Center for EcoLiteracy, 2008f).[60] This list of "best" practices for Ecological Education is useful because it shows how ecological principles may be translated into practice. In hopes of improving Ecological Education, this research is interested in what may be missing from this list of "best" practices and suggests, in Chapters Four and Five, what may be required to fill in the gaps.

Lessons from the *Schoolyard Ecosystems* approach out of the Biogeoscience Institute at the University of Calgary, Canada, and the *Edible Schoolyard Program* at Martin Luther King Jr. Middle School in Berkeley, California, fulfill most if not all of these practices and reflect single and multiple-subject approaches to Ecological Education. For example, both programs provide students with direct, experiential learning opportunities. Both focus on the

[60] Not surprisingly, the more comprehensive multiple-subject model fulfills more of these criteria. However, the single-subject model I selected also demonstrates most of these practices, illustrating that it is possible to teach "ecologically" within regular school curricula.

places in which students learn.[61] Hands-on activities are integrated with learning outside and inside school walls. Moreover, both programs engage students with the natural world, directly opening up the possibility for students to develop personal relationships with nature. What can be gained from a brief overview of these two programs and the kinds of lessons and units they employ, is a demonstration of the different ways in which Ecological Education is being practiced in schools.

Schoolyard Ecosystems

Schoolyard Ecosystems is a website created by the University of Calgary Biogeoscience Institute that offers resources for teachers of science at the middle and secondary school level, educators from non-formal education organizations, or for anyone generally interested in learning more about the science of ecology (Biogeoscience Institute of the University of Calgary, 2007a).[62] The resources are designed for implementing the Alberta Program of Studies for science in Grade 7: Interactions & Ecosystems (Alberta Department of Education, 2001).[63] These resources include planning templates, lesson plans, and resources that focus learning about ecosystems on the schoolyard and natural areas immediately

[61] Associated with the science curriculum, Schoolyard Ecosystems focuses on the natural features of the local area (the schoolyard), whereas the Edible Schoolyard Program is interdisciplinary and also addresses cultural and historical features.

[62] The Kananaskis Field Stations and the G8 Legacy Chair in Wildlife Ecology merged to form the Biogeoscience Institute (Biogeoscience Institute of the University of Calgary, 2007a).

[63] The science Curriculum topics proceeding the Grade 7 unit on "Interactions and Ecosystems" are as follows: Grade 1: Needs of Animals and Plants; Grade 2: Small Crawling and Flying Animals; Grade 3: Animal Life Cycle; Grade 4: Waste and Our World; Grade 5: Wetland Ecosystems; Grade 6: Trees and Forests.

surrounding schools.[64] (In conjunction with the Schoolyard Ecosystems website, the Biogeoscience Institute has another website called "Ecology Connections" that provides ecological research and education resources (Biogeoscience Institute of the University of Calgary (2007a).)

The Schoolyard Ecosystem website provides an overview of the overall objective of the ecosystem unit:

> To foster an understanding of ecosystems, this unit develops student awareness of ecosystem components and interactions, as well as natural cycles and processes of change. Building on this knowledge, students investigate human impacts and engage in studies that involve environmental monitoring and research. By reflecting on their findings, students become aware of the intended consequences of human activity, and recognize the need for responsible decision-making and action. (Biogeoscience Institute of the University of Calgary, 2007b)

The website also provides a blank lesson plan template so that teachers may submit exemplary lessons to the website. The lessons require the following components: a title, connections to mandated curricula, a brief overview, some background information, and identification of appropriate instructional strategies, assessment strategies, required materials and resources and, if necessary, other reflections or insights that may help in the successful implementation of the lesson (Biogeoscience Institute of the University of Calgary, 2007b).

In the unit overview provided, the topic of the schoolyard ecosystem is introduced through two activities. First, students are asked to draw the

[64] The site and its resources were developed collaboratively by teachers participating in a professional development project linked to the University of Calgary Kananaskis Field Station (KFS) and the Calgary Separate School District (CSSD).

schoolyard ecosystem and identify what they think lives there and how the ecosystem functions.[65] Next, there is a class discussion addressing the challenges of managing an "urban" ecosystem such as the schoolyard and the nature of the schoolyard ecosystem: "Are all schoolyards the same? Have schoolyards changed over time? How are schoolyards managed, for whom, and for what purpose? Has schoolyard management changed over time?" (Biogeoscience Institute of the University of Calgary, 2007b).

Lesson plans for teaching about four aspects of ecosystems are provided: ecosystem management, ecosystem monitoring, ecosystem processes, and human impact on ecosystems (Biogeoscience Institute of the University of Calgary, 2007b). The lessons pair a focal question with each topic as follows:

> How do we manage schoolyard ecosystems (ecosystem management)? How do we monitor change in schoolyard ecosystems (ecosystem monitoring)? What are schoolyard ecosystems and how do they work (ecosystem processes)? What are human activities that impact schoolyard ecosystems (ecosystem impact)? (Biogeoscience Institute of the University of Calgary, 2007b)

In each lesson plan, students complete activities in their schoolyard that support the development of a personal understanding of what ecosystems are and how they function. For example, they draw maps of the schoolyard, complete inventories of various features of the schoolyard, or complete "scavenger hunt" type activities in which they explore and discover various features of the schoolyard ecosystem. Students are required to make detailed observations of

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[65] This activity builds on students' prior knowledge of what ecosystems are (in Alberta students learn in grade 5 science about "Wetland Ecosystems" and in grade 6 science about "Trees and Forests.") (Biogeoscience Institute of the University of Calgary, 2007a).

what they notice in the schoolyard. They look for patterns, trends and changes in the distribution of various living things. They study ecosystem components and how they interact, as well as ecosystem processes such as food webs, carbon and water cycles. They look for evidence of human impact on the ecosystem. They use these observations to discuss the impact of various human activities and management options. Based on their observations, students design and implement strategies for monitoring ecosystem changes and assessing the impact of human activities. Students are required to keep journals in which they describe their experiences and reflect on issues that arise in the class around human-nature interactions. For example, they are asked to consider the impact of humans on the food web. They engage in projects with real-world consequences. For example, one assessment strategy is for students to develop a management plan for the schoolyard that takes into account ecosystem processes, economic factors, and human needs. In another lesson, students design field studies for monitoring the distribution of biotic (e.g. organisms) and abiotic (e.g. water and light) components in the schoolyard (See Biogeoscience Institute of the University of Calgary, 2007b).

In summary, the Schoolyard Ecosystem program engages students directly with the places in which they live. The schoolyard becomes the object of study, the place around which the science curriculum focuses. Conceptual learning about ecosystems is paired with hands-on activities that increase student knowledge of their environments. Their activities allow them to develop skills that they then use towards projects of relevance to their school and community. Schoolyard Ecosystems is one example, thus, of how ecological principles can

inform the content and practice of Ecological Education. The next program to be described extends Ecological Education beyond the confines of one school discipline. Ecology is an integrative theme for an entire school and all students' curricula from grades six through eight.

The Edible Schoolyard

The Edible Schoolyard program at Martin Luther King, Jr. Middle School uses the cultivation and preparation of food as a unifying concept (The Edible Schoolyard, 2006d).[66] It reflects, thus, a multiple-subject or infusionist approach to Ecological Education. The Edible Schoolyard program aims:

> ...to create and sustain an organic garden and landscape that is wholly integrated into the school's curriculum and lunch program. It involves the students in all aspects of farming the garden--along with preparing, serving and eating the food--as a means of awakening their senses and encouraging awareness and appreciation of the transformative values of nourishment, community, and stewardship of the land. (The Edible Schoolyard, 2006a)

At Martin Luther King Jr. Middle School, ecological principles and, in particular, the notion of community are embedded in the pedagogical goals and vision of the school (The Edible Schoolyard, 2006k). The success of the program is based on the participation and partnerships of students, teachers, parents, chefs, gardeners, farmers, donors, and volunteers from the community (The Edible Schoolyard, 2006d). The school is actively engaged with its community.

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[66] Martin Luther King Jr. Middle School is an urban public school for sixth, seventh, and eighth grade students in Berkeley, California. The Edible Schoolyard is a non-profit organization located on the school's campus (http://www.edibleschoolyard.org/ppl_mlk.html). See also Stone and Barlow (2005) and the Center for EcoLiteracy website (www.ecoliteracy.org) for more information on the Edible Schoolyard Program and other food-based Ecological Education programs.

Inside the school, a sense of community is enriched through the mutual experiences students and teachers share while learning in multiple contexts. Students, teachers, and community members come together in the garden and they come together in the kitchen for celebrations. The sharing of communal meals produced through the work of everyone in the school supports a sense of cohesion and reinforces an understanding of interdependence.

Learning is interdisciplinary. The maintenance of an organic garden located next to the school, the harvesting of food and its preparation in a communal kitchen, shape the science, mathematics and humanities curricula. Curricula are infused with "the key concepts of community, sustainability, diversity, responsibility, networks, systems, cycles, and flows" (The Edible Schoolyard, 2006b). Building on the belief that hands-on experiences in the kitchen and garden facilitate students' understanding of ecological principles and support the development of a sense of community in the school, students are actively involved in food production and preparation from "seed to table" (The Edible Schoolyard, 2006b).

Classes conducted in the school garden teach ecological principles, the origins of food, and respect for all living systems. Students work together to shape beds, sow seeds, transplant, compost, weed, water and harvest flowers, fruits, and vegetables. Students' emotional engagement in these hands-on activities in the garden and kitchen are believed to make the classroom learning more meaningful and enhance student understanding of ecological principles:

> In a garden, the principles of ecology and systems thinking come alive. Through hands-on experiences students gain understanding

> of cycles, from the life cycle of a plant to the nitrogen cycle. They experience webs of relationships, both social and biological, as they work with their classmates and teachers to prepare the soil for planting or observe pollinators as they dart from flower to flower. (The Edible Schoolyard, 2006e)

In the kitchen, the cycle of food production is completed as food grown from the composted soil of the previous year's work is enjoyed (The Edible Schoolyard, 2006h). Students prepare food and cook meals with produce from the school garden. They work collaboratively in food preparation and in the setting of tables for a communal meal where teachers and students come together. Lessons in the garden and kitchen are designed specifically to enrich classroom learning of ecological concepts.

Students begin their garden classes by meeting their teacher and the school gardeners in a common area (The Edible Schoolyard, 2006e). Here their thinking is sparked by a question to consider as they work. For example, they might be asked to "Name a dormant plant" or asked to ponder questions such as "If you were a garden superhero, what would your superpower be?" or "If you could make a recipe using something from the garden at home, what would you make?" (The Edible Schoolyard, 2006e). Next students select one of a variety of tasks to complete in the garden and break into small groups. The kinds of activities students are engaged in reflect the daily and seasonal needs of the garden. They include: "mulching, weeding, compost turning, bed preparation, harvesting food for the kitchen, vermicomposting, planting, seed starting, transplanting, a variety of hardscape [sic] jobs, cooking, and garden crafts" (The Edible Schoolyard, 2006e). The students conclude their garden classes with a

collaborative clean-up process and a group "circle" activity in which students reflect on their experiences in the garden and share their responses to the "Question of the Day." The keeping of "Garden Journals," "The Special Spot" activity, and a unit on worms are examples of specific learning activities used in the program (The Edible Schoolyard, 2006c).

Students document their garden and kitchen learning experiences in their journals. The keeping of a journal is considered an important piece of experiential learning because it offers students an opportunity to focus on their experiences, figure out their importance, and make curricular connections. "Journals are an important tool for monitoring learning and development in the students thinking, processing, understanding, and writing" (The Edible Schoolyard, 2006f). In their garden journals, students have an opportunity to reflect on their work in the garden. They often receive a "prompt" to shape their entries. For example, they may be asked to reflect on personal experiences. They might describe something that surprised them in the garden or something that was unexpected. Alternatively, they may be asked to describe what they liked or disliked. They may be invited to imagine something in their journal such as, for example, if they could choose to be any plant or insect, which they would choose and why. Prompts might lead them to describe what they learned through their senses or what they observed: What has changed? What did the experience look, smell, sound, taste, or feel like? Alternatively, students may be asked a technical question such as how decomposition occurs and what they observed of the process: "What happens in the compost pile? What is involved in the decomposition process? How do you build a compost pile? What is worm tea?"

(The Edible Schoolyard, 2006f). The garden journal is also the place in which students express what they learn through the "Special Spot" activity (The Edible Schoolyard, 2006g).

The "Special Spot" activity is designed to allow students to get to know a particular place in the garden on a deeper level. Each time they go into the garden, students spend some quiet, reflective time in the spot they select. They are asked to encounter it in ways that engage all of their senses. So, they may lie on the ground or take their shoes and socks off. This activity aims to teach about cyclical seasonal changes in the landscape and to enrich students' emotional connections to nature. In their journals students are asked to describe what they observed in their spot using as many descriptive words as possible. They are asked to explain why they chose the spot they did, and how it feels to be in that spot. They are asked to focus on what is changing in their spot, from the first time they visited it and also between visits (The Edible Schoolyard, 2006g). This activity allows students to develop and reflect upon a personal relationship with place.

Students may also engage in a nine-week unit on worms that connects learning in the garden with classroom learning. As they are working, students are asked to look for worms in the garden and to record what they notice in their journals. Students then build "worm bins" as part of their garden work and bring these to the classroom. They compare the activity of the worms in inside and outside bins and share their observations. They read stories and watch videos about worms. They create their own stories and draw cartoons. They draw in

their journals what they notice about worm activity. They develop and conduct experiments about worms. Students demonstrate their learning about worms through a variety of means such as through individual projects in which students have the opportunity to express their learning in ways they select, through their journals and through activities such as storytelling and art work.

In the kitchen classroom, students have further opportunities to explore ecological concepts through experiential means. The kitchen at Martin Luther King Jr. Middle School is an experiential learning environment that connects food to daily life (The Edible Schoolyard, 2006j). Learning activities in the kitchen "are designed to integrate culture, history, language, ecology, biology, and other classroom-related subject areas into the preparation of food from the garden" (The Edible Schoolyard, 2006j). There are five explicit objectives listed for kitchen lessons:

> To teach and provide practice for principles of ecology, to celebrate and use the seasonal harvest from The Edible Schoolyard garden, to build community within and beyond the classroom and school, to implement the State Standards (World History, English, Reading) and to build students awareness of nutrition and encourage healthy food choices. (The Edible Schoolyard, 2006h)

Before coming to the kitchen, students participate in "preview lessons" in their classrooms that introduce ideas that will be involved in the kitchen lesson (so, for example, they learn about cultural and historical aspects of the topic). Similarly, following the kitchen lesson, students complete "linking" or follow-up activities in the classroom that reinforce their learning. These kinds of activities may include writing in their journals, completing a map, using vocabulary specific to their work in the kitchen in some creative writing, depicting a

procedure learned in the kitchen in artistic form, telling a story, or designing a menu (The Edible Schoolyard, 2006h).

An example of a kitchen lesson is one entitled "The Middle Ages: European Serf Diets" (The Edible Schoolyard, 2006i). In this lesson, students learn about serfs in feudal Europe in terms of their position in society, their work, and their diets. They examine the nutritional values of various foods. They examine the relationships between technology, environmental factors, and crop yield and between diet, stamina and health. In a preview lesson, students read an introductory text on the diet of European serfs, including various agricultural methods of crop rotation (For a copy of the text used in this lesson see The Edible Schoolyard, 2006i). They are asked to highlight what foods they consume out of the foods listed, and to compare and contrast how crops are cultivated. Finally, to conclude this pre-kitchen preparatory lesson, students are asked to "write a statement, which demonstrates their understanding of the relationship between crop rotation, diet, and stamina, and make a prediction about how this combination might have affected historical events" (The Edible Schoolyard, 2006i).

Once in the kitchen classroom, students begin discussing in a large group what the links are between food cultivation, serf diet, and stamina. They identify the foods they will be working with that were staples in the serf diet. In small groups, students cook, set a table, eat the meal they prepare and clean up. Additional linking and follow-up activities include the creation of stories based on a series of pictures depicting stages of crop cultivation, the kinds of tools used,

serf clothing, animals, and foliage. They explore the historical connections to commonly used expressions containing references to food (for example, being "full of beans" or "two peas in a pod"). Assessment activities include the creation of story or cartoon boards that show how food was cultivated and how it impacted the daily life of serfs (The Edible Schoolyard, 2006i).

As an infusionist or multiple-subject model, the Edible Schoolyard program emulates more of the ecological principles than our first example, the Schoolyard Ecosystems program. In addition to cultivating interpersonal relationships, relationships with place and engaging the whole child, learning is interdisciplinary. Even more, in this program, ecological principles shape the content and pedagogical practice of the whole school.

The Schoolyard Ecosystems and Edible Schoolyard programs demonstrate two ways in which Ecological Education is being implemented in schools. In the interest of increasing the effectiveness of Ecological Education at the level of planning and teaching, this thesis focuses on pedagogical practices such as lesson planning and implementation in both models to see if they support program goals. At one level, the practices do appear to support ecological goals. For example, in both single-subject and multiple-subject models, students are working directly with the natural world, focusing their activities on the places in which they reside. They have opportunities to develop personal relationships with nature. In the more comprehensive Edible Schoolyard program, where ecological principles infuse the school as a whole, students engage in projects connected to their local communities. Cognitive, emotional, aesthetic and

physical dimensions of learning are addressed through the integration of learning in multiple contexts. Still, it seems that something may be missing. This thesis is primarily concerned with whether sufficient attention is being paid to the body, emotion and imagination in processes of planning and teaching. While it is clear that ecological principles such as relationship, community, and systems thinking among others are having an impact on the kinds of activities students undertake, it is not clear that engagement of the body, emotion and imagination influences lesson or unit preparation to the same degree. This problem is both theoretical and practical.

Problems

Ecological Education has weaknesses at theoretical and practical levels that, if addressed, may increase the overall effectiveness of the field. First of all, Ecological Education lacks the support of a comprehensive theoretical framework of its shared purposes and principles (Mikelskis, 1990). It was argued earlier in this chapter that the overall aims of Ecological Education are obscured by the use of multiple terms in the field. Different terminology suggests different goals. This weakens the overall strength of the field of study. The common core of values and beliefs that these programs share is out of focus, as is the nature of the aims themselves. Without clarity of goals and deeper understanding, educational means can more readily fall out of alignment with educational ends. This leads us to the second problem. At the practical level, Ecological Education lacks a pedagogical framework that, based on deeper understanding and articulation of aims, supports its shared purposes and principles. These theoretical and

practical weaknesses represent, in my view, a central problem with current Ecological Education. The cognitive, emotional and behavioural dimensions of Ecological Education's aims have not been articulated and, to date, no pedagogical framework has been designed that aligns with these goals.

Bowers (1993, 2003), Orr (1992, 1994), O'Sullivan and Taylor (2004), and Smith and Williams (1999) all argue that dealing with environmental crises requires education that fundamentally changes how we perceive the world and one another, as well as our membership in both human and natural communities. Education of a certain kind is required. It is also argued that how we educate must be shaped around ecological principles, and must stem from the perspective that human-nature interactions do matter (Huckle and Sterling, 1996; Orr, 1992, 1994; O'Sullivan and Taylor, 2004; Smith and Williams, 1999, Sterling, 2001; Stone and Barlow, 2005).[67] The implications for education are significant. With the exception of certain Ecological Education programs, education in the Western world is not addressing how human beings perceive nature. It is not infused with ecological principles. It does not teach that human-nature interdependence is a biological reality and that our interactions with nature do matter. Orr (1994) argues that more of the same kind of education we currently have will not help us because the problem lies with education itself. Like Orr (1994), I believe that more fundamental educational change is necessary. When it comes to instilling in students a sense of care and concern for the natural world and developing an

[67] The Deep Ecology perspective best encompasses this view. It embraces the intrinsic value of natural and human entities on the planet, their equal worth (biospherical egalitarianism), and on Self-realization (Drengson and Inoue, 1995).

understanding of the interdependence of the world, a new approach to education, rather than simply a new curriculum package, is required.

Capra (2005b) emphasizes the importance of *what* is being learned. In short, they must learn about ecological principles in order to live sustainably: "We need curricula that teach our children these fundamental facts of life" (p. 22-23). Without question, teaching about how nature functions (the *what*) is important for the development of ecological understanding. I suspect, though, that if more attention is paid to *how* students learn across the curriculum Ecological Education may take a more central position in schools. In addition to teaching about nature, we can make all education imaginative and ecological. My interest is on pedagogical practice, or *how* teachers can teach imaginatively and ecologically. How students are learning across the curriculum and how the information is presented to them strongly influences whether or not learning is meaningful. In order for student learning to be meaningful in ways that can support ecological understanding, engagement of the body, emotion and imagination become a central pedagogical concern.

As the overview of Ecological Education provided in this chapter illustrates, students are learning in ways that provide them direct encounters with nature, and, thus, to some degree, support the development of their ecological understanding. Students are working collaboratively in environments that enrich their sense of being members of a human community and, in particular, of being part of a natural community. However, even if learning activities engage students directly with nature, these activities do not necessarily

engage students' emotions or imaginations, or engage them as powerfully as they could. Hands-on activities are not necessarily anchored to emotional and imaginative dimensions. The physical activities students participate in do not necessarily enhance their ability to use the body's tools for understanding the world. In order to develop ecological understanding, Ecological Education must engage the body, emotion and imagination on a more frequent and more powerful basis. Engagement of the body, emotion and imagination should become part of all learning and part, therefore, of all lesson and unit planning.[68] Emotion lies, after all, at the core of ecological understanding.

At the level of practice, Ecological Education, like education generally, does not talk much about students' emotions (Egan, 2005). Moreover, like education generally, Ecological Education seems to assume that students' bodies and imaginations are engaged in what they are learning without actually making emotional and imaginative engagement central to processes of planning or teaching. A pedagogical framework for Ecological Education can be built once there is deeper understanding around the nature of its goals, and once the various dimensions of its goals are articulated. This thesis aims to move in this direction by identifying the cognitive, emotional and behavioural dimensions of Ecological Education goals. Whether it is ecological understanding, ecological literacy, ecological consciousness or any other number of terms, Ecological Education is an intellectual, emotional and behavioural process. It involves what students know, feel, and do. Students' emotional and imaginative engagement

[68] While subject matter is undeniably an important piece of Ecological Education, it is, in my view, practice that needs attention.

lies at the heart of the learning process. What students *feel* about what they learn makes it meaningful; what students *feel* about nature can influence their interactions with it. *Feeling* personally connected to the natural world is the glue that positions us within nature. Acting from this interconnected position becomes possible, when we feel in our hearts that it is worthwhile to do so.

So, in addition to thinking about teaching in terms of *what* students need to learn to support the cognitive dimensions of ecological understanding (for example, photosynthesis or the water cycle, or the greenhouse effect), we need to consider how to fulfill students' emotional and imaginative needs in learning. We need to realign the means and ends of Ecological Education. This involves thinking about learning in terms of the inherent wonder in the topic, and teaching in ways that support students' use of the body's tools for understanding. We should teach in ways that tap into students' emotional and imaginative lives and that employ the body's sense-making tools, solidify meaning and support the emotional and imaginative core of ecological understanding.

The next chapter on Imaginative Education presents the "tools" to connect learning directly to students' emotional and imaginative lives. What Imaginative Education teaches is that learning anything can be more emotionally and imaginatively engaging if topics are presented in ways that evoke their inherent wonder, awe, or mystery. For elementary school students, initial access to the topic being learned should be shaped in story form and around emotionally engaging "binary oppositions." For students at middle and secondary school levels, teaching should be framed in ways that draw out the heroic qualities of the

topic, and that highlight the extreme features. Hands-on activities can be made more emotionally and imaginatively engaging if linked to pre- and post-lessons that connect activities to emotionally and imaginatively engaging themes. Moreover, hands-on activities can more effectively support students' sense of connection with nature if they are designed to employ some of the body's learning tools.

Before heading into the terrain of Imaginative Education, consider how our examples of Ecological Education might be transformed through an imaginative lens. In the Schoolyard Ecosystem program, lessons are focused on achieving certain objectives, rather than the inherently wonderful and awesome aspects of the topic. The emotionally powerful aspect of the topic is not defined. One could emphasize the heroic self-sufficiency or adaptability of the ecosystem as a means to draw out the wonder in the topic and as a way of helping students see its uniqueness. Consider the unit on worms from the Edible Schoolyard Program. If, for example, the resilience or strength of a lowly worm was used to shape teaching, and if students learned about the biggest, smallest, slimiest worms as part of their preparation for this unit, they would be more emotionally and imaginatively engaged than simply by observing them in varying contexts. (See Chapter Five for a unit on worms shaped around the framework I propose for Imaginative Ecological Education.) The "Special Spot" activity sets the stage for the engagement of the body's learning tools such as the senses, or the recognition of pattern and musicality. This activity could be shaped to more powerfully encourage students' use of these tools if, for example, they were asked to seek out the visual or auditory patterns of their spot. Learning about the serf's

diet and about life in the Middle Ages could be shaped in narrative format that draws out the emotionally charged conflict and struggle inherent in life at this time. The miraculous human discovery of the fallow field for increasing the fertility of the soil, or the power of the humble turnip in re-establishing the soil, could spark students' sense of wonder. Is there another vegetable sitting in their fridge right now that has the potential to change the world? The next chapter on the theory and practice of Imaginative Education describes tools of imagination that when used to shape teaching, may prove to increase the overall effectiveness of Ecological Education. It becomes clear that Imaginative Education offers a framework that can support the cognitive, emotional, and behavioural dimensions of Ecological Education.

CHAPTER THREE:
MAPPING THE THEORETICAL AND PRACTICAL TERRAIN OF IMAGINATIVE EDUCATION

This chapter provides an outline of the main features of Imaginative Education. It explores the theoretical and practical terrain of Imaginative Education in terms of its central purposes, underlying principles, and specific practices. How Imaginative Education aligns with features of Ecological Education as well as how Imaginative Education may be useful for nurturing an ecological perspective are discussed. The possible limitations of Imaginative Education as a framework for teaching Ecological Education are also addressed. It becomes clear that Imaginative Education offers theoretical and practical support to the field of Ecological Education and may assist students in developing ecological understanding.

Purposes

Egan's (1997) book on the theory of Imaginative Education is entitled *The Educated Mind*. This title captures Imaginative Education's central purpose: to describe what constitutes an educated mind and show how a person can be educated to have one. An educated mind is one fully equipped with the culturally

based strategies or "tools" with which human beings make sense of the world.[69] Imaginative Education aims to equip students' minds with these tools, enhance students' skill in using them, and develop as fully as possible the different kinds of understanding of the world these tools create. Connecting students' emotions and imaginations with the world around them and with whatever aspect of the curriculum is being learned is the key to achieving these goals.

In Imaginative Education, mind and body are closely linked. Egan (1997) notes that education of the mind also requires education of the body because the body is "the most fundamental mediating tool that shapes our understanding" (p. 5).[70] Language and other cultural acquisitions are not the sole contributors to how we make meaning of the world. In effect, we have "bodies before language" and language "bears the ineluctable stamp of the body" (Egan, 1997, p. 5). Chodakowski and Egan (in press) remark that the body tends to be neglected in education:

> Most educational theorizing, and practice, seems to go on as though humans were disembodied brains. While it is indeed the strange distinctiveness of our brains that is of great importance in education, it is also important to recognize that these brains are parts of our bodies, and that the distinctive human body remains central to all forms of education.

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[69] Egan (1997) identifies three educational aims that have shaped schooling in varying combinations in the Western world: socialization, academic cultivation, and individual development (p. 24). He argues that the three are incompatible. As a result, combining them in schooling means none of the aims is adequately achieved. Egan notes that these aims will inevitably be achieved to some degree simply by virtue of being aims that shape current educational theory and practice. His argument is that in trying to achieve all three, none is properly fulfilled.

[70] Egan (1997) notes that he originally intended his book *The Educated Mind* to be titled *The Body's Mind* (p. 5).

Central to Imaginative Education is the value of maintaining Somatic understanding as much as possible: "only by attending much more closely to the kind of body we have and how it, in part, constitutes and interacts with our minds will we be able to construct an adequate notion of how to educate" (Chodakowski and Egan, in press). A central premise in Imaginative Education is, thus, that mind and body, reason, emotion and imagination are intertwined in the act of learning. As the following overview illustrates, an educated mind has its roots firmly planted in the body's understanding of the world.

Principles

Imaginative Education is an approach to education that differs significantly from the kind of pedagogy practiced in most classrooms. Two principles set Imaginative Education apart: one, that imagination constitutes the heart of all learning, and two, that learning is a culturally mediated activity. The "cognitive tools" human beings use to make sense of the world shape certain "kinds of understanding."

Imagination: The Heart of Learning

Imaginative Education begins from the position that learning requires imagination. Stated another way, in order for anything to be educative the imagination must be engaged (Egan and Nadaner, 1988). Egan (1992) articulates additional ways imagination contributes to learning: it supports memorization of information, it enriches understanding, it enables one to empathize, it supports

personal and intellectual freedom, and aids in the comprehension of secure knowledge and the development of narrative thinking (Egan, 1992).

The imagination plays a significant role in human memory and understanding (Egan, 1992). Egan (1992) suggests that it was the "need to memorize things that early stimulated and developed the human capacity for imagination" (p. 11). Indeed, the only things people could know in oral cultures were what they could remember. Imagination plays an active role in transmitting cultural lore from one generation to the next in oral cultures by making knowledge memorable. The more imaginatively engaging was the story or tale, the more memorable it was (Egan, 1992; Ong, 2002). A second value of imagination for education is its connection with the cultivation of social virtues such as empathy and tolerance. Egan (1992) suggests that it is in our imaginative ability to transcend our personal situations and contexts and contemplate the "other" that empathy lies: "By imaginatively feeling what it would be like to be other than oneself, one begins to develop a prerequisite for treating others with as much respect as one treats oneself" (p. 55). Like Egan, Greene (1995) asserts that:

> Imagination is what, above all, makes empathy possible...imagination...permits us to give credence to alternative realities. It allows us to break with the taken for granted, to set aside familiar distinctions and definitions. (p. 3)

The same transcendent power of imagination that supports empathy is a source of personal power and intellectual freedom (Egan, 1992; Sturrock, 1988; Sutton-Smith, 1988). Being able to envision oneself and one's circumstances

differently creates a sense of power and escape.[71] This personal sense of freedom that imagination offers leads also to intellectual freedom; imagination broadens both the scope and flexibility of understanding (Egan, 1992; Greene, 1988; Hughes, 1988). Imagination makes possible the transcendence of traditional ideas, a vital step in freeing understanding:

> Transcending the conventional is necessary to constructing one's sense of any area of knowledge; accepting conventional representation is to fail to make knowledge one's own, is to keep it inert rather than incorporate it into one's life. (Egan, 1992, p. 48)

Imagination has, thus, a relationship to kinds of freedom that support deeper understanding and emotional engagement.

In terms of learning in general, imagination also helps us make sense of an "objective" world and to do so in a narrative way. For Egan (1992) the imagination is "one of our major tools in pursuit of objective knowledge, and indeed in establishing the very conditions of objectivity" (p. 59). Imagination helps develop one's sense of an external world through the capacity it affords to transcend one's own situation, and to imaginatively inhabit another one. Imagination both develops our awareness of an external or "objective" reality, as well as offers us a glimpse of the nature of that reality, by incorporating it into our emotional and imaginative lives.

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[71] Sturrock (1988) describes how, for Wordsworth, imagination *is* a form of personal freedom or escape and also *requires* freedom to develop. Wordsworth emphasized how the child's imagination was released most fully if she or he had the opportunity to explore nature freely. For Wordsworth, then, the imagination is connected to both mental and physical freedom: "Intellectual freedom for Wordsworth is the freedom of the imagination to roam, the freedom involved in self-forgetfulness, and the freedom given by the imagination's ability to apprehend and accept what the reason can not grasp" (Sturrock, 1988, p. 60).

Imagination supports, moreover, narrative understanding. Egan (1988, 1997), Bruner (1996) and Sutton-Smith (1988) identify narrative as central to how human beings make meaning in their lives. Their work illustrates how we make sense of our lives in terms of story and it is in this context that our lives become meaningful. So for example, we situate our lives, our personal stories, in the larger context of history (Egan, 1997). Egan (1992) suggests human beings have narrative minds:

> ...we make sense of the world and of our experiences in narratives...we recall items in narrative structure better than in logically organized lists...we more profoundly code knowledge in our memories by affective than by logical associations. (p. 63)

Imagination contributes to narrative understanding by playing a role in the formation of one's own narratives and in making meaning of others'.

In the context of Ecological Education, one needs to be alert to the potential value of narrative understanding for ecological understanding, as well as the potential harm that may result from the kinds of narratives we employ to describe how the world works. The distinctly human process of shaping information into stories is neither ecological in nature nor is it necessarily antithetical to ecological thinking. Narrative understanding simply refers to a way of shaping information. Just as imagination says nothing of *what* will be imagined, narrative understanding says nothing of *what* information will be shaped or how; in other words, narrative understanding on its own does not indicate the kinds of stories we have to make sense of the world.

The kinds of narratives we have adopted in the Western world to explain how the world works have had serious ecological implications. Bowers (1997) describes, for example, how Western understanding of the autonomous individual, or of progress and development as inherently "good," underlie unsustainable cultural practices. Livingston (1994) explores the environmental impacts of the Western narrative of development and industrial growth. Narratives representing human beings as members of a larger natural community (in which they are equal participants), and of the cyclical nature of life, have been replaced with narratives of Modernity in which the individual is conceived of as the basic social unit, in which an anthropocentric view of the world shapes how knowledge is organized and what is valued, and in which change is considered inherently progressive in nature (Bowers, 1997, 1999). Narratives that, on the surface, might seem to value human rights may, in the wrong hands, be used in support of human or environmental exploitation. In the context of this research, then, it is important to consider the ecological implications of the stories we currently employ to make sense of the world, and to be alert to the possibilities of shaping new stories (or, indeed, revisiting those of our ancestors) as we employ the tool of narrative understanding in emotionally and imaginatively engaging teaching.

I have briefly outlined the educational value of imagination, that flexibility, energy and vividness of mind that enables us to transcend the actual, to enter a world of possibilities, and to understand the world more fully from different perspectives. Through its emotional connections, imagination helps us to remember and can make learning more meaningful. It affords us the possibility

to experience an alternative perspective, to extend ourselves into the situation of another person, place, or time. Envisioning alternative realities can offer a sense of freedom and emotional satisfaction. Imagination supports a narrative understanding of the world. Imagination enables us to incorporate knowledge into our emotional lives, making it our own. For these reasons imagination is valuable for education and should, therefore, play a prominent role in our educational theory and practice.

Learning and Culture

The second principle of Imaginative Education is that learning is a culturally mediated activity. Imaginative Education builds on the idea that learning is a process shaped by one's cultural context and the features of culture one employs to make sense of the world. This premise brings Imaginative Education in line with the work of psychologist Lev Vygotsky (1962, 1978) who suggests that in the process of intellectual development different features of one's cultural environment (especially different aspects of language) are internalized. These features of language are "mediating tools" that in turn profoundly influence the kind of sense one makes of the world. This conception of development implies a sense of the human mind that:

> ...extends into and is constituted of its socio-cultural surroundings, and its kinds of understanding are products of the intellectual tools forged and used in those surroundings. (Egan, 1997, p. 30)

Cognitive tools and kinds of understanding are the pillars of this culturally embedded understanding of mind that informs Imaginative Education.

Cognitive Tools

Imaginative Education is based on the premise that in order to understand our intellectual development we must understand the role played by the "intellectual tools" provided by culture (Egan, 1997).[72] Wertsch (1991) argues that human beings pick up different features of language from their cultural contexts that shape their psychological development and understanding. These features of language are what Vygotsky calls "psychological tools" or "cognitive tools".[73] Cognitive tools, in Egan's formulation, bring together three components that tend to be addressed separately in educational theory: the epistemological, the psychological, and the emotional. So not only are cognitive tools tied up with knowledge and central to our psychological development, they also engage our emotions and imaginations. By using a cognitive tool we can learn knowledge in

[72] Egan (1997) explains that intellectual development is not adequately understood in terms of what specific knowledge one has or, in the Piagetian tradition, in terms of predetermined genetic stages. Like Vygotsky (1962, 1978), Egan (1997) argues that understanding intellectual development requires an understanding of the different intellectual tools that shape it.

[73] In addition to language, other symbolic systems that can serve as intellectual tools include, for example, systems of numeration and counting, different forms of art, mathematical symbols, and maps. Egan (1997) argues that while "different cultures and environments have stimulated a great variety of intellectual tools to think with...the ones that have had the greatest impact on general kinds of understanding are linguistic" (p. 175). His focus, thus, is on the intellectual tools of language in various forms: "I want to consider degrees of culturally accumulated complexity in language, beginning with oral language, then moving to literacy, then to the development of systematic, abstract, theoretic linguistic forms, and finally to habitual highly reflexive uses of language" (p. 30).

a particular way, and can engage our emotions in the process. Our bodies, intellects, and emotions work together.[74]

Egan (1988b) borrows from Levi-Strauss (1962) the notion that cognitive tools are good for thinking, or good things to think with; they are "bonnes à penser" (p. 93). Cognitive tools are "aids to thinking developed in human cultural history and learned by people today to enlarge [their] powers to think and understand" (Egan, 2005. p. 219). An example of a cognitive tool is the metaphor. This cognitive tool has already helped both you and me to make sense of the notion of the cognitive tool:

> You clearly select the right attributes of a tool's utility, its powers to expand our potential to do work, its transforming of how we see ourselves when 'en-tooled', and you apply these appropriate characteristics to cognition. (Egan, 2005, p. 13-14)

The notion of "tool" leads us to think, perhaps, of a gardening tool or some other kind of implement that helps us to do something. A gardening tool helps us to garden; a building tool helps us to build. A "cognitive" tool, by metaphoric extension, helps us to think. Metaphor is a cognitive tool that, by representing something (a feature of language) *as* something else (a tool), offers insights and meanings that can deepen understanding. Other cognitive tools include story,

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[74] Egan notes that the term "cognitive tool" is somewhat misleading. First, it does not adequately capture the tripartite nature of the tool—its epistemological, psychological and emotional dimensions. Second, the association with the cognitive tends to downplay the emotional nature of these tools. Third, the term "cognitive tool" does not express that the tool is tied up with knowledge or that it grows through use. Although the metaphor of "tool" is powerful for describing these features of our bodies and aspects of our cultural that can enlarge our experience and facilitate meaning-making, the metaphor is somewhat static. Use of the tool in learning something new expands the tool and increases its power to assist in learning and understanding. Thus, cognitive tools are not solely for engagement with knowledge. Their growth and expansion is also a purpose of the engagement. Egan seems increasingly to prefer the term "learning tools."

images, extremes of experience and limits of reality, and narrative structuring.[75] Discussion of how these tools help us to think is addressed with reference to the different kinds of understanding they support.

Kinds of Understanding

As children internalize the tools of language, the nature of their emotional and intellectual engagement with the world, and the kind of world that engages their emotions and imaginations, change dramatically. What this means is that intellectual and emotional development is shaped by the cognitive tools one employs to make sense of the world. Egan (1997) describes five "somewhat distinct" kinds of understanding, each with its strengths and limitations, that children experience as they acquire different forms and associated features of language.[76] Each kind of understanding represents the way "the mind works when using particular tools" (Egan, 1997, p. 176).

Egan (1997) describes how the different cognitive tools that we employ at different stages in our lives shape our emotional and intellectual development into five kinds of understanding: Somatic, Mythic, Romantic, Philosophic and Ironic. The kinds of understanding we tend to experience as individuals in the

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[75] Fettes (2007a) has organized the cognitive tools of Imaginative Education (or what he calls TIEs – tools of imaginative engagement) in a way that illustrates what dimension of the world each tool helps us to grasp, and how each tool might change as different kinds of understanding develop. The categories he proposes include, for example, tools for "grasping wholes," "grasping composition," and "grasping detail." (Fettes' table is included as Appendix A.)

[76] The kinds of understanding should not be understood as completely distinct but rather as a matter of emphasis. Egan (1997) suggests that they are "somewhat" distinct stages as one can demonstrate different kinds of understanding at different times based on one's cultural context and the cognitive tools one employs (pp. 179-180). One does not use (except perhaps in infancy) only one kind of understanding exclusively: "We have, you might say, a fivefold mind, or, more dramatically, we are a five-minded animal, in whom the different kinds of understanding jostle together and fold in on one another, to some degree coalescing, to some degree remaining 'somewhat distinct'"(Egan, 1997, p. 180).

Western world as we acquire different forms of language recapitulate the stages through which Western culture evolved. Language development stimulates similar kind of understanding in individuals as it did in our cultural history (Egan, 1997). So Western culture transformed from a pre-linguistic stage, through the development of oral language, literacy and increasing flexibility with literacy.[77] The child, similarly, begins without language (Somatic understanding), acquires oral language (Mythic understanding) followed by the skills of literacy (Romantic understanding) and then may, within an appropriate cultural context, develop an increasingly theoretic use of literacy (Philosophic understanding) and possibly a sophisticated reflexive use of language and literacy (Ironic understanding).[78]

Egan (1997) asserts that it is inappropriate to see these kinds of understanding as another example of either developmental or hierarchical models of learning. First, despite what may at a superficial level seem like a "staged" and thus progressive educational scheme, Imaginative Education is distinct from Piagetian and other developmental models. Egan (1997, 2005) argues that the kinds of understanding will not develop naturally but emerge, rather, out of contexts that employ the cognitive tools central to each stage. So while we pick up cognitive tools by virtue of using language, we may increase the power of the tools through deliberate education. Cognitive tools are also agents of education in the sense that the more they are employed, the more they can assist in learning. The aim of Imaginative Education, as stated earlier, is to

[77] Egan (1997) provides a detailed discussion of this historical process.

[78] The order of the kinds of understanding is determined by logical, psychological and cultural factors (See Egan 1997, p. 177).

develop each kind of understanding as fully as possible, and thereby provide students with the largest array of intellectual tools for making sense of the world.

Second, Egan (1997) argues that it is wrong to interpret Imaginative Education as a hierarchical "integrative" type of educational model. He offers two reasons for this distinction. The first reason is that the development of each kind of understanding always involves both gains and losses. Mastering each new kind of understanding has a cost in terms of the loss of ways of understanding the world characterized by the previous kind of understanding. A second reason kinds of understanding should not be understood as hierarchical is that they do not represent a simple progression toward a superior form of thinking (Egan, 1997). While there is certainly some kind of progression involved in the development of the kinds of understanding—if there was not, Egan asks, why would one bother developing them? —the progression is complex and subtle.[79] Egan (1997) argues that it is one's cultural context that determines the appropriateness or value of each kind of understanding. So, for example, while Ironic understanding may be the most sophisticated and most useful form of thinking in a highly literate society, it would be unsuitable for an oral language using society. Thus literacy-based forms of understanding are not qualitatively

[79] Discussing whether Ironic understanding is superior to Mythic, Egan (1997) suggests there is no simple (or "sensible") answer (p. 192). One can describe the kinds of understanding as hierarchical, and thus, consider later forms of understanding as in some way superior to earlier kinds, or one can describe the kinds of understanding as heterogeneous and so different but equally valuable in different ways and for different purposes depending on the context in which they are used. According to a hierarchical view, the later kinds of understanding provide better access to knowledge, whereas in a heterogeneous view the kinds of understanding are more or less suitable for different sociocultural contexts (p. 191). He does concede that there is some complex and subtle development as well as hierarchical features involved in the kinds of understanding. See Egan (1997) for a more comprehensive discussion of this question.

better than oral language understanding so much as they are qualitatively *different*.[80]

The following sections examine each kind of understanding more closely and provide examples of some of the cognitive tools that characterize each stage. Given the focus of this thesis on Ecological Education from elementary through secondary school contexts, I elaborate upon the first three kinds of understanding: Somatic, Mythic, and Romantic.[81]

Somatic Understanding

Imagine a baby waving its arms, kicking its legs, sucking its toes; it is discovering its body. Different sights, sounds, textures, tastes and smells bombard it on all sides. The baby's eyes widen in delight as it notices its own hands turning before its face. It babbles joyfully as it realizes the sounds it can make. The baby rubs a soft toy across its cheek, puts it in its mouth and drops it on the ground. Each action provides a new sensory experience. The baby giggles in delight as it is bounced on a knee, spun around or encounters different sounds. It is immersed in sensory experience, captivated by the stimuli of the world around it. For the baby, the mind *is* body; all cognition grows out of its ability to perceive its surroundings and, thus, from its body's participation in the world.

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[80] That the transition to literacy is "progress" and therefore a "good thing" is a cultural assumption Bowers (2003) identifies as perpetuating the modern worldview. Imaginative Education can help reveal how the acquisition of literacy involves loss on both individual and cultural levels.

[81] Egan (1997) pairs Somatic Understanding with the infant or young child with no or very minimal oral language use (from birth to approximately age 3 or 4). Mythic Understanding generally applies to children from ages 4 through 8 who are mastering oral language. Romantic understanding applies to children or adolescents from about age 8 through 15 or so who are becoming increasingly literate. These kinds of understanding apply, thus, to primary through secondary school. I emphasize Somatic kind of understanding also because of the role the body plays in ecological understanding throughout our lives.

The baby is immersed in its context, highly attuned with its surroundings (Egan, 1988).

At the start of our lives our bodies are our primary means of making sense, and are the primary mediators of the kind of sense we can make. Not yet fully acculturated into an ideological system through which to make sense of the world, our understanding of the world develops out of the unique ways our emotions are engaged as our bodies encounter the world. We have a "distinctly human, non-languaged understanding," or what Egan (1997) refers to as Somatic understanding (p. 165).[82]

The body comes equipped with different tools[83] for encountering the world and making sense of these encounters that include, for example, emotional responses and attachments, the senses, the body's sense of pattern and musicality, and humour.[84] These tools result from the kind of bodies we have and allow, thus, a distinctly human understanding of the world.

One distinctive feature of being human and of how we make sense of the world is the role of emotion. Emotion represents the most basic way human beings orient themselves to the world and make sense of their experiences. We

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[82] Egan (1997) also describes Somatic understanding in mimetic terms. In line with Donald (1991), Egan (1997) describes mimesis as representation that involves invention and reveals intention.

[83] The idea that we are born with certain tools that help us make sense of the world expands the original sense of Egan's (and Vygotsky's) "cognitive tool" (1997) and helps account for Egan's increasing use of "learning tools." The tools that come with language are cultural whereas those of Somatic understanding may be considered biological. Like cultural tools, they are educable and contribute to the degree of vividness and meaning we make of the world.

[84] For a detailed account of each of these features of the body see Chodakowski and Egan (in press). To my knowledge, the Chodakowski and Egan (in press) article is the only one focusing on Somatic understanding. Somatic understanding and its implications for teaching are aspects of Imaginative Education that require additional research and development.

are, as David Kresch notes, "perfinkers" because we perceive, feel and think together (cited in Egan, 2005, p. 89). The meaning we make of our experiences and of knowledge is "shot through" with emotion (Chodakowski and Egan, in press).[85] The emotional engagement of the body in the world is crucial to Somatic understanding, as it is through our emotional experiences and their connections to our imaginative lives that we come to connect with or "embody" the world around us (Egan, 1997). The "instinctive, vivid, intimately participatory involvement with the natural world" that emerges when sense-making occurs through the use of the body and when our emotions respond to these experiences can result in a sense of "oneness with nature" (Egan, 1997, p. 67).[86]

The senses perform a central role in Somatic understanding because they determine the physical range of what can be known. The senses are the body's "tools of observation" through which we understand the world in detail (Egan, 1997). They stimulate emotion and imagination. Emotions and imagination are immediately engaged by what is directly encountered through the body's senses. What we see, hear, smell, touch, taste and feel means something to us because of our emotions.

Pattern and musicality is another one of the body's sense-making tools. Chodakowski and Egan (in press) describe how we seek:

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[85] Emotions are, thus, important sense-making tools for all kinds of understanding, not solely Somatic understanding.

[86] Consideration of this dimension of Somatic understanding seems particularly important for Ecological Education as it is at this intersection of the body, sensory engagement, and emotion, that ecological understanding may find its roots.

> ...meaning in patterns from our earliest years, even when what we see, hear, or touch may be quite random. But we quickly recognize those recurring regularities that give us our most basic understanding of the world we find ourselves in, of its significant patterns of sound, sight, touch, taste, and smell. We begin to construct that uniquely human kind of meaning on the back of these patterned regularities our senses deliver to us.

So, what Chodakowski and Egan are suggesting is that through its sense of pattern, the body gains an initial understanding of how the world is organized. These patterns or rhythms are a source of aesthetic delight. They are also brought forth in movements such as walking, running, or dancing (Mithen, 2005).

Beginning soon after birth, the sense of humour emerges. Egan (1997) argues that humour rarely receives the educational consideration it is due. Humour is, in fact, an important learning tool. Humour is often sparked by recognition of incongruity: "the intentional interruption of any normal pattern of activity—even if that pattern has just been created for the game—can stimulate a humorous response" (Chodakowski and Egan, in press). While recognition of incongruity offers aesthetic delight, it also supports learning: "Incongruity plays a cognitive role, contributing to a flexibility of mind, to imaginative and creative thinking" (Chodakowski and Egan, in press). Egan (1997) identifies humour as a possible source of the flexibility of thought that can ultimately lead to a sense of irony. Mithen (2005) also suggests that the humour we see in babies—the giggles that erupt from peek-a-boo games or from funny faces or sounds—contributes to the formation of relationships and communication.

The impact of the body's tools and, thus, the force of Somatic understanding, fade as we take on the cultural tools of language. Oral language offers alternative tools that greatly extend the child's world and support a different kind of understanding. Nevertheless, the influence of Somatic understanding remains. Throughout our lives, and in all kinds of understanding, the body contributes to the kind of sense one can make of the world. Egan and Chodakowski (in press) discuss, for example, how the body and its tools serve as the basis for all the cultural tools acquired later with language acquisition.[87] As the child learns an oral language a "mutual invasion" takes place: "language begins to invade our bodies and our bodies' tools reciprocally invade language" (Chodakowski and Egan, in press). The tools of Somatic understanding become "transformed constituents of all further kinds of understanding" (Egan, 1997, p. 36).

Our bodies and our earliest bodily experiences provide templates for our later language-based experiences and associated understandings.[88] So, for example, lung capacity shapes language into phrases and sentences. The basic musicality of our bodies contributes to the complex patterning of language

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[87] Phenomenologists Jardine and Abram (2000) situate the bodily origins of knowing deeper still. They argue that all knowledge is carnal knowledge. All knowledge, all *bodies* of knowledge, "are not fixed and finished sets of facts but corporeal practices, styles of engagement, ways of seeing, active ways of knowing" (p. 171). Abram (2000) describes, for example, how mathematics is a body of knowledge shaped from our bodies and how they encounter the earth: "It is our breathing body—with its symmetries, its rhythms, its vertebral sequences and distances and digits—that infiltrates us into the field of numbers and numerical relations—and so of course the body will lend something of its character to the mathematics that it glimpses and explores" (p. 170). So for children and, indeed, at all stages of knowing and understanding, we would be wise to be aware of and nurture the body's role in all knowing.

[88] See Mithen (2005) and Lakoff and Johnson (1980) for detailed discussion of the complex connections between the body and language development.

(Chodakowski and Egan, in press). The story form can also be traced to the body. The idea of plot may be tied to our body's emotional patterns:

> The relationship between those rituals of expectation and satisfaction the baby experiences from the beginning, such as hunger and feeding, or hunger and not being fed sufficiently quickly and so frustration, then satisfaction, and the thousand variations we all know from the beginning of our experience, can be seen when language develops in the plots of stories. We set up expectations in stories, complicate them, then satisfy them, or fail to satisfy them in more complicated plots. (Chodakowski and Egan, in press)

The body offers, moreover, a take on the world unmediated by culture. Although it comes *before* oral language acquisition chronologically, Egan (1997) describes how our Somatic understanding captures meaning that is "ultralinguistic" (p. 168). We understand things about ourselves, and about the world around us, through engagement of our bodies and emotions in the world that language is unable to express (though poetry in particular strives to articulate the ineffable).[89] Something gets "lost in translation" when we attempt to express aspects of Somatic understanding in words.

Egan (1997) describes how Somatic understanding also supports recognition of the "uniqueness and loneness" of human experience (p. 168). Beneath the layers of relationships that surround and define us as members of society and culture, we are still unique beings:

> We are born alone and we die alone, and in the short interval between, underneath our languages, histories, cultures, and socialized awareness, we live alone. (Egan, 1997, p. 167)

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[89] Egan (1997) notes the ultralinguistic dimension that Somatic understanding lends to Ironic understanding. It is this somatic dimension that Egan argues sets his conception of irony apart from other post-modern notions.

Somatic understanding represents, thus, an awareness of a unique, or individual consciousness. Egan (1997) argues that this understanding is valuable insofar as it may serve to counterbalance the potentially overpowering effects of living in a cultural world of shared meaning and experience.

My discussion of ecological understanding may seem to contradict this aspect of Egan's conception of Somatic understanding. Whereas Egan is interested in the "sense of uniqueness and loneness" Somatic understanding provides, I am interested in the sense of interconnectedness it affords understanding. These meanings are not actually at odds, however, because Egan's focus is on the human realm, on the world of language and its influences, and mine is on the natural world. In the context of the human world it is reasonable to argue that we are alone in the sense Egan describes, and that Somatic understanding can support our comprehension of this. What I aim to emphasize is that in the context of the natural world, Somatic understanding provides us with a sense that we, also, are implicated in nature. The natural world engages the body from all sides and it is through Somatic understanding that this awareness may be most vivid.[90]

Within each of us lies a sense of rootedness in the world originating in this pre-linguistic stage. We were, once, without language and made sense of the world only through the body. We were, once, intensely aware of our physical and emotional connections with the natural world. In line with Egan's argumentation, it is reasonable to suggest that from an ecological perspective,

[90] Fettes (2007b) notes, "experience can never be quite so immediate and vivid once we have gained a Mythic sensibility" (p. 134).

Somatic understanding offers a sense of humankind's immersion in the natural world that tends to be lost, or at least overpowered, when we internalize the tools of oral and written forms of language.

Mythic Understanding

At age 4, my daughter's world is filled with fantasy. She believes in the magical powers of fairies, the Easter Bunny, and that some beanstalks lead to magical kingdoms populated with giants. Between having elaborate tea parties with dolls, she enjoys being Cinderella, and jumping into the carriage (box) that a fairy godmother can, with a flick of her wand, magically create out of a pumpkin.

Mythic understanding develops when children employ the tools of oral language to make sense of the world. Mythic understanding is predominant, then, from approximately age two or three through to about seven or eight when oral language develops and is employed most vigorously (Egan, 1997). A Mythic understanding of the world is poetic: storied, metaphoric, and imagistic.[91]

Egan (1997) calls this kind of understanding "Mythic" because of the similarities that can be drawn to oral language-using cultures. The tools of oral language expand children's sense of the world, allowing them access to information and experiences stretching beyond their own perception. Cognitive tools such as story, abstract binary oppositions, mental imagery, metaphor and rhyme, rhythm and pattern shape children's understanding. (An overview of the main cognitive tools of Mythic understanding can be found in Appendix B).

[91] By "poetic" Egan (1997) does not mean to sentimentalize childhood or make any specific connections to poets, but rather to illustrate that the cognitive tools of oral language such as metaphor, image, and rhythm and pattern are poetic (p. 69).

The story-form is a distinctive feature of Mythic understanding. Egan (2005) describes how story tends to be understood in two ways. One is the sense of a fictional creation in which characters and events are invented. The other meaning refers more to *how* information is shaped. Story shapes information in a way that is emotionally engaging: "The value of story to teaching is precisely its power to engage the students' emotions—and also, connectedly, their imaginations—in the material of the curriculum" (Egan, 2005, p. 12). The educational value of story, then, is that it provides an emotional context for learning anything in the curriculum. Tied up with emotion, telling a story is akin to an invitation to imagine (McEwan and Egan, 1995, p. viii).

Stories that characterize Mythic understanding tend to be shaped around abstract binary oppositions and include fantasy. Abstract binary oppositions, another cognitive tool of oral language, offer an initial means of grasping concepts and ordering experience in an otherwise complex world (Egan, 1997).[92] Examples of binary oppositions include good/evil, freedom/constraint, hope/despair, and power/helplessness. In addition, the stories children most enjoy are marked by fantasy, another feature of children's minds (Egan, 1997, p. 45). Fantasy is an emotional and imaginative realm in which children can make sense of their experiences.[93]

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[92] Egan (1997) argues that abstract binary oppositions are features of language and also of human thinking, that grow out of Somatic distinctions that include self/other and figure/ground (p. 39).

[93] Egan (1997) suggests that the fantasy children so readily engage in at this age may be a result of their tendency to make sense of the world in terms of oppositions. So, for example, Peter Rabbit, a talking rabbit, may emerge when the binary oppositions children perceive of human/animal are mediated. For a detailed discussion of fantasy see Egan (1988a).

Mythic understanding also involves frequent use of metaphor. Gardener and Winner (1979) note that "we begin as poets" in the sense that our metaphoric capabilities are most flexible early in our lives, peaking at about age five. Metaphor, or when one describes one thing in terms of another, "establishes a new relationship between heterogeneous ideas in a way that adds something to, or throws new light on, the thing talked about" (Egan, 1997, p. 55). Metaphor is a powerful learning tool because it offers insights that can expand our power to think (Egan, 2005). Egan (2005) locates metaphor "at the heart of human intellectual inventiveness, creativity, and imagination" (p. 3). Listening to stories or employing metaphors inevitably leads to another tool of Mythic understanding: the construction of mental images.

Egan (2005) describes the mental image as "a tool of immense emotional importance, influencing us throughout our lives" (p. 4). The mental images we create (whether from what we hear or from what we envision based on what our other senses provide) can have great potency, often more powerful than the images bombarding us from the media. This is due, in part, to the emotional dimension of the images we create in our minds. By employing mental images we may incorporate knowledge into our emotional and imaginative lives. Mental images evoke emotional response and can call up imaginary worlds of what is not present as though it is present. Use of mental imagery, then, can help us to deepen our understanding of content by drawing upon the body's senses and emotional responses. Vivid imagery can evoke sensory engagement so that we not only "see" something but we also experience, in our imaginations, smell, taste, touch, and sound.

Imagery, in conjunction with story, abstract binary oppositions, metaphor, and other tools based in oral language, supports the development of human memory. Egan (1988b) discusses how collectively, in oral cultures, these cognitive tools are "poetics of memory" supporting strong emotional associations that aid in the memorization of cultural myths and the transmission of cultural lore. So, for example, when listening to an emotionally charged story full of vivid images and powerful metaphors, and tied into a rhythmic or rhyming pattern, one is not passive but is often drawn into the story and can connect the emotional resonances of the story's content with one's own emotional experience. In this way knowledge is much more memorable. The connection of the cognitive tools of Mythic understanding to human memory development and also, centrally, to the evocation of emotion and imagination make them educationally significant.

Imaginative Education invites us "to reconsider the general character of the foundations of education when literacy and rationality are conceived of as growing out of, rather than displacing, the oral culture of early childhood" (Egan, 1988b, p. 95). Egan (1988a) emphasizes how orality involves a richness out of which later forms of literacy and theoretical thinking emerge. It is worthwhile, thus, to maintain the features of oral understanding as much as possible:

> Orality entails a set of powerful and effective mental strategies, some of which, to our cost, have become attenuated and undervalued in significant parts of our culture and educational system. (Egan, 1988a, p. 94)

In the context of Ecological Education, the tools of orality facilitate a relational way of knowing that may support ecological understanding. So for example, in an oral language context one engages directly with others in ways

that invite a sense of participation in language use. The more intimate face-to-face encounters required when information is accessed through the ear facilitate the formation of relationships between people in communicative acts. Egan and Nadaner (1988) note too that the tools of oral language draw us emotionally and imaginatively into the experiences or events being learned. Oral language use is a bodily activity that involves "the whole person" (Egan, 1997, p. 72). The cognitive tools of oral language help to tie our emotions into the experience or the information being learned. In this way, knowledge may resonate with the body in powerful ways. For example, vivid mental images and the rhythms of story evoke the emotions and senses in ways that may provide a sense of participation in a world of language, and can also nurture a sense of personal connection with knowledge and nature.

The story form and mental imagery are examples of two cognitive tools that can support an awareness of connectedness central to ecological understanding.[94] Stories may transform how we understand our relationship to nature by introducing us to different perspectives (Jackson, 1995; Witherell, Tran, and Othus, 1995). Stories invite us to encounter the world through another's experience, thereby supporting new ways of understanding our position in the world:

> Through stories we can envision, with our students, new possibilities for human action and feeling, new horizons of knowing and understanding, new landscapes of engagement and even enchantment. (Witherell, Tran, and Othus, 1995, p. 41)

[94] While all cognitive tools can engage students' emotions and imaginations in learning about ecological themes, there are certain tools that seem to be particularly useful for supporting the sense of connection at the core of ecological understanding. Story and mental image are two of these tools.

Witherell, Tran, and Othus (1995) suggest that experiencing the other through story "affirms [the] sense that we are inextricably intertwined with other lives and with our natural world" (ibid.). Besides the story form, particular kinds of stories are also useful in supporting ecological understanding. In Indigenous education, for example, the content of stories reflects relationships between people, family, and community, as well as with the natural and spiritual worlds (Cajete, 1994). Thus stories can demonstrate an understanding of human-nature interdependence that underlies ecological understanding.

Mental imagery can also facilitate ecological understanding by allowing students to imaginatively experience another perspective:

> Images allow us in a limited but very real sense to extend our grasp on the world. Affective images do not need to reduce the content being taught, rather, they provide a means for the child to 'incorporate' it. This helps them to see that mathematics, history, and science are not made up of alien knowledge, something out there apart from them. By imaginatively grasping knowledge, children make it, *reciprocally*, become a part of them. So children discover that they are mathematical, historical, and scientific beings. (Egan, 1997,p. 62)

Egan's (1997) example of the flower illustrates how mental imagery may support students' imaginative and emotional engagement with the natural world:

> When teaching about flowers, one could imagine emerging from the cold ground, pushing toward the light, bursting with a kind of ecstasy in the warmer air, turning with passion toward the sun, feeling the rush of sap, then experiencing the horror of the returning cold, and shrivelling back underground. (p. 61-62)

Through dramatic embodiment of the content students can take on, in a symbolic sense, another perspective. They may identify with some aspect of the natural

world, as they symbolically "become" it.[95] Imagery can evoke students' sensory engagement, enriching the experience further still by drawing on the body's sensory participation in the experience. It is possible that in combination with direct experiences in the natural world and teaching that engages somatic awareness, mental imagery may facilitate the development of ecological understanding.

Mythic understanding also has a lingering somatic dimension that nurtures children's sense of participation in the natural world. Children who have Mythic understanding make sense of the world based on what they hear (oral language) as well as what they perceive through the body's learning tools (such as the senses). These perceptually-based discriminations implicate the body in knowing (Egan, 1997). What can emerge, thus, is a sense of "oneness" and participation in the world of language and also the natural world in which the child is immersed.

Romantic Understanding

Children of approximately 8 through 15 years of age do not so easily accept the existence of fairies, the Easter Bunny or magical kingdoms accessible by beanstalks. Instead they become increasingly interested in making sense of the real world. The fantasy of Mythic understanding transforms into an interest in the fantastic aspects of the real world, such as the fastest car ever made, the

[95] It is my sense that mental imagery (in combination with experiential educational opportunities and sensory development) may support the process of "identification" described in Deep Ecology literature. Deep Ecologists (See, for example, Drengson and Inoue, 1995; Fox, 1990; Naess, 1989) describe "identification" as a process in which one experiences a sense of commonality with another entity (Fox, 1990, p. 249). Identification is a personal, ontological and cosmological process central to Self-realization or the formation of as extensive a sense of self as possible (Fox, 1990). It is reasonable to suggest that identification may be enabled in teaching when content becomes vivid and memorable through imaginative means.

smartest or most ingenious animals in the world, the largest pumpkin ever grown, or the greatest pop singers (who will win the next *Canadian* or *American Idol*?). Egan (1997) attributes the change in the ways children understand the world to their increasing use of written language. It is literacy and the cognitive tools that come along with written language that shape Romantic understanding.

The development of literacy and the tools that constitute written language provide children access to more abstract ways of referring to the world. A new sense of autonomous reality emerges that children make sense of in emotionally engaging ways. They come to make sense of reality in "romantic" terms. Egan (1997) calls this form of understanding "romantic" because the child does not immediately begin to engage in a purely rational mode of thinking which, in the Western world, has tended to exclude the affective dimensions that are central to Mythic understanding. Instead, in Romantic understanding the cognitive tools of Mythic understanding such as story, metaphorical thinking and image interweave with and shape the tools of rational inquiry. A "romantic" rationality results (Egan, 1997).

Egan (1997) describes how, in Romantic understanding, the "crucial elements of rationality develop along with persisting features of myth" (1997, p. 80). What this means is that a new sense of reality is shaped by powerful affective dimensions. In Romantic understanding one seeks out, among other things, the extremes and limits of reality and what is wonderful and exotic in the real world. In the real world context, students engage with emotional aspects of reality such as the heroic or transcendent qualities of the world or the human

sources of knowledge. Seeking the extremes and limits of reality, focusing on the transcendent or heroic qualities, collecting, contextualizing knowledge in human terms, and engaging the sense of wonder are all examples of cognitive tools of Romantic understanding that help to provide a deeper sense of reality and, perhaps, where one fits in. (An overview of the main cognitive tools of Romantic understanding can be found in Appendix B). They all contribute in various ways to a sense of personal and intellectual security and confidence.

Identifying the limits and extremes of reality can help the newly literate person gain a sense of security by indicating that the world is not limitless. Associating with heroic or transcendent qualities in the world represents a means to imaginatively secure one's own place, where one fits in, and imaginatively escape the limits of everyday life. The heroes children come to idolize offer insight into the limits of being human. Collections and hobbies, another cognitive tool of Romantic understanding, represents an additional way for children to gain confidence when faced with a new sense of the world. Collecting allows one to grasp some aspect of reality in detail and may provide a sense of intellectual confidence.

Identifying the human origin of all knowledge is a cognitive tool that provides children with an emotionally engaging context for learning. Egan (1997, 2005) argues that everything we know has roots in human experience and emotion; someone's hopes, fears and passions were involved in either the creation or discovery of all knowledge. The identification of the human origins of all knowledge is a cognitive tool of Romantic understanding that makes learning

emotionally and imaginatively engaging. It is a means through which children can identify personally with the human emotion involved in the discovery, invention, or use of knowledge. A premise of Imaginative Education is that knowledge is most easily and most meaningful gained when it is learned in the human context.

Supporting children's sense of the inherent wonder in all things—that there is infinitely more to know in the world than can ever be known—is another cognitive tool of Romantic understanding. The sense of wonder drives intellectual inquiry, combining emotion and imagination in a quest for deeper understanding (Egan, 1997). The sense of wonder makes everything in the world emotionally and imaginatively engaging because one can come to see that everything is in some way wonderful and can be known in its particular uniqueness.

So, the tools of literacy that constitute Romantic understanding provide access to the "storehouse" of the world's cultural experience and knowledge. One's sense of the world's scope and complexity greatly expands as a result. The tools of literacy help us deal with this new sense of reality and enhance our ability to think by providing access to powerful ways of reasoning. The development of Romantic understanding also, inevitably, involves some loss. What is potentially lost is the vivid sense of personal participation in the world of language and, as I argue, participation in nature that comes from somatic engagement with the world and oral language use. A sense of alienation from the world is possible with the realization of an autonomous reality that comes along with literacy

(Egan, 1997). Imaginative Education aims to minimize these losses, maintaining as richly as possible the affective dimensions of Mythic understanding into Romantic understanding.

Philosophic Understanding

By the final years of high school, students tend to lose interest in their collections and in the dramatic features of the real world. Instead they begin to seek some kind of certainty in general explanations of how the world works and why. They begin to make sense of the world in abstract terms. Philosophic understanding emerges as one takes on the tools of abstract theoretic thinking.

Instead of the fascination with dramatic account of particular aspects of the world that characterize Romantic understanding, Philosophic understanding is interested in establishing the more general "Truth" in which the particulars of the world reside.[96] Philosophic understanding represents, in this way, a more general and holistic understanding of the self and of the universe. The cognitive tools that shape this distinctive kind of understanding include a sense of abstract reality, a search for authority and truth in general schemes or theories, and the use of meta-narratives (Egan, 1997). (An overview of the cognitive tools of Philosophic understanding can be found in Appendix B).

The sense of abstract reality enables adolescents to think about the world in theoretic terms:

[96] So, for example, Egan (2008) describes how the notion of "nature" may, for someone with Mythic understanding evoke images of specific animals or plants and, perhaps, for someone with Romantic understanding, images of extreme natural events or disasters. In contrast, the philosophic thinker may consider nature as a complex system composed of multiple processes.

> ...the developing mind begins to construct an abstract world of general concepts that represent reality in a new way. It permits understanding of the processes by which nature and society work and of our increasing control over these processes. It takes shape as part of the development of disembedded, rational, logically structured forms of thinking. (Egan, 2005, p. 152-153)

Adolescents with a developing Philosophic understanding engage with a world of ideas, of general schemes and theories to describe the particulars of the world around them. Because they seek general ideas to make sense of the world, it becomes increasingly important for them to determine what is true (Egan, 2008). So more than simply a description, or general law, "an objective, certain, privileged view of reality is sought" (Egan, 2008, p. 137). Faith in the adequacy of general schemes or descriptions for describing the world is a feature of Philosophic understanding. That said, the truth of theories or ideas can be challenged by anomalies—the particular aspects of the world that are inadequately explained by a general theory. The adolescent's consideration of anomalies that challenge the truth of a general scheme they embrace may lead to the refinement of ideas and to more sophisticated understanding. The emotional shaping force of narrative also plays a role in Philosophic Understanding. Metanarrative is:

> ...a tool that allows us to order particulars facts or events into general ideas and form emotional associations with them. That is, we don't just organize facts into theories, but our tendency to shape even our theories into more general meta-narratives also shapes our emotional commitments to them. (Egan, 2008, p. 138)

Philosophic understanding and the cognitive tools it employs, provide an integrating kind of intellectual power that can offer greater effectiveness in organizing experience. Making sense of the world in terms of abstractions can

lead to the identification of patterns and the formation of explanatory laws. A sense of epistemological authority can be gained in the process. Egan (1997) notes that the sense of enlarged consciousness that can result from engagement with abstract ideas is both "energizing and liberating" (Egan, 1997, p. 124). Like all kinds of understanding, however, Philosophic understanding involves some loss of previous kinds of understanding.

Egan emphasizes how the gains of rational thought such as clarity or precision can come at a cost: "The main loss stems from the Philosophic tendency to embrace a narrow, disembodied rationality, which links itself with the cognitive but distances itself from the affective" (Egan, 1997, p. 135). So, Philosophic understanding may, in some ways, emerge as a more disengaged perspective based in part on an exclusion of Somatic and Mythic kinds of emotional engagement from processes of meaning-making. Egan (1997) states that theoretic thinking:

> ...encourages a division between the cognitive and the affective, and the mind and the body, in which rationality is connected with the former. The imagination is conceived as playing no significant role in cognition, and the emotions are considered likely only to infect it with confusion. (p. 135)

A premise of Imaginative Education is that Philosophic thinking need not be this way. As has been articulated previously, it is a central aim of Imaginative Education to minimize the losses and maximize the gains that inevitably occur as one develops new kinds of understanding. So in the context of Philosophic understanding, the aim is to maximize the gains that come with Philosophic

understanding while maintaining the powerful emotional and imaginative dimensions of previous kinds of understanding.

Ironic Understanding

When one makes sense of the world through Ironic understanding, one loses total faith in the general theories of Philosophic understanding. At the same time, one recognizes the value of theory to make sense of the world. What comes clear for the ironic thinker is both how much and how little it is possible to know, that the insights, although valuable, provided by all the kinds of understanding fall pitifully short of providing any firm grasp on the world. Moreover, this realization need not be cause for alarm but, perhaps, for levity.

Equipped with the skills of irony one can more readily see the inadequacies of the general schemes created in Philosophic understanding. A sense of irony challenges the faith in general schemes that characterizes Philosophic understanding. Egan (1997) describes Ironic understanding in part as the ability to "recognize how inadequately flexible are our minds, and the languages we use, to the world we try to represent in them" (Egan, 1997, p. 155). The "extreme linguistic reflexiveness" of Ironic understanding problematizes what we previously believed to be true (Egan, 1997, p. 4).

Egan (1997) differentiates "sophisticated" irony from "alienating" irony. "Alienating" irony "undercuts and suppresses general schemes, romantic associations and mythic stories" whereas "sophisticated" irony "is different in that it succeeds in achieving reflexiveness without suppressing Mythic, Romantic and Philosophic understanding" (p. 161). Egan suggests that while the former

can lead to systemic doubt, the latter may result in intellectual and emotional liberation. Someone possessing Ironic understanding (and, thus, Egan's sense of sophisticated irony):

> ...enjoys an abundant consciousness of varied ways of understanding, and can appreciate a varied spectrum of perspectives while concluding that some are better or more valid or more helpful or more beautiful than others in particular circumstances and for particular purposes. (Egan, 1997, p. 161-162)

Thus, an ironic thinker is someone who sees both the value in, and limitations of, all previous kinds of understandings, and who can flexibly move between these different forms of engagement with the world. Irony becomes a kind of regulator of all of the previous kinds of understanding.[97]

Egan has not articulated a "toolkit" for Ironic understanding in the same way he has for the previous kinds of understanding. In the sense Egan describes it, irony includes tools such as openness to interpretation, flexibility in perspective, and humour. Openness and flexibility are tools that allow one to see what is, or is not, valuable given different circumstances. Ironic understanding involves, moreover, a heightened sense of, or revival of, somatic awareness. There are aspects of human experience that escape explanation. They are "ultralinguistic" (Egan, 1997, p. 169). Egan suggests, "Somatic understanding provides to Ironic understanding something beyond language... something below

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[97] Because the cognitive tools one employs to make sense of the world result in different understandings of the world, there are limits to what can be understood at the Ironic stage of understanding, even when one's use of language is most flexible and when one is aware of, and even tuned into, other kinds of understanding. So, for example, someone with Ironic understanding cannot understand the world in the way someone with Mythic understanding would because all the cognitive tools he or she has internalized shape meaning. One might be said to have, thus, an *Ironic* Mythic understanding.

language that our language can strive to be true to" (Egan, 1997, p. 169-170).[98] And, of course, a strong sense of irony is a strategy for making "the ineffable, including our somatic understanding, articulate" (Egan, 1997, p. 170). Irony may, in some ways, be equated with a sense of humour about the inadequacy of what we can ever know, know we know, or say we know. In order to develop most effectively this ironic mind, each previous kind of understanding should be developed as fully as possible.[99] This may be possible given cultural contexts that routinely engage the cognitive tools central to each stage.

As this overview suggests, education that engages the tools language provides for making sense of the world and, thus, students' emotions and imaginations, represents a new approach to thinking about and practicing teaching. When we are born, the body's tools help us to gain initial access to the world and make meaning of our experiences. As we grow up, we have access to many more tools language provides for making sense of the world. An important feature of these tools is that they engage our minds and bodies, emotions and imaginations simultaneously.

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[98] In *The Educated Mind*, Egan (1997) pairs Somatic understanding with Ironic understanding. He explains that this does not mean that Somatic understanding is somehow only a part of Ironic understanding but is "just another case of the first being last" (p. 163). So, *why* he put the first stage last in the explanation is not clearly explained. It may be that Egan discusses Somatic understanding along with Ironic understanding because the latter affords the necessary flexibility of language to recognize it. It is as though Egan is arguing that one needs to complete the process of developing all the kinds of understanding in order to be aware of the somatic core from which our understanding emerges. On the other hand, its description with Ironic understanding may also, as Egan suggests, be of little significance.

[99] Developing and maintaining the cognitive tools associated with the various kinds of understanding means that even with the losses that inevitably occur as we take on different forms of language, someone with Ironic understanding remains aware of and able to engage in the world in Somatic, Mythic, Romantic and Philosophic ways.

Practices

This section demonstrates how the principles of Imaginative Education translate into practice. The main features of the planning frameworks for Mythic and Romantic understandings are examined.[100] These templates show how to plan and teach in ways that engage the cognitive tools of Mythic understanding for students in elementary school (up to approximately age eight) and the cognitive tools of Romantic understanding for students in middle and high school (ages eight through fifteen). Central to both planning frameworks is imaginative engagement with what is wonderful and meaningful about the topic.[101]

The Mythic Planning Framework

You will recall that students demonstrating Mythic understanding are predominantly oral language users who may be making preliminary advances into written language acquisition. The sense of wonder, the story format, abstract binary oppositions, mental imagery, and a sense of mystery are some of the main cognitive tools that shape Mythic understanding. Framework 1 presents guiding questions that will help the teacher incorporate these cognitive tools into lesson and unit preparation for Mythic Understanding. (See Appendix C for an example of a Mythic unit written by Egan entitled "Properties of the Air.")

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[100] There is no framework or template for Somatic Understanding. In my articulation of Imaginative Ecological Education in Chapter Four I add to these templates a somatic dimension.

[101] Space precludes a detailed account of how Imaginative Education may be used in relation to all subject matter. Lesson and unit plan templates in blank and detailed form as well as many examples of imaginative lessons can be found at the Imaginative Education Research Group Website: www.ierg.net.

Framework 1
Imaginative Education – Mythic Planning

1. Locating importance

What is emotionally engaging about this topic? How can it evoke wonder? Why should it matter to us?

2. Thinking about the content in story form

How can we shape the content so that it will have some emotional meaning? How can we best bring out that emotional meaning in a way that will engage the imagination?

2.1. Finding binary opposites:
What binary concepts best capture the wonder and emotion of the topic? If this were a story, what would the opposing forces be?

2.2. Finding images and drama:
What parts of the topic most dramatically embody the binary concepts? What image best captures that content and its dramatic contrast?

2.3. Structuring the body of the lesson or unit:
How do we teach the content in a story form?

3. Conclusion

How does the story end? How do we resolve the conflict set up between the binary opposites? How much do we explain to the students about the binary oppositions? How do we give them some sense of the mystery attached to this topic?

4. Evaluation

How can one know whether the topic has been understood, its importance grasped, and the content learned?

Finding the significance in the topic is where imaginative teaching begins. Imaginative teaching requires the teacher's emotional engagement. The teacher begins by identifying the emotional core of the topic; that is to say, what she finds most engaging about it. Thus, the "importance" of the topic is not sought in utilitarian terms (how the topic may be useful to the child for example) but in emotional terms—in terms of its inherent wonder (Egan, 2005). Once the teacher has determined what she is passionate about in the topic, she then

considers how to shape the story into story form.[102] This is the second step in imaginative teaching.

As discussed previously, story is a powerful teaching tool because it conveys information in a way that engages students' emotions. More than that, different stories orient emotions in different ways so the listeners (or readers) come to feel something specific about the topic. The story-shaped topic to be taught should include abstract binary oppositions that capture the wonder and importance of the topic. As described in the last section, abstract binary opposites are central to many stories that engage young children's imaginations like, for example, fairy tales in which good strives with evil, rich with poor, strong with weak. Shaping our story around such oppositions draws on the ways students tend to make initial sense of experience and can increase, thus, their understanding of the topic. Once the oppositions around which the story will be shaped have been determined, the teacher then considers the best way to include them in the story. She may do so by thinking of an image that best captures both the opposing forces selected and the dramatic features of the topic that convey its

[102] There is an assumption in Imaginative Education that what engages the teacher or, in other words, what he or she identifies as emotionally significant, will also engage most if not all students. It is possible that in classrooms that are highly culturally diverse, the teacher's selection will not emotionally engage the majority of students in learning. This problem will likely be compounded in a situation where the teacher is from a different cultural background from the students he or she is teaching. I am not suggesting that the teacher can necessarily choose one idea that will engage each and every student. I am suggesting, though, that teachers need to strive to identify significance that will ring true for *most* students; it is wrong to assume that what the teacher on his or her own finds most meaningful is necessarily so for his or her students. While it is not discussed in Imaginative Education literature, it seems important to consider this dimension. In order for Imaginative Education to be as effective as Egan (1997) suggests it is, teachers need to get to know their students. Perhaps the significance of topics and the narrative structure teachers employ could be identified collaboratively with students. This dimension of Imaginative Education requires further consideration.

wonder and emotional significance.[103] Here again, the teacher needs to *feel* about the topic in order to locate its dramatic core. With the structuring elements of the binary oppositions and sense of wonder and drama identified, she can create the narrative plotline of the topic. The story takes shape. The content needs to be organized in a way that makes the topic accessible to students, that captures the binary oppositions around which it is based, and that evokes the emotional image that dramatically captures the importance of the topic.

The third step in imaginative teaching for Mythic understanding involves establishing a conclusion for the story. The ending for the story may include a simple resolution or mediation of the opposing forces provided, or it may include an investigation of the various features of the story. The main objective of the conclusion is for students to solidify their emotional connection with the content of the story, or "to feel the drama of the story and internalize the material while expressing their understanding of it in imaginative ways" (The Imaginative Education Research Group, 2008). Also, it is important to conclude in a way that leaves the students with a continued sense of emotional attachment. Egan (2005) suggests that evoking the sense of mystery or wonder is a powerful way to further engage students' imaginations.

The fourth step involves evaluation of student understanding. Because Imaginative Education is a means by which to achieve prescribed learning outcomes, it is possible to use traditional means of evaluation to assess students'

[103] Resources for planning imaginative teaching on the Imaginative Education Research Group website state that every subject contains drama: that "every topic has some kind of dramatic conflict in it" (The Imaginative Education Research Group, 2008). That is what needs to be identified; "a core conflict, contradiction or drama that seems to best convey the wonder and emotion of the topic" (The Imaginative Education Research Group, 2008).

comprehension of the topic (Egan, 2005). It is also important, however, to think about whether students have been imaginatively engaged with the topic. Egan (2005) suggests looking for signs of emotional and imaginative engagement and use of the cognitive tools employed in the lesson. Such signs might include whether students do further reading or investigation, the nature of the questions students ask, the originality of work, and the "vividness, originality and relevance" of images students use to explain or extrapolate on the topic (Egan, 2005, p. 47).

The Romantic Planning Framework

Framework 2 outlines how to plan a Romantic unit or lesson. You will recall that with Romantic understanding a new set of cognitive tools acquired with the development of literacy changes the nature of the child's emotional and imaginative life. The cognitive tools of Romantic understanding that the template guides the teacher in incorporating into the lesson or unit include heroic or transcendent qualities, narrative structuring, extremes of experience and limits of reality, humanization of meaning, collections and hobbies, and the sense of wonder. (See Appendix D for an example of a Romantic unit written by Egan entitled "The Amazing Life Cycle of the Eel.")

Framework 2
Imaginative Education – Romantic Planning

1. Identifying "heroic" qualities

What heroic human qualities are central to the topic? What emotional images do they evoke? What within the topic can best evoke wonder?

2. Organizing the topic into a narrative structure

2.1. Initial access:
What aspect of the topic best embodies the heroic qualities identified as central to the topic? Does this expose some extreme of experience or limit of reality? What image can help capture this aspect?

2.2. Composing the body of the lesson or unit:
How do we organize the material into a narrative structure to best illustrate the heroic qualities?

2.3. Humanizing the content:
What aspects of the narrative best illustrate the human emotions in it and evoke a sense of wonder? What ideals and/or challenges to tradition or convention are evident in the content?

2.4. Pursuing details:
What parts of the topic can students best explore in exhaustive detail?

3. Conclusion

How can one best bring the topic to satisfactory closure? How can the student feel this satisfaction? How can we evoke a sense of wonder about the topic?

4. Evaluation

How can one know that the content has been learned and understood and has engaged and stimulated students' imaginations?

Like the planning process for Mythic understanding, the teacher of students demonstrating Romantic understanding begins by identifying the wonder in the topic and then moves to creating a narrative form. He identifies the heroic quality of the topic and the wonder inherent in this quality. He considers what mental images he may evoke that best capture this heroic aspect. By identifying a heroic human quality or emotion (such as, for example, courage, compassion, tenacity, hope, delight, etc.) students may come to understand the content in human terms. Linking knowledge to the human context, specifically to the hopes, dreams and fears of real people, is the greatest source of meaning (Egan, 1997, 2005). Next, the narrative structure is used to shape the topic.

Having selected a heroic quality around which to shape the lesson or unit, the teacher now thinks of an image that best captures this quality and around which the narrative may be developed. The image should reflect the emotional core or importance of the topic. The image should also capture some extreme feature of the topic and so, too, engage this cognitive tool.

In creating the shape of the narrative that will serve as the body of the lesson, the heroic quality of the topic will serve as the dramatic core of the narrative. In this step, Egan (2005) encourages the teacher to think about what makes for a really good movie or novel. Obstacles facing the hero or the triumph of the heroic quality are generally discussed. The triumph of the heroic quality is presented in a way that evokes a sense of wonder on the part of the viewer or reader. The narrative should illustrate how the heroic quality will carry through to the end of the teaching unit. The narrative will need to situate the content in the context of human hopes, fears, and passions. It should also include opportunities for students to "collect" features of the topic. The objective is to identify some aspect of the topic that students may be able to find out everything about. This cognitive tool, what Egan (1997) refers to as "collections and hobbies," offers students a sense of confidence by allowing them to become experts on some aspect of the topic.

Bringing the narrative to a close is the next step in the process. The teacher should aim to conclude the narrative in a way that leaves students' emotions engaged. Evoking a sense of wonder or awe in a conclusion is a powerful way to leave a topic resonating with students. Egan (2005) describes

two ways to bring a narrative to a "romantic" end that reinforce its emotional core. The first is to encourage students to take on different perspectives, identify other heroic qualities in the topic and mediate any conflicting views that emerge. The second way to "romantically" bring the narrative to a close is to show how the heroic qualities identified in this topic may be identified in other topics. Students may look for the heroic qualities around which the lesson or unit was taught in other contexts. In so doing they could learn other topics in an imaginatively engaging way.

Now that the lesson or unit is complete it is necessary to consider how best to evaluate students' understanding and their level of imaginative engagement. Like the Mythic planning process, traditional means of evaluation such as tests, projects, or discussions are useful and appropriate to assess students' content knowledge. In terms of assessing their degree of romantic engagement in the topic, teachers may consider the degree of student enthusiasm for the topic, the effort students demonstrate in their work, the quality of their work, signs that students have done further investigation or reading, or examples of students applying the features of the unit to other contexts.

These planning frameworks illustrate how Imaginative Education as an approach to teaching differs from mainstream educational models. An interest in how to fulfill prescribed learning outcomes is not a driving force in Imaginative Education (although this can be achieved). Instead, teaching a topic based on engaging the cognitive tools students use to make sense of the world—those that characterize the kind of understanding they have of the world—and, thus, tapping

into their emotional and imaginative sensibilities, certainly is. What makes Imaginative Education particularly useful in all classrooms is that it supports the fulfillment of prescribed learning outcomes in ways that are meaningful to students.

Problems: Incompatibilities

The discussion of Imaginative Education thus far may lead some readers to question its appropriateness for Ecological Education. The fact that Imaginative Education has completely different goals than Ecological Education and is not at all concerned with cultivating the human-nature relationship may lead some readers to question why I would suggest a union of the two fields and why ecological educators should take it seriously. Based on the differing theoretical and philosophical premises underlying the two fields, it may seem like an unlikely marriage.

This section addresses two critiques that may be raised against my proposal. The first critique may be that it is inappropriate to use Imaginative Education in the context of Ecological Education given their different ideological stances. The second critique may concern what, in my view, is perhaps the largest potential problem of unifying the fields; Imaginative Education and Ecological Education reflect very different philosophical positions in regards to the human-nature relationship. It is important to consider whether it is possible to develop ecological understanding within an anthropocentric pedagogical framework that does not share the same belief in human relationship to the natural world. I aim to show that despite these differences, the theories are

compatible. While it is certainly important to make note of the ideological differences between Imaginative Education and Ecological Education and to reflect upon these as part of practice, Imaginative Education can make significant theoretical and practical contributions to Ecological Education.

Differing Premises: The Purpose of Education

The stated aims of Imaginative and Ecological Education are distinct. The two theories of education reflect very different views of what education is for. Whereas Imaginative Education aims to develop students' intellectual skills as fully as possible based on the tools language provides, Ecological Education aims to educate students in ways that may lead them toward a more ecologically sustainable worldview.

Egan (1997) describes Imaginative Education as an approach to schooling that steps away from three educational traditions (socialization, academic rationalism, and individual development) that have, in varying combinations, shaped education in the Western world. Egan believes schools should focus only on the education of minds, not on how intellectual skills are used: "Societies socialize; schools stimulate and develop kinds of understanding" (Egan, 1997, p. 188). So, in other words, education should be concerned with maximizing the cognitive toolkits students have available to them, rather than instilling certain beliefs. In contrast, Ecological Education aims to cultivate an ecological worldview: a more relational, embedded understanding of humankind's ontological position in the world. Some may question, thus, the appropriateness of using the theory of Imaginative Education to teach Ecological Education.

There are several ways to deal with this critique. The first would be to focus on the socialization aspect of the argument. I could argue, for example, that it is incorrect to conceptualize Ecological Education as a form of socialization and Imaginative Education as not. This binary form of thinking is, of course, too simplistic. Imaginative Education is socially and culturally embedded. As a theory based on the recapitulation of cultural tools, social and cultural values are completely wrapped up in what Imaginative Education *is* and what it aims to reinforce. Using Imaginative Education to teach the current curriculum will reinforce the social interests embedded in that curriculum. That is to say, Imaginative Education will continue to socialize students to live in ways that reflect the current worldview, a worldview that has resulted in serious ecological degradation. So even though Imaginative Education may not be explicitly concerned with instilling a certain view or certain beliefs and it is not, indeed, the stated aim of Imaginative Education, socialization does occur.[104]

I could assert, then, that the Ecological Education I propose is no more or less a form of socialization than what Imaginative Education already entails. I might also argue that if socialization is, as Egan (2007) argues, about "inducting students into *current* conventions," then the point of view Ecological Education is concerned with developing is *not* a widely held belief (p. 11, emphasis mine). The environmental movement is certainly visible in the media and environmental issues are increasingly recognized, but understanding the world ecologically in the way I describe is not common. If it were, it is doubtful that we would face the

[104] Egan (1997) acknowledges that Imaginative Education preserves "adequate" levels of all three traditional aims (p. 24).

environmental issues we are facing. So, yes, Ecological Education is concerned with helping students understand the world in more relational terms, but if this view is not the norm, we may consider it an alternative view that can enrich the way students are already making sense of the world.

Like mathematics, science, history and all the other "stories" we teach our students in (and outside) classrooms, ecology offers another story about how the world works.[105] It opens up possibilities to develop ecological imagination and to be ecologically thoughtful about how we interact with nature. By nurturing and developing the cognitive tools that can enhance one's sense of participation in the world, we may be able to problematize what "is" and allow for other possibilities. The Ecological Education I propose here, then, is in line with the stated goal of Imaginative Education: it equips students' cognitive toolkits as much as possible. Let me push the envelope a little if I may. Is it possible that by neglecting an ecological perspective we are not developing students' cognitive abilities as well as we could? Are we leaving important cognitive tools out of their toolkits? On a theoretical level, is it possible that the current ecological challenges facing the world could offer to Imaginative Education new grist for the mill?

It is my sense, however, that arguing about whether Imaginative Education does or does not socialize any more or less than Ecological Education does not serve much good. One gets caught up in a debate over what "socialization" entails and how it should be defined rather than dealing with the

[105] Of course I am proposing a much more central pedagogical role for ecological concepts, but one may still think about Ecological Education as a "narrative" depicting a certain view of the world.

question of the effectiveness of Imaginative Education for developing ecological understanding. What may matter more than appropriateness is effectiveness. The appropriateness of Imaginative Education for Ecological Education is not tied to its effectiveness or its utility for achieving the aims of Ecological Education. So while its use in Ecological Education may contradict Egan's (1997) understanding of what education is for, this does not mean it cannot support the aims of Ecological Education. Imaginative Education is, indeed, effective for teaching anything (Egan, 2005).

Differing Premises: Considering Alternatives to Anthropocentrism

Imaginative Education and Ecological Education reflect very different perspectives on the relationship between humankind and nature. Imaginative Education is a human-centred framework. In Imaginative Education the source of emotional engagement comes out of the human context of all knowledge. Egan (2005) states that "all knowledge is human knowledge; it is a product of human hopes and fears and passions" (p. 96). Imaginative Education not only focuses, then, on how we may use human qualities to highlight emotional significance, but is based on the notion that the human dimension is the true source of emotional connection. Because our emotional responses spring from their relation to the human dimension, it is only in the human realm that meaning emerges and things are most imaginatively engaging.

Anthropomorphizing or assigning human qualities to the natural world in order to emotionally engage with it in learning, may diminish the possibility of developing ecological understanding based in the intrinsic value of nature. By

anthropomorphizing the natural world, we may continue to subjugate the Earth. Orr (2005) laments, for example, that education tends to be "worship of human accomplishments, history, and mastery of nature" (p. 104).[106] The problem may be that educating only or predominantly about human achievement and human mastery or control of nature supports further manipulation of the natural world (Orr, 2005). Ecological Education may counter-balance the human-centredness of the Imaginative Education framework by bringing into focus the ways in which human beings and nature are interdependent, and the ways in which nature is intrinsically valuable. We may alter our ontological understanding in ecologically imaginative ways. The model for Imaginative Ecological Education I outline in Chapter Four introduces ways to do so.

Moreover, it is important to note that the location of meaning in the human realm is not necessarily antithetical to an ecological perspective.[107] We are human beings that do indeed make meaning out of our experiences and our contexts. Egan's position that the human realm is the major source of our emotional connection does not necessarily mean that nature is only valuable in human terms. It is also possible to consider the intrinsic value of nature. Other dimensions of emotional association may be brought to the fore in Ecological Education that Imaginative Education does not include. For example, Imaginative Ecological Education may draw out the natural dimension, balance it

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[106] While I would not use the word "worship", Imaginative Education does celebrate human achievement, qualities and capacity. The human realm is, for Egan, the source of emotional engagement as it is that which we as humans can most readily identify.

[107] It may be argued that even the intrinsic value of nature takes on meaning for us because it is defined in human terms. This kind of argument—that absolutely everything is human-centred simply because we are human beings is overly general (Fox, 1990).

with the human, and encourage different understandings of human-world relationship.

Ecological Education aims to consider alternatives to an anthropocentric perspective. It tries to shift the focus away from human beings as the measure of all things toward an understanding of how human beings are embedded within the context of natural systems. Nature is intrinsically valuable. Imaginative Ecological Education may support a more embedded view of human beings in nature by engaging students emotionally and imaginatively with the world in ways that are "ultralinguistic."[108] Tools that can support more ecological thinking are already part of the imaginative toolkit Egan describes: the sense of wonder, mystery and awe for example. The beauty and fascination that comes when one is faced with the wonderful, awesome or mysterious aspects of life can defy explanation.[109] With these kinds of tools, we may engage students emotionally and imaginatively with the natural world without imposing human qualities on it or without making human qualities central to their experience.[110]

Before discussing the many ways in which Imaginative Education and Ecological Education are compatible, there are two additional incompatibilities that merit brief discussion. One has to do with epistemology, or how knowledge

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[108] Egan (1997) suggests that Somatic understanding offers an ineffable kind of understanding of the world that is "ultralinguistic" or that cannot be captured in words.

[109] I build on Evernden's (1992) sense of wonder as somehow "pre" explanation and, possibly thus, not necessarily defined strictly in human terms. Of course it is up for debate whether it is possible for anything to escape the influence of culture when we are cultural beings and when language shapes not only what we say but also what we think. If a sense of wonder or awe can create a space that escapes explanation then it offers a possible space for emotional engagement that is, symbolically at least, outside the human realm.

[110] There are more tools, too, that will develop as part of Imaginative Ecological Education. Chapter Four explores place-making tools that may support direct engagement with nature. Further research into other, more ecological, cognitive tools is required.

and knowing are conceived, and the other has to do with the inclusiveness of Imaginative Education. First, then, one may question the compatibility of Imaginative Education and that of Ecological Education in terms of epistemology. In the former, knowing is largely associated with the individual. In the latter, more relational understandings of knowing emerge.[111] Imaginative Education presents a very individualized understanding of the learning process and of the learner. Cognitive tools may be cultural creations, but they are internalized by individuals and employed by these individuals as they, essentially alone, make sense of the world. Through the five kinds of understanding, the individual develops an increasingly sophisticated comprehension of the world for him or herself. Although influenced by cultural contexts, the various kinds of understandings that emerge are not collectively shared; understanding is an individual phenomenon. If we are to take seriously the notion of ecological understanding then we must also consider what an ecological epistemology might look like, and how this may be translated into practice.[112] From an ecological epistemological stance, nature is inextricably part of knowledge and knowing. The world participates in our knowing. Knowing is, moreover, systemic and cooperative. The writing of Dillard (1974), Lopez (1986) and Thoreau (1961) exemplify a situated, ecological, kind of knowing. Immersed in place, their writing demonstrates what a union of place, person and pedagogy might look like. While I do not think that these differing epistemological stances stand in the

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[111] While I do not address this consideration in depth here because I do not think it prevents a marriage of the fields, it is worthy of consideration and investigation as part of further research into this topic.

[112] Roszak (1978, 2001) and Bookchin (1991) address some of the theoretical dimensions of an ecological epistemology.

way of effective imaginative teaching for ecological understanding, they do call our attention to the need to consider how more collective, shared understanding may be supported and valued in the context of Imaginative Ecological Education.

Second, some readers may question why I have not identified Imaginative Education as Eurocentric and, thus, potentially incompatible with Ecological Education. Based largely on European tradition, Imaginative Education may not, at first glance seem particularly culturally inclusive. I have not elaborated upon this potential critique because, in my view, Imaginative Education is Eurocentric in *des*cription but not in *pre*scription. While Egan (1997) draws largely on Ancient Greeks and examples of Western cultural development in describing his theory, he does not associate intellectual superiority with this particular historical account. Beyond the European-based examples, then, Imaginative Education is concerned with stimulating and developing the tools all human beings have access to that influence how we make sense of the world and our experiences (Egan, 1997). In the next section outlining the compatibilities between Imaginative Education and Ecological Education, I describe the culturally inclusive nature of Imaginative Education.

My argument for bringing together Imaginative Education and Ecological Education requires acknowledgement of how the fields juxtapose. Attention to incompatibilities, and what they may imply, is a part of reflective practice. However, these different philosophical premises should not, in my view, prevent trying out a potentially positive educational change. Whether the different philosophical origins of the two theories will indeed limit the effectiveness of

Ecological Education can only be assessed if Imaginative Ecological Education is put into practice in schools. As the next section aims to show, there are good reasons to bring Ecological Education in line with Imaginative Education. So while the incompatibilities described above deserve acknowledgement, they are outweighed by the possibilities that a marriage of the fields offers.

Possibilities: Compatibilities and Contributions

Imaginative Education and Ecological Education are not only compatible, but Imaginative Education can make some important contributions to Ecological Education. In terms of compatibilities, Imaginative Education aligns with Ecological Education in four ways: it reacts to the problems of current schooling in the Western world, it attends to language as a tool shaping both intellectual and cultural development, it focuses on preserving the intellectual devices that accompany oral language use, and it builds upon particular cultural contexts. In addition to these compatibilities, Imaginative Education can make three contributions to Ecological Education. It can add strength to Ecological Education by offering a way of describing the changing nature of students' ecological understanding, thus enhancing clarity around the overall aims of the field. Imaginative Education offers methodological support in the form of pedagogical frameworks that may be used, with some revision, by ecological educators to engage students' emotions and imaginations in learning. Imaginative Education makes explicit the importance of the body, emotion and imagination for learning, and identifies specific practices that can be used to support ecological understanding.

Compatibility: Critiques of Schooling in the Western World

Both Imaginative Education and Ecological Education take aim at current notions of schooling in the Western world. For Egan (1997), the attempt in most schools in the Western world to simultaneously inculcate academic knowledge, socialize students, and attend to each child's individual needs has resulted in a system that fails dismally (Egan, 1997). Indeed, in trying to achieve aims that are, in his view, largely incompatible, schooling fails to achieve any of its purported aims. Ecological Education does not take on the purposes of education as much as its results. Orr (1992, 1994) and Bowers (1993, 1995) argue, for example, that ecological crises are a result of modern schooling in its current form. They go so far as to say that education, in its current form, is dangerous for the planet. Students graduate with little to no understanding of where they live or how their lives impact the natural world around them. They are educated to enter a society that is based on unsustainable industrial practices and misconceived beliefs about the natural world. Changing the overall result of schooling is, thus, the aim of Ecological Education. Changing notions of the purpose of education and, thus, its results, is the aim of Imaginative Education. Ecological Education and Imaginative Education both upset the applecart, albeit for different reasons and with different consequences. What is important for this discussion is that both educational fields see a need for change. This thesis aims to illustrate how Imaginative Education may serve the overall interests of Ecological Education in instigating educational reform. By applying Imaginative Education to Ecological Education and, thus, by educating students differently, the aims of Imaginative Education may also be served.

Compatibility: Attention to Language

The cultural roots of Imaginative Education and, in particular, its attention to language and the role of cultural context in learning, align with Ecological Education. Theorists such as Abram (1996), Bowers (2003), Evernden (1992, 1993) and Livingston (1994) note the cultural dimensions of the ecological crisis. They argue that the cultural transformation required for human flourishing and an ecologically sustainable future must involve a re-examination of key assumptions that perpetuate the Western worldview. Evernden (1993) suggests that current efforts at environmental reform are ineffective for reasons that include their failure to query the taken-for-granted cultural beliefs that shape consciousness; what we understand to be true and real is a product of the cultural norms we employ and the cultural context in which we are immersed. One such assumption that Ecological Education must question is that language is a neutral technology (Bowers, 2003). We need to recognize the power and limitations of language as part of education.[113] The kind of language we use shapes our relationships with the Earth (Abram, 1996).

In his work on the impact of political language on the environmental movement and educational practice, Bowers (2003) argues that in order to change the belief in the autonomous self in the Western world to one in which the self is understood as nested within cultural and natural systems, students need to

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[113] Bowers (2003) and Evernden (1993) suggest also that in order to reveal the cultural forces shaping our current worldview one needs to be able to identify the power and limitations of language. Flexible use of language is necessary for revealing the cultural "shells of belief" that make unsustainable human practices a matter of common sense (Evernden, 1992, 1993). The extreme reflexive use of language that characterizes Ironic understanding may support such a re-examination of the taken-for-granted cultural assumptions that underlie the ecological crisis.

recognize "how different language systems shape thought differently, sense of self, [and] identity" (2003, p. 167).[114] In line with Ong (2002), Bowers (1995) discusses, for example, the impacts literacy has had on how human beings relate to the world and to each other. He highlights the ecological implications of the development of written language. Bowers (1995) notes:

> ...the largely overturned ... view that the introduction of the alphabet that made modern writing possible was primarily a technological advance in enabling us to be more rational and objective in our thinking and in contributing to the upward spiral of knowledge (civilization) through a more effective means of sharing knowledge with other rational individuals. (p. 60)

He argues that literacy supports the sense of individualism in the Western world that is at the heart of ecologically destructive practices. He links the modern sense of individualism to "alienation," to the mistaken belief that it is possible to be separate from nature. Bowers (1995) argues that, on a broader scale, "the alienating characteristics of literacy contribute to a form of culture that is out of harmony with its habitat" (p. 61).[115] Underlying this argument, one we see echoed in Abram's (1996) work, is that orality and literacy represent different relationships (and assumptions) about the world. Different understanding of the world as well as different patterns of social interaction result from the form of language we use (Bowers, 2003, 1995).

Different forms of language (as well as different languages) engage us differently with the world. Abram (1996), Bowers (1995, 2003), and Egan

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[114] Bowers (2003) says "language systems" are diverse, including oral and written language as well as the built environment, traditional ceremonial practices, etc. (p. 167).

[115] Bowers (1995) suggests a need to balance out the effects of literacy such as individualism, privileging of abstract and analytic thought and the decontextualization of knowledge, with features of oral cultures.

(1988a, 1988b) note the participatory, relational nature of orality, and the more disengaged nature of literacy. Egan (1988b) identifies "participation and conservation" as features of orality.[116] In orality, "the ear is most highly attuned to picking up cultural messages" (Egan, 1988b, p. 107). What this means is that communication is limited to a certain physical range and, in order to be understood and remembered, is tied up with emotional intensity:

> Sound is alive and participatory...The living word is the word in the arena of human interactions and conflicts; it is not the distanced and "cooled" word of the written text. Language in an oral culture...is charged with the direct energy of the speaker's body and so the speaker's hopes, fears, wants, needs, intentions, and so on. (Egan, 1988b, p. 107)

So the spoken word is "tied into the context of reference," connected to the emotions of who is speaking, where the communicative act occurs, and the purpose of what is being said (Egan, 1988b). One participates in communication, often being emotionally drawn in by the speaker. Citing the work of Ong (1977), Bowers (1995) notes, "The spoken word is always a social event, an ongoing action, that allows intuition, context, non-verbal communication, memory, intonations, character of participants, and all the sense to be fully involved" (p.

[116] Egan (1988b) divides the features of orality into three sub-headings: the poetics of memory, participation and conservation, and classification and explanation" and then goes on to explore how these are demonstrated in young children's thinking (p. 95).

61).[117] What Bowers is arguing, and what has relevance for an ecological understanding of the world (because, of course, social events are not necessarily ecological), is that oral language is a more participatory form of communication. Orality engages the body in the act of communication, calling on the emotions and the senses more immediately. It also contextualizes knowledge and enhances a sense of community through the shared constructions of meaning (Bowers, 1995).

The written text requires no such human interaction to convey meaning. Its meaning is fixed in time, separated from the emotional context of the human being who wrote it down. We engage with the written text as individuals, requiring no human interaction to understand meaning. We engage, instead, with the written word. The written word does, of course, engage our emotions and imaginations, but in a less participatory way. Literacy may also reify the abstract word. The abstract word is seen to have an independent existence that may be considered more real than the original it represents (Bowers, 1995; Evernden, 1993). So, what this means is that through written language we engage with the "secondary" realm of text rather than the "primary" realm of direct experience and face-to-face encounters:

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[117] Bowers (2003) notes the power of language to shape thought. If we take seriously Bowers' argument that language limits how (and even if) we can question cultural assumptions, one is led to question how an imaginative approach to Ecological Education is any different. Thus, analysis in Ecological Education, whether it is imaginative or not, risks falling into the linguistic traps Bowers alerts us to. A place to start is being alert to the power of language itself; if we begin from a place in which language is understood as a reflection and construction of culture, then it may not be used as if it is neutral, or it may be used more cautiously with consequences for what language says about our worldview considered. We may supplement this alertness to language with enhanced somatic awareness that, as Egan (1997) notes, comes both before languaged understanding and lies "beyond" anything language can express.

> The primary is actually our embeddedness as sensory and cognitive beings in an interdependent biocommunity; the secondary is what we are able to represent in symbolic form about our existence. The reversal makes the abstract more real than what is experienced, which exceeds in richness, complexity, and depth what can be communicated through the technology of language—especially the printed word (Bowers, 1995, p. 62).

Like Bowers (1995, 2003), both Abram (1996) and Egan (1997) discuss how literacy can lead to more disengaged perspectives. Abram and Egan describe how oral cultures often have more participatory, symbiotic cultural connections with the natural world than do literate cultures. While Egan outlines the effects literacy and subsequent rational forms of inquiry have had on our consciousness[118] in the Western world, he does not explicitly address the possible ecological implications of the dominant paradigm.[119] Abram (1996) does. His discussion focuses on the impact of literacy on ecological understanding.

Abram (1996) outlines the impact of the phonetic alphabet on our sense of relationship and participation with the Earth. He describes the intimate relationship in oral cultures of people, land, and language: the "lived affinity between language and the land" (Abram, 1996, p. 173). "Language...is inseparable from song and story, and the songs and stories, in turn, are inseparable from the shapes and features of the land" (Abram, 1996, p. 172).

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[118] Egan's notion of "understanding" may be compared here with consciousness insofar as the "understanding" we have of the world (whether, Somatic, Mythic, Romantic, Philosophic or Ironic) shapes the kind of world we perceive. It is, in this way, akin to the notion of consciousness.

[119] Abram's (1996) work highlights the ecological consequences of the historical development of literacy. While the impact of literacy on human consciousness is central to Egan's (1997) cultural recapitulation theory and he does acknowledge the transformation of the human-nature relationship that accompanies the development of written language, this is not a central concern in his work.

Language comes from and reflects the land, tying up personal and cultural identity with the natural places in which one lives:

> If we listen...to the sounds of an oral language—to the rhythms, tones, and inflections that play through the speech of an oral culture—we will likely find that these elements are attuned, in multiple and subtle ways, to the contour and scale of the local landscape, to the depth of its valleys or the open stretch of its distances, to the visual rhythms of the local topography. (Abram, 1996, p. 140)

What Abram (1996) emphasizes is an additional dimension of oral language's "participatory" nature. That is to say, how language also connects people with place. In oral cultures, the act of speaking connects people emotionally with the places they are speaking about, and with the people they are speaking to.

Abram's (1996) central argument is that in highly literate cultures we participate with the phonetic alphabet rather than with the natural world around us: "it is only when a culture shifts its participation to these printed letters that the stones fall silent" (p. 131). Rather than participating directly with the Earth, using the body's tools or employing the tools of oral language that resonate with the body, the modern foci of participation are the phonetic alphabet and the written word. Abram's work is a call to return to a more intimate, engaged relationship with the natural world. In the context of this thesis, Abram's work leads me to consider how it may be possible to nurture this sense of participation with both natural and cultural worlds that oral language provides, through the engagement of the cognitive tools of Somatic and Mythic understanding.

To briefly recap, then, Imaginative Education clarifies the consciousness-shaping power of language. It highlights how our use of language shapes our

consciousness in the same way it historically shaped (and continues to shape) our culture. This perspective aligns with Ecological Education's concern with the power of culture, and language in particular, in shaping human-world relationships and how we make sense of them. While Abram (1996), Bowers (1995, 2003) and Evernden (1992, 1993) are clearly writing from a different perspective and for a different purpose than Egan (1997, 2005), they all acknowledge the role of culture in the sense we make of the world. The arguments are not so different after all. Imaginative Education represents a useful foundation from which to investigate how language influences what we perceive around us and how we make sense of it. It may also serve as a basis to investigate further the possibilities of how language may shape ecological understanding.

Compatibility: Preserving the Cognitive Tools of Somatic and Mythic Understanding

Imaginative Education aims to preserve as many cognitive tools as possible in our intellectual toolkits.[120] In Egan's (1997) words, "The educational task is to make languaged understanding as rich as possible while losing as little as possible of the 'oneness with nature' that is our birthright as animals" (p. 67). Our "languaged" understanding of the world involves "some loss of the instinctive, vivid, intimately participatory involvement with the natural world that characterizes our fellow mammals' understanding" (p. 67). Somatic

[120] Implicit in the idea of preservation is development. In other words, we not only want to keep these tools available for use or "preserve" them in our toolkits, but we also want to maintain and even enhance our ability to use them to make sense of the world.

understanding adds, thus, a valuable dimension to how we understand our experiences.

Similarly, Mythic tools of oral language may enrich more rational kinds of understanding. While we may gain clarity of understanding and expression through literacy and the ability to manipulate linguistic abstractions, we also lose proximity to a sophisticated use of other ways of understanding. In Imaginative Education, Philosophic and Ironic understanding do not represent a break from, as much as growth out of, Mythic understanding. The emotional and imaginative dimensions of Egan's framework reunite Mythic and Philosophic modes of thinking that have historically been polarized; a polarization that, in Egan's view (1992, 1997, 2005, 2006), misrepresents how human beings think. By preserving (and developing) as many cognitive tools as possible through the development of all five kinds of understanding, Imaginative Education aims to remedy the potentially detrimental effects a distancing from the affective and imaginative features of Somatic and Mythic understanding can have on how we make sense of the world, as literate, theoretical thinkers.

This focus on preserving and developing an array of cognitive tools supports the goals of Ecological Education. Bowers (2003) suggests that in an era of ecological uncertainty, the primary question shaping educational reform should be "what do we want to conserve?" (p. 166).[121] He suggests that we are losing the valuable insights tradition can offer us about how to cultivate

[121] Notions of "preservation" and "conservation" have different meanings in the field of ecology. In this discussion I use "preservation" and "conservation" interchangeably to refer generally to a sense of nurturance through pedagogical theory and practice.

sustainable human-world relationships (1997, 2003).[122] Bowers asserts that education should help students "distinguish the cultural gains and losses connected with the introduction of new technologies as well as distinguishing the cultural gains and the losses of older ones" (2003, p. 169). The parallel with Imaginative Education is clear. Attention is paid to what is gained and lost as one uses different forms of language and makes sense of the world in different ways. This thesis explores in particular whether preserving the kinds of understanding that support a sense of "oneness" in the world typical of oral cultures, may broaden the kind of sense we can make of the world as literate individuals to more centrally include the human-nature connection.

Compatibility: Cultural Inclusion

Fettes (2007b) notes how Imaginative Education "is remarkably hospitable toward alternative cultural histories and modes of thought" (p. 134). He describes the diversity of perspectives Imaginative Education allows:

> Egan's work implies that different kinds of understanding jostle for primacy in the worlds of the classroom, school, and community. Rather than privileging one set of these above all others, his educational scheme enjoins us to treat them all with respect—while nonetheless seeking to develop them further, to draw out their potential for deeper insight into ourselves and our world. (Fettes, 2007b, p. 135)

LUCID (Learning for Understanding through Culturally Inclusive Imaginative Development) is a project investigating whether Imaginative Education, "in

[122] Bowers (1997) argues that the "high-status" form of knowledge that our current educational systems value contributes to consumerism and ecologically destructive economic practices. He suggests "low-status" knowledge that focuses on intergenerational knowledge, small-scale technology and community development, can help support an ecologically sustainable worldview.

conjunction with other forms of support already in place, can produce significant gains for Aboriginal learners when it is used to structure teaching and learning in mainstream classrooms" (The Imaginative Education Research Group, 2008).[123] In LUCID, "cultural inclusion" refers to efforts to level the playing field and make schools equally welcoming places for all children (The Imaginative Education Research Group, 2008). Fettes (2006), project leader for LUCID and co-director of the Imaginative Education Research Group, considers Imaginative Education "a particularly promising model for improving the experiences and outcomes of schooling for Aboriginal students" (p. 2). This is due, in part, to the way in which Imaginative Education draws on the cultural context of the learners.[124] Fettes (2006) identifies "a distinctive model of culturally inclusive imaginative education...tailored to the needs of teachers in predominantly Aboriginal communities" emerging from the LUCID project (p. 3).[125] Moreover, Fettes (2006) notes that while Egan's work draws largely on Western history (particularly the Greeks), Imaginative Education's "emphasis on the cultural roots of understanding resonates with traditional Aboriginal thought" (p.3):

> Unlike many modern educators, Egan regards oral traditions as a great intellectual and cultural achievement to be cultivated side-by-side with the literate and academic traditions of modernity. He also differs from both conservative and radical educators in advocating an integrative mode of understanding, termed Ironic, that both

[123] LUCID is funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) under its Community-University Research Alliances (CURA) Program. The project began in January 2004 and is funded until December 2008. (For more information see the Imaginative Education Research Group website: www.ierg.net)

[124] Imaginative Education builds on the notion that there are similarities in the way human beings across cultures make sense of the world (Pinker, 1994). From this perspective, differences in the kinds of thinking one finds in the world are due not, thus, to genetic differences as much as to the tools employed to make sense (Egan, 1997).

[125] See Fettes (2008) for discussion of how Imaginative Education may shape science education. Fettes draws on examples from the LUCID project.

> celebrates and revitalizes these diverse modes of thought. In a world where local communities are increasingly bound into global processes, Egan offers a vision of education that can be local and global at one and the same time. (Fettes, 2006, p. 3)

What Imaginative Education offers, thus, is a pedagogical model in which diverse perspectives are not only welcomed but are also required. Diversity becomes a part of the curriculum as teaching is shaped around the cultural tools children use to make sense of the world, tools that they acquire as they learn language and as they take part in the daily activities of different cultural contexts.

In Ecological Education, the notion of connecting students to their natural places and local communities is a central feature (Caduto, 1998; Elder, 1998; Smith and Williams, 1999; Sobel, 1996, 2001). Based on the initial findings of the LUCID project it seems that Imaginative Education is a particularly useful model for engaging students in their local contexts and for then bringing features of these cultural contexts into the learning process.

This discussion of some of the compatibilities between Imaginative Education and Ecological Education has aimed to show that Imaginative Education represents a useful model for Ecological Education. Not only is Imaginative Education centrally concerned with employing cognitive tools that engage students' emotions and imaginations and, in this way, can make learning meaningful and effective, but it also critiques current approaches to schooling, focuses on the influence of language on human understanding, and recognizes the importance of preserving features of Somatic and Mythic understanding. These overlapping features of Imaginative Education and Ecological Education are accompanied by the specific contributions that Imaginative Education has to

offer the field of Ecological Education. Imaginative Education has the potential to contribute theoretical and practical support to Ecological Education.

Contribution: A Discourse for Understanding

Imaginative Education offers theoretical support to Ecological Education in the form of a discourse for understanding the different ways students make sense of their relationship to nature. Imaginative Education facilitates, thus, deeper understanding of students' ecological understanding. The kinds of understandings around which Imaginative Education is shaped describe the distinct ways in which students understand the world in general. They also describe how students are making sense of ecological concepts and in what ways these topics connect to students' emotions and imaginations. Imaginative Education sheds light on the dynamic nature of ecological understanding. Instead of conceiving of ecological understanding as a static concept that may be developed in ways appropriate for all students, Imaginative Education confirms that students make sense of the world and of their relationship to it differently as they grow.

It was also argued previously that the overall goals of Ecological Education are vague, due in part to the use of multiple terms in the field, but also to the lack of a clear description of what these terms have in common. In addition, there is currently no theoretical support that may deepen comprehension around how students' ecological understanding develops. By describing the changing emotional and imaginative nature of students' ecological understandings,

Imaginative Education offers this needed support and adds clarity to the goals of Ecological Education.

Contribution: A Framework for Teaching

Imaginative Education can offer Ecological Education frameworks for lesson planning that remedy two current weaknesses. First, Imaginative Education can provide pedagogical frameworks based on a dynamic conception of ecological understanding and, second, it can provide pedagogical frameworks that align teaching practices with the overall goals of Ecological Education.[126]

Ecological Education does not currently have a pedagogical framework based on a dynamic understanding of how students' relationships with nature develop. Without theoretical means to differentiate how students understand ecologically, there is a danger that teaching practices aimed at developing ecological understanding will be mismatched with the students they strive to engage in learning. If we know how students are emotionally and imaginatively engaged at different times in their lives, we may teach in ways that more effectively draw out the emotional significance of all topics.

It was argued previously that ecological understanding has an emotional and imaginative core. Teaching according to the principles of Imaginative Education, in ways that employ the cognitive tools students use to make sense of the world, is more meaningful to students because it engages their emotions and nurtures the emotional connections they are forming with what they are learning

[126] Chapter Four in this thesis outlines how Imaginative Education frameworks may be revised to address the specific features of Ecological Education.

and experiencing. Emotional and imaginative engagement can become a central part of learning.

So how can Imaginative Education guide Ecological Education teachers in preparing lessons that will emotionally and imaginatively engage their students? Imaginative Education suggests that children with Mythic understanding will be most emotionally and imaginatively engaged in learning if teaching draws out the inherent wonder in the topic. Imaginative Education also illustrates that students with Mythic understanding may initially grasp concepts in terms of abstract binary oppositions and will be engaged in story form. We might begin teaching about plant and animal kingdoms at the grade 2 or 3 level by looking at what is wonderful about plants and animals. Perhaps one could consider how all life depends on plants and, more specifically, on what plants do (photosynthesis) —that our lives are, in a sense, in the hands (or should I say limbs?) of the tree next to the classroom window. We could shape our teaching about plant and animal kingdoms in story-form around the notion of separation and connection. [127] So, for example, we could show how plant and animal kingdoms are very distinct and yet also closely interconnected. We could encourage students to figure out how these seemingly separate entities are actually interconnected. One could discuss the mutual invasions of animals into the plant kingdom (once eaten and digested, plants return to the Earth through faeces; decomposition processes form soil for plant growth; animals transfer plant seeds, helping to pollinate in

[127] While we may use these abstract oppositions to shape initial introductions to topics, it is important that the stories, images and metaphors we use help students to mediate these oppositions. Failing to mediate these oppositions leaves out the subtleties and complexities that characterize the world. It paints the world simplistically in black and white rather than in many shades of grey.

some cases etc.) and plants into the animal kingdoms (where would the animals be—could they be—without plants to provide them with food and shelter?). Images of webs, cycles (for example of life, of water, or of air), or networks may draw out the connections between plants, animals and the Earth. To support ecological thinking further, our teaching will also engage students in ways that help them feel these interconnections. For example, students could be encouraged to re-enact the kinds of interconnections they identify between plants, animals and the Earth as a whole. There are many tangible ways to illustrate to students the interconnectedness of things that can engage students' emotions and imaginations.[128]

Imaginative Education reveals that teaching for ecological understanding for students who have a Romantic understanding of the world should support them in grasping the scope of reality, and offer them means to imaginatively transcend their own situation. So teaching may begin by highlighting the extremes and limits of the natural world or of human-world interaction. One may consider the amazing forces of nature, the survival stories of people who have braved Earth's forces, or the patterns of Earth (from the smallest out to the greatest) that connect major ecosystems. Students will also be emotionally and imaginatively engaged by heroic or transcendent qualities of the natural world,

[128] Traina (1995c) suggests focusing on things like how the air we breathe, the water we drink and the food we eat never disappears; it circulates between us and the Earth. Was the water you drank this morning once inside the belly of a dinosaur? Is the dinner you ate last night eventually going to contribute to the growing of more food or towards your swimming in the sea? We are held to the Earth with the force of gravity, we get our clothes and shelters from products stemming from the plant and animals kingdoms.

such as the mind-boggling complexity of a single cell or the immense role the molecule plays in the material existence of all things.

Chapters Four and Five describe in detail an imaginative approach to Ecological Education and provide demonstrations of how Imaginative Ecological Education might look in practice. What this section has aimed to show is that the pedagogical frameworks of Imaginative Education can support teaching for ecological understanding by shaping teaching around the unique emotional and imaginative lives of students, and by making engagement with these dimensions a routine part of learning. Doing so can more effectively reach the emotional and imaginative core of ecological understanding and can make all teaching both imaginative and ecological.

Contribution: Acknowledging the Educational Importance of the Body, Emotion, and Imagination

Imaginative Education argues for the recognition of the educational value of the body, emotion and imagination in learning. While their possible (and potentially valuable) educational roles lie latent in the Ecological Education literature, they have not been translated into an approach to teaching that routinely addresses them in practice. Imaginative Education offers an approach that brings the body, emotion and imagination to the core of learning and provides theoretical support for so doing.

Ecological Education is interested in the role of the body in cultivating a sense of connection to the Earth. That the body has an important role to play in cultivating ecological understanding is not a new idea. Indeed, in Ecological

Education students often get outside; they work in gardens, they dig in swamps, they get muddy. Egan's work lends support to the argument that the body plays a significant role in learning generally and, as it applies to this thesis, to ecological understanding in particular. What Imaginative Education's description of Somatic understanding brings to light, however, is that there is more to engaging the body in learning then simply *doing* things. Simply being active out of doors may not, thus, achieve the kind of Somatic understanding that supports ecological understanding. Imaginative Education lends theoretical support to investigating the role of the body and how to engage it more thoroughly in Ecological Education.

Imaginative Education also places emotion and imagination at the heart of education. In so doing, Imaginative Education makes emotional and imaginative engagement a valid educational goal, rather than the stuff of superfluous activities fit only for Friday afternoons. The theoretical and practical support Imaginative Education offers may allow emotional and imaginative engagement to become a routine part of Ecological Education. The potential for teaching in ecological and imaginative ways and for developing students' overall sense of ecological understanding will likely increase by bringing emotional and imaginative engagement to a position of educational importance in the Ecological Education classroom.

To summarize, then, in addition to the compatibilities between Imaginative and Ecological Education outlined previously in this chapter, Imaginative Education has the potential to make significant contributions to

Ecological Education. It provides theoretical support to Ecological Education by outlining the key features of our emotional (and imaginative) lives as we become fluent in different forms of language. It offers a discourse for describing ecological understanding, provides practical support for its development in the form of a pedagogical framework that describes specific ways in which features of students' emotional and imaginative lives can be accessed educationally, and acknowledges the central roles played by the body, emotion and imagination in learning. While incompatibilities between Imaginative Education and Ecological do exist and do require acknowledgement and consideration, they do not preclude a union of these educational approaches. In effect, Imaginative Education offers Ecological Education significant possibilities for developing ecological understanding. The model for Imaginative Ecological Education outlined in Chapter Four reveals an approach to teaching that can bring the body, emotion and imagination to the core of Ecological Education.

Conclusion

In order to develop students' ability to understand the world ecologically and support their formation of sustainable relationships with the Earth, it is important to expose them from a young age to curricula that increase their sense of embeddedness within the world. Developing relationships with the natural world requires, moreover, the ability to feel, in multiple ways, one's interconnectedness within the world. Teaching for ecological understanding according to the principles of Imaginative Education affords students the opportunity to somatically, emotionally and imaginatively experience the world

in all their learning. Personal relationships with nature may be developed through learning across the curriculum. By using the principles of Imaginative Education—the importance of the body, emotion and imagination, cognitive tools, and kinds of understanding—in a reshaping of Ecological Education, a more imaginative and more ecological learning experience for all students may result.

CHAPTER FOUR:
EXPLORING IMAGINATIVE ECOLOGICAL EDUCATION

This chapter enters the as yet uncharted terrain of Imaginative Ecological Education. The principles of engaging the body, emotions, and imagination in learning that are central to Imaginative Education, are now applied to the context of Ecological Education and to the goal of developing ecological understanding. Educators practicing Imaginative Education will recognize landmarks of the terrain such as the use of cognitive tools and the discussion of Somatic, Mythic, Romantic, and Philosophic kinds of understanding. Similarly, Ecological Education educators will recognize the discussion of learning activities that enhance students' relational understanding of the world through the body's engagement in learning and an interest in developing students' relationships with the local natural context, or place, in which they live. What emerges is an educational approach for making all learning both imaginative and ecological.

In line with the structure of previous chapters, I discuss the purposes, principles, practices, and potential problems of Imaginative Ecological Education. This chapter does not reiterate how ecological principles can inform learning and teaching at a general level; this is well done in the field of Ecological Education (O'Sullivan and Taylor, 2004; Smith and Williams, 1999; Stone and

Barlow, 2005) and has been explored in Chapter Two.[129] My aim here is to outline how teachers may practice Imaginative Ecological Education; that is, how they may frequently engage their students somatically, emotionally and imaginatively in learning for ecological understanding. The content of this chapter adds to Ecological Education what I have previously argued may be missing and may be considered a pedagogical weakness: an imaginative and ecological framework for teaching that aligns the means and end of Ecological Education. Moreover, unlike conceptions of Ecological Education in which the content that is taught is specifically about the natural world, I propose a framework that can render any topic ecological. The brief examples provided throughout the chapter aim to show how Imaginative Ecological Education may result in an imaginative and ecological orientation to teaching any topic.[130] By infusing notions of relationship and engagement with nature throughout the three principles that shape this framework—Activeness, Feeling, and Place/Sense of Place—we may make Ecological Education more mainstream and, potentially, more effective in developing ecological understanding.

This chapter also introduces new cognitive tools to the imaginative ecological educator's toolkit for Mythic, Romantic, and Philosophic kinds of understanding. Place-making cognitive tools are introduced that help us to situate ourselves in the world. By chapter's end a conceptual map charting the

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[129] While the Imaginative Ecological Education framework outlined in this chapter may be used in any educational context, it will be most effective in nurturing and developing ecological understanding in contexts shaped around ecological principles of relationship, community, systems, change, and diversity.

[130] This chapter contains only brief examples. Chapter Five provides more detailed unit and lesson ideas shaped according to the Imaginative Ecological Education framework.

terrain of Imaginative Ecological Education is created; one that may be readily used by teachers interested in nurturing ecological understanding and in bringing imagination to the core of their practice. Unlike the kinds of Ecological Education activities described in Chapter Two that engage the body, emotion and imagination in learning *some* of the time—a positive result, most likely, of novel learning opportunities rather than deliberate consideration of students' imaginative lives—Imaginative Ecological Education shapes learning around the imaginative and emotional dimensions of students' lives and aims, thus, to engage the body, emotion and imagination in learning *all* of the time and in the teaching of *all* topics. As features of these two fields come together, new possibilities for Ecological Education emerge.

Purposes

The overall purposes of Imaginative Ecological Education are similar to those of Ecological Education. Imaginative Ecological Education aims to develop students' abilities to understand the world ecologically.[131] As discussed previously, understanding ecologically involves having a sense of one's interdependence with all life, and a concern for all inhabitants of the Earth. It represents a positioning of self within the world. Nurturing students' personal relationships with the natural and cultural contexts in which they live represents the foundation of an ecological stance. Imaginative Ecological Education puts a spin on this shared purpose however. It helps students celebrate the wonders of

[131] The goal in the Bioregional movement to understand and to live "as part, not apart" reflects the notion of understanding ecologically described in this thesis (Traina and Darley-Hill, 1995, p. xi).

the world by routinely[132] engaging the body, emotion and imagination in learning.

Imaginative Ecological Education builds on the understanding that human beings perceive, feel, and think together (Egan, 2005, p. 89). You may recall from Chapter Two that we are, in David Kresch's neat term, "perfinkers" (cited in Egan, 2005, p. 89). From this stance, effective teaching for the development of ecological understanding will pair thinking with sensory and emotional engagement. Imaginative Ecological Education aims to develop students' somatic, emotional and imaginative bonds with the natural world generally, and with specific places in particular, by teaching in ways that engage students as "perfinkers." The next sections consider the main components underlying this goal: the body, emotion and imagination[133], and context.

The Body

Somatic understanding, as described in Chapter Three, refers to how the body makes sense of the world.[134] The body's engagement and the understanding that emerges from the body's direct participation in nature underlie an ecological worldview. How the body participates in knowing and how the body relates to

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[132] The word "routinely" is used here in the sense of frequently or consistently.

[133] Emotion and imagination are, in my view, so closely intertwined that I pair them in this discussion. That said, I have, for the sake of clarity, separated out the body and context when these elements are also connected to emotion and imagination. My doing so should not be taken to mean that I consider the body to be somehow separate from emotion or imagination (in the sense of not engaged or involved as emotion or imagination are) or that the body, emotion and imagination are not interconnected as we make sense of our context.

[134] Egan (1997, 2005) notes that current forms of education generally tend to neglect somatic understanding. While it is common practice in Ecological Education to incorporate the body in learning through, for example, hands-on, place-based activities, this thesis argues that these kinds of activities may not adequately engage the body's tools for learning, and, thus, it may be possible to enhance somatic understanding by doing so.

nature are important features of understanding ecologically. We feel the interconnectedness of human and natural worlds at the level of the body. A sense of closeness with the natural world stems in part from one's somatic engagement with it. For example, encountering the world in ways that employ multiple senses, or that engage the body's sense of pattern or musicality, can support the formation of personal connections with nature. Imaginative Ecological Education will aim to drench students in the sights, sounds, tastes, smells and textures of their surroundings. The emotional and imaginative connections our students form with the natural world both grow out of and nurture these somatic roots. If we neglect the somatic toolkits our bodies are equipped with to make meaning, we may limit the degree to which we can encounter the world and the richness of the meaning we make of our experiences. Moreover, by ignoring our bodies in education we may neglect, in turn, the emotional and imaginative connections that can make learning more meaningful and, therefore, more effective.

Emotion and Imagination

Imaginative Ecological Education aims to cultivate in students a range of feelings for[135] nature. While love for nature and for places in particular is certainly a powerful emotional response that may support students' sense of care toward the Earth, there are many more, equal if not even more powerful

[135] I am not completely comfortable with the implicit sense of directionality within the expression "feelings *for* nature." While I am using this expression throughout the thesis, I wish to clarify that it may be more appropriate to describe human feelings "with" rather than "for" nature because the latter positions nature as subject rather than object and suggests a sense of reciprocity between human beings and nature. Describing human beings' feelings "with" nature better captures my belief in a living natural world of which human beings are part (Abram, 1996).

emotions underlying ecological understanding.[136] As Egan (2005) states, "Emotions come in many forms and endless degrees" (p. 89).[137] Wonder, awe, surprise, curiosity, delight, calm, compassion, and comfortable familiarity are examples of the kinds of feelings Imaginative Ecological Education seeks to nurture in students as they encounter the natural world.[138] As Naess (2002) notes, we want to evoke in students "enthusiasm for the creative power of nature. That something like life has arisen is a miracle" (p. 111). Helping students understand that they "live in a world of unsurpassed wonder, beauty, and possibility" captures the imaginative dimension of understanding the world ecologically (Glasser, 2002, p. xiv). The emotional stimulation that comes with the body's engagement can solidify the child's relationship with nature. It can help him or her feel immersed in the world and may stimulate what has been referred to previously as the ecological imagination.

Emotion and imagination must also be engaged in knowledge acquisition through other means. Because having emotional associations with the natural world is what makes understanding of human interdependence in nature meaningful, comprehension of ecological principles and processes also needs to be supported by emotional and imaginative engagements in learning.

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[136] Naess (2002) uses that the term "feeling" rather than emotion because, in his view, "emotion" too often portrays only very strong feelings.

[137] In the Imaginative Ecological Education classroom emotional response comes in many forms. While one may have a very powerful feeling about something being learned, this is not always the case nor is it even necessary. Feeling something about subject matter even in less breath-taking degrees than, say, intense fear or love, is a foray into imagination.

[138] Of course, there is also the very real possibility that students may have some negative emotional reactions to nature including sense of fear, repulsion, familiarity that breeds contempt, or confusion. These emotional response could then lead to a sense of disassociation towards nature at best and, at worst, animosity. Bringing more positive emotional associations such as wonder and awe to the fore may serve to counter these negative associations.

Imaginative Ecological Education brings imagination to the core of the student-nature relationship by addressing students' feelings towards the natural world as a central component of pedagogical practice.

Context

Imaginative Ecological Education builds also on the premise that personal relationships with nature most effectively develop in particular contexts when the body, emotions and imagination are engaged in the learning process. Place is the meaningful context in which emotional bonds with nature take hold in our hearts and minds. Understanding the contexts in which we live ecologically involves an awareness of the body's relation to its natural environment that may be achieved, in part, through enhanced sensory development. Similarly, understanding ecologically involves consideration of how one's body is engaged in the learning process in context, and how one's somatic understanding contributes to how and what one understands. Imaginative Ecological Education aims, thus, to bring the mind, body, emotion and imagination together in the contexts in which students live and learn. It aims to support students' development of a sense of place, what may be described as a sense of closeness with the natural world based on emotional connection and knowledge.

In summary, the development of ecological understanding rests on a triad. The body, emotion and imagination, and context come together in Imaginative Ecological Education to support and facilitate the development of ecological understanding. Three guiding principles support this goal: Activeness, Feeling, and Sense of Place. In line with Imaginative Education generally, a cognitive

tools approach to teaching supports the tripartite nature of the human being as perceiver, feeler and thinker.

Principles

The following discussion outlines how principles of Activeness, Feeling, and Place/Sense of Place may shape an imaginative approach to education for ecological understanding.[139] In Imaginative Ecological Education, the body, emotion, and imagination come together in a context and through practices characterized by patterns of relationship (partnership, systems, networks), change, diversity, and complexity.[140] The employment of cognitive tools in teaching, each with its own epistemological, emotional and psychological function, can maximize learning and help realize each guiding principle. This framework introduces some "new" cognitive tools that may support the development of students' sense of place or their emotional connection to and understanding of the natural context in which they live. These tools, which I have called *the sense of relation* (Somatic understanding), *emotional attachment to objects* (Mythic understanding), *creation of special places* (Romantic understanding), and *association with ideas* (Philosophic understanding), will be well-used by the imaginative ecological educator.

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[139] These principles are, of course, interconnected. They are discussed separately here for the sake of clarity.

[140] As outlined in Chapter Two, these four principles (relation, change, diversity and complexity) are by no means the only ecological principles. They are, however, four that most routinely emerge as shaping forces in the Ecological Education context. This chapter does not reiterate how these ecological principles can and do shape Ecological Education. This is done in Chapter Two. Rather, building from how this is already done in Ecological Education, I focus on practices that can more effectively engage the body, emotion and imagination in learning.

Engaging the Body: Activeness

Activeness is the principle of Imaginative Ecological Education that attends to the body's engagement in learning and, specifically, to the nurturance of Somatic understanding. Naess (2002) differentiates between being active and activeness. These are two different kinds of relationship in which one engages with nature:

> For me, closeness to Nature has unveiled a marked difference between being active in Nature through play and sport on the one hand and, on the other, experiencing Nature in a way that engages us completely as human beings. (p. 2)

Being active is characterized by movement of the body in activities such as play or sport. Naess (2002) describes it as an externally manifest relationship that has limited impact on our understanding of nature.[141]

Activeness, on the other hand, is an internal form of relationship and has the most potential impact on our understanding of nature. "To do a great many things is not enough; what is important is what we do and how it happens. It is those of our actions which affect our whole nature that I call activeness" (Naess, 2002, p. 76). Activeness, or what Naess calls being completely absorbed in one's situation, may on the surface appear like inactivity:

> From the outside one might not seem to be active, but as a person, one is completely absorbed. One's whole being is in reality activated in such circumstances, but outsiders do not necessarily perceive one to be in a state of activeness. (p. 3)

[141] Being active supports a kinaesthetic type of understanding whereas activeness is more in line with Egan's sense of somatic understanding.

While it may be achieved through physical activity, activeness may be better characterized as "lingering in silence" or as "pause" (Naess, 2002, p. 2-3). Our somatic engagement in the world, the attunement of our senses with our surroundings, contributes to activeness. There is an intimacy with our environment that characterizes Somatic understanding; it is a kind of understanding, in Cobb's (1977) words, that emerges from "the direct organic participation of the perceiving nervous system in systems of nature" (p. 33). One is employing all of the senses to intently observe one's surroundings.[142] This is activeness.

Naess's distinction between activity and activeness is useful because all too often, or so it seems, the involvement of the body in learning is of the "being active" rather than activeness variety. Simply because students are actively walking in the forest or are digging soil in a garden does not mean that they are necessarily somatically engaged in a way that can, as Naess puts it, support closeness with nature. As Blenkinsop (2008) remarks:

> 'Getting the body' involved [in learning] means more than just having bodies do things. It is about making content and the world available in such a way that the body and its particular tools are engaged, along with the mind, in the process of making sense. (p. 140)

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[142] Fettes (2007a) describes "intent observation (all senses)" as a somatic TIE (tool of imaginative engagement or cognitive tool) the body employs to make sense of or "grasp" detail. (See Appendix A). Activeness may be described, in part, as an all-senses type of engagement (what Fettes calls "intent observation"). Indeed, this may be the most straightforward way to describe what activeness is and how we might engage it in our teaching. However, associating activeness with one feature or dimension of how the body makes sense of the world (through the senses) is not completely accurate either. Activeness may be better described as a state in which any or all of the body's tools are afforded an opportunity to contribute to the sense one makes of a situation. Activeness represents, thus, a concerted effort to focus on and employ somatic tools including, for example, the body's senses of rhythm and musicality in meaning-making.

The Activeness principle focuses on developing the body's tools for making sense of experience. It supports consideration of such activities as part of the curriculum and as legitimate learning activities.

In Imaginative Ecological Education, the principle of Activeness or being absorbed in the moment asks us to stop—to pause, as part of learning, on a more regular basis. When we are faced with a seemingly insurmountable curricular load and time constraints, simply pausing more frequently, as part of the learning process, may not be considered a valuable (or appropriate) educational activity. And yet, by pausing and thereby enabling the body to encounter the world, we open up the possibility to perceive something new, something unfamiliar, that we may not otherwise notice in our busy lives. Pausing allows possibilities for "moments of surprise discovery" when the familiar suddenly becomes strange (Blenkinsop, 2006, p. 160). Perceptual surprises can emerge from our direct experiences in a state of activeness that do not necessarily align with what we previously thought to be true (Blenkinsop, 2006). We begin to understand the limits of what we know about the world, and what we can imagine in terms of alternative possibilities.

Teachers of Imaginative Ecological Education will have to overcome possible challenges to fulfilling this principle. They may be met with resistance, not only by parents who may consider such activity a waste of time rather than an educational activity, but also by students themselves who, growing up in a world of multi-media and virtual realities, television and video games, consider silence and pause to be nothing but boring. They will, indeed, have to reshape the

educational atmosphere, helping students to see that a state of activeness can be infinitely more engaging than even the most appealing video game.

The tools of Somatic understanding will be employed on a regular basis to support activeness. So, for example, learning about nature will include developing the senses, focussing on rhythm and pattern, and drawing on the body's sense of the musical. Tools from cognitive toolkits other than the somatic can also support activeness. For example, story and mental imagery can evoke the body's senses and can call upon somatic awareness (Egan, 1992).

Engaging Emotion and Imagination: Feeling

Feeling something about what is being learned and imagining possibilities based on these emotional connections are principles that come directly from Imaginative Education. This thesis is interested in developing students' feelings for nature and, at the same time, bringing into focus what I have called ecological imagination, a way of thinking and feeling stemming from students' emotional engagement with the natural world. Understanding ecologically requires this emotional and imaginative focus. Indeed, what children come to *feel* about nature may be as important for understanding ecologically as what they know

about it.[143] Carson (1965) reflects on this in her famous essay *The Sense of Wonder*:

> I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to *know* as to *feel*. If facts are the seeds that produce knowledge and wisdom, then the emotions and the impression of the sense are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused—a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love—then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning. It is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate. (p. 45)

What Carson (1965) is arguing is that feeling is what inspires the child's sense of wonder at the world. Evoking positive feelings such as surprise, joy, care, awe, or comfort is, thus, an invaluable part of Imaginative Ecological Education.

Egan (1988b) argues that the sense of wonder is a cognitive tool that enables us to see the particular uniqueness of any aspect of the world. Wonder plays a central role in Imaginative Ecological Education because it allows us to recognize the wonderful in all aspects of the world. It allows us to see the wonderful in even the most unexpected, ordinary contexts and, thus, *feel* something for these. A sense of wonder leads us to ask why. Considering why

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[143] Carson's (1965) emphasis on emotion being potentially more important than knowledge may appear anti-intellectual. This is not the argument I am making. It is Carson's (1965) acknowledgement of the importance of students' emotional connections with nature to their overall understanding of the world that I draw on here. Indeed, a central premise of Imaginative Education is that students need breadth and depth of knowledge in order to be imaginative. Emotion and imagination and knowledge work together in the learning process. I aim to illustrate that emotional engagement with nature cannot be considered a supplemental or optional part of Imaginative Ecological Education. It, like knowledge, is a fundamental requirement of Imaginative Ecological Education.

can lead us to new possibilities for how we understand reality, and, in particular, how we position ourselves in relation to nature.

Evernden (1993) suggests that a sense of wonder is that imaginative spark that leads us off the conceptual map we have been trained to use. One's sense of wonder is the ability to consider alternative possibilities, and can support encountering the world differently and making sense of these encounters differently.[144] It is possible that a sense of wonder emerging from our direct bodily encounters with the world and the emotional connections we form, may help us to think and to feel from a position of being immersed in the natural world. This, in my view, represents the potential broadening of imagination that may be considered ecological imagination.

You may recall from Chapter One that I conceptualize ecological imagination in terms of relationships, connections and context. I conceive of ecological imagination as flexibility of mind oriented to interdependence and pattern, and to the diversity and complexity that characterize natural and human-world relationships. Because ecological imagination may be engaged and

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[144] Evernden's (1992) argument is based on the premise that our current cultural context blinds us to other possibilities for understanding and relating to nature. He conceptualizes wonder as that which goes beyond "the *need* for explanation": "In wonder we accept the presence of something entirely distinct and self-possessed" (p. 118). One could argue, of course, that the cultural context is all encompassing, so that anything that evokes the sense of wonder is culturally defined. How one expresses what one feels is culturally mediated through language. When one's feeling or experiences become understanding then we enter a culturally mediated world. This line of argumentation means that it is impossible to escape one's cultural context. The somatic dimension of understanding ecologically may be a means to, at least partially, address this critique. Yes, while culture will shape our direct encounters with nature as language-using, culturally embedded people, our somatic experience is possibly the most un-mediated means to experience nature and, perhaps, to understand it. The sense of wonder that may emerge from our sensory encounters with nature may lead us off the map toward alternative experiences of the world. These experiences may reinforce an ecological kind of understanding that our cultural context currently does not.

developed through the body's understanding of relationship and, in particular, through an understanding of one's natural context, I pair this interest in emotional and imaginative engagement (what I call Feeling) with Activeness – (the body's understanding of the natural world I have described above) and Place/Sense of Place (the contextual focus I describe next). Imaginative Ecological Education builds on the premise that ecological imagination may develop through activities in which one's body, emotions and imagination are engaged in the natural world.

Students may come to understand and imagine the concept of community more ecologically, for example, if they are provided opportunities to explore it in multiple ways. The concept of community may come to have a different meaning if students get down on their hands and knees and observe the behaviour of ants working to procure food for their colony. They may attempt to imitate the movement or "dance" of ants. They may study in more depth the rather ingenious way ants find the shortest distance to where they are going. How do the ants communicate with other ants? Students may be asked to adopt a tree. They may adopt, too, its inhabitants. Who lives there? What is this particular creature—bird, spider, slug or whatever—doing? Where is it going? How might this creature understand community? What does this tree smell like to an ant? What does it feel like? What natural odours do students detect? They may feel leaves, branches, or bark in different ways, such as with their forearms rather than their fingers. How does it feel different to the forearm? How might a creature feel? By taking the notion of community into the realm of nature and by having students study the concept in sensory ways, ways that may help them take

on a different point of view, they may feel something like joy or surprise or wonder at the actual extent of the notion of community. They may begin to feel as though they are part of a larger community than just a human one.

To ensure students' emotional and imaginative engagement, teachers will employ the cognitive tools in either the Mythic or Romantic toolkit—whatever is most suitable for the age group of students they are teaching. So for example, teachers of students in primary and elementary school will use story, abstract binary oppositions, metaphor, rhyme, rhythm and pattern, and the recognition of mystery, among other tools, in their teaching.[145] Teachers in middle and high school will focus on narrative structuring, the extremes of experience and limits of reality, the heroic, students' sense of reality and, of course, the sense of wonder, among other tools, in order to ensure the emotional engagement of their students. With attention to the Activeness principle students of all ages will have opportunities to employ the tools of Somatic understanding as a means to further engage emotion and imagination in learning. Moreover, we may stimulate students' emotional and imaginative engagement in learning and, in particular, ecological imagination by employing the cognitive tools with which they develop a sense of place.

Engaging With Context: Place and Sense of Place

Engaging with context, the third principle of Imaginative Ecological Education, is concerned with the dual notions of *place* and *sense of place*.

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[145] Egan (1997) considers the sense of mystery as a sort of precursor to the sense of wonder. By locating the sense of wonder tool in the Romantic toolkit it seems that the sense of wonder is somehow localized with this kind of understanding. My sense is that wonder and mystery go together. Children of all ages have a sense of mystery that is tied up with a sense of wonder.

Following a brief introduction to how these ideas are conceptualized in various disciplines, I locate my use of these terms in an ecological perspective and describe how, within Imaginative Ecological Education, we may enhance students' sense of place or sense of relationship with the natural world in which they live. What may be gained from a brief overview of how notions of place and sense of place are understood across disciplines is an understanding of their universality; everyone everywhere ascribes meaning to the spaces of their daily lives. These meanings help us to situate ourselves in the world and to feel a sense of belonging. I will describe certain cognitive tools that human beings everywhere employ to build a sense of place.[146] In the context of this project, however, it is necessary to think ecologically about these concepts. Because understandings of place and sense of place may not necessarily focus on the natural context, I situate my use of these terms in an ecological perspective and describe how place-making cognitive tools we are afforded by our culture may be used in Imaginative Ecological Education to connect with the local natural context. Underlying ecological understanding is sense of place that has, at its heart, an understanding of, and emotional connection to, nature.

Defining Place and Sense of Place

Place is a multidisciplinary concept that is being researched in a diversity of fields including sociology, psychology, architecture, leisure studies, literary theory, education, geography, philosophy and cultural studies (Ardoin, 2006;

[146] While sense of place may be understood in a general sense as a "tool" that helps human beings feel a sense of belonging, it is not in itself a *cognitive* tool. Sense of place develops as human beings engage in activities that help them situate themselves in the world. These different activities are the cognitive tools, or what I call place-making cognitive tools, that build sense of place.

Gruenewald, 2003a, 2003b).[147] In a general sense, places are "centres of experience" (Gruenewald, 2003a, p. 625). They are the meaningful contexts of human perception of, and participation in, the world (Tuan, 1971, 1977). Places are culturally defined, shaped by our experiences and the cultural tools we employ to make sense of our experiences.[148] So, as we encounter the world around us, observing and participating in the activities of daily cultural life and as we make sense of our experiences, the spaces where we are, the contexts we find ourselves in, take on meaning (Seamon and Mugerauer, 2000).

If places are the meaningful contexts in which we live our lives, then *sense of place* refers to how we understand and relate to these contexts. Ardoin (2006) suggests that across disciplines, sense of place is used to describe "the complex cognitive, affective, and evaluative relationships people develop with social and ecological communities through a variety of mechanisms" (Ardoin, 2006, p. 118). Sense of place is made up of interconnected emotional and intellectual dimensions; it takes shape around what we feel about place and what we know

[147] Detailed examination of research on the notion of place exceeds the scope of this thesis. This section focuses on place in the context of Imaginative Ecological Education only.

[148] Gruenewald (2003a) emphasizes that places are once and always human-made—they are "never precultural or presocial" (p. 626). From an ecological perspective this view may seem at first to negate the intrinsic value of nature. Gruenewald's point is, however, that the meanings ascribed to places come from people who are influenced by culture. Gruenewald argues that saying all places are cultural constructions "does not negate the idea that places such as ecosystems, oak trees, and wilderness have other qualities that transcend the often place-destructive purposes of human beings. It simply allows that human beings are responsible for place-making" (Gruenewald, 2003a, p. 626). The natural world contributes to what meaning is made, but that meaning is human.

about place. Sense of place involves, thus, both a personal relationship with one's context as well as a certain depth of knowledge about it.[149]

Literature in Bioregionalism and in Place-Based Education links *place* and *sense of place* to nature. It is in this more Earth-centred understanding of place and sense of place that this project is situated. Rather than thinking of place or sense of place in terms of the social or cultural context alone (although this does play a role), nature is brought into focus. Place refers to the natural context in which one lives.[150] Similarly, sense of place:

> ...involves a sense of closeness with the elements, geological structure, animals, plants, all natural beings in a given local, natural place. It is a feeling of community with people in the context of a larger family which includes all the natural beings of a region. (Traina, 1995c, p. 5)

Affective and cognitive dimensions weave together to form a sense of place that involves feeling close to nature and knowing about the soil underfoot, the flora,

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[149] What exactly contributes to human connection with places and the development of sense of place is complex not only in terms of the personal, social and cultural factors involved, but also in the fact that "place" or the environment to which attachment forms can be natural or built, social or symbolic. Ardoin (2006) argues that sense of place is not only a product of "rootedness" or great length of time spent in one location, but also develops in the modern, mobile societies. She notes also that the electronic world of virtual places is another dimension of place receiving increasing attention. Just how much time may be required to develop a sense of place, and how much one needs to know, has led to some debate around whether sense of place can develop in all contexts. This will be discussed at some length later in this chapter.

[150] A critique of Place-Based Education is that it is parochial. An ecological understanding of place is not a parochial concept, however, as place is relational, linked to ever larger (and smaller) places. With an ecological view of place, one inevitably thinks "globally" when one thinks locally.

fauna, sources of water, and rock structures.[151] Sense of place is composed of both emotional connection to nature and knowledge about it.

Across disciplines, sense of place is considered significant on multiple levels including the physiological, psychological, socio-cultural, and pedagogical (Ardoin, 2006). At a physiological level, sense of place can support human survival. With knowledge of place, one is much more able to procure what one needs to survive. Moreover, with an emotional connection to one's place, it is much more likely one will protect it, making long-term survival more likely.[152] This is, in part, the argument within Place-Based Education and Bioregionalism for developing a sense of place. A personal sense of connection with the natural world is thought to provide a feeling of being "at home" that supports psychological wellbeing (Orr, 2005; Roszak, Gomes, and Kanner, 1995; Traina, 1995a, 1995b, 1995c). In addition, it is thought that if we come to feel personally connected to the natural world we will be more likely to protect it (Ardoin, 2003).[153] Sobel's (1996) work on how to shape Ecological Education around the

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[151] In the Bioregional movement, one's place is often equated with one's bioregion (Traina, 1995c). This is a culturally and naturally defined area: "A bioregion is an area without hard boundaries but which can be distinguished by its many natural features including the flora, fauna, soil, climate, geology, and drainage area. A critical component of each bioregion is the human culture which has developed within and is integral to that area" (p. 1). The size or extent of the bioregion or place is influenced by the individual and collective sense of identification: "The final boundaries are determined by the feelings of the people living there 'in-place,' that is, who are living there as 'natives,' as people consciously living in such a way 'that will enrich the life of that place, restore its life-supporting systems, and establish an ecologically and socially sustainable pattern of existence within it'" (Berg and Dasmann cited in Traina, 1995c, p. 5). Because the local natural and human community is understood as an interconnected whole, one's sense of place also includes knowledge of the local community, its plans, history, and traditions.

[152] Beyond biological survival, it is the sense of place that helps us determine what is, and is not, acceptable behaviour in our social contexts. One could say that our sense of place helps us to "survive" in our cultural contexts as much as our physical contexts.

[153] It is also suggested that we are born with an affinity for nature, a desire to relate to the natural world that contributes to this emotional connection (Orr, 1992, 1994; Wilson, 1984).

developmental needs of the child suggests we begin with place for it is here, not, he argues, in information about global warming or scary stories about wildlife extinction, that interest in caring for the Earth can begin[154]:

> What's important is that children have an opportunity to bond with the natural world, to learn to love it and feel comfortable in it, before being asked to heal its wounds...Our problem [in Ecological Education] is that we are trying to invoke knowledge, and responsibility, before we have allowed a loving relationship to flourish. (Sobel, 1996, p. 10)

We see, thus, in Ecological Education literature, an understanding of the value of place not only for the knowledge one gains of context but, perhaps more importantly, for the emotional bond that can form. It is this emotional bond that may inspire people to live sustainably.

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[154] Sobel (1996, 1999) argues that approaches to Environmental Education that begin by introducing global environmental crises or problems involving "exotic" species (extinction of elephants is an example he uses) are ineffective because they do not match the developmental stage of the child. He also argues that these approaches are dangerous insofar as they can create a sense of dislocation for the child; the child may come to think of environmental problems as something "far away" rather than in his or her own backyard or community. He suggests a "near-to-far" curriculum beginning in place is more appropriate for the developmental needs of children. He outlines a three-staged curriculum that starts by nurturing a sense of empathy towards nature then affords children opportunities to explore place and, finally, introduces opportunities for social action. It is this kind of curriculum that can, in Sobel's view, support the establishment of strong emotional bonds with place and that will, ultimately, support sustainable action in the world. Egan (1997, 2002, 2005) strongly disagrees with the kind of "near-to-far" approach to education Sobel (1996, 1999) describes. He considers the widespread educational belief that we need to begin with what students know, to be seriously wrong and, in effect, a central cause of student boredom. He disagrees largely with the assumption underlying this belief that young children are not abstract thinkers. Rather, he suggests the young child uses his or her ability to think in terms of abstractions to gain initial understanding of a topic (abstract binary oppositions tool). My interest in place as part of Ecological Education, as articulated above, has to do in part with supporting students' emotional connections to nature. While a place-based approach like the one Sobel (1996, 1999) describes may seem at odds with Imaginative Education, it does not need to be. There is nothing to say that place cannot be learned about in ways that draw out what is wonderful about it and that evoke abstract thinking. There is wonder in everything, as Egan (1997, 2005) notes, and place is no exception. Moreover, Egan (2002) is not against studying the local environment as much as the assumption that it is somehow developmentally appropriate for children to do so. One can indeed, through the framework he proposes, study the local, known environment in emotionally and imaginatively engaging ways.

Sense of place is also psychologically and socio-culturally valuable, contributing at both personal and cultural levels to individual and collective identity formation and sense of belonging (Ardoin, 2006; Relph, 1976). Our minds and the places in which we live interact to define who we are as individuals and as members of a culture. The study of "place identity" considers "the environment as an important factor in developing self concept" (Ardoin, 2006, p. 115).[155] Gruenewald (2003) emphasizes how "places *make* us: As occupants of particular places with particular attributes, our identity and our possibilities are shaped" (p. 621). "We live our lives in places, and our relationship to them colors who we are" (p. 625).[156] Similarly, Ardoin (2006) notes the role of place in "making us who we are, and as part of understanding where we are" (Ardoin, 2006, p. 116). So how we understand our situation, both social and geographical, contributes to who we are.[157]

The significance of sense of place to human existence is often linked to how it contributes to our sense of belonging. Godkin (1980) notes:

> ...the places in a person's world are more than entities which provide the physical stage for life's drama. Some are profound centres of meaning and symbols of experience. As such, they lie at

[155] Ardoin (2006) is speaking here of the environment in a general sense.

[156] Gruenewald (2003) refers to Bachelard's (1964) *The Poetics of Space* in which thinking about a house in which one has lived can show how "places, memory, experience and identity are woven together over time" (p. 625).

[157] Egan (1997) does not consider that we may connect with the natural world in ways that shape our senses of self and identity. Egan's suggestion that the child engages in a "lifeworld" refers exclusively to the child's interactions within a world of language. Similarly, he privileges human relationships in his discussion of what contributes to the young child's developing sense of self (Egan, 1988b).

> the core of human existence. (Godkin cited in Buttimer and Seamon, 1980, p. 73)[158]

Because places are "foci of meaning...where one knows others and is known to others," the need to belong is partly fulfilled through sense of place (Seamon and Mugerauer, 2000, p. 27). Sense of place helps the young child and early adolescent to fit in, to gain some sense of security in the world (Judson, 2006). The value of sense of place for learning, something I address in more depth in the section that follows, is based largely on how building a sense of place connects knowledge with experience, and how it can readily evoke our emotions. The body, emotion and imagination are tied up together as we situate ourselves in the world.

So we can see both a general and distinctly ecological understanding of notions of place and sense of place. In the context of sociology or psychology, for example, place and sense of place are not necessarily nature-focused but refer to the meanings ascribed to one's context more generally (Relph, 1976; Seamon, 1979; Seamon and Mugerauer, 2000). It is in this general sense that place-making may be considered a universal characteristic. Making sense of one's context or, if you will, "place-making" is one way in which human beings in all cultural and geographic contexts understand their situations. Situating ourselves in the world is valuable for, among others, psychological and socio-cultural reasons. Of course, the sense one may make of context living in Paris or Detroit is not necessarily the kind of understanding of context that can support ecological

[158] Godkin (1980) draws attention to the possibility that some places can hold much more significance for us than others. This does not mean that other places in which we live our lives are insignificant. Indeed, as I have tried to argue here, understanding place and what it means helps us to function in the world.

understanding. I am concerned specifically, then, with how students make sense of the natural contexts in which they live, and how we might increase their emotional connections to, and knowledge about, these natural places. In short, how we might support the development of an ecological sense of place through educational means. In order to support sense of place of this kind we would be wise to draw out—indeed, to nurture and develop—what E. O. Wilson (1984) called "biophilia": an innate sense of connection to the natural world.

Biophilia might be considered the seed out of which an ecological sense of place can grow. If we are born with an affinity for nature, as Wilson (1984) and Orr (1992, 1994) argue we are, then this sense of biophilia may represent the leverage point for orienting place-making in an ecological direction.[159] In some contexts and for some people, the sense of biophilia may be robust, nurtured by opportunities to engage with nature and form emotional connections with it. In other contexts, the biophilia seed out of which an ecological sense of place may grow may, literally and figuratively, be paved over. One's sense of place may be mostly if not totally shaped by the human context in which one lives. In the latter case, the biophilia seed has not been given the opportunity to grow; it remains dormant.

Building on the premise that wildness or wild nature is everywhere, and that we are born with an innate sense of connection with nature, I aim to show that there is a potential in all contexts, whether urban, suburban or rural, to bring

[159] While I am not suggesting, then, that humankind's tendency to grasp situation through place-making is driven by biophilia, place-making may more fully involve biophilia and an ecological dimension in contexts in which one is afforded opportunities to encounter and engage with the natural world.

the natural context into focus as one situates oneself in the world. We all possess the *potential* to develop an ecological sense of place. Could this be easier in rural Alberta than in downtown Toronto? Probably. Even so, is it not possible, by teaching in a certain way, and by providing students with opportunities to emotionally engage with nature wherever they live, to bring into focus the natural dimension of their contexts? Yes. An ecological sense of place is a potential everyone may develop given certain encounters and opportunities. This is where Imaginative Ecological Education can play a role. If we are born with an affinity for nature, a desire to relate to the natural world, then education that affords opportunities to do so may contribute to how we understand ourselves and our contexts. Nurturing biophilia may result in a sense of place that is more fully informed by humankind's engagement in the natural world. Given opportunities to encounter nature and to learn about it in ways that engage the body, emotion and imagination, students' place-making will be more fully informed by biophilia and may, in any context, turn in an ecological direction.

What this chapter now considers are the cognitive tools we employ to build a sense of place. In the context of Imaginative Ecological Education, teachers will employ these tools in relation to the local natural world as a means to support the development of an ecological sense of place. Because place is where we encounter the natural world and where personal relationships with nature take hold in students' hearts and minds, attending to place and developing students' sense of place is a guiding principle of Imaginative Ecological Education.

Sense of Place: A Socio-Cultural Perspective

From John Dewey's interest in modelling the school on the local community at the turn of the twentieth century as a means of supporting more child-centred, meaningful learning opportunities, through Lewis Mumford's description of the "regional survey" in the 1940s in which the curriculum would stem from the local context and would develop students' emotional commitment to the natural contexts in which they live, place has been discussed as a focal point for curriculum.[160] In Ecological Education, sense of place has long been identified as part of ecological understanding (Smith and Williams, 1999). There is a rich literature in Place-Based Education that builds on the premise that place, the local natural context in which one lives, can be an emotionally engaging context for learning and can be the source of life-long concern for nature (Elder, 1998; Sobel 1996, 1998, 1999, 2004; Smith, 1993, 1995a, 1995b, 2002; Woodhouse and Knapp, 2000). This work has the potential to add theoretical insight and practical support to this educational discussion by examining the notion of sense of place through a socio-cultural lens. A socio-cultural approach can deepen understanding of how sense of place develops and how its development may be supported through education.

If we are, in Gruenewald's (2003a, 2003b) terms, "place-makers," what are our place-making tools? What kinds of activities or encounters with nature help us to ascribe meaning to the natural context in which we live? In line with Imaginative Education, I am interested in the cognitive tools that might

[160] Dewey and Mumford had different conceptions of place and its role in education. My point here is that focusing on place as part of schooling is not an educational innovation.

contribute to the development of one's sense of place and, specifically, how these tools might be engaged to turn sense of place (or, perhaps keep it turned) in an ecological direction. Investigating how place-making cognitive tools may be used to support the development of an ecological sense of place can contribute to what is already known about place and sense of place in Ecological Education and, importantly, can provide concrete ways in which to incorporate the development of sense of place in teaching.

I aim to show how certain cultural activities—shaped in different ways by the cultural contexts in which they occur and by one's individual experiences but, nonetheless, something all human beings do—help us to learn about and form emotional connections to context. I identify four place-making tools corresponding with Somatic, Mythic, Romantic and Philosophic kinds of understanding that may be employed in Imaginative Ecological Education to nurture students' sense of relationship to their natural contexts: *the sense of relation, emotional attachments to objects, creation of special places*, and *association with ideas*. These tools represent new additions to the cognitive toolkits of Imaginative Education and represent important tools for the imaginative ecological educator. Place-making tools are particularly interesting for Imaginative Ecological Education because they may support the cultivation of ecological understanding. Through learning experiences rich in sensory experience and opportunities for engagement with nature, we can support the development of a sense of place in which our relationship with nature comes into focus and, ultimately, makes a difference in how we understand ourselves and the world.

Grasping Situation: Place-Making Tools

Fettes (2007a) has organized Egan's cognitive tools—or what he calls TIEs (Tools of Imaginative Engagement)—in a way that illustrates what particular aspect or aspects of the world each tool can help human beings "grasp" or understand. His organization of the tools also suggests how they may change as different kinds of understanding develop. (Fettes' Table can be found in Appendix A). Fettes (2007a) suggests nine categories or dimensions relating to how human beings make sense of the world: Grasping wholes, Grasping composition, Grasping detail, Grasping limits, Grasping regularity, Grasping agency, Grasping possibility, Grasping struggle, and Grasping inconsistency.[161] So, for example, he suggests human beings "grasp wholes" by employing the following tools: joyful participation (Somatic understanding), wonderful stories (Mythic understanding), heroic feats and quests (Romantic understanding) and powerful theories (Philosophic understanding). I add to Fettes' (2007a) work, and to the toolkits Egan (1997) outlines for Imaginative Education, by proposing an additional dimension of human sense-making and the tools that may be used

[161] Fettes (personal communication, June 2008) acknowledges that the table is problematic in that it is too "tidy"; human beings make sense of the world in complex ways that the table cannot show. Nevertheless, the table he has designed is useful insofar as it shows what aspect of the world cognitive tools can help us to grasp as well as how these tools change along with different kinds of understanding. This knowledge is useful not only for deeper understanding of Egan's (1997) theory of Imaginative Education, but can assist in its implementation by helping teachers see, at a glance, what tools they might consider using, as well as the origins and possible developments of these tools.

to support it. Missing from Fettes' categorization is the place-making process or what we might, in Fettes' terms, refer to as "grasping situation."[162]

When we talk about child development, we tend to focus on psychological development in regards to entry into the cultural world (Barrows, 1995). Notions of self and identity refer largely to where one situates oneself in the social world (Barrows, 1995). Work in the field of ecopsychology (See, for example, Roszak, Gomes, and Kanner, 1995) and also in Deep Ecology (Devall, 1988; Devall and Sessions, 1985; Naess, 1989, 1995, 2000) around the notion of the ecological self brings the human-nature relationship into focus. Cobb (1977), Hutchison (1998), and Shepard (1982) are a few theorists noting that human relationship with nature—the fulfillment one could say of our innate biophilia—is an important dimension of human development. My interest in this discussion is the natural dimension of how we situate ourselves in the world. "Grasping situation," then, involves building a sense of place in which our relationships with the natural world also contribute to our senses of self and identity. I describe four tools that are, in Gruenewald's (2003a, 2003b) term, "place-making" tools; we participate in activities that help us to attribute meaning to where we are, and that engage us in our contexts. Whether it be in the baby's initial sensory explorations of the world (the *sense of relation* tool), the young child's emotional connection to "binky" or to some other object (the *emotional attachment to objects* tool), the child's interest in creating forts and hide-outs (the *creation of special places*

[162] While one may argue that all of the cognitive tools we employ to make sense of the world contribute in greater and lesser degrees to how one "grasps situation" and thus to the development of one's sense of place, there also seem to be some more direct, specifically place-focused tools which provide people knowledge about context and support the development of emotional connections with context.

tool), or the adolescent's interest in situating him or herself within some conception of how the world works (*association with ideas* tool), the tools human beings use to build a sense of place are good for thinking. Like the cognitive tools Egan describes, place-making tools have epistemological, emotional and psychological dimensions that make them valuable learning tools.[163] Before articulating what functions different place-making tools can serve in the cognitive toolkits of Imaginative Education—and Imaginative Ecological Education in particular—it is important to discuss how they measure up to Egan's (1997) definition of what cognitive tools are, and what they do.[164]

Fulfilling Criteria: Place-Making (Cognitive) Tools

You will recall from Chapter Three that a "cognitive tool" represents a feature of culture that human beings use to make sense of the world. Egan (2005) describes cognitive tools as "aids to thinking developed in human cultural history and learned by people today to enlarge [their] powers to think and understand" (p. 219). Egan's (1997) conception of a cognitive tool is tied closely to the body. Cognitive tools are formed, in part, along somatic lines (Chodakowski and Egan, in press). In other words, the body comes equipped with mechanisms for making sense of the world such as, among others, the senses, a sense of rhythm and pattern, and humour, that serve as templates for

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[163] Egan notes the educational tendency to separate these features: "The problem in education is that we try to focus in educational research on epistemology or psychology or emotion and then infer the other categories from there. But this is not how education works. These aspects work together and so we need to think about these elements together, not only in our theories but also in our teaching" (K. Egan, personal communication, July 2006).

[164] Because all of the tools I propose help us to situate ourselves in the world (a process I discuss in terms of the development of sense of place), the following discussion addresses the epistemological, emotional and psychological dimensions of what I call "place-making tools" collectively. I aim to focus on how the tools themselves have the tripartite nature Egan describes. The sections that follow provide further insight into each individual tool.

the formation of the cognitive tools that accompany language acquisition. These cultural inventions, based, in part, in the body, are "good" for thinking and shape understanding. What makes cognitive tools good for thinking relates to how they combine thinking, feeling and perception; they have a tripartite nature. The same may be said of place-making tools.

Egan (1997) suggests that cognitive tools are made up of epistemological, emotional and psychological dimensions. In terms of their epistemological function, place-making tools contribute to what, and how, we know. In the first case, place-making tools help us gain specific knowledge of the world around us. By using our senses, or by forming emotional connections with objects in the natural world, for example, we learn about the world. Place-making tools can also help us understand how the world works. By learning about natural processes, such as, for example, how local populations of birds survive through winter or how wildflowers grow, we can learn lessons for our own survival.[165] From place (conceived of as one's natural context) we can learn important lessons in sustainability.[166] Place can teach about limits, what happens when

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[165] We may, of course, gain incorrect understandings from place. So, for example, if we grow up in an urban environment and never have an opportunity to actually participate in the growing of food, for example, the cultural context of the city might lead us to believe that local environments can provide the variety of food we see stocked on supermarket shelves. In environments in which concrete and skyscrapers have replaced wild grasses and arbutus, we may believe that this is the way the world is, that human beings do not necessarily need nature to survive.

[166] For cultures living in close contact with the land, knowing place is essential for survival. This is not considered as important in modern society where it is possible to live in an area for many years and still learn little about its physical, natural features. It is assumed that one does not need to know about the flora and fauna of a place when food comes from stores stocked with produce from far away places. One need not be aware of local sources of water and, possibly, what human activity is impacting water quality, when treated water comes from a tap in our homes. What I am arguing here is that it is important to regain the kind of knowledge of place that we would need if our stores were not stocked with food, and if clean water did not come out of our taps so easily.

limits are surpassed, and what practices are, or are not, appropriate. Through place-making we may learn some humility in terms of the position of humankind in the greater natural world, and how much we can still learn, and will never know. These are a few examples of direct ways in which place-making tools may support learning.

Place-making tools also teach indirectly. The meaning we ascribe to our contexts reveal what our culture tells us is true, valuable and beautiful; our sense of the world reflects a specific cultural understanding. Gruenewald (2003a) points out how "places *teach* us about how the world works and how our lives fit into the spaces we occupy" (p. 621).[167] Because what place means to us is shaped by the cultural meanings we ascribe to our contexts and their contents, and by the cultural tools we use in making sense of the world in general, it follows that the understanding we gain by employing place-making tools can teach us implicitly, if not explicitly, about our culture's understanding of the world.[168] How we understand the world in the context of modern Western society, for example, is just one interpretation of how the world works. Consider what those places that typify life in the Modern era teach implicitly about our cultural values. While

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[167] Gruenewald (2003a) notes that what we learn in terms of content and depth is shaped by how much we experience of place: "What we know is, in large part, shaped by the kinds of places we experience and the quality of attention we give them" (p. 645). In other words, how much influence one's sense of place is going to have will depend on one's openness to receiving the lessons which places have to teach: "the kind of teaching and shaping that places accomplish, of course, depends on what kinds of attention we give to them and on how we respond to them" (Gruenewald, 2003a, p. 621).

[168] This dimension of place-making tools is valuable for Imaginative Ecological Education insofar as it may support discussion of alternative understandings of the world. If we are alert to the influence of culture on how we understand "place," it may be possible, for example, to imagine alternative possibilities, different values, and understanding of nature and human relationships. There is always the limitation, as Bowers (2003) alerts us to, of seeing any "new" possibility within a certain cultural context. We are, as Evernden (1993) describes, confined within cultural shells that shape what we are able to see. Nevertheless, being alert to cultural influence on understanding is a step towards recognizing alternatives.

large urban shopping malls such as the Mall of America in Minnesota, U.S.A., or the West Edmonton Mall in Edmonton, Canada, help us to understand (grasp) our situations, they also teach us to be consumers, and to accept consumption as a central part of modern culture. By how they are understood and valued, natural places also teach. Do we want more parks because these contain plants and animals with an equal right to exist, or do we want more parks because they fulfill our need to play? Is nature intrinsically valuable or is it primarily instrumentally valuable? Depending on what place means to us, or on our sense of place, our answers to these kinds of questions will differ. Place-making tools are cognitive tools after all; they are inventions tied up with one's culture, values and beliefs.

In addition to *what* we know, place-making tools have implications for *how* we know. Place-making tools support thinking in two ways. First, like the cognitive tools Egan (1997) describes, place-making tools are tools of the imagination; they support thinking by engaging the emotions in learning. They support the formation of emotional connections to context.[169] A second way place-making tools can support thinking is by virtue of how place-making tools are employed. Place-making tools combine "intellect with experience" (Orr, 2005, p. 90). This supports thinking and learning. Whereas in the typical classroom intellectual growth often occurs through discussion or lecture forms of

[169] I am not suggesting that the place-making tools I describe here are the only cognitive tools that support the formation of emotional connections with context. The toolkits of Imaginative Education contain many tools, all of which can help us to feel something for what we are learning. If, among others, story form, metaphor, extremes and limits and hobbies and collections cognitive tools are employed in learning about local natural context, they may also support these emotional connections. The value in identifying place-making tools specifically is, as I discuss in the critique section of this chapter, that they may engage us more directly in place. They may be particularly useful and powerful for increasing our knowledge of the contexts in which we live, and for supporting our sense of emotional connection to these contexts.

teaching, learning about place *in place* necessarily involves activities that may support Somatic understanding of context.[170] Students develop skills of "direct observation, investigation, experimentation and skill in the application of knowledge" (p. 90). We see, thus, that place-making tools link knowledge with experience and may, in this way, support thinking.[171]

The discussion above of the epistemological dimension of place-making tools has already brought into focus their emotional aspect.[172] As Gajdamaschko (2006) argues, in order for something to be considered a cognitive tool, there must be "a unity of imagination and thinking, and imagination and the emotions" (p. 40).[173] Tied up, then, with the epistemological dimension is the emotional. The understanding we have of where we are in the world that place-making tools can support combines knowing with feeling. As we employ place-making tools to situate ourselves in the world, our emotions are, by definition, engaged.

Without emotional engagement, place cannot be defined and, as a result, there is no sense of place. In other words, building a sense of place or situating oneself in the world, requires emotional engagement. The kinds and degrees of

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[170] One does not necessarily need to be physically moving or actively doing something in order to participate in learning, or to be emotionally engaged. Classroom discussion is a form of participation and can be emotionally engaging. My point here is that place-making tools may engage the body's tools more directly in learning than more traditional activities do, and in this way may support learning.

[171] While it is beyond the confines of this research to investigate the implications of place-making for epistemological beliefs in the Western world, it is worthwhile noting how place-making as a focus in education may support more relational understanding of what knowledge and knowing are. Conceived of as a kind of emotional union of self and the natural world, sense of place can support the embedded or connected kind of knowing underlying ecological understanding (See Roszak, 1978, 2001; Bookchin, 1991).

[172] It should come as no surprise that when one considers the epistemological value of these activities we also discuss emotion. The three dimensions Egan identifies are completely interconnected. That is why employing cognitive tools in teaching supports the "perfinking" human being; they include at once psychological, emotional and epistemological dimensions.

[173] Gajdamaschko (2006) articulates Vygotsky's criteria for what constitutes a cognitive tool.

emotions one feels will, of course, be diverse. Whether it results in a sense of familiarity and calm, anticipation, or even discomfort, place-making is emotional work. Situating oneself in the world represents, in part, feeling something about one's context. A sense of security and belonging are two powerful emotions that can emerge from the spectrum of feelings that we may experience as we employ place-making tools. It is in the emotional domain that contexts take on meaning in our lives; it is in our hearts where everyday spaces become places. In effect, it is the emotional dimension of place-making tools that make them meaningful.

The third dimension of a cognitive tool, tied up closely with the epistemological and the emotional, is the psychological. As discussed in the introduction to this section, sense of place contributes to one's sense of self and identity. Who we understand ourselves to be is connected to the cultural and natural context in which we live. While the cultural influences on identity formation are well documented, the natural are less so. In this project, the potential contributions that the natural context can contribute to sense of self and identity are significant. Orr (2005) discusses the interplay of landscape and psyche in the development of sense of place.[174] Orr (2005) notes "knowledge of place—where you are and where you come from—is intertwined with knowledge of who you are. Landscape, in other words, shapes mindscape" (Orr, 2005, p.

[174] Orr does not differentiate general sense of place from an ecological orientation as I do here. For Orr, sense of place centrally involves the natural world. It is not something everyone possesses and is not something everyone can necessarily develop. I address Orr's understanding of sense of place in the critique section that follows.

93).[175] Similarly, Abram (1996) notes how we are defined in relationship to both the human and the more-than-human world. So, to some degree, the cultural meanings we attribute to places help to shape how we understand ourselves, and live our lives.

In summary, place-making tools are cognitive tools; they are cultural inventions that have helped human beings make sense of their contexts and figure out where they fit into these contexts. Because the cognitive tools we use to understand the world actually shape the kind of sense we make (Egan, 1997), it is reasonable to suggest that place-making tools, employed in ways that engage students with the natural world, may support ecological understanding. Students may come to realize how they are connected to the natural world around them as they build a sense of place. Like the other cognitive tools children acquire along with their use of language, place-making tools are culturally mediated, shaped by the cultural contexts in which they develop and in which they are used. While the tools may be shared across cultures, then, in the sense that everyone everywhere makes sense of situation through the employment of similar tools, there is a certain flexibility within these tools that allows for diverse manifestations of sense of place. Place-making tools are "good" for thinking and making sense of situation because they combine epistemological, emotional and psychological dimensions. Having now addressed why place-making tools should be

[175] Orr's (2005) argument applies only to those people with close, personal and enduring relationships with the natural world. He is not suggesting that everyone in every context will have a sense of self that is shaped by landscape. Rather, he suggests that those people who are immersed in place (the natural context), who have history and experience in place, will have an understanding of self that is necessarily shaped by place. My interest here is in how relationship to the natural world has the potential to shape one's understanding of self and world. So, in other words, how place-making tools, like other cognitive tools Egan proposes, have a psychological dimension.

considered cognitive tools and having introduced what they can add to the toolkits of Imaginative Education, I will describe each place-making tool in turn at both theoretical and practical levels. I begin with the body where place-making tools, like other cognitive tools, take their initial shape, and where their driving forces may be situated.

The Sense of Relation: Somatic Understanding

As introduced in Chapter Three, the human body comes equipped with tools for engaging with and, thus, making initial sense of the world. By engaging with the world around us physically, psychologically and emotionally, we make sense of our contexts in ways that support our survival and that ensure our psychological and emotional well-being. Awareness of our own bodies' positioning and movement in space represents one of the earliest ways the body situates itself in the world.[176] Proprioception (from the Latin *proprius* meaning one's own, belonging to oneself, and perception) refers to the body's awareness of its positioning in space and how different body parts are positioned in relation to one another. It is "the perception by an animal of stimuli relating to its own position, posture, equilibrium, or internal condition" (The Encyclopaedia Britannica, 2008). If one's proprioceptive sense deals with the location of the body in space, it may be considered one of the first tools the body employs to

[176] You will recall from Chapter Three how the meaning of cognitive tool changes in relation to Somatic understanding. Whereas the cognitive tools that come with language are cultural, those of Somatic understanding are biological. (It was noted that Egan is increasingly using the term "learning tools" to take into account, among other things, the biological origin of some of the cognitive tools).

situate itself in its context.[177] Knowing where our limbs are in space and how they move in terms of direction and speed has biological significance. It enables us to use our bodies to survive, to attain food and water, to find or build shelter, etc. Our emotions and other senses of sight, sound, smell, taste and touch allow us to connect with the cultural and ecological community into which we are born, contributing further to one's initial understanding of the world. We reach out to and encounter the world through the use of the body's tools.

While Imaginative Education describes to some extent what somatic tools human beings are born with, there is limited explicit discussion of what may drive or inspire human beings to actually use them. One might argue that their use is automatic, that we come hard-wired to use our bodies. While I do not disagree with this, I suspect there is something else at work, something that contributes to what it means to be human.

The body's first and arguably most important place-making tool may be described as the *sense of relation*: the innate human desire to form relationships and, in this way, to engage with its surroundings. It may be a sense of relation that actually inspires or drives us to employ our somatic tools. I want to argue that we may consider the sense of relation to be a force that compels us to engage with the world around us. I build on the premise, then, that human beings are relational animals (Buber, 1958, 1965). I would like to draw attention also to the inherently ecological dimension of human relationality. We are not only

[177] Proprioception says nothing of emotional response, the core of sense of place. What I am suggesting is that this early sense of our bodies in relation to space may be the root of making sense of the world and emotional engagement.

relational animals, but also innately ecological animals. If one observes babies and young children relating to the world, a particularly ecological dimension of human relationality emerges. The body's innate desire to relate to the world has an ecological dimension (Hutchison, 1998; Livingston, 1994; Nabhan and Trimble, 1994; Orr, 1994; Shepard, 1982; Wilson, 1984).

Hutchison (1998), Nabhan and Trimble (1994), and Orr (1994) are a few theorists, among others, who argue that human beings have an affinity for nature.[178] This innate sense of "biophilia" as E. O. Wilson (1984) first called it, is demonstrated in children's fascination with the natural world.[179] Children seem to have an urge to relate to nature and an innate sympathy for natural things. Before children acquire the specific knowledge of nature that underlies ecological understanding of the world as I describe it, it may be biophilia that informs their sense of participation in the world and their desire to encounter nature.[180]

If we accept that we are relational beings, born with an urge to relate to the world, and nature in particular, then we may conceptualize the sense of relation as an impetus of sorts that drives human sense making. The place-making tools I describe for Mythic, Romantic and Philosophic kinds of understanding may be said to develop out of the body's sense of relation. Moreover, given our innate

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[178] Shepard (1982) and Livingston (1994) are two theorists who note the developmental and, thus, psychological significance of the child's engagement with nature.

[179] Biophilia may be considered biologically significant insofar as focused engagement with nature can increase knowledge of one's immediate context, and can support survival.

[180] Orr (1994) worries that our innate sense of biophilia is being replaced in the modern world with biophobia. Through what and how we are teaching our children, and in cultural contexts in which the natural world's intrinsic value is hardly recognized, the natural world has become, for some people, something to fear rather than love.

ecological interest, place-making tools have a potential for supporting human connections with the natural world.

When we are first born, then, the contexts we seek to understand—indeed, those we can only comprehend as existing at all—are those within reach of the body's senses. For a baby making sense of the world somatically, sense of place includes, centrally, an emotional connection to the mother or to other caregivers. As the baby becomes increasing mobile, and begins to employ the tools of oral language, a broader sense of the world develops. Foraying into the world on hands and knees, or on wobbly legs, the young child forms emotional attachments to objects that may contribute in symbolic ways to his or her sense of place.

Emotional Attachments to Objects: Mythic Understanding

Young children often struggle with a desire to explore the world around them, and a contrary sense of fear or insecurity of actually moving away—both physically and symbolically—from the mother or father figure. Paired with mobility, employing the tools associated with an oral language greatly expands children's worlds. The ability to walk and climb makes any part of the physical environment accessible. Oral language opens up to the child a past and future, and incorporates features outside the child's immediate context. Of interest for this discussion is the tendency of young children to develop strong *emotional attachments to objects*.

Young children often develop powerful bonds with objects such as blankets, teddy bears, articles of clothing, toys, or books. I know many parents

(myself included) who would rather lose their wallets than misplace the beloved "binky" or "bear bear." The emotional stability of the young child is often closely tied to this item. It is not my intention to discuss the psychological theories attesting to the significance of this phenomenon for child development. Instead, it is my intention to highlight two aspects of this activity that relate to my discussion of sense of place development.

First, I want to argue that a child's emotional attachment to some aspect or aspects of his or her lifeworld[181] may be considered a universal phenomenon.[182] Children everywhere develop emotional attachments to features of the world they encounter on a daily basis. It is possible that this activity grows out of, among other things, the body's sense of relation. The sense of relation may indeed drive us to form emotional attachments to the world around us. We understand the world, in part, through relationship. The second aspect I wish to consider is the significance of children's emotional attachments to these items in terms of grasping situation or place-making. It may be that the objects children form emotional relationships with contribute to their sense of place. For young children the favourite object represents a familiar, constant aspect of a "new" environment. The emotional connection to the object can provide a needed sense of security and belonging.[183] Because the object with which children form

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[181] I use "lifeworld" in the phenomenological sense of "the world of our immediately lived experience" (Abram, 1996, p. 40).

[182] By universal I mean to suggest that at a certain level of generality, emotional attachments to objects is a cross-cultural phenomena (what aspects of their world children form attachments with will, of course, vary, as will the meaning they hold for them.)

[183] It is also possible that the need for a sense of belonging results in emotional associations to form. Which comes first—the sense of belonging or the emotional attachment—is a "chicken and egg" situation. In this discussion of place-making I am more interested in how the two are interrelated than in which comes first.

emotional attachments is often of their own choosing, it may also offer them a sense of control, an initial experience of a sense of autonomy in the world.[184] In this sense, then, the teddy bear or other object is a central feature of a child's understanding of place. A child can situate him or herself in the world and gain a sense of belonging when the teddy bear is near.

Winnicott (1971) describes the significance of young children's emotional attachments to various objects in terms of "transitional" phenomena. The "transitional object" is something that represents, for the child, the space *between* the body and the external world. Thus the child understands the teddy bear as not fully separate from his own body or, in other words, not completely part of an external reality (Winnicott, 1971). It is through emotional attachment to these transitional objects that the child "tests" reality.[185] You may question the appropriateness of Winnicott's object-theory for this ecological project. I address this concern in the section that follows. What I find useful about Winnicott's work is in what it suggests for how children might situate themselves in the world at this early age. The idea of the transitional object suggests that, as the child determines the nature of reality, as Winnicott describes, the emotional attachment they form with an object helps them to symbolically situate

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[184] While it is true that children form attachments with comfort items they were given as infants and, thus, did not actually choose for themselves, it is also true that children make their own choices as they grow. Many a parent has seen the child dismiss what one might assume would provide comfort, for another item entirely. What is important for this discussion is that the objects children take interest in are part of their immediate surroundings.

[185] Winncott's (1971) transitional object theory refers to the child's "investment of subjective meaning in objective phenomena, a shadowy area of experience where there is neither me nor not-me, but rather a dynamic interpenetration between the self and something in the world" (Barrows, 1995, p. 106). Before the child understands, for example, that his teddy bear is not part of his body, he may believe that it is somehow part of himself. There is, thus, an intermediary space between the child and the "objective" world in which the relationship between one's body and the world can be explored.

themselves in the world. Winnicott sees the transitional object as a sort of bridge for the child as he or she gains a sense of being a "detached" individual, independent of the mother. One could also think about the object children form emotional associations with as a tool for grasping situation, for developing a sense of place. Children carve out a piece of personal, symbolic space that they feel strongly about. The teddy bear, "pet" rock, or blanket are symbolic places of security, part of the child's sense of place. Young children "grasp situation" differently than babies and older children. Emotional attachment to objects may provide the same sense of belonging or security that, for children with Romantic understanding, is provided by emotional connection with larger pieces of terrain.

Winnicott's (1971) work also suggests that the objects children develop emotional associations with actually bridge the child's understanding of him or herself and the world. They are, in Winnicott's work, transitional tools toward an objective understanding of the world. The transitional object supports the development of the autonomous individual living in a world of objects. This part of Winnicott's theory, which I recognize as a central piece, is certainly problematic for the ecological understanding of the world I am exploring. What might be gained from Winnicott's work, however, is deeper understanding of the connected kind of knowing the child experiences at this time. The young child considers these objects as separate from the body, but also "not fully recognized as belonging to external reality" (Winnicott, 1971, p. 2). The objects represent in some ways, then, a physical connection between the child and the world.

While "object" language and the underlying assumptions or cultural implications of an "object" theory of reality (such as dualistic thinking for example) juxtapose the ecological perspective from which I am working, I, like eco-psychologist Anita Barrows (1995), still see insights within Winnicott's (1971) work that may support a more ecological understanding of the world. Like Barrows (1995), what I consider most insightful and appropriate for ecological thinking in Winnicott's project is the relational space between the child and the object. Barrows (1995) suggests that the "between" space linking the child and the world may prove to be the focus of a much more ecological understanding of child development. She considers, for example, how Arne Naess's work on *identification* focuses on the relational space between the child and the world, and how, by supporting students in identifying with aspects of the natural world (seeing, that is, what is shared in common) emotional connections with these objects may form that influence the child's developing sense of self.

As part of a rationale for Place-Based pedagogy, Sobel (1996, 1999) argues that young children demonstrate a "development tendency toward empathy with the natural world" (p. 12). Although using different terms than does Winnicott, he draws attention to the child's tendency to form relationships with features of the lifeworld, and suggests that children feel a sense of empathy because they have not yet developed a sense of the world as "other":

> Early childhood is characterized by a lack of differentiation between the self and the other. Children feel implicitly drawn to baby animals; a child feels pain when someone else scrapes her knee...we want to cultivate that sense of connectedness so that it can become the emotional foundation for the more abstract ecological concept that everything is connected to everything else. (p. 13)

Sobel (1996, 1999) suggests that a curriculum for young children that affords opportunities for them to encounter the local natural world and develop emotional bonds with nature is necessary for their development of a strong sense of place. In line with Sobel, whose language is much more conducive to an ecological perspective, this work builds on the premise that assisting children in forming connections with aspects of the natural world can support ecological understanding. If, as I am suggesting, children make sense of place, in part, by coming to feel strongly about certain objects in their lifeworld, we might assist children in forming emotional associations with aspects of the natural world in particular as part of Imaginative Ecological Education.

How might teachers engage this place-making tool? What kinds of learning activities and opportunities would allow students to form emotional connections with the natural world? One way to employ the emotional attachments to objects tool is to provide students with opportunities to "apprentice" to place—to have time to get to know at a personal level some aspect or aspects of their local natural context. Orr (1994) describes, "apprenticing to place" as the study of nature and its systems and processes through our direct experience of them. By apprenticing students to place, they may learn about their relation to the world first hand through "uncensored" sensory experience (Orr, 1994, p. 96). Over weeks, months, or perhaps years at school, students may have the opportunity to learn about, and learn from, some particular aspect of the local community, be it a grove of trees in a local park, a family of squirrels in the backyard or a local waterway. By apprenticing to place, we provide students with opportunities to form emotional attachments to aspects of the local natural

environment that may assist them in situating themselves in the world. Another idea would be for students to symbolically "adopt" different aspects of the natural world. Students would then be encouraged to not only learn from, and about, this feature of nature, but also to try to care for it.[186] A further idea would be to use the natural world as an integrative theme for learning. This is a useful way to make ecology a more mainstream part of the curriculum, and to increase students' knowledge of some aspect of place. So, for example, some aspect of the local ecology such as a nearby stream or waterway could be the theme for a language arts project.[187] Through opportunities to engage with their senses, to study and observe a local stream, students may strengthen their sense of emotional attachment tool in a way that brings the natural world into focus. In addition to what they learn from the teacher, through direct instruction about the chosen theme, students will also gain knowledge through their experiences. The more opportunities children are given to learn experientially, the stronger their somatic understanding can be, and the richer their emotional bond with the

[186] Of course, we do not want to suggest students interfere too much with whatever they have adopted, for risk of harming it. My thought is that students could consider what the needs are of the natural item they have adopted and, perhaps, they could support its needs in unobtrusive ways.

[187] The River of Words (ROW) is a place-based approach to learning in which students explore and express their understanding of, and their connection to, their local contexts through poetry. Students are encouraged to "find the poetry in water and earth and stone—not just to explore the beauty of a place, but to feel these connections to it" (Michael, 2005, p. 112). (See www.riverofwords.org).

natural world. The stream, or whatever aspect of nature students are studying, may contribute to students' sense of place.[188]

Sobel (1996) suggests, "children desire immersion, solitude, and interaction in a close, knowable world" (p. 12). Young children in particular are drawn to the natural world; they empathize with aspects of their lifeworld. For Sobel (1996), teaching suitable for young children will afford them opportunities to develop relationships with animals and other features of place. "Stories, songs, moving like animals, celebrating season, and fostering Rachel Carson's 'sense of wonder' should be primary activities during this stage" (Sobel, 1996, p. 13). These activities support students' knowledge of place, and can engage their bodies and emotions in learning. Sobel (1996) outlines an activity entitled "Becoming Birds" for example, in which story, song, role-play, celebration and wonder come together in teaching. It was not until students had observed birds, heard stories about them, sang about them and pretended to *be* them that the bird books, in which birds are labelled and categorized, came out. Students' knowledge began in a way that allowed emotional connections to form first. This is the kind of activity that may support students' emotional attachment to objects tool and that may engage them with natural dimensions of their contexts. In Imaginative Ecological Education, teachers will be thoughtful of context and how

[188] In order to move toward a profound sense of personal connection to nature in environments in which one finds concrete rather than grasses or soil underfoot, teachers (and parents) will need to seek out the wildness that surrounds them. If we consider, for example, that wildness is all around us, that even in the biggest of cities nature persists, we may be able to focus our teaching in ways that alert students to it. Classrooms can contain natural products. They can, for example, be filled with plants. Teachers will need to also, of course, strive to immerse students in actual forests rather than concrete jungles as part of their learning experiences.

to enhance students' employment of place-making tools in ways that support ecological understanding.

Creation of Special Places: Romantic Understanding

Whether it be tree houses perched precariously amongst the branches of neighbourhood trees, inviting hollows in dense shrubbery, lean-to structures of scrap material in vacant lots, or a sheltered space under the jungle gym at a nearby park, children everywhere seem to love forts. Sobel's (1993) research suggests just that: building or laying claim to special places—what he refers to in his research as forts, dens and bush houses—is a universal feature of middle childhood.[189] We may consider the *creation of special places* by children of this age to be a place-making tool. Creating special places—indeed, symbolically claiming a space for oneself—can support children in situating themselves in the social and natural contexts in which they live.

Driven, in part, by the sense of relation we discussed earlier, and an extension perhaps of the young child's attachment to objects, creating special places supports children with Romantic understanding in making sense of a broader sense of reality, and their wider physical explorations of it. As Egan (1997) describes, in Romantic understanding children make sense of the world by employing the cognitive tools that accompany written language. The "boundaries" of a broad sense of reality are sought through, for example, identification of the extremes and limits of reality, and association with heroic features of reality. Creating or laying claim to special places is another way a

[189] Sobel's (1993) research addresses the experiences of children in two very different geographical and socio-economic contexts: Devon, England, and the island of Carriacou in the West Indies.

child can situate him or herself in the world. Sobel's (1993) research illustrates how a fort can provide a child with a sense of security that supports wider explorations of the world:

> In order to go farther and farther in their explorations, many children create an outpost, a place to be at 'home' in the out-of-doors. Herein lies one psychological component of why children find and build houses, forts, and dens. As they start to sense their independence from parents, they start to feel a need to have a separate space. Younger children do this in the form of blankets over tables, the space underneath the stairwell, the wardrobe in the attic. But starting around seven, children want these places to be outside the house, both as a way of separating from parents and because they want to be in the natural world. (p. 61)

Sobel (1993) identifies the significance of special places for the child's developing sense of self: "The small, manageable world of the fort, with everything pulled inside, is calm and reassuring. It provides a protective barrier within which personal forces can be summoned to deal with the onslaught of otherness" (p. 74). The development of a sense of self is often described as a process of finding one's place, or situating oneself in the social world. Sobel's research suggests that special places symbolically protect the child's developing sense of self, and may assist the child in the transition to adolescence: "Through making their own places, children start to carve out a place for themselves in the world" (Sobel, 1993, p. 47). What Sobel's (1993) work demonstrates, then, is the emotional significance of special places for children. In addition to helping them situate themselves in the social world, creating special places also assists children in making sense of their natural context. Depending on children's encounters with nature and the contexts in which they have opportunities to create special places, this place-making tool has the potential to support children's emotional

connections to nature and forge an ecological sense of place. This is an important dimension of ecological understanding.

Cobb (1977), Hutchison (1998), and Sobel (1993) are a few theorists noting the formative significance for lifelong ecological understanding of children's experiences with nature during middle childhood. Sobel (1993) goes so far as to situate a concern for nature as adults with children's exploration of nature and creation of special places: "the sense of place is born in children's special places" (p. 161). Sobel (1993) provides accounts from adults to illustrate how the special places of middle childhood remain significant; they "hold special meaning throughout our lives; they become places of repose, of sureness, to return to" as adults (p. 86). Creation of special place emerges as an important tool for the imaginative ecological educator. Given opportunities to learn about and explore nature, and to create special places in natural contexts, children may not only gain knowledge of the natural context, but may develop emotional connections with it.

Mapping is another activity that may be considered a place-making tool. Sobel has done a significant amount of work on mapping in the context of Place-Based Education (For example, Sobel 1996, 1999, 2006)[190]. Mapping, for Sobel, is an important activity for building sense of place:

> Mapmaking, in the broad sense of the word, is as important to making us human as language, music, art, and mathematics. Just as young children have an innate tendency to speak, sing, draw, and count, they also tend to make maps. When children share their homemade maps with me, I see their active yearning to make sense

[190] Sobel (1993) actually uses children's maps of place to study the phenomena of fort and den building described above.

> of the nearby world, their desire to record and share discoveries and their connections to place. (Sobel, 2006, p. 15)

Sobel argues that tied up with a child's innate desire to explore the world around him or her, and to create special places, is the desire to "make paper match place" (Sobel, 2006, p. 15). Children's maps are "the weaving together of inner emotion and external forays" (Sobel, 2006, p. 15). While Sobel (2006) notes the overall pedagogical value of mapping[191], his interest in mapping has to do with what it contributes to sense of place:

> Much good work has been done recently on the value of using concept mapping as an instructional device and as a tool for helping children organize their own thoughts. My desire is to forge an approach that fosters affective and cognitive connections—using mapmaking to teach the content of the social studies and geography curricula and as a tool for developing a sense of place. (Sobel, 2006, p. 15)

Reflecting his support for "near-to-far" pedagogical approaches, Sobel argues that mapping must begin with the places children are familiar with.[192] The kinds of maps children should be studying and creating are maps of the local area because this is what they know and this is where they are forming emotional connections. Sobel (2006) does not deny the value, ultimately, of having students work with maps of faraway places and also having them work explicitly with more abstract features of maps such as scale etc., but he thinks that using such maps with young children (something that is very commonly done) is developmentally inappropriate: "Asking first graders to make maps of their

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[191] Sobel (2006) notes how in British schools "graphicacy" or "being skilled at visual representations of information such as drawing, creating collages, constructing graphs, making diagrams, and making maps" has been added to educational objectives alongside literacy and numeracy (p. 15).

[192] See Egan (2002) for a critique of this approach.

neighbourhoods makes sense; asking them to make maps of continents puts the cart before the horse" (Sobel, 2006, p. 16). Sobel (2006) suggests giving children the opportunity to explore the local environment, to create or claim special places, and then to map their adventures and discoveries. As they learn about place, their maps will become increasingly more detailed and more accurate representations:

> We need to begin by rooting the cartographic experience in visual, kinaesthetic, and emotional experiences. We do a disservice to children when we jump too quickly—at a prematurely abstract level —into map reading and mapmaking. Children can begin mapmaking the way they begin drawing, by representing the things that are emotionally important to them. Children's early maps tend to depict experiences of beauty, secrecy, adventure, and comfort. With these affective endeavors as a foundation, we can gradually start to focus on scale, location, direction, and geographic relationships. Developing emotional bonds and cognitive skills can go hand in hand. (Sobel, 2006, p. 15-16)

While I agree with Sobel that mapping is a useful place-making tool, I am not comfortable connecting it, as Sobel does, with all children and especially with young children. Young children making sense of the world through the tools of oral language may mentally visualize (in the sense of creating mental images) what place is, but I am not convinced that they "tend to," as Sobel suggests, represent this understanding in visual form. Mapping may more accurately be described as an activity that emerges with literacy. Children gaining access to the world of literacy will more readily represent place in symbolic, visual form because they are gaining access to the tools to do so. As children "shift from dominance of the ear to the eye in gathering information" they begin to represent information in symbolic forms such as lists, flowcharts and diagrams (Egan,

2005). Mapping may best be considered, then, a place-making tool of "the literate eye"; a tool, like tables, charts or lists, that comes along with literacy in the Romantic toolkit.

The kinds of maps students with Romantic understanding create are "romantic" demonstrations of sense of place; they demonstrate features of students' romantic understanding of the world. So, for example, based on what they have learned through personal exploration and experience, students' maps of place will contain the boundaries or limits of the places they know; they will be marked with the locations of greatest personal significance, by features of place that students find extreme, heroic or wonderful.[193] These maps will situate students' special places in the world. As a means to "assemble (their) experience" of place, the maps students create can visually represent the cognitive and affective dimensions of their sense of place. Sobel (2006) suggests that "maps are clothespins—tools for hitching children's lives to their places" (p. 18). What I like about this metaphor is the sense it provides of how a map offers a glimpse at how a child may be situating him or herself in context—what, for *that* child, place means.

In terms of teaching, then, employing the creation of special places tool will ideally involve providing students with opportunities to explore natural contexts and to create special places in these contexts. Mapping activities may be used in conjunction with opportunities to explore and create special places.

[193] Although Sobel (1999, 2006) labels children ages 8-15 differently than does Egan (so, for example, Sobel calls this "middle childhood" and Egan discusses "Romantic understanding") there is much overlap in terms of the way they describe children's sense-making. The maps Sobel describes in relation to his 1993 research on forts and dens reflect the "romantic" characteristics I suggest above.

Because employing this place-making tool may present different challenges to teachers based on the context in which one lives, I begin by discussing how this tool could be employed in areas where the natural world is accessible. I then consider what alternatives exist in those situations where access to the natural world is limited, and where students cannot, for various reasons, create their special places.

In contexts in which one has access to wooded areas, local streams or parks, one could incorporate "exploring clubs" into teaching (Sobel, 1993). Students could be given the task of either building or finding some kind of fort in the areas they explore. They could be given opportunities to use the forts they either make or claim as a group as "outposts" for learning, as a sort of "home base." Students could be asked to go into the schoolyard and find/create their own special spot, to describe it using multiple senses, to express (perhaps through art or other mediums) how it feels to be there, or how it feels to "have" this special spot. Students could be taken on field trips to more densely wooded areas or other natural terrain and given opportunities to explore. They may also be encouraged to "find" forts in these areas, and, with proper guidance and in suitable contexts, actually "forage" for whatever supplies they might need to function in these places, making tools or utensils out of what they can find (Sobel, 1993). Students may be asked to describe the special places they have already created, those located, perhaps, in backyards or other places in the community. They may be asked to draw a map of their "place." Where are the limits? What are the significant points in place? Where are their special places?

Affording opportunities to explore nature and to create special places can be a challenge in urban contexts. Still, I believe it is possible to engage students with nature anywhere. While it will obviously be easier to do so in rural or some suburban contexts than in urban areas with limited park access, the natural world can still be engaged in urban contexts through, for example, focusing on weather patterns (investigating the sensations of water, wind, sunlight, temperature changes etc), bringing plants into the classroom, or creating urban gardens. Teachers may create sound, texture, smell and even taste walks in the classroom where students, blindfolded perhaps, engage their senses encountering natural objects from the local context. Following the activity, students could be asked to go out and find these items, and to describe where they are located. They could be asked to map their place before and after the activity. Did encountering these items through the senses, and then locating them in the community following the indoor experience, have an impact on students' place maps? Students may be encouraged to create special places indoors into which natural features may be included such as plants, rocks or pieces of wood (Sobel, 1993). Students may be asked to design, and perhaps to even construct, miniature forts in different environments such as woodland, wetland or desert. How would these different contexts feel? Students could be asked to imagine that they are the size of a pea. Looking at a patch of garden or even a potted plant, where might they create a fort in this context and why?

Whether in vacant lots or in forests, children create special places as they situate themselves in the world. As teachers we can support them in doing so.

Our role as imaginative ecological educators is to try to bring nature into focus for students so that they may incorporate it into the sense they are making of place.

Association With Ideas: Philosophic Understanding

What shape does place-making take for students making sense of the world with general theories? How do students grasp situation as they search for certainty about the state of the world around them? Philosophic understanding opens up to students a "new" world of abstractions and general ideas. This section aims to show that with the development of Philosophic understanding, place-making takes on a different form; it moves from the context of the real world into the realm of general ideas. During Philosophic understanding, place-making involves situating oneself in this new intellectual world. The tool with which we make place during Philosophic understanding may be described as *association with ideas*: the claiming or creation of one's own ideational place.

Adolescents often feel very strongly about what they consider to be certain truths about the world, whether it be freedom of speech, the rights of humans, animals or the Earth, war, democracy or whatever. These ideas appeal to students because they satisfy (partially or temporarily at least) a need for certainty, and a desire to understand why things are the way they are, or how the world should be. Associating with certain ideas or theories can situate students in the intellectual world. They can feel a sense of belonging in the world of general ideas they find themselves in. Associating with an idea may be described as the creation or claiming of intellectual place. It offers students an ideational place or meaningful location from which the world makes sense, and from which

they feel they can explain how the world is the way it is. The idea with which they associate will likely ring true for their own experiences and for what they have learned vicariously about the world.[194]

Place-making during Philosophic understanding seems to pose both challenges to, and opportunities for, the development of ecological understanding. First, secondary school teachers should be alert to the potential feeling of dislocation from the natural world that students may be feeling as they develop Philosophic understanding. By employing the cognitive tools of Philosophic understanding, such as the search for general ideas, the search for authority and truth, and meta-narrative understanding, adolescents can begin to comprehend that there exists a world of abstract ideas. These tools, and the world of abstract ideas they open up, may leave students feeling an increasing sense of dislocation from the natural world and the concrete context in which they live (Egan, 1997, 2008). Egan (2008) describes how the sense of abstract reality tool:

> ...has historically been the source of our understanding of the processes by which nature works, and our increasing control over these processes, but can come at the cost of our alienation from the natural world—so that we might see nature, for example, only as a set of 'resources.' (Egan, 2008, p. 133)

A shift from the extremes, limits and heroic aspects of the real world into the realm of how and why the world is as it is, can move students intellectually away

[194]Of course, the teacher's role is to challenge students' sense of comfort with these general theories (Egan, 1997). The introduction of anomalies to students' understandings of certain ideas or theories can lead to more sophisticated understanding. I do not think the introduction of anomalies necessarily upsets the adolescent's association with ideas. Rather, it lends more clarity to the ideas students associate with, and may result in students associating with new or different ideas. In this discussion of place-making, it is not so much what idea(s) students associate with that matters, but more that they tend to do so.

from the local, natural place they have been engaged with thus far. How to connect students' emerging general ideas and theories with the context of the real world is, thus, an important consideration, not only for increasing the sophistication of students' understandings, but also for maintaining a sense of personal connection to the local, natural world.

In the context of Imaginative Ecological Education, attention will be paid to maintaining the strength of Mythic and Romantic place-making tools into Philosophic understanding as a possible way to enrich adolescents' ability to connect abstract ideas to concrete situations, counterbalance potential feelings of alienation with somatic experiences, and develop somatic understanding that nurtures a sense of embeddedness in the natural world.[195] Continuing to employ the emotional attachment to objects tool and the creation of special places tool, for example, may help to solidify for students the link between the world of ideas and the actual environment. Consider, for example, how ecological notions of interdependence, networks and systems can be discussed at a theoretical level and tied to specific contexts in nature. As part of their studies of biology, for example, students may be given opportunities to garden. In gardening, they can discover first-hand examples of symbiosis. Processes such as pollination and decomposition demonstrate the ecological principle of interdependence. The garden is a living network; it is a system that exemplifies abstract ideas in powerful ways. Students can be encouraged to adopt and study over the course of

[195] Egan (2005) describes ways imaginative teachers can support their students in connecting general ideas to concrete situations, although in a different way than the somatic emphasis I am focusing on here. He suggests, for example, that students study the etymology of words as a means to draw abstract concepts back into the realm of human experience and emotion.

a semester or longer a certain feature of the local natural context. Alternatively, students may choose a place on school grounds to which they are allowed frequent access to work or to simply reflect. They may be encouraged to study their special spots over the course of a semester, for example, noting in as much detail as possible the changes they observe. Place-making tools of Mythic and Romantic understandings may nurture personal relationships with nature and connect abstractions to concrete places.

While we can see, then, how Philosophic understanding may leave students feeling somewhat placeless—afloat, if you will—in a world of general ideas, it is also important to consider how the association with ideas tool may support ecological understanding. The general ideas students associate with, or, *where* they situate themselves in the intellectual world, may reinforce the ecological understanding they have experienced as Somatic, Mythic and Romantic thinkers. It is with a Philosophic understanding of the world that ecological concepts may make most sense for students. They may now grasp abstract ecological concepts (such as interdependence or complexity) that can explain the particulars of place they have developed through Mythic and Romantic understanding. More important perhaps for the development of life-long ecological understanding, is the possibility that students may associate with these ideas; they may carve out their intellectual place in relation to these ecological concepts. It may be that stepping away intellectually from the particulars of place can enrich students' sense of it. The role of the imaginative ecological educator will be to introduce students to these ecological concepts and tie them back to students' own experiences in ways discussed briefly above.

Students may engage in activities that support their sense of agency and are in service to place.[196] Whether saving local animal or plant species, or restoring a local park or stream, students can be given opportunities to act upon ecological understanding of the world in the local context. By enriching students' ecological conceptions of how the world works, ideas that may serve as anomalies to the kinds of beliefs underlying Industrial worldviews perhaps, imaginative ecological educators may help their students carve out ecological intellectual places from which to make sense of the world.

Summary

In summary, then, we might consider the *sense of relation*, *emotional attachment to objects*, *creation of special places*, and *association with ideas* to be cognitive tools that help us to grasp situation. These tools help us to forge a sense of place in the world that can help us to situate ourselves in social and natural contexts. These are place-making tools that engage us in the cultural and natural worlds in which we live, and that may support an ecological sense of place.

This work adds to Ecological Education theory and practice by describing the cognitive tools teachers can employ to develop students' sense of place and support ecological understanding. By employing the cognitive tools that help us to situate ourselves in the world, and by doing so in ways that engage students with the natural context, the development of students' sense of place can take a

[196]Sobel (1996) argues that teenagers are particularly interested in acting in service to place. He suggests an educational approach called "Social Action: Saving the Neighbourhood." While Egan (1997) does not suggest any direction towards which students' sense of agency should be directed, he does acknowledge students' interest in getting involved in social causes at this age.

central role in pedagogical practice and may more effectively support the development of ecological understanding. The sense of connectedness in the world that may develop alongside use of the tools of place-making make it particularly valuable for Imaginative Ecological Education.

Place-making tools can connect people to places in ways that may support more sustainable human action. Ardoin (2006) argues, "reconnecting people with places may enhance psychological, social, and spiritual well-being, while also raising awareness of human impacts on the environment" (Ardoin, 2006, p. 120). Orr (2005) suggests that place has significance for "re-educating people in the art of living well where they are" (p. 92).[197] Ardoin (2006), Gruenewald (2003a, 2003b), Orr (1992, 1994, 2005), Smith (2002), and Sobel (1996, 1998, 1999, 2004) note the importance of cultivating a sense of place for creating more sustainable human-world relationships. They suggest that in order for people to actively work to preserve the natural world, they have to come to know, and care about, particular places. A sense of place based on a close relationship with nature and knowledge of nature is considered a foundation for developing an ethic of care towards the Earth (Naess, 1989; Orr 1994, 2005; Smith, 2002; Sobel, 1993, 1996, 1998, 1999, 2004). Place-making tools will take prominent places in the imaginative ecological educator's toolkit, supporting ecological understanding and increased knowledge of place.

[197] Orr (2005) differentiates inhabiting from residing (p. 92). Whereas the resident is a "temporary occupant, putting down few roots and investing little, knowing little, and perhaps caring little," the inhabitant is rooted, engaging in "an intimate, organic, and mutually nourishing relationship with place" (p. 92).

Place-Making Tools: Three Possible Critiques

There are at least three criticisms that may be raised in response to my description of place-making tools and their value for Imaginative Ecological Education. First, one might question whether "grasping situation" is a discreet category or whether sense of place develops as we employ other cognitive tools. Second, one might critique whether the place-making tools I describe support an ecological perspective. Third, one might question the possibility of developing in schools, and in the suburban or urban environments in which these are increasingly located, an ecological sense of place to the degree that may be required to support ecological understanding. Whether it is even possible to develop and maintain the sense of place in the context of modern schools in which time is limited, populations are transitory and students have marginal access to a limited natural world, is an important question. This section addresses each of these possible criticisms in turn.

Is it appropriate to discuss place-making tools as distinct from other tools? How helpful is it to do so?

One may question the validity or utility of separating "place-making" tools from other cognitive tools we employ to make sense of the world. It is true that employing the tools of language contributes in a general way to one's sense of place. I do not deny that other cognitive tools influence and contribute to how we "grasp situation." The same may be said, however, of the categories Fettes proposes. In other words, how valid or useful is it to categorize human understanding into how we grasp "wholes," "composition," or "incongruity"? These categories are, in a sense, quite arbitrary divisions because our sense of

"wholes" or "composition" or "detail" develops in complex ways, and through the employment of many tools, as we encounter the world in specific cultural contexts. This is why, as Fettes also acknowledges, creating a neat and tidy table to express a process as complex as how we understand the world is problematic. At the same time, however, the table (what Egan (2005) calls a cognitive tool of the literate eye) helps us to make sense of Egan's theory. It is a useful tool for understanding. We can see how the cognitive tools we employ may change as we develop different kinds of understanding. Understanding how cognitive tools change may support their successful inclusion in teaching.

So although it may not be helpful, in some sense, to separate the tools into discrete categories, we can see there is educational value in doing so. Also, the categories in the table Fettes has designed are helpful insofar as they suggest what the particular power or influence of a tool is. Take, for example, Fettes' association of employing the body's senses with how we grasp detail. While the body's senses also contribute to our understanding of "wholes" or "composition" or whatever, they may be considered most powerful or influential in grasping detail. In this thesis, then, I have tried to show how, in addition to the other tools we employ to make sense of the world (and that, thus, inevitably shape one's sense of situation), we also have specific tools that may be considered particularly useful and powerful for increasing our knowledge of the contexts in which we live, and for supporting our sense of emotional connection to these contexts. By suggesting a "new" category entitled "grasping situation," I have aimed to highlight another aspect of the multifaceted process through which human understanding emerges.

How "ecological" are the place-making tools I propose?

In my description of place-making tools, I have employed "object" language that may seem to contradict an ecological perspective. Language has baggage; it carries with it meaning tied to the different social, cultural, and historical contexts in which it has been used. If my project aims to overcome dualistic thinking about the world through cultivating ecological understanding, is it appropriate to encourage students' engagement with "objects"? Does using Winnicott's object language reinforce, by extension, a sense of human-nature separation? The word "object" is, of course, not neutral. No language is. What are my options for dealing with this potential problem?

I have at least three options. Option One: Instead of "object," I could use some other, potentially less troublesome word such as element, feature, or aspect. These terms could easily be used in place of "object." (But, of course, each term also has historical and cultural significance.) Option Two: I could invent a word and define it in a way that aligns with an ecological perspective. (But, unfortunately, the terms I use to describe my new word would also have historical and cultural significance.) Option Three: I could define my use of the word "object" in ecological terms and could acknowledge the potential problems or risks associated with the term (such as, for example, how Winnicott originally used it and what views of self and world his work supports). Rather than entering into a semantic struggle, or inventing a new word and in this way trying to sidestep the issue of language's power, I have chosen in this thesis to think about the term "object" from an ecological perspective.

I have aimed to show, for example, that the place-making tool "emotional attachment to objects" can be understood relationally. The "object" represents one view or level of the whole of which it is part; it is connected to a larger whole. We can also examine the emotional attachment to object tool in a way that focuses on the relationship *between* the child and the object. Consideration of "object" in this way provides an opportunity to nurture an emotional bond that, as Winnicott suggests, represents for the child a shadowy area in which the "me" and "not-me" are not completely distinct. Winnicott (1971) describes the transitional object as the realm in which the child attributes "subjective" meaning and value—his or her feelings for example—to "objective" phenomena.[198] So while I do not want to reinforce the dualistic tradition out of which Winnicott works, and, indeed my ecological interest is to maintain the sense of how we are connected to the natural and social world in which we live, I see value in Winnicott's theory for ecological thinking.

Barrows (1995) describes Winnicott's transitional object theory as a potential "bridge" to a new, more ecological formulation of child development:

> The place where transitional phenomena occur...might be understood, in this new [ecological] paradigm of the self, to be the permeable membrane that suggests or delineates but does not divide us from the medium in which we exist. It is in this realm that distinctions between subjective and objective begin to blur and intersubjectivity is possible. (p. 106-107)

[198]I recognize that Winnicott's belief that human beings progressively move out of a subjective understanding of self and world into an objective understanding stands in opposition to an ecological interest in nurturing a sense of being connected to the "other." Even with this view of the detached individual, Winnicott acknowledges relationship in terms of the value of "experience"—the intermediate space in which inner and outer worlds perpetually interact.

In order to avoid my proposal becoming another tool, then, in an objectification of the world and a bifurcated understanding of human beings and nature, I draw attention to the space between the child and the object. This is a space where education for ecological understanding can focus. This is the space where students come to feel something for the natural world they encounter and, perhaps, where they come to acknowledge how they are connected to it.

As briefly discussed in my initial introduction of the tool, the sense of "emotional attachment to objects" which I am interested in developing may be compared to the Deep Ecology notion of *identification*. Naess (1989, 1995, 2002) proposes that we can realize our full humanity by associating or identifying with the natural other. Through a process of identification in which we sense what we share in common with the other, we can expand our sense of self to such an extent that the "me" includes the other. In other words, through identification we come to feel the other as an extension of ourselves. Rather than a sort of developmental stage through which we want to pass, then, understanding the world from the position of connection is where we want to stay.[199]

If we consider the place-making tool of "emotional attachment to objects" as an opportunity for identification rather than for separation, as a means to connect with the natural world and, perhaps, expand our sense of self in the process, we may support ecological understanding. Through the cultivation and

[199] The ecological sense of self that the process of identification can develop is drastically different from Winnicott's independent, objective self. What the process of identification and Winnicott's work share, however, is recognition of the *possibility* of understanding the world through connection. Whereas for Winnicott emotional attachment is part of the developmental process we pass through as we move toward an objective understanding of the world, from a Deep Ecology perspective, understanding the world from the perspective of relation is the goal. Rather than a stage through which we want to move, it is where we need to stay.

nurturance of the child's emotional attachment to something in the natural world—whether it be a local stream, sapling or backyard squirrel—the child may develop an ecological sense of place characterized by a sense of connection to nature.

Is it possible to develop an ecological sense of place in schools?

Some readers may consider my proposal overly optimistic. Orr (2005) argues, for example, that sense of place does not develop anytime or anywhere. Sense of place requires:

> ...time, patience, perhaps poverty, but most certainly a great deal of necessity...It can not happen during a vacation, although a kind of infatuation with a place can occur in that length of time. It will not likely happen without something akin perhaps to a marriage vow, a commitment to a particular location for better or for worse. (Orr, 2005, p. 102)

If one takes Orr's description of sense of place seriously, then one may doubt whether it is possible through educational practice, and in the relatively short time we have students with us each day, to provide the kinds and extent of encounters with nature the cultivation of sense of place requires. A more problematic aspect of Orr's (2005) argument for this thesis is his suggestion that it may not be possible to develop a sense of place in urban or even suburban contexts (Orr, 2005, p. 102).[200] He suggests that in the city one may only be able to develop a "sense of habitat shaped by familiarity to human-made places" rather than a sense of place which he defines as "the affinity for what nature, not mankind, has done in a particular location, and the skill to live accordingly" (Orr,

[200] Orr's (2005) conception of sense of place involves a close understanding of and connection to nature, not a general understanding of one's context.

2005, p. 102). I, and others (See Sobel, 1996 or Smith and Williams, 1999 for example), am not convinced, in the way Orr seems to be suggesting, first, that a sense of connection to nature is something we have or do not have, second, that it is exclusively a rural phenomenon, or, third, that it cannot be successfully developed in schools.

First, sense of place isn't "all or nothing." In line with how Smith (2002), Sobel (1996, 1998, 1999, 2004), and Traina and Darley-Hill (1995) describe sense of place, I consider sense of place as a question of degree rather than something we have or do not have. A sense of connection to, and care for, nature does not abruptly pop to the surface after years of encountering nature. A sense of connection develops slowly based on the kinds of encounters we have with nature. Second, sense of place is not only a product of rural living. *Where* one lives does not matter as much has *how* one lives when it comes to the development of sense of place. Someone living in a completely rural context may have only a very limited ecological sense of place. One does not develop an ecological sense of place simply by osmosis. One does not develop a sense of emotional connection to nature simply by having it at one's front (and back) door. Third, Smith (2002), Sobel (1996, 1998, 1999, 2004) and Traina and Darley-Hill (1995) are a few theorists who acknowledge the important role schools can play in developing sense of place. Their work suggests that what matters most for the development of sense of place are the kinds of interactions children have with nature.

This thesis builds on the premise that the kinds of encounters that may support a sense of closeness with nature may be afforded to students in virtually any context. What is novel about this work for the field of Place-Based or Bioregional Education, and what can respond to the kind of critique Orr (2005) presents, is the discussion of the cognitive tools for place-making that students are already employing as they try to make sense of the world around them. I have aimed to show that we are relational beings who are drawn to engage with the world around us. We are drawn, in particular, to the natural world. If students are given opportunities to engage with the wildness that exists all around them, teachers may, in this way, support them in developing emotional connections with nature that can inform their sense of place.

I have aimed to show how sense of place may be developed anywhere. Will this be easier in suburban environments with ready access to parks, and in rural environments in which children may have lifestyles that provide them with encounters with nature? I believe so. Because one's context plays a role in the sense of place one develops, the role of the teacher in Imaginative Ecological Education will be to afford students opportunities to turn the place-making tools they are already employing in an ecological direction. Teachers may do this by creating contexts for learning in which nature plays a role and by affording students opportunities to encounter nature in its multiple forms. As Gruenewald (2003a) rightly notes, the impact of place on our lives depends on the *kinds* of encounters we have with it and our willingness to listen and learn. In line with the Activeness principle, then, students need opportunities to not only increase their knowledge of place, but to form emotional connections to places in ways

that engage the body. Students may be encouraged to explore the visual patterns or textures of nature. They might be given an opportunity to study the construction of a fir or pinecone or the intricacies of a flower. The complex design of a simple dandelion can be mind-boggling. Students could use their sense of touch—their forearms, the soles of their feet, the palms of their hands—to feel various natural objects (whether in or outside the classroom). They could then be asked to try to express their sensations through poetry, art, or dance. The same activity could be repeated using the sense of smell and then, following this alternative perspective, the two sensory experiences could be compared. What do these experiences add to students' understanding of place? These examples aim to suggest that it is entirely possible and probable that education of a certain kind may develop one's sense of connection to nature. Imaginative Ecological Education may develop, by degrees, the kind of ecologically-oriented sense of place underlying ecological understanding.

Practices

We have begun to explore how principles I have called Activeness, Feeling, and Place/Sense of Place may come together in Imaginative Ecological Education in a way that supports the development of ecological imagination and, ultimately, ecological understanding. Activeness alerts the teacher to the need to provide students with opportunities to employ the body's sense-making tools. Feeling is a reminder that in order for learning to be meaningful, and for our imaginations to be engaged, emotion must be evoked in learning. Activeness and Feeling principles come together in Place. The Place/Sense of Place principle emphasizes

the significance of students' understanding of the natural context. Place is the site of the child's personal relationship with nature, his or her body's connection, and the site of an emotional bond that may support behavioural change in line with sustainable living. Through engagement of the body in the local context, and the cultivation of emotional connections with what is being encountered and learned, we may see the development of ecological imagination. Possibilities for understanding the world and humankind's position within it may emerge that are shaped around notions of interdependence and relationship. An ecological understanding of place may develop, moreover, through the use of place-making tools in conjunction with the other cognitive tools of Imaginative Education.

This section presents the planning templates for Imaginative Ecological Education that may be used to translate the theory of Imaginative Ecological Education into practice.[201] Specifically, Framework 3 outlines a planning template for an Imaginative Ecological lesson or unit suitable for Mythic Understanding, and Framework 4 outlines one for Romantic Understanding. (Chapter Five offers examples of how these templates can be used with various topics.)

[201] These frameworks are based on the templates developed by the Imaginative Education Research Group. They are accessible, along with multiple example of Imaginative Education lessons, from their website: www.ierg.net.

Framework 3
Imaginative Ecological Education – Mythic Planning

1. Locating importance

What is emotionally engaging about this topic? How can it evoke wonder? Why should it matter to us?

2. Thinking about the content in story form

How can we shape the content so that it will have some emotional meaning? How can we best bring out that emotional meaning in a way that will engage the imagination?

2.1. Finding binary opposites:
What binary concepts best capture the wonder and emotion of the topic? If this were a story, what would the opposing forces be?

2.2. Finding images and drama:
What parts of the topic most dramatically embody the binary concepts? What image best captures that content and its dramatic contrast?

2.3. Structuring the body of the lesson or unit:
How do we teach the content in a story form?

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What other cognitive tools support the child's sense of embeddedness in the world?

4. Engaging with Context: Sense of Place

How can students learn about the topic in a way that engages them emotionally and imaginatively with some aspect of the natural world around them? How does the topic connect to the local environment? What does it mean here?

5. Conclusion

How does the story end? How do we resolve the conflict set up between the binary opposites? How much do we explain to the students about the binary oppositions? How do we give them some sense of the mystery attached to this topic?

6. Evaluation

How can one know whether the topic has been understood, its importance grasped, and the content learned?

Framework 4
Imaginative Ecological Education – Romantic Planning

1. Identifying "heroic" qualities

What heroic human qualities are central to the topic? What emotional images do they evoke? What within the topic can best evoke wonder?

2. Organizing the topic into a narrative structure

2.1. Initial access:
What aspect of the topic best embodies the heroic qualities identified as central to the topic? Does this expose some extreme of experience or limit of reality? What image can help capture this aspect?

2.2. Composing the body of the lesson or unit:
How do we organize the material into a narrative structure to best illustrate the heroic qualities?

2.3. Humanizing the content:
What aspects of the narrative best illustrate the human emotions in it and evoke a sense of wonder? What ideals and/or challenges to tradition or convention are evident in the content?

2.4. Pursuing details:
What parts of the topic can students best explore in exhaustive detail?

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What cognitive tools support the child's sense of embeddedness in the world?

4. Engaging with Context: Sense of Place

What aspect of the topic might be learned in a way that affords students the opportunity to explore the natural world around them? How might learning about the topic support a sense of belonging in the natural environment?

5. Conclusion

How can one best bring the topic to satisfactory closure? How can the student feel this satisfaction? How can we evoke a sense of wonder about the topic?

6. Evaluation

How can one know that the content has been learned and understood and has engaged and stimulated students' imaginations?

You will notice that the overall structure of Imaginative Education's Mythic and Romantic planning templates has not been changed. This is because these templates in their current form fulfill the second principle of Imaginative Ecological Education: emotional and imaginative engagement. So, for Mythic Understanding, the template has the teacher begin by identifying the emotional

importance of the topic. Next, the topic is shaped in story form around abstract binary oppositions that will initially engage students' access to the topic; these are played out using powerful mental imagery. Wonder, story form, abstract binary oppositions, and mental imagery are all cognitive tools of Mythic understanding that tap into students' emotional and imaginative lives. Similarly, Framework 4 demonstrates how to shape a lesson into narrative form that incorporates a sense of wonder, the heroic qualities of a topic, extremes of experience and limits of reality and detailed investigation. And so, the frameworks' overall structures have remained unchanged. What is different, and what brings the templates in line with the goals of Imaginative Ecological Education, is the addition of two new categories that focus on the somatic and contextual dimensions of learning.

Two categories have been added to the frameworks in order to fulfill the first and third principles of Imaginative Ecological Education: Activeness and Place/Sense of Place. These additions are what make the templates appropriate for teaching in ways that support ecological understanding. In order to facilitate the Activeness principle, the teacher must consider the somatic dimension; specifically, how the body may engage with the topic. Engaging with context in learning and fulfilling, thus, the Place/Sense of place principle may be achieved by employing place-making tools. The teacher considers how the topic might be studied in ways that connect students to their natural contexts, and how it may

shape students' sense of place.[202] In Imaginative Ecological Education, fulfilling the Activeness and Place/Sense of Place principles will involve providing students with opportunities to study any aspect of the curriculum in ways that engage their emotions and bodies in the natural contexts in which they live.

Rather than being asked to merely describe what some aspect of nature *looks* like, students may be urged to smell, touch, listen to and even taste it. They could be encouraged to lie face down in the grass, getting as close to it as possible. How did the experience compare to what students already knew? What surprised them? What comforted them? What alarmed them? What interfered with their experience? Students may deepen their understanding of place by studying patterns of sound. Students could create "sound maps" (Birchard and Crook, 2005). In this activity, students would first be asked to stop and sit, perhaps blindfolded, listening closely to all the natural sounds they can hear. To enhance what they can hear, students might put an ear to a tree on a windy day, plug the other ear, and listen to the creaking sound of the tree as it blows in the wind. After a few minutes of focused listening they could "map" what they are hearing and where, by placing a dot in the centre of a page that represents them selves, and then sketching in where the other sounds are coming from. They could draw images of what they hear and be encouraged to write, by combining letters in whatever patterns they see fit, the sounds they are hearing (See Van Matre, 1974). Students could take their sound maps and express, through movement, what they are hearing. How might we express in movement the pattern of rain falling?

[202] The teacher will consider what the topic means for the child's reality, for his sense of where he or she is. How does the topic participate in this place? One could turn the question around and ask what the place says about the topic.

How might we express the pattern or rhythm of rain in poetry? What is the rhythm of a bug scuttling across the ground? This activity could be repeated for senses of smell, touch, and, for the daring, taste. Together these various sensory explorations and expressions of place support a much richer somatic understanding of place.

In Imaginative Ecological Education, teachers at the primary level will engage students with features of the natural, local context. So, for example, students may be asked to adopt a colour. Armed with cameras, students may be asked to capture in a digital images seven (or more) shades of green (or whatever colour they have chosen). Students may explore movement by observing natural movements—the flow of branches moving in a wind, the slither of a snake in grass, the wiggle of an earwig or the powerful hop of a flea—and then attempting to repeat these movements. Students may express their experiences through creating mental images they can then share with the class. Where were you? What did your feet feel? What did your ankles feel? What happened to your knees when you moved like a snake or a flea? Students may study community by completing inventories of the places in which they live. They may start to think about community while inside school walls. Next they may move outside, disperse and have a chance to pause. Lying in the grass, staring up at the sky, feeling grass tickle the back of their neck or noticing something, perhaps, crawling up their pant leg, they could complete another inventory. What does community mean? What communities are they a part of? What do their encounters with nature say about the notion of self? How do they feel connected to the natural world around them? In support of learning about health, students

could work to restore or build a school garden that may, with collaboration among teachers and, perhaps, food services, end up supporting school lunch programs. Gardening, as was documented in Chapter Two's description of the Edible Schoolyard program, can embed the content of multiple curricular areas in place.

For students who have Romantic understanding, teaching will engage cognitive tools that draw out the heroic qualities of a topic and that demonstrate extremes and limits. Topics will also connect to specific places and provide students opportunities to either build or claim special places in nature. Have students heard the story of the hummingbird? In what places does the hummingbird hide? Consider the following example of how a study of hummingbirds might be used in various curriculum areas in ways that engage students with place, and allow them to employ their place-making tools. The elegance, fearlessness and truly remarkable powers of flight of the first "Hummer" make for a really engaging story. (Who said bigger was necessarily better?)

Did you know that hummingbirds' wings beat between 70 and 80 times per second resulting in a flight speed of up to 48 kilometers per hour? (Bailey, 2004, p. 35). These incredible fliers are the only birds that can hover, fly upside down, forwards, backwards, sideways, or up and down like an elevator. Several hummingbird species migrate from the tropics and Central America to the United States or Canada each year in non-stop flights of about 800 to 1000 kilometers. What fuels these fearless hummingbirds (who, I might add, fulfill their

pollinating duties rain or shine when most insects lay low)? Well, in short, a *lot* of food. Hummingbirds require about two times their body weight in insects and nectar per day to make their flight possible. In human terms, that would mean that in order to meet the caloric needs of a metabolic rate like that of a hummingbird one would need to consume 155, 000 calories a day (Bailey, 2004, p. 35). Supersize it!

Students could build their own hummingbird feeders and, through some research, figure out ways to make the school ground a more hospitable habitat for birds of various kinds. In learning about these amazing birds, students could branch off and investigate, for example, the migration patterns of other birds they observe in their communities. This natural context could connect to studies of migration in the social studies curriculum. Studying the hummingbird could support learning in science about movement and, of course, flight. Another direct connection to the science curriculum would be the role of the hummingbird in pollinating plants. The unique beak of the hummingbird is a good point to start investigating the notion of adaptation and the relationship between form and function in nature. Pollination could be used as an integrative theme for studying the ecological notion of interdependence and the various roles and responsibilities of members of the natural community. Students could take on the role of a hummingbird. They might express, from this new perspective, what the world looks and feels like. Students could become bird watchers in their local neighbourhoods, backyards or on school grounds. Once they notice a bird they could "adopt" it, researching more about this species. What makes this species unique? The hummingbird is a fearless flier—what makes a robin, blue

jay, or crow unique? What is the hummingbird's nest like? Students might create their own nests. They could study their bird species (directly and indirectly through internet and other resources) and use the information as a basis for work in the English curriculum. How have birds been incorporated into daily language? What does it mean when something is "for the birds" or if someone is said to have a "bird brain"? "Birds of a feather stick together" right?

What these brief examples have aimed to show is that Imaginative Ecological Education can bring Activeness, Feeling and Place/Sense of Place together in learning. These frameworks can guide the teacher in fulfilling the principles of Activeness, Feeling, and Place/Sense of Place on a regular basis in their teaching. They can support the teacher in thinking of how to incorporate the body's tools and various place-making cognitive tools in teaching any topic. Activities such as those described briefly above can serve as jump-off points for further investigations, further opportunities for students to get outside and engage somatically with their contexts. In doing so, students learn in ways that are likely more imaginative and more ecological than they are currently experiencing and that may also support an ecological understanding of the world.

Implementing the principles of Feeling, Activeness, and Place/Sense of Place as part of Imaginative Ecological Education also requires consideration of how to nurture relationships. In addition to specific content and the employment of the principles above, ecological understanding will be nurtured through teaching practices that support the formation of relationships of various kinds. By nurturing relationships of all kinds, teachers can support students'

understanding of how they are connected to others in communities that are both human and natural. So, for example, students could be given the opportunities to learn collaboratively so as to support relationships between students. Collaboration between the school and the community can reinforce students' learning and bring the relevancy of what they are learning to the fore. They can come to feel part of a larger human community. Given opportunities to feel the natural world around them, to feel in emotionally powerful ways how their bodies engage with the world around them, students may develop a very real sense of participation in the natural world.

Problems

Potential problems arising from my proposed model of Imaginative Ecological Education may be grouped into two broad categories. The first category concerns what may be required of teachers in terms of knowledge and training. The second category concerns what may be needed for successful implementation of the model including, for example, such things as changes to teacher education, school design, scheduling and assessment. First, one might argue that Imaginative Ecological Education requires too much of the teacher. It seems to me that the imaginative ecological educator will require three qualifications: a degree of theoretical and practical understanding of Imaginative Education, depth and breadth of subject matter knowledge, and individual concern for or connection to nature.

Theoretical and Practical Understanding of Imaginative Education

In order to successfully implement Imaginative Ecological Education, teachers will need a certain degree of understanding of the theory of Imaginative Education and some skill in Imaginative Education practice. Early findings from the LUCID project described in Chapter Three demonstrate the need to provide teachers with theoretical and practical support:

> Infusing classrooms with imagination is a more difficult and complex task than it might appear on the surface. Teachers are required to think in unfamiliar ways, to acquire new kinds of resources, to take risks in what they ask of children, and to reexamine their assumptions about children's learning and the roles of community and culture. (Fettes, 2007b, p. 135)

Fettes (2007b) notes a small study (See McKenzie and Fettes, 2002) revealing the importance of "supportive colleagues, administrators, and university collaborators in sustaining a long-term commitment to imaginative teaching" (p. 136). Both theoretical understanding and practice in using Imaginative Education, as well as theoretical and practical support for teachers, will be required to move the imagination from its current, peripheral position as an educational "hook," to the core of learning.

Having some depth of understanding in the theory of Imaginative Education is, in my view, important for teachers if they are to move beyond merely testing the waters of Imaginative Ecological Education and begin actively teaching everything imaginatively and ecologically.[203] Imaginative Ecological

[203] My assertion that teachers require "some" theoretical may seem overly vague. I say "some" because I do not feel the theory needs to be understood in great depth, only that the principles of Imaginative Education should be sufficiently understood to support their successful implementation.

Education represents a very different approach to education that if learned solely or predominantly at the practical level may seem quite easy, but can readily miss the mark in terms of emotionally and imaginatively engaging students in learning. Without some theoretical understanding, teachers may be unable to move beyond incorporating a few features of Imaginative Ecological Education in their classrooms. Development of ecological understanding may require a larger commitment.

In addition to understanding the theory of Imaginative Education, teachers will likely require some training in the design of imaginative and ecological lessons. My own experiences in practicing Imaginative Education have shown me that without proper guidance and training Imaginative Education may be misunderstood. Imaginative Education represents a very different way to teach that, as Egan (2005) acknowledges, some teachers might, at first, find difficult. That is why some practical training in Imaginative Education and support in its implementation may be required.

With training and support, teachers may find Imaginative Education to be a more natural way to teach (Egan, 2005). Once teachers become familiar with the principles, they may find that Imaginative Education is not necessarily more time-consuming or demanding than regular teaching. So, while teachers will need to be willing and able to commit some time to learning about Imaginative Education, Imaginative Ecological Education will not end up being a cumbersome process. Moreover, the time required to provide enough training in Imaginative Education for teachers to begin to use the frameworks and principles

in their classrooms does not need to be extensive. Basic training on the theory and practice of Imaginative Education provided through professional development sessions or in-school staff training sessions can be enough to support initial implementation of Imaginative Education. The same is true of Imaginative Ecological Education.

Egan (2005) suggests that Imaginative Education is not an "all or nothing" kind of theory; one does not need to know everything about Imaginative Education in order to implement it (Egan, 2005). Use of some aspects of Imaginative Education can have significant effects on student learning (Egan, 2005).[204] Egan (1997) does suggest, however, that the effectiveness of imaginative educators may depend on how well their own kinds of understanding of the world are developed. Effective imaginative educators will need to have "abundantly and flexibly developed" (Egan, 1997, p. 276) various kinds of understandings and the cognitive tools of each. This necessarily involves their becoming imaginatively engaged in learning about the world from Somatic, Mythic, Romantic, Philosophic and Ironic perspectives. If this is the case, then learning about Imaginative Education in theory seems even more important, as doing so may allow teachers to enrich their own kinds of understanding.

While I agree with Egan that teachers may begin by using just one or two cognitive tools in their teaching, I feel that more widespread implementation will require additional training. Training in Imaginative Education, and more extensive knowledge about it, can make it more effective. Theoretical study may

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[204] I suspect too that Egan would dispute the need for teachers to study the theory of Imaginative Education in any depth.

also support teachers' own analyses of how they make sense of the world, supporting potentially richer kinds of understanding. It may be that following initial training, and after trying out some of these ideas in their classrooms, teachers will be sufficiently interested in the possibilities Imaginative Education offers to learn more about it. If teachers are willing to commit the time necessary to gain this knowledge, they may transform their teaching in significant ways.

Depth of Subject-Matter Knowledge

Understanding the theoretical and practical aspects of Imaginative Education is not all, however. It has become clear to me through my own work with Imaginative Education, and in talking to my colleagues, that a certain depth of knowledge in the content being taught—more, perhaps, than teachers currently possess—is required to successfully practice Imaginative Education. While this additional depth of subject matter knowledge—whether on the Trojan War, fractions, the semi-colon, or Shakespeare's Sonnets—may be gained through an hour or two of research on the internet, teachers may not have the time, desire, or indeed feel the need to acquire additional knowledge in topics that they have already been teaching for many years. Yet it is in depth of subject matter knowledge that we are most likely to find the emotional significance of the topics we are teaching. The information provided by textbooks only skims the surface of all there is to know about what we are teaching. In order to begin the Imaginative Ecological Education process, that is, to locate the inherent wonder in the topic we are teaching, one needs to move beyond what students can, presumably, read for themselves in textbooks. It is in the uniqueness of the topic

(that may not at first be apparent) that we will find the emotional meaning around which we can shape our teaching.

You may question, too, whether or not teachers need to have a depth of knowledge in ecology in order to teach more imaginatively and ecologically. The model I propose is not intended solely for teachers of ecology or Ecological Education, although they will certainly find it applicable to what they are teaching. It is aimed, rather, at teachers of any topic who are interested in developing students' ecological understanding. If teachers happen to be teaching ecological concepts such as symbiosis or succession, then, like any topic, they will indeed require depth of subject matter knowledge to effectively engage students' emotions and imaginations. That said, understanding of ecology and of its principles could, in my opinion, add to the effectiveness of Imaginative Ecological Education teaching. If we understand notions of relationship, complexity and diversity on a deeper level, for example, we may more easily incorporate these concepts into our teaching of other topics. Imaginative ecological educators are asked, in all their teaching, to consider how to engage the body in learning, and to bring forth the connections of learning to the natural contexts in which students live. Doing so may be facilitated if teachers choose to read some of the available literature in Ecological Education. For example, Van Matre's (1972, 1974, 1979) work provides insight into how to engage the body's senses in learning in ways that can support students' sense of immersion in place. Similarly, literature in Place-Based Education (Elder, 1998; Gruenewald, 2003a, 2003b; Sobel 1996, 1998, 1999, 2004; Smith, 1993, 1995a, 1995b, 2002; Woodhouse and Knapp, 2000) and in Bioregional Education (Diffenderfer and Earle, 1997; Traina and

Darley-Hill, 1995) can provide information that may deepen teachers' ecological subject-matter knowledge and support more effective Imaginative Ecological Education.

Concern for Nature

Effective Imaginative Ecological Education will also require teachers to feel a sense of concern for nature. Concern for nature, for the sustainability of the Earth's natural systems, may be what initially draws teachers to Imaginative Ecological Education. Media coverage of ecological issues seems to be increasing. It may be this increased awareness of the severe impact of Modern lifestyles on the Earth that will convince some teachers to try to make a difference through their teaching. Other teachers may already have a strong sense of ecological understanding and may be currently seeking a way to make their teaching more ecological. I suspect that teachers with a strong personal sense of connectedness with nature may be more effective in cultivating this in their students. Students learn important lessons from their teachers, so teachers modelling a strong sense of personal connection to nature may facilitate this same sense in their students. It may be that those teachers that are inspired to teach more imaginatively and ecologically out of an initial concern for nature may end up developing an emotional connection. They, along with their students, may develop ecological understanding as they teach in ways that engage the body's tools in learning and that employ and develop place-making tools.

So, a personal connection with nature as well as depth and breadth of subject-matter knowledge represent important ingredients of Imaginative

Ecological Education. If we add Imaginative Education to the mix, a fair amount is required of the teacher. If teachers are willing to commit the time, then some basic training in Imaginative Education and theoretical support can facilitate their move to imaginative and ecological teaching. As individual teachers begin to see the effectiveness of this approach to teaching in general—both in terms of student achievement and their own and their students' enjoyment in learning—and as ecological understanding begins to shape how students are making sense of the world, interest may grow in implementing Imaginative Ecological Education on broader, school or district-wide, scales.

Additional Requirements for Successful Implementation

There are additional implementation issues that I have not discussed in this thesis but which will need to be addressed in order to make Imaginative Ecological Education a successful approach to teaching all students. Successful implementation of Imaginative Ecological Education has implications that will affect, among other things, how teachers are educated, how schools and school grounds are designed, how the school day is scheduled and how students are assessed. Beginning training on Imaginative Ecological Education in post-secondary institutions represents an important next step in the widespread implementation of Imaginative Ecological Education. Imaginative teacher education and, specifically, Imaginative Ecological Education training programs in which ecological subject matter knowledge is paired with methodological knowledge, are areas requiring additional research. In terms of school design, more attention will be paid to incorporating nature into schools overall and

classrooms in particular. The outdoors will be considered an important "classroom" which students will, on a daily basis, use for learning. Schools may routinely include gardens, for example, that may be used as part of teaching. Playgrounds may be less manicured and more wild. Imaginative Ecological Education supports more interdisciplinary approaches to teaching. As students engage with the natural places in which they live, they can address multiple subjects at once. Scheduling may be changed to allow greater collaboration among teachers, and for longer time commitments to projects that engage students with human and natural communities. I have not addressed, too, the issue of assessment—specifically, what assessment means from an ecological perspective. More traditional means of assessment may allow students to demonstrate some of the knowledge they are learning, but these assessment measures will not address the degree of students' emotional and imaginative engagement in learning, how or if students somatic understanding is developing, how students' sense of place is developing, or how all of these factors contribute to their overall ecological understanding. A long-term study will be required, once Imaginative Ecological Education has been implemented, to assess its impact on students' overall ecological concern.

Despite these areas requiring additional consideration, this model can be used to move toward more effective Ecological Education. It offers individual teachers the means to make a start in their classrooms. Developing comprehensive knowledge, whether of Imaginative Education or Ecological topics, takes time. If teachers are willing to invest the time required of them in learning about Imaginative Education, and if they are personally committed to

developing students' ecological understanding, then this model of Imaginative Ecological Education may become a reality. Even small changes can move practicing teachers toward the more routine engagement of the body, emotion and imagination in learning.

You may feel that this notion of educating ecological understanding through imaginative and ecological means is overly idealistic in the face of the cultural norms that seem to validate and reinforce unsustainable behaviour. Perhaps. But one must start somewhere, and this approach is a means to make Ecological Education a more mainstream part of learning, first with individual teachers and then on a more widespread level. We will only know how it can work, if it can work, if we actually give it a try.

Conclusion

The terrain of Imaginative Ecological Education we have explored in this chapter is similar to, and yet distinct from, the fields of Imaginative Education and Ecological Education around which it is shaped. A marriage of the two fields in the way I propose opens up possibilities to position Ecological Education more prominently in the curriculum by making the teaching of all topics both imaginative and ecological. Landmarks of the field include principles of Activeness, Feeling and Sense of Place that focus on engaging the body, emotion and imagination in context. Place-making tools take a prominent position in the cognitive toolkits of Imaginative Ecological Education and may, if employed on a regular basis in teaching, and combined with experiences that develop somatic understanding, support students' ecological understanding. Shaping teaching in

ways that develop Somatic understanding of the local natural context and the formation of emotional connections with aspects of the natural world, may also support the development of ecological imagination. Being able to imagine the world ecologically, that is, in terms of relationships and interconnectedness, represents an important step towards a new, ecological understanding of the world. Armed with the explanation and examples provided in Chapter Five and with the frameworks provided in this chapter around which they may shape their own lessons, teachers may begin the Imaginative Ecological Education of their students.

CHAPTER FIVE: IMAGINATIVE ECOLOGICAL EDUCATION ACROSS THE CURRICULUM

The purpose of this chapter is to demonstrate how topics across curricular areas can be organized to exemplify the principles of Imaginative Ecological Education outlined in Chapter Four. In the examples that follow I frame six different units and provide some elaborated lesson ideas within these that show how to teach a variety of topics imaginatively and ecologically. In order to reinforce my argument that Imaginative Ecological Education can offer a way to make anything taught in schools both imaginative and ecological, I have selected topics that reflect both elementary and secondary school curricula and that may, at first, seem unrelated to ecological understanding and partially (if not completely) unimaginative. These topics and their associated curricular areas are: The Basic Needs of Life (science), Movement (physical education), Verb Tenses/Literacy Skills (language arts), Patterns (mathematics), Punctuation (English), and Exploration (social studies).

The first three units are shaped according to the framework for Mythic understanding and the remaining three to the framework for Romantic understanding. Each example follows the planning steps found in the Mythic and Romantic templates for Imaginative Ecological Education outlined in Chapter Four. I also include possible activities teachers may use, suggest how the topic may be extended into other curricular areas, and provide, in Appendix E, some websites that I found particularly useful in forming these examples. Appendix F

contains circular cognitive tool charts for Imaginative Ecological Education planning at Mythic and Romantic levels. Teachers may find these charts useful for brainstorming, organizing their ideas, or for seeing "at a glance" the main cognitive tools they should aim to include in their teaching.[205] Finally, in order to support teachers in developing their own imaginative ecological lessons and units, the first example for each kind of understanding ("Take a Wiggle on the Wild Side: Exploring Soil" for Mythic understanding, and "Decoding Patterns: Welcome to Training Camp" for Romantic understanding) also includes discussion of the kinds of pedagogical considerations that shaped my design of the unit. (These comments are dispersed within the example units, but are in italics so as to set them apart.)[206] Teachers' pedagogical decisions (like how a topic is introduced or explained, or the kinds of activities they have students take part in) are often influenced by considerations such as what they believe best supports student learning, or what they feel contributes to a positive learning environment. In Imaginative Ecological Education, we also need to consider what impact our decisions, as teachers, have on the development of ecological understanding and, importantly, what our teaching might say explicitly and implicitly about the human-nature relationship. By including in my examples the kinds of questions and concerns that need to be considered as part of Imaginative Ecological Education, as well as my responses to these questions and concerns, I hope to provide further encouragement for teachers in creating their own

[205] These circular charts were initially developed by Tannis Calder (2007) for the LUCID project and have been adapted to be used in the context of Imaginative Ecological Education.

[206] This research and the examples I delineate in this chapter have been shaped by the many texts I have read in the field of Ecological Education. Resources that teachers may find particularly useful in preparing imaginative ecological lessons include Caduto and Bruchac (1988, 1997, 2001), Grant and Littlejohn (2004, 2005), and Van Matre (1972, 1974, 1979).

Imaginative Ecological Education units. Overall, this chapter provides an image of what Imaginative Ecological Education might look like for students in elementary through secondary school.

Imaginative Ecological Education: Mythic Understanding

Take a Wiggle on the Wild Side: Exploring Soil

The basic needs of life—soil, air, water, and light—is a topic often associated with the elementary science curriculum.[207] My goal in this example unit is to show with sufficient detail how topics associated with this unit of study might be organized in accordance with the principles of Imaginative Ecological Education. In other words, I aim to show how this topic might be shaped so as to be imaginative and support ecological understanding. Following an elaborated example on teaching about the properties and components of soil, I will suggest how one might teach about the remaining three elements—air, water, light—in ways that engage the body, emotions and imagination in learning, and that connect what is being learned to students' contexts. You will also find throughout this unit outline, in italics, a roughly parallel discussion of the kinds of questions and concerns I had as I prepared this example. These are some of the issues that the imaginative ecological educator will need to be alert to in preparing to teach for ecological understanding.

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[207] The science curriculum for grade 2 lists the following Prescribed Learning Outcomes: Earth and Space Science (Topic: Air, Water, Soil). Students will: describe physical properties of air, water, and soil; distinguish ways in which air, water and soil interact; explain why air, water, and soil are important for living things.

Introduction

I have chosen to combine my proposed study of soil with the study of worms. Learning about soil from a worm's perspective as it makes its way through the soil, tightening and relaxing its muscles in order to burrow deeper, consuming and digesting organic materials, escaping to the surface of soil in sudden rainstorms etc., may be a useful way to engage students' emotions and imaginations in learning about the hidden life in the soil.

Why worms? As I began thinking about how to teach about soil in a way that might be conducive to engaging the emotions, imagination and the body in various ways and in the local natural context, I had the idea of having students take on the role of something that actually lives in soil. In this way, students would not only learn more about the aspect of soil they would take on "in role," but they would likely develop an emotional connection as well. With a dual interest in supporting students' Somatic understanding and connecting learning to students' particular contexts in ways that support their understanding of place, I wanted to select something that most if not all students would have access to, or (in the context perhaps of an urban environment with limited surrounding green space) teachers could bring into the classroom. A living creature such as a worm offered more options for engaging students' bodies in learning than did an inanimate object such as a rock or mineral. The worm was also an interesting option because of the negative associations often associated with it in Western culture. Someone with questionable morals might be referred to as a "worm." The worm was not the huggable, lovable creature we tended to adopt as a family pet. This worm's view of soil could, potentially, challenge

some of these conceptions. Finally, the worm seemed like a particularly useful choice because of the significant role it played in soil production and regeneration and, therefore, in human, animal, and plant survival. By studying the soil from the worm's perspective, it seemed possible to bring to light the important role it played in the life cycle of many animals. While the instrumental value of worms for human beings is certainly a source of emotional connections for students, nature must also be considered for its intrinsic value. So, as I shaped this unit I tried to also think of ways to move beyond the instrumental value of worms for human beings and consider too their intrinsic value.

Before discussing how to teach about soil imaginatively and ecologically, I begin by quickly framing how one might introduce the worm perspective in a way that could engage students' Mythic understanding of the world.

Lumbricus Terrestris

Allow me to introduce Lumbricus terrestris. One might begin by telling students they will be meeting and learning about one of the top "soil scientists" in the world. Well, there are far more than one of these scientists. There are actually approximately 2,700 different kinds of these soil scientists and countless numbers of each kind. Have they already met these creatures of long, segmented bodies, few hairs and no eyes or feelers? Well, considering that in an acre of typical soil (so not unlike the soil upon which your house or school might be located) there are more than a million of them, the chances are high. About 100,000 in an average back yard! What has no eyes, no arms or legs and, after a

hard rain, can be found scattered on the surface of the ground rather than burrowed in it? Earthworms of course.

Our teaching about earthworms might be shaped around the abstract binary oppositions of power and vulnerability. The earthworm is, indeed, powerful. Its "soil science" plays a vital role in the maintenance of the soil. Earthworms tunnel deep in the soil. As they do so, they bring subsoil closer to the surface, mixing it with the topsoil. Earthworms secrete a slimy substance that contains nitrogen; this is an important nutrient for plants. Not only does the slime provide nitrogen for the plants, but it is sticky, helping to hold clusters of soil particles together in chunks called aggregates. Earthworms digest the organic matter in soil, recycle the nutrients and make the surface, or topsoil, richer and better for plants to grow in. It is estimated, in fact, that each year 15 tons of dry soil in every acre of land pass through earthworms. Earthworms' work is, thus, closely tied to human survival. Without the soil-rejuvenating and enriching work of worms it would be impossible to grow the crops required to feed the world.

An earthworm's work requires great strength. It is the truest of miners—working in moist, dark channels beneath the surface, away from the light of the day. But how do earthworms move? How do they see without eyes? Students might look for worms in the schoolyard. Students could examine an earthworm up close to observe its body. They could touch the worms gently—noting the slimy or moist feel of the worm's outer skin. The body is composed of a lot of rings all connected together—kind of like the corduroy you might have on your

pants. These rings are the segments of the worm. A full-grown worm will have between 120-170 of these segments. On the first segment (or the head) of the worm the mouth is located and on the last segment, the anus. (One could also encourage students to try not to confuse the worm's front and rear ends—just imagine how it would feel if someone said he/she couldn't tell the difference between your head and your rear end!) Another amazing power of the worm is its ability to re-grow lost segments; if a worm's tail gets chopped off it can actually grow another one. Some earthworms can even (in certain conditions) grow a new head! Worms are not entirely bald either. They have four pairs of bristly hairs on each segment.

The worm's body structure is directly tied, of course, to how it moves. The worms work really hard to move forward and backward. The worm contracts the circular rings around its body thereby making its body thinner and longer (kind of like if you were to pull a piece of spaghetti from each end). The worm's head gets squeezed forward this way. The worm then squeezes its muscles together to pull its tail end toward its head. The bristly hairs on each segment help to slow the worm down when it really gets moving and to stop it completely if necessary. (I have described in third person here how worms move but one could also speak in first person, as if a worm.) Students could be encouraged to try wriggling like worms. They could lie down on their tummies, arms tight against their sides and legs close together, stretching their bodies out and pulling in their knees and feet. Just how long would it take them to cross a short section of the field inching forward like worms?

What are the limitations of having students "become" worms? Does having students attempt to imitate worm movement contribute to the development of their Somatic understanding of worms and soil or does it only trivialize it? Having students "become" worms in this unit is, of course, a symbolic act. Unlike taking on the role of another human being or even, perhaps another primate, it is exceedingly difficult for the human body to experience soil like a worm. Human bodies cannot wriggle like worms. My concern, then, is that having students attempt to do so may not contribute to their Somatic understanding of worms or of soil and that the opposite could be an effect; the activity may trivialize the worm/soil study. That said, asking students to attempt to wriggle like worms can support their learning of this unit on several levels. First, moving in different ways draws greater attention to the kinds of bodies we do have as human beings, what we can and cannot do with our bodies, and what other creatures can do. Drawing attention to the limitations of our own bodies may evoke a sense of wonder at the diversity of life forms on Earth, forms of life we can never fully understand. Second, attempting to move like worms on the ground (preferably grass or soil) forces students into a different physical perspective on the world. My aim of supporting students in understanding the world as part of it, rather than separate from it, may be facilitated by having them see and feel it from alternative perspectives.

As we shape our story of L.T. (Lumbricus Terrestris) around our selected binary opposites of power and vulnerability we might highlight for students both what gives earthworms their strength (and so what they need to survive) and how

this very characteristic may render them vulnerable. So for example, we might discuss why our L.T. needs to be slimy; sliminess is, of course, essential for earthworm survival. Because they breathe through moist skin, being wet and slimy is very important. Too much moisture can kill earthworms, though, as they need a moist but not too wet environment for survival. After a heavy rain and possibly saturated soil, worms come to the surface for a short time. They can drown if the soil is too wet. Once exposed to the air, worms are even more vulnerable. Paralysed by light, they may be eaten by birds and other predators. Unable to move, the worms may dry out, and thus be unable to breath. Immobile, or heading back to wet soil at warp worm speed, they may be crushed by other animals and humans (or any number of human-made objects). Worms are not that big after all—a typical earthworm measures between 9 and 30 cm long. (One might encourage students to imagine being the person to discover the largest earthworm. It measured 22 feet from one end to the other!)

So, an "earthworm perspective" of the properties of soil can be shaped around binary oppositions of power and vulnerability. These themes will continue to be explored as students learn about the wonder of soil. By becoming a worm and learning about soil in ways that engage the body's senses of sight, hearing, touch, taste and smell, and its sense of rhythm and humour, we may also support the development of our students' ecological understanding in this unit. As students journey through the soil with L.T., or, rather, *as* L.T., students will encounter many a fascinating creature—not to mention a few ghosts.

As I chose the binary oppositions around which to shape this unit I was alert to what implicit message that choice might convey about the human-nature relationship. A premise of Imaginative Education, as we have previously noted, is that students' emotions and imaginations are most effectively engaged in the human realm, when the human significance of what they are learning is made apparent. In the context of Imaginative Ecological Education we want to teach toward an egalitarian view of human beings within the natural world. So what might my choice of power and vulnerability say about the human-nature relationship? I have aimed throughout this unit to avoid associations of human beings with power, and worms with vulnerability, although this may be what first comes to mind for most people. Rather I have tried to show how earthworms have their own power that, relatively speaking, human beings cannot match. I have also included discussion of how everyone and everything may be considered to be both powerful and vulnerable, in different ways and at different times. A second concern I had as I chose power as one of the abstract binary oppositions around which to shape this unit was that the power of the worms would be considered significant only in terms of its instrumental value for human beings. Obviously worms' work does support human survival in various ways. Developing ecological understanding also requires consideration of what makes worms intrinsically valuable. Worms are valuable in their own right. Worms' activities are wonderful in their own right. These are ideas I hope to convey along with the important role worms play for human survival.

Soil

1. Locating importance

What is emotionally engaging about this topic? How can it evoke wonder? Why should it matter to us?

If soil could talk! As we dig in a garden, churning up the soil, we are engaging with the history of the Earth itself. Indeed, the soil is full of ghosts—the remains of everything that once lived eventually ends up in the soil, becoming the basis for new life. This is the interesting juxtaposition in the topic of soil; it is both death and the source of new life. Moreover, soil is teeming with life; there is more life below the soil surface than there is above it.

2. Thinking about the content in story form

How can we shape the content so that it will have some emotional meaning? How can we best bring out that emotional meaning in a way that will engage the imagination?

One might shape the story of soil around the experiences of an earthworm, one of the soil's most productive, and numerous, animal inhabitants.

2.1. Finding binary opposites:

What binary concepts best capture the wonder and emotion of the topic? If this were a story, what would the opposing forces be?

This unit contains two parallel stories and, thus, two sets of abstract binary oppositions. The worm's story is shaped, as mentioned above, around the binary oppositions of power and vulnerability. I have shaped the story of soil around the binary oppositions of death and life or, more specifically, around the notion that while soil at first glance may seem devoid of life, it is in fact full of life forms and, a little spookily, can claim to be haunted by the ghosts of all that lived before.

2.2. Finding images and drama:
What parts of the topic most dramatically embody the binary concepts? What image best captures that content and its dramatic contrast?

Our story of the worm will be as imagistic as possible. We will guide students along with L.T., our worm friend, as it journeys through the soil. Our description of the journey will aim to evoke the mysterious dimensions of the soil, as being full of life and full of stories of previous life. The organic material the earthworm consumes once had its own story to tell. As organic matter passes through the worm it becomes the stuff of new life, creating a new, more complex story that also contains the ghosts of the past.

Shaping the study of soil around the story of L.T. as he struggles through the soil, doing his "work," surviving various episodes, "thinking" about these etc., does anthropomorphize him. One can, of course, argue that all human understanding anthropomorphizes; human beings can only understand in human terms (Livingston, 1994). Nevertheless, in the context of Imaginative Ecological Education, it is important to be alert to the dangers of anthropomorphizing. Have I provided other means for students to emotionally connect with what they are learning about worms and soil?

A central premise of Imaginative Education, as we have noted and discussed, is that the primary source of emotional engagement resides in the human context of all knowledge. Imaginative Education focuses on how we may use human qualities to highlight emotional significance. There is a danger of anthropomorphizing the natural world in order to emotionally engage with it that we need to be alert to as imaginative ecological educators. There is a danger of subjugating the Earth, of reinforcing a privileged position for

humankind in relation to nature, when we assign human qualities to features of the natural world in order to develop emotional and imaginative connections. Obviously, any story I compose, and in which L.T. plays a leading role, will represent a very human interpretation of what being a worm is like. It can be no other way. Our teaching will need, therefore, to offer students opportunities to emotionally engage with features of the natural world in ways that do not explicitly assign to these features human qualities. We might do so by evoking students' sense of wonder and awe in relation to what they are learning. They might consider what is wonderful about the worm's body, the structure that supports its movement and work, its five hearts, and its ability to regenerate parts of its body. We might encourage them to consider what is awesome about how the worm senses the world around it. Students might be encouraged to consider the mystery of the natural features they are studying—for example, the mystery of the soil, the "perfect" combination of elements, air, and water to support life. They might be given opportunities to "praise" what is intrinsically wonderful about worms and soil. The kinds of activities that might develop students' Somatic understanding of what they are learning might also serve as useful ways to evoke students' sense of wonder and awe around what they are learning. Perhaps, by providing them with activities that open up new perspectives of the world or that "spark" new understanding through different sensory experiences, we can enable students to become emotionally and imaginatively engaged with soil and worms in ways that highlight their intrinsic value or that hint at soilness or wormness.

2.3. Structuring the body of the lesson or unit:
How do we teach the content in a story form?

Hungry, hungry, always hungry! Lumbricus is famished. Even though he often eats his own body weight in food each day—and did so yesterday, and the day before—he is famished. And so he's off to find breakfast. Clenching his muscles, pulling in his tail end, inching forward, burrowing into the soil, L.T. cannot help but feel he is being watched. And indeed he is.

The soil, formed from rocks and decaying plants and animals, surrounds the Earth like the peel on an orange. It contains air and water, as well as minerals and living matter. L.T. is one of many earthworms and other organisms that inhabit the soil. L.T. is on high alert for the real thugs in the neighbourhood —there are some hairy giants that burrow into the soil and would squish or eat him in an instant. Moles and shrews are a couple of these big hairy beasts that would really enjoy him for breakfast. The other day he came across a very large cave in the soil—a rabbit hole most likely. On a daily basis L.T. senses the proximity of critters his own size such as woodlice, beetles, centipedes, slugs, snails and ants. He always enjoys meeting snails—he feels like a real speed demon in comparison—and cannot believe how many teeth they have (some 14,000!). There are lots of mites in the soil too. L.T. has always been fascinated by mites. Mites are part of the arthropod family so they have arms and legs that are hinged with joints. What would *that* be like!? While mites have no backbone (L.T. is pretty comfortable with being boneless) they do have an external skeleton. The mites chow down on fungi. They work hard for food, scraping and consuming bacteria and fungi off the root surfaces. L.T. knows that these critters

compete with him for food; they also feed off the organic material in the soil (decaying plants for example) to survive.

L.T. chews away at some decaying organic matter in the soil—a dead plant or animal perhaps. As he does so he cannot help but sense the wispy tickle of a story escaping. Where did this bit of leaf come from? What did this leaf experience? From where did it fall? L.T.'s dream is broken, however, when he begins to feel too wet, the moisture in the soil is getting to be too much. He needs to escape to the surface or he'll drown. Struggling toward the surface he begins to sense some light. It seems like an eternity but he does reach the surface, passing mites that seem to be forever in his way. He doesn't eat the mites, though. Instead L.T chews up leaves, stems, dead roots, and dead animals in the soil. He is used to the soil filling with water like this—soil is a great absorber of water. And, well, waste too. That's another thing soil does. It neutralises and filters pollutants. It stores tons of water (as much as 3750 tonnes of water per hectare actually). As they forage for food, soil creatures create channels in the soil that are important for aeration and drainage.

L.T. can sense the surface of the soil approaching, but then his path is blocked momentarily. Whatever it is, just will not budge. L.T. attempts to burrow his way into it. No luck. A root. What a pain. Roots get in his way but, of course, they also loosen the soil and help him burrow in other ways. By loosening the soil, roots allow oxygen to penetrate, which is essential for the survival of animals living in the soil, L.T. included. Roots also keep the soil

together—L.T. has heard of places where the roots have disappeared and, as a result, the soil has just washed away in heavy rain.

At last L.T. manages to escape from the wet pool of muck that used to be his perfect soil habitat. L.T. waits, on edge, to return into the dark. Sunlight is the enemy. It dries up his skin, preventing him from breathing. He cannot hide. He hopes there are no birds around. Suddenly, feeling something squeezing his sides, he curls and wriggles in response. He is dropped. He is still alive, though. Again, he feels pressure at his head and at his tail. This time he is being stretched. Ouch! The light is starting to be unbearable. He is sure it is all over, he thinks he's going to have hearts attack (he has 5 of them after all). His life flashes before his eyes. But suddenly he falls into softness. He feels the comfort of soil around him again. Somehow he has returned to the dirt. Phew. Whatever it was, this has happened to him before. He gets scooped up, squeezed and put back. He has heard that soil makes excellent mud pies and, well, he often gets discovered in the process.

Around him he is surrounded by life he cannot sense. He is surrounded by life that is often no bigger than the head of a pin, and often much *much* smaller. Yeasts, bacteria, fungi, protozoa and roundworms are some of the microscopic creatures that live with him in the soil. Oh boy—the bacteria seriously outnumber the worms. In one gram of soil there are 100,000 to several billion! What's even smaller? Well in a tablespoon of soil there are about 50 billion microbes! Nematodes and protozoa swim in the film of water that surrounds soil particles. They feed on bacteria. Mites eat fungi and fungi decompose soil

organic matter. Actually, fungi and bacteria play very important roles in maintaining healthy soil. They are decomposers that break down organic materials to form detritus and other breakdown products. Nutrients are released into the soil in the process that are really important for plant growth. Detritus is what L.T. eats and digests. L.T. relies, thus, on the fungi and bacteria. He never remembers to thank them.

One could, of course, extend this story at length, developing new characters that L.T. would meet, or different adventures that L.T. might experience. It might be interesting also to explore how food passes through L.T. Does he ever get a bellyache from something he eats? One could trace a leaf through L.T.'s mouth, pharynx, esophagus, crop, gizzard, intestine, blood stream and out the anus to see how it gets digested.

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What other cognitive tools support the child's sense of embeddedness in the world?

In order to fulfill the Activeness principle, students will be given opportunities to engage their senses in learning about worms and soil. They will be given opportunities to observe worms closely, to gently touch them, smell them, and listen to them. They will not, of course, be able to hear the actual sound of the worm's five beating hearts, but they can imagine what this might sound like. They can observe it online at most worm websites. They can replicate for themselves, through drumming or clapping perhaps, what the rhythm is like. They will also study soil up close. They will be encouraged to note all the

different elements they discover in a small patch of soil, smelling it, running their fingers and toes in it, even tasting it (they are worms after all).

Students should try to get to know the soil as worms might. So, lying down in the grass or on the soil, rolled, perhaps, in something to keep their arms and legs tight to their sides, they can close their eyes, turning from the light, nosing into the soil. They can try to wriggle like an earthworm. What are the rhythms of an earthworm's movement? What sound might we associate with the ripple of an earthworm's wriggling body? What words might we use to describe this powerful, yet vulnerable, being? Students might play a game of earthworm ball. Lying facedown in grass, scattered around in a small area, students need to wriggle to procure "food" that the teacher can scatter amongst the students. If it is a hot day, teachers could make the game even more authentic by spraying the wriggling worms with water. If you are going to be an earthworm you should be dirty and slimy. What did the students enjoy about the game? What is funny about wriggling like an earthworm?

As I considered how to support activeness in the learning process, I was concerned that the kinds of activities I proposed—ones that had students attempt to take on a worm's perspective—might not have their intended effect. Where does activeness end and being active (which may not support my educational goals) begin? I was also concerned with how I could maintain the emotional and imaginative power of the somatic activities I proposed. There is a risk that somatic types of activities—the kinds of learning activities students may not currently be familiar with—might also become mundane or too

familiar (and, thus, less emotionally and imaginatively engaging). My suggestions in this unit, then, aim to engage the body's senses in explicit ways (and, so, support activeness) as well as be diverse. Teachers will need to find a balance between guiding students through activities, and giving them some freedom in how they encounter nature.

4. Engaging with Context: Sense of Place

How can students learn about the topic in a way that engages them emotionally and imaginatively with some aspect of the natural world around them? How does the topic connect to the local environment? What does it mean here?

This step in the planning process directs us to contextualize student learning, to connect learning to place in a way that supports students in developing an emotional connection with some aspect of the natural world. So while one may construct "worm bins" in the classroom and bring worms into the classroom to examine, students will need to seek worms outside in the soil of local gardens or lawns. In this context we can have students examine worms more closely. How does a worm move? What are its actions? What are its relationships? How does it engage with its surroundings? What is the soil like from the perspective of the worm? How might the worm sense the proximity of a human being? Activities that can enhance students' sense of place will also include investigation of the actual properties of the soil in students' contexts. What are its particular components, and what does that mean for what grows in this area? Students can go worm hunting, looking for worms that have different appearances. Students can investigate what else lives in the soil community, adopting some other aspect and taking on this role (such as mites or bacteria or moles for example). Students might work collaboratively to inform their families

or other members of the community about the work of the worm scientists in their neighbourhood.

As I planned this unit I was alert to the importance of studying features of nature in context. Imaginative Ecological Education aims to not only support the development of students' sense of place, but also to support a more egalitarian understanding of human beings and nature. Development of ecological understanding requires paying attention to how we treat the natural elements we are studying, and considering how we might study them in unobtrusive ways. Taking worms out of the soil and into the classroom to poke and prod at them sends an implicit message about our relationship to these animals that does not support ecological understanding. The same argument applies to soil. Having students study soil outside in parks or gardens is more ecological than bringing it into the classroom in cups.

Quinn and Scott (1997) argue that in order to understand something it must be studied in context.[208] *Plants and animals are contextual; their distinctive characteristics are tied to the contexts in which they reside. Pulling a worm out of its context in order to study it may, thus, be less effective than studying it in context. What makes a worm a worm is as much the soil in which it resides as all of the identifiable traits we readily associate with this squishy, wiggly creature. Quinn and Scott (1997) suggest studying animals and plants in their uniqueness—the wormness of the worm—by focusing on the place in which it lives. Emphasis, then, on place is an important aspect of this unit.*

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[208] While this may not in all cases be possible or desirable, it is an important consideration for imaginative ecological educators.

5. Conclusion

How does the story end? How do we resolve the conflict set up between the binary opposites? How much do we explain to the students about the binary oppositions? How do we give them some sense of the mystery attached to this topic?

As a means to bring the soil story to an end, and also to extend students' sense of mystery around this topic, we may look at the ghosts of soil in a positive light. The mystery of the soil may be exposed in a positive light by emphasizing how the ghosts of yesterday—the stories of all the dead and decaying matter that is recycled in the soil—is the stuff of new life. This is the cycle of life. Life exists through the symbolic sharing of stories, the decomposition of organic matter and the recycling of nutrients for new life. The stories students have encountered in this unit are, moreover, only a few of many. There are, really, too many stories to tell. The soil and its inhabitants represent a repository of stories we will never—can never—completely hear. In terms of L.T., we can emphasize how vulnerability does not exclude strength. We are all vulnerable in our lives. People of all shapes and sizes expose themselves to potential harm as part of living and as part of being human. In a way, this vulnerability can even make us stronger. L.T., our worm friend, might also be praised. Students could be asked to write an "ode to a worm" in which they highlight what makes worms wonderful. The wonder of the worm can draw out what makes it intrinsically valuable.

There is much more to learn about worms and about soil than any teacher can possibly include in their teaching. As I considered how to conclude this unit, then, I was concerned with how I might support students in realizing the great mystery behind what they are learning—that there is infinitely more

to know than they can ever know. The conclusion I propose also aims to reinforce the intrinsic value of worms and soil so as to support ecological understanding.

6. Evaluation

How can one know whether the topic has been understood, its importance grasped, and the content learned?

While one might evaluate student learning through traditional means such as tests or other written assignments, it would also be appropriate to pair this evaluation with project work in which students could express their learning through other means. They may, for example, create and enact short plays in which they role-play life in the soil. They might construct models of how soil functions. They might do artwork in which they represent the properties of soil. The kinds of activities that would best conclude this type of unit would have students working outside with worms, with soil, and also with each other. Consideration should be given to how students might work collaboratively in activities that conclude this unit.

The kinds of evaluative activities we choose as teachers provide our students with opportunities to demonstrate just how much—or how little—they have learned and, hopefully, the freedom to express this learning in multiple ways. The kinds of activities we want to choose in Imaginative Ecological Education will provide students with flexibility in how they express their learning. The kinds of projects they complete should, however, include aspects that demonstrate what students' Somatic understanding of the topic might be, how the topic connects to place, and also how it contributes to students' sense of

place. How, too, students might we supported in working collaboratively with others throughout this unit, as well as on a final project, should be considered.

Suggested Activities

There are many different kinds of activities that students may undertake as they learn about soil and worms. They can engage, for example, in any number of creative writing or art projects based on their new knowledge. They may go worm hunting. They may collaboratively build "worm bins" so they may do further study of worms. There are 1,000 to 10,000 nematodes in every cubic centimeter of soil. One can bring these "monsters" out by putting a heat lamp above and something cool below a container of soil (Argast and MacDonald, 2005, p. 78). Students may build composting boxes for the school and instigate a recycling program for biodegradable school wastes. They may develop a Soil Exhibition in which they display their artwork, writing, and studies (which could include mathematical concepts as well) and invite the community in to see the work. They may advertise and celebrate a Worm or Soil Appreciation Day. This might involve recognizing the important roles worms and soil play in the community (this being, of course, the human and natural communities) and could also involve the giving of "gifts" to the worms and soil. What might the worms enjoy? Food! What might soil enjoy? Water! There would be no harm, of course, in practicing the culinary arts of making some hearty mud pies as well.

Extensions

This unit represents one way that the topic of soil might be taught imaginatively and ecologically. It could be contained in a larger unit of study in which air, water and light were also explored. One could continue the adventure

of L.T. into learning about these other basic supporters of life. Poor L.T. could, for example, end up on a fishing line as bait. Does he feel pain? What does he encounter in the water? What happens when he is eaten by a fish? A guided tour through the digestive system of a fish would be pretty fascinating. One could shape the story of water around emotionally powerful binary oppositions such as hope and despair. Of course, poor L.T. is hoping desperately that all the fish in the sea are suddenly on a hunger strike of some kind, but water offers all living things hope—it is a bringer of life. We can survive up to 30 days without food, but only a few days without water. One could introduce water in a way that draws out what is wonderful about water. One might give each student a "magic elixir" in a baby food jar (or some other container with a lid, so students could shake it around, dip into it, smell it and eventually drink it). The teacher could tell the students that he knows people in high places, pulled some strings and has, for each student, some of this magical potion in its liquid form! Each student now has something precious that will make him or her healthier in an instant (provided the liquid isn't polluted!). This magical potion that can create life and can also take it away is, of course, clean water.

One could extend this unit by using the "Properties of the Air" unit (included in Appendix C) that is based on the idea of the air being active and full, yet seemingly empty. To bring this Imaginative Education lesson in line with Imaginative Ecological Education one could fulfill the Activeness and Place/Sense of Place principles in various ways. For example, students could actively focus on their breathing, visualizing the air coming into their bodies with each inhalation, the journey of the air through the lungs, the conversion of

oxygen into carbon dioxide, the release of carbon dioxide with each exhalation. They could be encouraged to breath in different ways—deeply, shallowly, quickly, to hold their breath, to breath in through clenched teeth, through the nose only, with one nostril, then the other. One might enhance the sense of how air is a shared element of the world by having students inhale and then blow the air to someone else, who then inhales and blows it on again. Activities might have students sit quietly outside on a windy day with bare arms and legs, focusing on the feeling of the air passing through the tiny hairs on the skin. What does the wind feel like as we inhale it compared to still air? What does it feel like to breath in the air of a rainy or humid day? How does breathing in deeply on a very hot or cold day feel? Following this kind of teaching about the properties of the air, students will likely have a much greater appreciation of what, exactly, they are inhaling. Just how many skin flakes were in that last breath? How much of you is now cycling through me? Per breath, about 100,000,000,000,000,000 atoms of air are inhaled. Now, if we do the math and think that when relaxed we might breath 12 or so times per minute for 60 minutes each hour, 24 hours a day, just how much air does each person require on this planet? (Van Matre, 1979, p. 59). Students may research the quality of the air where they live. What kinds of things negatively influence the air quality? What can be done about this?

Once students have learned about soil, water, and air in ways that are imaginatively and ecologically engaging, it would be quite easy to explore the interrelationships between soil, water and air, and introduce the final need of all life: the energy of sunlight. There are ample opportunities for students to role-play various elements, to enact the kinds of relationships that exist between soil,

water, air, and light. It may be interesting to conclude the unit with a "Declaration of Interdependence" in which the relationships between these basic life needs are expressed, and the contributions of each element to life on Earth is celebrated.

Exploring Movement

In addition to learning the skills associated with specific sports, the physical education curriculum for elementary students includes the development of various kinds of movements. Non-Locomotor Movement Skills refer to movement skills that are performed on the spot, such as balancing, rocking or swaying, or transferring body weight in various directions. Locomotor Movement Skills are those that incorporate traveling in various directions, levels and ways, individually and with a partner. These kinds of movements might include rolling, galloping, sliding, or leaping. This unit outline considers how one might explore movement with students in ways that engage their emotions and imaginations in learning, and that also increase their ecological understanding. It also provides students with opportunities to move their bodies in a diversity of ways.

1. Locating importance

What is emotionally engaging about this topic? How can it evoke wonder? Why should it matter to us?

As much as children (and adults) often like to move around just for the fun of it, movement is also directly linked to an animal's survival. Given our high position on the food chain we, unlike those animals below us, do not have to worry too much in our daily lives about predators out to eat us for lunch. This is

not the case for the animals that surround us. The way they behave and, specifically, how they move is directly related to their survival. This unit teaches about the survival strategies of animals—how they move to get food, how they hide and, so, avoid *being* food—in ways that engage students somatically in learning. The diversity of animal movements, and the strategies they employ to survive is truly astonishing. This unit aims to evoke a sense of wonder and awe at the diversity of animal movement.

2. Thinking about the content in story form

How can we shape the content so that it will have some emotional meaning? How can we best bring out that emotional meaning in a way that will engage the imagination?

One way to organize this unit into different lessons would be to have students imagine, during different classes, different regions of the world. So, during one class one might choose to focus on the tropical rainforest, and the kinds of animals found there. The next time one might invite students to come out onto the savannah or the desert. The aim would be to set the stage so that students imagine they are in different habitats and take on the movements of different animals that one might find in these places. Because Imaginative Ecological Education is also concerned with developing students' sense of place we will also want to be alert to students' contexts. So in addition to inviting students to join us in the tropical rain forest or savannah, we will also focus on what creeps, crawls, and slithers in the local community. Students can practice the "animoves" of the creatures that they find in the schoolyard, or in a small patch of garden soil.

2.1. Finding binary opposites:
What binary concepts best capture the wonder and emotion of the topic? If this were a story, what would the opposing forces be?

The kinds of bodies different animals have and the "animoves" associated with these animals are directly related. The ways animals behave and move represent how they deal with problems they face in their habitats. This unit aims to evoke students' sense of mystery and wonder at the diversity of animals and their adaptation strategies. To this end, it will include consideration of animals of all shapes and sizes.

The role-playing which students will engage in to study animal movement (that is, the story they will be acting out), will be based on the notion of predator and prey. Thinking about predators and prey can evoke a variety of emotional responses including anticipation, excitement, fear, and surprise. Notions of predator and prey are also useful for teaching students about the interconnections between human and natural worlds because, within the cycle of life, everything is both predator and prey. In this unit students will role-play being both predator and prey, and will also consider how animals that one might at first consider predators (human beings, lions) are also prey, and animals one might consider prey (rabbits, deer, insects) are also predators.

2.2. Finding images and drama:
What parts of the topic most dramatically embody the binary concepts? What image best captures that content and its dramatic contrast?

To best evoke the images and drama in the topic one might begin with animals that students may immediately consider to be predators. So, for example, they may take on the role of a lion or tiger on the savannah. Students will get down on all fours and may proudly roam around. Their movements will

change, however, if they suddenly notice their prey. Female lions hunt at dusk or in the evening, and generally in packs. Students will be asked to imagine the end of a day, the soft light spreading across the tall grasses as the sun begins to set. They roam with a few others, starting to feel the hunger in their bellies. They are on high alert for prey. Their prey consists mainly of large mammals, such as antelopes, gazelles, warthogs, wildebeests, buffalo and zebras, but smaller animals like hares and birds are also taken occasionally. The students, like lions, will hunch down, silent and still. They will then pounce forward, with as much might as they can muster, toward their imaginary target. One might enlist some students to become the prey, the gazelles, for example, who move differently, more gracefully, perhaps, with heads up, always alert to their surroundings. Upon hearing a movement beside them they might leap to avoid becoming a predator's dinner.[209]

Spiders are another kind of animal that may powerfully capture the drama and wonder of the topic. Wherever you live, you are always close to a spider—a creature that has a long history of being a source of both fear and fascination. Spiders are abundant and widespread, able to survive in almost any location on Earth. You are far more likely to run into a spider when you go out for groceries than you are to meet a lion. Which would cause a greater scream? Well, for some people it is hard to say. There are, of course, more harmless spiders than there are harmful ones when it comes to human beings. Still, these creatures can send people running.

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[209] The extent to which students can actually experience the animal movement or "animove" is, of course, limited by the kinds of bodies we have. We might also discuss this with our students in activities that support the Activeness principle.

Spiders spin silky webs to catch prey. Once caught, they may immediately bite the prey and release a toxic poison or, first, wrap up their supper making sure their victim doesn't bite them first. Given some yarn, students may attempt to make a web of their own between two posts or two trees. How quickly can they wrap someone up with the yarn? (We might be wise to leave the biting out of this school-based activity!)

Students may be encouraged to try some of the defensive strategies of spiders. Spiders are, of course, prey for other animals. Animals that feed directly on spiders include birds, reptiles, mammals, centipedes, and scorpions as well as other spiders. So what kinds of movements save these spiders? American tarantulas use the barded irritant hairs on their abdomens to protect themselves against predators like lizards and mammals. When feeling threatened, they brush their back legs rapidly across the back of their abdomen. Could students crouch down and attempt the same? (What the spider's movement achieves is to send sharp hairs into the eyes, nose, and mouth of the predator chasing them. This gives the spider time to crawl away.)

One of the most amazing ways spiders protect themselves is by a process called autotomy. Autotomy refers to the spider's ability to amputate its own leg in order to escape a predator. So if a bird or other predator has taken hold of a spider's leg, the leg breaks off close to the body. (Young spiders actually regenerate lost legs!). How might our students' attempts at crawling like spiders change when they are told to tuck away a leg or arm? Some spiders play dead, or

imitate things that their prey will not touch. Dung Spiders imitate bird droppings on vegetation for example. Surely students could try that out!

While hiding or camouflaging themselves can be a very useful survival technique, not all spiders take this passive route. The Two-Tailed Spider (also called the Rotating Spider) actually bursts into activity when prey such as an ant approaches. As the spider crawls rapidly around and around, it releases its web thereby entangling the prey in the silky bands. Other spiders actually act like ants. This strategy can save the spider from bird predators (who think they are a dangerous stinging ant) and can also help the spider procure an ant snack. When spiders behave like ants, ants will more readily approach them. Spiders can also mimic the smell of the ants they kill, thereby attracting others.

Spider crawling is, of course, how most get around. But spiders have truly fascinating bodies that allow them to grip onto surfaces and go straight up. No human beings can do that. (Well, no one except Peter Parker, the fantastic Spiderman who was bitten by a radioactive spider. The bite gave him amazing strength, a "sixth" spider sense, the ability to form webs and crawl on walls and ceilings. But that's another story.) So how well can our students crawl? Can they crawl up anything? Can they attempt to crawl with eight legs? To do this one student may get on all fours and another on top of him or her. Crawling gets complicated now! Some spiders are also jumpers and even gliders with wing-like flaps under the abdomen that can extend their jumps. Although not a part of daily life, some spiders can swim for survival. Pretty impressive.

2.3. Structuring the body of the lesson or unit:
How do we teach the content in a story form?

Each of the different movement lessons could focus on the struggles of some prey and predators. So, for example, we might build on the examples of the spiders above and introduce some initial spider movements. Students may be encouraged then to notice some prey, to weave their imaginary webs, to sit and wait for the prey to get ensnarled in their webs. They could crawl over, bite and kill (perhaps even chew with spider jaws) the prey. But, of course, there is no peace in the world of predator and prey. Students may be told that a bird is nearby, a very hungry bird whose attention has been attracted by the recent movement of the spider. What to do? Do they attempt to crawl away? Do they jump away and try to hide? It might be interesting to introduce several species at a time. Students may learn about bird movements on the day they learn about spiders. This way, a culminating activity might be for some of the students to take on the role of the birds, and the rest the role of spiders, each re-enacting the appropriate movements.

No matter what context we choose to depict for the students, we will tell the story of a certain species, how it moves and how it survives, and we will include in the mix a predator for that species, so that various movements can be explored. There will be much wiggling, crawling, creeping, slithering, leaping, hopping, diving, ducking, swinging, soaring, flapping, turning, tumbling and rolling in the stories we tell in this unit.

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What other cognitive tools support the child's sense of embeddedness in the world?

Because this is a physical education unit, the body is going to be actively engaged. The Activeness principle draws attention to how the body as a participant in the learning process can contribute dimensions to understanding we cannot gain through thinking alone. So as we choose activities, we need to consider ways to incorporate the body as a learner that employ the body's learning tools.

We want to be aware, too, of the difference between activeness and mere activity. You will recall that activeness is more than simply doing things. Activeness is more than playing leapfrog, for example, in an attempt to become a frog. Activeness will also include opportunities for students to try to think and feel like the animal whose movements they are repeating. In order to leap like a frog in a way that supports activeness, students will need to consider what the other parts of their bodies should be doing and how they might be feeling. Are their faces tilted up? Are they looking for flies? Are their tongues darting in and out of their mouths? So, how does leaping feel in the legs? Leaping like a frog will be paired with opportunities for students to reflect on what leaping, instead of walking or running for example, feels like. Students will be asked to make sense of the rhythm of the "animove" they are performing. So, what is the rhythm of a leap, versus a slither, versus a slide? For whatever animal is being studied, then, the teacher will also guide students in considering what being that animal might mean at the level of the body.

Van Matre (1979) discusses ways in which to help students focus on motion and how it feels to the body. Minor movements of the body engage many muscles at once. Van Matre suggests having students first write their names. As they do this, he suggests asking them to focus on what the pen feels like in their fingers. Can they feel its weight? Can they bring their awareness to where the pen touches their fingers, how it feels at the wrist and up the arm? How does the pen feel, how does the body feel, as they write their names? Van Matre (1979) suggests getting students to then switch hands. Are they now more aware of how the pen feels to the fingers, wrist and arm? The same kind of focus can be applied to activities like walking, running or throwing a ball. That is, we can pause in class in order to focus our attention on the muscular activity involved in movement.

4. Engaging with Context: Sense of Place

How can students learn about the topic in a way that engages them emotionally and imaginatively with some aspect of the natural world around them? How does the topic connect to the local environment? What does it mean here?

Although we may invite students to imaginatively accompany us in the remote Australian outback or into a tropical rainforest, the study of movement should also be directly connected to students' local contexts. We will want to consider how to assist students in developing an emotional attachment to some nearby feature of nature. Students could be asked to select an animal, wild or domesticated, that lives in their local community. They could study it closely in order to prepare to imaginatively become it. There are many animals that students can take on, whether of the domesticated soft and furry kind or the wild kind. Cats like to rub up against things, arching their backs, sharpening their

claws. Dogs like to chase their own tales, play fetch, run, creep, and pounce. All around us there are spiders, snakes, flies, fleas, bees, butterflies, squirrels, raccoons, and rabbits, with which we share the contexts in which we live. Each has its own movements and actions that students may imitate. These animals may contribute to students' sense of place if they are incorporated into teaching in a way that supports students' emotional connections. What local animal do students most identify with? What "animove" are they most comfortable doing and why?

5. Conclusion

How does the story end? How do we resolve the conflict set up between the binary opposites? How much do we explain to the students about the binary oppositions? How do we give them some sense of the mystery attached to this topic?

The very nature of this activity brings to the fore the dual roles that animals play. They are both predator and prey. Even though we do not consider ourselves prey, we are, of course, prey to carnivorous animals that might encounter us. The predator-prey relationship is one that contributes in key ways to the survival of life on Earth. If one removes some animal from the mix—say, for example, if habitat destruction leads to the extinction of a certain kind of spider—there will be repercussions in the natural and human world. Whatever insect that spider helped control may flourish with devastating results. And so, our teaching of the movements of animals could be paired with an appreciation for the diversity of animals and their movements, a peek into the vastness and complexity of life on Earth.

6. Evaluation

How can one know whether the topic has been understood, its importance grasped, and the content learned?

Evaluating a unit like this could be easily done through asking students to demonstrate the various kinds of movements listed in the curriculum. But on a deeper level, what students are learning is that there is a diversity of movement in the world that human beings can only begin to imagine. Students may be asked, thus, to pay tribute to this movement. They may work in teams to exemplify the movements of the desert, rainforest or local community. What will likely emerge is a kind of dance that students can be encouraged to perform with or without music.

Suggested Activities

Other kinds of activities appropriate for this unit might include tracking, stalking, and orienteering. The game of charades would be an active and fun way for students to demonstrate various movements. Students could also be asked to do their own research into a geographical region and its animal inhabitants. They could then lead the class in an imaginative journey of the kind that you will have demonstrated. Students could lead the class in moving like certain animals and their prey. They could have their classmates re-enact some predator-prey scenarios or create games in which students demonstrate "animoves."

Extensions

The study of movement that I have associated here with physical education may complement various areas of study in the science curriculum and could lead into discussion of more complex processes. Students could, as part of the science curriculum take part in "movement scavenger hunts" (Birchard and

Crook, 2005, p. 36). They could be asked to look around a local park or the school grounds and note examples of things moving (for example, clouds drifting, leaves falling etc.). They might be provided with tasks that include finding things that fall, jump, slither, tilt, or wobble. They could be asked to discover things getting bigger or smaller.

These explorations of movement may lead into discussion of more complex processes such as adaptation and interrelationship. So, for example, we could discuss how animal movements are not only influenced by the kinds of bodies they have, but also by the terrain they encounter. The animal and the place interact. Studying animal movements may lead into broader discussion, thus, of how animals and places are interconnected. The predator-prey relationship around which this unit has been shaped is an example of interdependence; prey provide predators with food. There are, of course, cooperative rather than competitive kinds of relationships where animals actually work together to fulfill their individual needs that can be explored as part of a discussion of interdependence.

Developing Literacy Skills: The Subjunctive and the Technicolour Dreamcoat

How can students learn different verb tenses in imaginative ways? How can learning about verb tenses support an ecological understanding of the world? The aim of the following unit is to show how we might engage students emotionally and imaginatively in learning about verb tenses, and how verb tenses make it possible to encounter an extraordinary world. While the detailed

example I provide focuses on the subjunctive verb tense, the unit format is flexible and may be used in a similar way with other verb tenses or in a review of verb tenses. In the "extensions" section that follows this verb tense example, I describe some imaginative and ecological means to support vocabulary development. What emerges is an idea of how to develop students' literacy skills imaginatively and ecologically.

1. Locating importance

What is emotionally engaging about this topic? How can it evoke wonder? Why should it matter to us?

This lesson will evoke wonder concerning the power of the subjunctive verb tense to transport us from the actual world of the everyday, to the world of possibility. It is the verb tense of imagination and as such involves creativity, ingenuity, and freedom. The creativity, ingenuity and freedom contained within language will be sources of emotional engagement.

2. Thinking about the content in story form

How can we shape the content so that it will have some emotional meaning? How can we best bring out that emotional meaning in a way that will engage the imagination?

What's the story on the subjunctive verb tense? How can we generate a story context for our teaching in which it will become clear to our students what the subjunctive does, and how it differs from other verb tenses? We can shape the concept of the subjunctive tense in an emotionally powerful way by highlighting the qualities of this mysterious stranger, the elusive "Subjunctive." The "Subjunctive" is a chameleon of sorts; he is what people want him to be, and he does what people want him to do. To some he may appear purple, to others red or blue. He may, indeed, wear a cloak of invisibility! He is whatever those

who encounter him imagine him to be, and ask him to do. He transforms one's world into whatever one imagines.

2.1. Finding binary opposites:
What binary concepts best capture the wonder and emotion of the topic? If this were a story, what would the opposing forces be?

Our teaching can be shaped around the abstract binary opposition of the ordinary and the extraordinary. Possible alternatives might be imaginative and unimaginative or boring and exciting.

2.2. Finding images and drama:
What parts of the topic most dramatically embody the binary concepts? What image best captures that content and its dramatic contrast?

We may capture our binary oppositions with an opening image of a very drab, very colourless, very *boring* world. Very bored and very *boring* people live in this drab, boring, unimaginative world. One day a mysterious stranger comes to town and everything changes. The world is transformed. The mysterious visitor (and soon to be long term resident) is the subjunctive verb tense. He gives people the power to imagine different realities, to exceed the actual and enter an infinitely creative world of possibility. In order to engage students' imaginations we need to think of a way of distinguishing the subjunctive from other verb tenses. Our narrative will humanize the subjunctive by identifying its "character." In this way we may create a vivid mental image for students of what the verb tense is and does.

2.3. Structuring the body of the lesson or unit:
How do we teach the content in a story form?

We might introduce students to this mysterious stranger who, like a chameleon, changes constantly, depending on whatever his "host" wants him to

be. We could invite students to draw or enact their image of the subjunctive tense in ways that identify its distinguishing features. Having created the subjunctive character, the next part of the lesson would be to help students create a story in which the subjunctive—the mysterious stranger—drives the plot.

We could ask the students to think about what they would do if the subjunctive were to come to their door. How would he appear to them? Would they invite him in? What would happen if they did? What new possibilities would they envision for themselves and for the world? That is to say, how does the subjunctive change the world they know? What would it be like without the subjunctive?

We could ask students what, if any, scientific discoveries and technologies would even exist today if we didn't have the subjunctive, if we didn't have the power to imagine. It may be useful to focus on the ingenuity and imagination that underlies technology like ipods and cellular phones that can take pictures, send email and—if you ask nicely—could probably make dinner once in a while. Students take as commonplace these amazing technological advances that result from the power of imagination.

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What other cognitive tools support the child's sense of embeddedness in the world?

This step in the planning process asks us to consider what one's somatic understanding of the subjunctive mode might look like, and how one might develop it. One possible way to do this would be to consider what the body

contributes to imagination as well has how, in the body, imagining feels. So, students might be asked to spend some time considering the relationship between their sensory engagement in the world and what they imagine. The senses provide, in part, the sensory information with which the subjunctive mode can work. Our senses provide us with imaginative resources. Van Matre (1979) describes an activity called a "Touching Trail." The teacher creates a trail or series of stations in which students encounter various textures: rough, smooth, silky, feathery, slimy, bumpy, brittle, spiky etc. (p. 178). In this activity, students work with a partner. One person is blindfolded and is led by the other through a highly tactile experience. Students are asked to consider how they might imagine the world if they could not see it but could only feel its textures. This activity could work just as well if students seated themselves apart in a local park or somewhere in the playground upon grass or soil. They could then be asked to refrain from talking and to blindfold themselves. They could be guided in trying to temporarily empty their minds and to focus on the present. What image of the world emerges from the sounds, smells and textures they encounter? Of course, students will already have a clear image of what the world looks like, but the teacher can encourage them to set this image aside, and try to "look" upon the world as if they are hearing, smelling and touching it for the first time. One could also ask students to imagine that they had an additional "sense" with which to engage with the world around them. What would it be? How would it feel? How would the body employ this sense? One might also ask students to try to feel how the body responds to imagination. By this I mean we might alert our students to what imagining does to the heart rate, to one's breathing or to one's overall

mood. Does imagination make the heart race sometimes? Can it affect the rate at which one breathes? Does imagination lift one's mood?

4. Engaging with Context: Sense of Place

How can students learn about the topic in a way that engages them emotionally and imaginatively with some aspect of the natural world around them? How does the topic connect to the local environment? What does it mean here?

The communities that students live in reflect a certain kind of vision; they are products of how human beings have imagined that we should live, where and how. They represent certain understandings of the human-nature relationship. Someone's imagination was at work when houses were designed as they are, when schools were designed as they are and when communities were developed. What was the vision? Is the community one in which people come together? Are houses constructed and located in a way to support this? What if the community was designed differently? Teachers might help students imagine the world thousands of years ago, without schools, restaurants, paved roads, and street lights. What if a different vision, a different image of what the world should be, had emerged? What if, from the time of the first inhabitants on the Earth through to the present time, human beings did not adopt a position of control and manipulation of the Earth? What if insects were in charge? What would the community look like then? Students could be asked to take on the role of some feature of nature in their community (animate or inanimate) that they have already learned something about or, perhaps, a new feature. They could consider the questions posed above from the perspective of some natural object. What might be the "community" vision of a slug or a dandelion? Students might be asked to describe their community from an alternative perspective of their

choosing. The objective of this kind of activity would be for students to employ the subjunctive tense as they considered that where they live—the way people interact, the meanings of different places and how these are constructed—represents only one vision of the world.

5. Conclusion

How does the story end? How do we resolve the conflict set up between the binary opposites? How much do we explain to the students about the binary oppositions? How do we give them some sense of the mystery attached to this topic?

To conclude our teaching on the subjunctive tense, we can ask students to consider what it allows them to do and to experience. We will want to help students see that the subjunctive is part of a system of language that, together, enables human beings to make sense of the world around them. As a means to bring a study of multiple verb tenses to a close, one might ask students to consider all of the different ways language allows one to move in time, or to express oneself. We will want students to review the grammatical structure of the tense, as well as to identify what "power" the tense has to create worlds. That is to say, what each tense allows them to do and to experience.

We will also want to help students resolve the conflict set up by our binary oppositions of the ordinary and the extraordinary. By making each tense into a "character" and identifying its distinguishing traits, students can enact the tenses. How would each tense act? Dress? Move? How would the tenses—Mr. Future, Ms. Past etc. —come together in dialogue? What unique aspect of reality does each add? This activity can help students see that the world is neither completely ordinary nor extraordinary, neither totally colourless nor colourful. Verb tenses

have the power to shape our worlds and engage our emotions in colourful and imaginative ways.

6. Evaluation

How can one know whether the topic has been understood, its importance grasped, and the content learned?

Traditional forms of evaluation like tests, written work, projects, and so on, can reveal students' knowledge of how to write using the subjunctive verb tense (or any verb tense for that matter). I would be inclined, however, to give students a short project in which they explore their own visions for the world by using the subjunctive tense. One could have students do this from their own perspective, or from the perspective of a plant, animal or mineral. As described previously, it is also important to try to assess the extent to which students' imaginations were engaged in learning. One might consider indicators like the degree of student enthusiasm, the way the topic invades their intellectual activity in general, their pursuit of aspects of the topic beyond the requirements you outline, their questioning and searching out of additional sources of information, and their desire simply to talk about it.

Suggested Activities

In the language arts curriculum, one can incorporate the ecological dimension by shaping teaching around ecological themes or topics. One could, for example, develop students' abilities to use multiple verb tenses while they learn about green plants and photosynthesis. Any topic can be an integrative theme for using language skills. A theme like relationships, for example, could be examined, and students could employ whatever verb tense they are studying in any number of activities. For example, activities focusing students' attention on

the ways their bodies are interconnected with the natural world might be used to develop the present tense. While sitting quietly or lying down outside, students could be asked to provide a running commentary (a "play by play") of all of the various sensations they are experiencing. They could then be asked to give a running commentary of the same event from the perspective of some other animal or plant with which they shared the experience. So, for example, the grass beside or under them, or the bee that came to investigate their presence, could provide the new perspective that they adopt in the second activity.

Extensions

This unit has aimed to show how one could teach one aspect of language and literacy development—verb tenses in general, and the subjunctive mode in particular—both imaginatively and ecologically. Egan (2006) discusses how to engage students' imaginations in developing a range of literacy skills. My contribution to Egan's (2006) work was to provide, in the Appendix to the book, examples for teachers of how cognitive tools could be employed to teach literacy skills. This section focuses on a few of these examples; how the cognitive tools of the story form and images might be used in activities that support literacy development. I revise these examples here, however, discussing how these literacy development activities might be made more ecological by engaging the body and employing place-making tools.

Egan (2006) describes how teachers may employ story form to draw students' attention to detailed word forms. Detailed word forms are those that contain other, smaller words within them. My example is about how we might

teach about words containing the word "ear" by having a game of "hide and seek," first with the ear and then the eye. So, we may read aloud a short text and ask the students where "ear" is hiding. Then the students may read the text and identify where "ear" is hiding. Here is a possible text:

> Once upon a time there was a b*ear* named Bob who was absolutely f*ear*less. No f*ear* at all. This d*ear* b*ear* participated in skate boarding competitions every y*ear* that were n*ear* his home, as well as others cl*ear* across the country. Did you h*ear* what happened to him last y*ear*? He took a fall that caused him to shed many a t*ear*. Thankfully he had on all his g*ear*. So now we know Bob has one f*ear*: falling on his r*ear*."

Students could be encouraged to make up their own "hide and seek" stories with other detailed words ("ink" —stink/link/pink/rink/fink/wink...).

While this suggestion may evoke students' imaginations, it does not yet engage the body in context. To do this, one could extend the game of hide and seek out of doors in ways that somatically engage the body in learning. For example, students could be asked to take a walk in the playground and find objects that engage their senses differently. So, instead of asking them to find objects that they can see, one might ask students to find natural items that they can smell or hear instead. What natural items can they smell, but not hear? Or what can they hear, but not smell? What can they both smell and hear? Students might list things like birds, flowers, long grass moving in a breeze, dirt, leaves falling, a tree or branch creaking, rain falling, a squirrel, a rabbit, etc. What hidden words can students find within the natural objects they encounter outside? They could then identify hidden words within these – FLOWers (fLOWers/flOWErs/fLOWERs), bRANch (BRANch, brANch), raIN, rabBIT etc.

This activity could also encourage students to notice what actually is "hiding in the grass" or, in a general sense, to pay more attention to the natural world around them. They may be encouraged to remain alert to, and keep track of, all of the animals that they observe in their community. Students might develop their vocabulary and focus on spelling by being asked to "find" a certain number of natural objects outside that begin with certain letters of the alphabet. They could, alternatively, be asked to find a certain number of objects that live in grass, water, soil, or air. All of these kinds of activities can increase students' knowledge of their local natural contexts. They may be encouraged to share their knowledge with their classmates. They could, for example, report back to the class what their investigations revealed to them in terms of the letter "b," or in terms of "dirt," or whatever criterion may have been provided in the activity.

Below you'll find four additional activities that suggest how images might be used to support literacy (See Egan, 2006). All of the activities reflect ways to develop students' vocabulary and have some clear interdisciplinary connections. I have, as above, made additional suggestions as to how to engage students somatically in these activities, as well as how they may be used to develop sense of place.

How Are You Today?

In this activity students will learn adjectives associated with different emotions. To begin, students could be asked to imagine what their faces look like up close in a mirror. (Students could actually stare into mirrors for this activity.) They may be told to focus closely on their eyes, eyebrows, nose, dimples, mouth, wrinkles etc. What does "happy" look like? What do "sad," "ecstatic,"

"surprised," or "tired" look like? Students may then draw these faces and write the appropriate adjective(s) next to the face. They may then be asked to imagine what makes them feel emotions like happiness, surprise, or worry. They may identify key-words from the images that come to mind. The body might be engaged more centrally in this activity if we extended the activity to include having students consider what different expressions feel like in other parts of the body. Does smiling have a different overall feel than a frown? We might have students try to express different emotions without using facial expressions but, instead, by using their hands only. What could one do with the fingers to express surprise? Flicking perhaps? What does anger look like in the hands? Clenching perhaps? One could use this opportunity to give students sensory experiences with water if, rather than mirrors, students had an opportunity to stare into puddles in the playground. As part of the activity and the development of vocabulary associated with different emotions, students would also be touching, observing, smelling and possibly tasting the water. Movement in the water would distort their reflections. What new emotions do these distortions reflect?

What's In Season?

In this activity students will use images to develop vocabulary around different activities and seasons. To begin, students will be asked to name their favourite outdoor activity. They will be encouraged to imagine as vividly as possible what they look like, and what their surrounding environment looks like, as they enjoy this activity. From this image, key-words may be identified. The best season in which to partake in this activity will be identified. Features of this season—whether adjectives or other words associated with the

environment/climate, or with themselves and their actions—will be written down. The student will then be asked to imagine doing the same activity in a different season. How does the activity change? What happens to the image? More key-words may be identified. How does this different season, climate, weather conditions etc. influence the clothing worn, and the activity itself? (e.g. skiing in summer). The aim would be to develop vocabulary around students' favourite activities (adverbs associated with *how* the activity is happening, in addition to nouns and adjectives that describe equipment and themselves engaged in the activity) as well as around climate and weather.

Weber (2004) shapes a unit around the topic of Phenology or "the study of natural phenomena that recur periodically, such as migration or blossoming, and their relation to climate and changes in season" (p. 2). Students could be asked to describe the seasonal changes in flora and fauna where they live. What conditions need to exist for these changes to happen? Students could be asked to select one local plant and animal species to study over a school year. Their documentation of the changes that occur would be a means to support vocabulary development, and could be used for any number of creative writing activities. So, for example, what are raccoons, grey squirrels, mice, grasshoppers or flies doing in the spring? How does their activity change with the season? What is the life cycle of the Easter Lily or another wildflower that blossoms in the spring? Students could write poetry about their topics. Students might keep journals that track the changes they observe, and include images as well as text.

This kind of activity has clear connections to the science curriculum in terms of the study of specific organisms, and also crosses into the social studies curriculum in terms of study of the child's community. Its ecological importance is that it can enhance students' understanding that community is both natural and human, and can make him or her alert to the ever-changing world of nature.

No Walk In The Park

In this activity the teacher will begin by taking students on a "sensory stroll" around the schoolyard or a local park. They will be asked to focus on some aspect of the experience, such as what they hear, smell or see. Different students could be assigned a different sense to focus on. Following the stroll, teachers could help the students create a mental image of the stroll, but will then add a twist to this "peaceful" walk in the park. The teacher will insert a variety of different animals into the image and students will respond to the appearance of each animal in unique ways. Students will employ different adjectives to describe the animals, as well as different verbs and adverbs to describe their actions. The image-provoking text could be something like this:

> It is a beautiful spring morning in (wherever). The sun shines brightly in the sky creating a dappled pattern of light and shade across the path as you stroll through the forest. You smell/see/hear (descriptive words). A light breeze blows, filling your lungs with sweet spring air. Suddenly, emerging from the bushes and landing directly in front of you, is a (fox, giraffe, slug, hamster, grizzly bear etc.). The animal is (adjectives). You feel (adverb) and you immediately (verb/verb, adverb).

What's Your Favorite Colour?

In this activity students will be exploring nouns, adjectives, and use of the superlative. They will begin by identifying their favourite colour. Next they will

be asked how many different shades there are of their favourite colour. What objects in the human world are that colour? These words may be written down. What objects in the natural world are that colour? Which human-made object best represents that colour? (What is the bluest?, reddest?, etc.) What natural object best represents that colour? Students could be asked to imagine being completely surrounded by these objects, completely surrounded by this colour. What words describe this image? Alternatively all students may be asked to consider a colour that the teacher selects, such as red or yellow, and follow the same steps. The next activity could be with an "opposite" colour—adjectives could be compared and contrasted, listed etc.

Students could be given the opportunity to engage in colour scavenger hunts in their communities—whether in the schoolyard, at home, or somewhere in between. Their challenge would be to find as many different shades as possible of a colour they choose, and capture these with a digital camera. Students could also collect natural objects that are various shades of green, grey, brown or yellow and create names for these nuanced shades. One could provide students with paint swaths (from hardware stores for example) that they might use to match with natural objects.

Imaginative Ecological Education: Romantic Understanding

Decoding Patterns: Welcome to Training Camp

"Patterns and Relationships" and "Shape and Space" are two guiding themes in the mathematics curriculum for students in British Columbia,

Canada.[210] In particular, students in Grades 6 and 7 learn about concepts that include symmetry, tessellations, and reflection. This unit looks at how one might teach these topics in a way that fulfills the prescribed learning outcomes in imaginative and ecological ways. The unit will engage students as "Pattern Detectives," drawing their attention not only to the beauty of pattern, but also to its function. Students will undergo detective training that may help make them more alert to various kinds of patterns that surround them. They will explore visual patterns as well as patterns of sound, texture, and movement. Their mission will take them beyond recognition, however, and into the realm of "decoding" the function of the patterns that surround them. Like the first example I provided for Mythic understanding, this example contains (in italics) some personal reflection on the pedagogical considerations that shaped my formation of this unit.

What does the suggestion that we can "decode" nature's patterns say about human beings and about the human-world relationship? I am not completely comfortable with the term "decoding" in this unit. It applies a human term to the patterns of nature that is not suitable. It also infers that it is humankind's task to make sense of these patterns, and that we can in fact do so. Nature's patterns are obviously not "codes" in our sense of the term, and likewise, do not exist for humans to unravel. They are intrinsically valuable in their beauty and form, as much as they are instrumentally valuable in terms of what they can teach human beings. They are, of course, instrumentally

[210] You may access the Prescribed Learning Outcomes for mathematics at the following website: http://www.bced.gov.bc.ca/irp.htm

valuable in nature itself. It seems presumptuous to even suggest that human beings are equipped with the skills or intelligence to make sense of all of the complexity of nature's patterns. This is not my intention. Rather, I want to suggest to students that there is an immense amount we can learn from nature if only we have the skills to do so. In this way this unit might help students realize the vastness of nature, its complexity and, of course, the limited abilities human beings actually have to make sense of it all. At the same time, through shaping the unit around training students as "Pattern Detectives," I have an opportunity to explicitly engage the body in learning by developing each sense. In this unit I use the term "decoding" only to enlist students in the role of detectives. Through the somatic ways in which students are learning and with an emphasis on the sense of mystery, I aim to support an ecological perspective and to identify the intrinsic value of nature.

1. Identifying "heroic" qualities

What heroic human qualities are central to the topic? What emotional images do they evoke? What within the topic can best evoke wonder?

Patterns are aesthetically pleasing; they can, indeed, be absolutely stunning. While patterns are something that we might, at first, associate with artwork or fashion, in actuality we are surrounded by them. Visual patterns are ubiquitous in our lives, whether it be in the shadow of branches across the ground on a sunny day, the way we have tiled the floors of our home, the look that drew us to buy that particular couch or set of curtains, the way roses seem to unravel as they bloom, the clothing we wear, or the art we hang on our walls. The visual patterns of the natural world are particularly spectacular, and are often the inspiration for the patterns we recreate. From butterfly wings to the countless

shape and colour combination of flowers we know (and do not know,) to the way mushrooms emerge from the ground, frost forms on window panes, or ice cracks under pressure, patterns are everywhere. The diversity of visual pattern and of form in nature is unmatched by anything in the human realm. Mathematics is, of course, interested in another kind of pattern—the patterns of numbers and symbols found in equations, patterns that help to describe phenomena and solve real-world problems, natural and human-made alike. When we add to the mix the patterns of texture, sound, smell and movement that surround us in nature and in the human-made world, the concept of pattern becomes quite mind-boggling.

Is it problematic to juxtapose the human and the natural in this discussion of patterns? Patterns are everywhere. From an ecological perspective, human and natural worlds are completely interconnected. Given this premise, I am aware that the way I discuss patterns and engage students in learning about them should not separate the two realms. To this end, I intersperse examples of patterns that are natural with those that are human-made. This topic seems particularly useful for developing ecological understanding because, if taught in a way that helps students to realize the meta-pattern that connects the seemingly "individual" patterns they are studying about, it can reinforce the message that human and natural worlds are completely interconnected. The choices I make in shaping this unit need to not only implicitly and explicitly express how natural and human worlds are interconnected, but they also need to reinforce an understanding of humans, not as privileged beings on Earth, but as members of the greater Earth community.

While the sheer diversity of pattern and, thus, its infinite scope, may be one heroic quality of pattern that we may develop in this unit, I am inclined to focus more on the meaning and function patterns serve. Visual patterns found in the natural world, for example, are far more than simply aesthetically pleasing. They actually communicate meaning that allows for individual species' survival that, if we consider the larger picture of life, contributes to all species' survival. Patterns of sound enable human beings and animals to communicate. We pattern sound in particular ways in the human world and call it Vietnamese, Swahili, or English. Music, similarly, represents patterns of sound. Animals pattern sound to communicate. The drone of crickets on a summer evening, the early-morning call of a rooster, or the bark of the family dog are other forms of language. Patterns of movement also have meaning. Species like spiders, bees, rabbits or deer use movement to communicate where to find food or the location of a nest, or as a means to scare off a predator. Physical patterns are a form of strength and stability. We may marvel at the beauty of a spider's web, but we might also consider its strength, the stability the pattern provides.

Within the narrative I propose, in which students are enlisted to "decode" nature's patterns, is it possible to move toward a more Earth-focused understanding of the topic of patterns? Simply because students are studying nature's patterns, we cannot assume that this unit can support either ecological understanding or ecological imagination. In order to support the development of an ecological perspective, students need also to move toward some understanding of the interconnectedness of life that is more Earth-centred. So, they will be asked to study pattern in the local community and then to consider

how the pattern is represented in larger contexts. What role does it serve in the local community? In the larger context? An ecological perspective also includes, in my view, an appreciation of nature for nature's sake—not just for its instrumental value to human beings. In support of an ecological perspective in this unit, then, we will want students to have an opportunity to work out of doors, to learn as much as they can about certain natural patterns, and then grow to appreciate the beauty in the form they are studying.

An image we might evoke for our students as we teach about patterns is that we are surrounded on all sides by patterns that work to sustain life. If we take the time to focus, we might be able to engage our senses with these patterns. We might help our students imagine the patterns in our lives as "silent" or "invisible" stories that, if one has the proper knowledge and skills, convey messages worth hearing. This unit enlists students as Pattern Detectives, experts trained in pattern detection and translation. Part of the aim in this unit will also be to support students' sense of the vastness and complexity of the world around them and of which they are a part. This will be part of their detective training.

2. Organizing the topic into a narrative structure

2.1. Initial access:

What aspect of the topic best embodies the heroic qualities identified as central to the topic? Does this expose some extreme of experience or limit of reality? What image can help capture this aspect?

Some people claim to have the power to see what to others is "invisible." We might tell our students that with the proper sensory training, they can acquire that ability. They can become Pattern Detectives. Pattern Detectives are skilled at seeking out patterns. Pattern Detectives can see what most of the population

misses entirely. They can identify and, perhaps, make sense of the visual, auditory, tactile and kinaesthetic stories that surround them. From the tiny patterns of cellular division to the global patterns of soil, water and air that sustain life, the research work of the Pattern Detective is never done. We will also want to help students consider the limitations of even the greatest Pattern Detectives. Where would we be in our quest to make sense of the world without the aid of modern technology? What animals are better than human beings at seeing, hearing, smelling, tasting or touching? What additional sensory tools do they have? How, for example, does the worm sense light without eyes?

What does the idea of "Pattern Detectives" suggest about human beings in relation to the rest of the world? Are they placed in a position of power? We will want to avoid privileging the human being, at the expense of other animals, when we discuss the "great" Pattern Detectives. Scientists who work to make sense of nature's patterns and processes are, on their own (that is, equipped only with the body's tools), very limited in what they can perceive. We might emphasize for students the limited range human beings can perceive unaided by modern technology. We might also consider animals that surpass us in terms of their sensory abilities. Take, for example, the hearing of a dog or its acute sense of smell. Of course, other natural creatures may not use their senses to study nature's patterns and learn from them in the sense we humans do, but animals must, on some level, make sense of patterns in order to survive. If we draw this dimension into the discussion we might support a more egalitarian view of human beings within nature.

2.2. Composing the body of the lesson or unit:
How do we organize the material into a narrative structure to best illustrate the heroic qualities?

We might begin by welcoming our students to Pattern Detective training camp, a program for a select group of people born with certain skills and aptitudes for making sense of "invisible" messages. These messages are of top priority for human existence, not to mention quite ingenious in their form and delivery. The training we will take students through will be sensory training, activities that focus on individual senses, that make the "familiar" strange and that provide students with alternative perspectives of the world.

At this point in the planning process one needs to consider the conditions in which one is teaching. How much access to the natural world does one have? What kind of natural patterns can students encounter given their context? What kinds of activities can students participate in, given the time restraints of the school day etc.? Is it possible to collaborate with another teacher so as to create greater flexibility in the school day? Is it possible to take students on a field trip to increase their exposure to natural patterns? The activities I propose here may be conducted in most urban environments if students have access to a local park or other natural area. These activities may also be increased or decreased in length, depending on the time constraints of the teacher. Another important dimension for all teachers is their own comfort level. The kinds of things Imaginative Ecological Education encourages teachers to do in their daily practice may not be activities all teachers are comfortable with. Getting students outside can be messy, both figuratively in terms of student behaviour etc. and literally—mud is muddy and dirt is dirty after all. I would encourage

teachers to push the limits of their own comfort level so as to allow students these potentially messy but also potentially very rewarding outdoor learning experiences.

Van Matre (1974) describes a program for developing students' sense of emotional connection with the natural world that can serve as a guideline for the activities in this part of the unit.[211] Sensory development is at the core of Van Matre's program and, thus, all activities work in different ways on developing students' senses. Van Matre outlines activities in broad categories that might be adapted for this unit and included as central dimensions of Pattern Detective training: Sharpening Senses, Seeking Patterns, Perceiving Wholes.

In the Sharpening Senses part of their training, students will engage in activities that guide them in developing each of their senses in turn. They will be guided through activities that help them to focus on smells, textures, tastes, sights and sounds (For further detail see Van Matre, 1974). For example, each student might be given an apple (See Brown, 2005).[212] Students can be guided in closely observing it, taking note of what it looks like. What colours are on it? What different markings does it have? What does the skin or stem look like through a magnifying glass? Next they will focus on the feel of the apple. How does the top or bottom of the stem feel different from its skin? How does the

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[211] I am applying Van Matre's (1974) ideas to a different context than the one in which he describes them. Van Matre proposes an immersive outdoor experience, several days to several weeks in duration. Still, it is possible that the kinds of activities he describes may also support an imaginative and ecological approach to developing ecological understanding.

[212] Brown (2005) combines the story of the apple with sensory engagement. *Meditations on an Apple* is an example of how "the story of a single apple [can become] a whole curriculum in ecological literacy" (p. 184). While Brown's work focuses on the history of the apple, it demonstrates too how it is possible to invoke wonder and awe by taking the time to examine something closely.

apple feel different to the fingers, toes, or forearm? Students might rub their hands together or clap them vigorously and then feel the apple—how does the apple feel now? How does its weight feel to the fingers? Students might then be guided in focusing on the apple's smell and also its taste, being told to chew deliberately, to focus on the feel of the apple in the mouth, on the tongue, its taste, the release of its juices as it is chewed.

Training in Seeking Patterns will involve activities that focus students' attention on different aspects of the world (such as observing all they can about a tree), that frame the world in different ways (such as observing a specific thing or a limited area such as what appears through the space made by touching the thumb and index finger), or that group the world in different ways (such as looking for particular arrangements of shapes or lines). Returning to our apple example, students might record all they can about their apple. They might use magnifying glasses to focus on one particular aspect and describe it in minute detail, or they might look for patterns of texture or colour on its skin.

Perceiving Wholes training will involve activities that help students take a broader or more expansive look at the world (they might be encouraged to focus on the horizon, for example, and also try to comprehend all that is below and above it), that get students to focus on negative space (for example, they might be asked to focus on the "empty" space between the branches of a tree or behind a flower, rather than the branches or flower itself)[213], to survey where they are and so "collect" all the details they can from various perspectives, and to coordinate

[213] Van Matre (1974) calls the process of accentuating the negative space as "filling" (p. 43)

their senses so that they take in their surroundings as richly and as completely as possible (See Van Matre, 1974). In these activities, students learn that the tiniest of objects are as important to understanding context as are the largest. Students will be encouraged to scrutinize where they are methodically. At this point we might take the apple study outside to a tree (preferably an apple tree), and have students look at the apple in the broader picture. What new meaning is brought to the apple when it is encompassed in the larger picture in this way? Where does the apple fit in the larger scheme of the tree? Where does the tree fit in the larger context of the field or forest or community?

The narrative shaping this unit will involve training students as Pattern Detectives in, possibly, a way described above. Students could "graduate" in some kind of ceremony from their training programs, and be sent out to identify various kinds of patterns. Our story of patterns will not only emphasize the diversity of patterns, but will also consider how patterns themselves interconnect to form a meta-pattern—a pattern of patterns or, as Bateson (1984) describes it, the "pattern that connects."[214] There are similarities, in other words, in the form and function of patterns. We might begin teaching students about symmetry, reflection and tessellation by considering their form. We can then enlist our Pattern Detectives in finding examples of these pattern forms, and exploring their natural function. Consider how one might teach about symmetry in this way.

[214] Describing the world in terms of a "pattern that connects," Bateson emphasizes how "there is no 'thing in itself,' everything is always interconnected, contextual, relational" (Bateson, 1984, p. 11).

We will want students to understand that symmetry, in a very general sense, occurs when something is made of up exactly the same parts facing each other or around an axis. In geometry, rotation, reflection and translations are all forms of symmetry based on the Euclidean plane. In mathematics, exact symmetry is possible. In biology, symmetry refers to the balanced distribution of duplicate body parts or shape and is approximate. Human beings exhibit this kind of approximate symmetry insofar as what we see on the left side of the body is duplicated on the right (well, hopefully). Most multicellular organisms exhibit some kind of symmetry whether radial (so the top and bottom halves are the same) or bilateral or plane symmetry (there is a left and right side). Students can look in the mirror, or at each other, for examples of facial symmetry or the body's symmetry as a whole. Most bilateral animals have identical shape on either side —mirror images if you will. A small number of organisms have no symmetry— they are called asymmetric. Students can be challenged to think of examples of plants or animals that exhibit symmetry (for example radial symmetry in jellyfish or starfish, or in certain flowers). They can also be challenged to find some examples of symmetry outside. One might encourage students to "capture" these examples through digital imagery, or through sketching in a journal. Having been introduced to the form of symmetry and having found examples of it, the function of symmetry can be explored. What does bilateral symmetry allow? What is its function? (Among other things, bilateral symmetry in animals such as human beings allows for active movement and agility.)

Teaching about reflection and tessellations might occur in the same way. Students can first be introduced to the concept and then they can be encouraged

to use their Pattern Detective training skills to find examples. They might begin with the perfect reflections and tessellations that can occur using mathematical formula. In the case of reflections, following some in-class exercises where students graph reflected shapes on various axes, students might be given mirrors and be told to create reflections that they could then sketch. They may work indoors or outdoors. So, for example, they could choose a flower or leaf on a branch, line it up with a mirror and draw both the object and its reflections. Any kind of a water source can also be used to explore reflections.

As part of their study of tessellations, students may work on computers exploring the sites that allow students to view and create their own tessellations (See, for example, Coolmath.com (2007)). Students might then engage in broader searches to find examples of tessellations in the community. While there are some naturally occurring tessellations (such as honeycomb for example) it is more likely students will discover these patterns in buildings, flooring or other patterned material. The artwork of M.C. Escher has become particularly well-known for its use of tessellations (not to mention other optical illusions). Our Pattern Detective training might, indeed, include a guest speaker—Mr. M.C. Escher himself (you, the teacher, role-playing of course!). One could easily take on the role of Escher, show students a variety of examples of his work, and talk about his life and work in a way that clarifies the human use of tessellations. (The next section considers how to bring human hopes, fears and passions into this narrative in other ways.)

To make clear how we are surrounded by patterns, we will want to extend our teaching to include other kinds of patterns including patterns of sound, texture, movement and symbols. In doing so we can make students alert to the ubiquity of patterns. We can evoke a sense of wonder around the power of patterned sound to enable communication, or how patterns of sounds and rhythms are the sources of enjoyment (music). We can engage students in thinking about the various sounds animals make, the patterns of sound, for example of bird calls or song. We can create activities in which students feel patterns of texture, both natural and human-made. We might blindfold them and have them feel the pattern of various cloths, pieces of bark, mosses or feathers. We can have them do some dog, bird, bee, chipmunk or ant watching so as to track the kinds of movements these animals demonstrate. We can study the patterned movements of the human body as it runs, walks, breathes, or dances. Mathematical formulas are patterns of numbers; written language is composed of patterns of letters. More than simply diverse, these patterns are meaningful. You wouldn't be able to understand any of this if they weren't. The next stage of our narrative will move into the realm of function; what patterns do.

So what we have done in this unit, then, is to engage students as detectives in the identification of various patterns. They have received training that has developed their senses and has taught them about various pattern forms. They have become cognizant of the patterns of the world that surround them and, too, the amazing complexity of these patterns. You will recall that in addition to teaching about the great diversity of patterns, our heroic quality shaping the unit is the meaning that patterns serve. Our narrative, then, will encourage students

to move from form to function, to begin to consider what meanings these patterns portray. What is communicated through the patterned movements of various animals? What is communicated through the patterned sound of animals? What function does the brilliantly coloured petals of a flower serve? To study this dimension of the topic and to make it emotionally and imaginatively engaging for students, one could look at the lives of some real-world Pattern Detectives, people passionate about finding out answers to these questions.

2.3. Humanizing the content:

What aspects of the narrative best illustrate the human emotions in it and evoke a sense of wonder? What ideals and/or challenges to tradition or convention are evident in the content?

There are Pattern Detectives all over the world. Some, like M.C. Escher mentioned previously, have committed their lives to creating and playing with patterns. Escher is perhaps most famous for his artwork and carvings which feature "impossible constructions" (the Necker cube and the Penrose triangle for example), explorations of infinity, and tessellations. His work might be considered a study of mathematical principles. In his graphic art, he portrays mathematical relationships among shapes, figures and space. Teaching students about Escher's life—his personal and professional challenges and successes (he did have an asteroid named after him in 1985—the "4444 Escher") can make this aspect of the unit emotionally and imaginative engaging for students.

Other Pattern Detectives have committed their lives, or part of them anyway, to decoding the patterns of life. We might, for example, introduce our students to Nobel Prize winner Karl Ritter von Frisch, an Austrian ethologist most well-known for his work with bees. Frisch was passionate about bees. He

studied the senses of bees and how they communicate. He was one of the first people to translate the meaning of the honeybee's "waggle dance." The "waggle dance" is a figure-eight movement performed by the honeybee that communicates to other bees information pertaining to the direction of, and distance to, flowers yielding nectar or pollen (or both), as well as to water sources. Although his theory of its meaning was disputed by other scientists, and received a lot of criticism and scepticism from other scientists at the time, it has since been definitively proved as an accurate analysis of the meaning of bee movement.

University of Queensland researcher Dr. Rebecca Dunlop is passionate about whales. With the help of other researchers, Dunlop has analyzed thousands of hours of humpback whale sounds recorded off the coast of Queensland, Australia. Her work has begun to translate the language of whales. Over the course of three years, she and her team identified at least 34 recurring sounds. Her work links these various sounds—from "wops, thwops, grunts, moans and squeaks" to "purrs and low yaps" lasting from less than a second to more than ten seconds—with different social settings (Howden, 2007). The sounds express a variety of meanings such as aggression and competition or affection. Dunlop describes the "wop" as most likely the call a mother whale makes to a calf. It is one of the most commonly recorded sounds.

Our narrative will include, thus, the stories of people committed to studying patterns. Doing so can reinforce the magical aspect of the patterns that

surround us. If only we could understand all of the patterns, the "silence" would be deafening!

2.4. Pursuing details:
What parts of the topic can students best explore in exhaustive detail?

The introductions to symmetry, reflection and tessellation will not touch on the highly complex and multivariate nature of these phenomena. Students might be encouraged to choose one of these patterns and become experts on it. Symmetry is, for example, not as simple as radial and bilateral. There are special forms of radial symmetry like pentamerism (roughly equal parts are arranged around a central axis at orientations of 72 degrees apart, as seen in the arrangements of apple seeds). Students might focus more closely still, being encouraged to find out all there is to know about other special forms of radial symmetry such as tetramerism, hexamerism, or octamerism. Students might take on the role of someone committed to studying patterns, or perhaps an artist known for particular kinds of patterned artwork. They would then learn everything they could about this person and perhaps demonstrate their learning through a "conference" of sorts—the first annual Pattern Detective Convention? Students might choose to focus on a particular kind of pattern format—for example, sound or texture—and collect different kinds of patterns in this group. They could classify what they collect according to whatever system they deem appropriate. They could even, based on detailed observation and research on some animal common to where they live, attempt to decode its patterns. What is it communicating?

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What cognitive tools support the child's sense of embeddedness in the world?

Can I support, through the activities I propose, a somatic understanding of patterns? As discussed previously, fulfilling the Activeness principle requires the teacher to be alert to the difference between students being active and activeness. If students are learning the "waggle dance," can I also include an opportunity for "pause" so that students can reflect on how the dance feels to the arms, legs, torso? To support activeness and Somatic understanding of patterns, consideration must be paid to the body's understanding of this topic. I have included a suggestion for how to have students focus on their own bodies and the patterns within them.

Much of what was described earlier as "Pattern Detective Training" represents the kinds of activities that can develop students' Somatic understanding of this topic. By developing their sensory skills as they study patterns, students' sense of relation can be enhanced. In addition to seeing, feeling, touching, tasting and smelling as a means to connect with patterns, we will want students to try to feel various rhythms. They can, for example, do the waggle dance. According to von Frisch's work, bees performing the waggle dance move in figure-eight shapes at varying directions and speeds. Their direction of movement is thought to convey information about the direction in which food or water is located, while the speed of the dance is believed to indicate the distance to the food (a slower speed represents a closer food source). Students might also be encouraged to study an animal such as an ant, bird or squirrel in terms of its

movements. What patterns emerge? What rhythms? Students can certainly imitate these movements, but they could also be encouraged to think of what rhythm or rhythms might represent the movements of the animal they are studying. Students might be challenged to create different rhythms or movements that best describe the examples of symmetry, reflection and tessellation they have been studying. So, students might create repeating movements in which they move parts of their bodies simultaneously. In small groups, students might be encouraged to use their bodies to create an example of reflection or symmetry. These kinds of activities—ones that employ the body's learning tools—can support Somatic understanding.

We can also, as part of this unit, draw students' attention to the patterned movements of their own bodies. We breathe in and out at varying speeds and depths depending on what we are doing. We live according to the internal rhythm of our beating hearts, a rhythm followed by the blood flowing through our veins. We walk and we talk in patterns. The music we enjoy—that resonates within us and can evoke emotions—is patterned sound that we relate to at a visceral level. Some guided meditative type activities can help students focus on these bodily rhythms and patterns. We may also help students consider the patterns of which they are a part by drawing their attention to the feel of the air on their skin, and the flow of air and water through their bodies. How do their actions enable or disable the patterns that surround them? How is each student "related" to another in terms of relationships and interactions? How is the bug related to the slug? The slug to the pug? You to me? Drawing out these types of

questions for students can help to reinforce the overall connectedness of the world, the pattern connecting patterns.

4. Engaging with Context: Sense of Place

What aspect of the topic might be learned in a way that affords students the opportunity to explore the natural world around them? How might learning about the topic support a sense of belonging in the natural environment?

Students' sensory training can connect the study of pattern to place. Following the kinds of activities described above, students will have much more detailed knowledge about the patterns of their local communities. To employ the creation of special places tool, students can be encouraged to explore further the natural patterns around them. They could participate in "pattern scavenger hunts" in which they hunt for patterns of certain kinds on school grounds, at home and throughout the community. They could create collages of digital images and sketches, in which examples of natural as well as human-made symmetry, reflection, and tessellation, are evident. They could create "natural soundscapes," where they bring together natural sounds that characterize the area. They might imitate bird sounds, the sound of wind or rain, the sounds of grasshoppers or frogs. They might then compose the soundscape that includes the human dimension so, for example, the natural sounds plus the sounds of cars, machinery, or planes overhead. Are there any particular patterns to language that identify their place? They might engage in some drama by doing visual reproductions as well—each taking on roles of features of the community (cars, birds, trees, water sources, air etc.) and bringing each piece together in a visual reproduction of place. Students might focus their reproductions on the patterns of human behaviour. How do people move in the school? What are their

actions? What kinds of sounds do they make? Beyond the school, what kinds of patterns of human behaviour do they observe? Do people walk, run, or drive? Do people tend to walk quickly or slowly? Do they walk alone, in pairs or in groups? Who runs? How do they run? Do students notice anything about when and where patterns emerge? How do the daily cycles (or seasonal cycles) influence behaviour patterns? What these kinds of symbolic activities can do is not only engage students in identifying patterns in their communities, but draw out the specific meaning of their contexts. They allow students to explore the local community context and may contribute to a sense of belonging—where do they fit into the community pattern? One might also consider how to have students create maps illustrating what they discover during these kinds of local pattern explorations. These maps may represent their emerging sense of place.

5. Conclusion

How can one best bring the topic to satisfactory closure? How can the student feel this satisfaction? How can we evoke a sense of wonder about the topic?

Romantic understanding can involve a feeling for the vastness of the world. This unit may make students' awareness of the extent of reality even more acute. Its aim has been to illustrate the diversity of the world's patterns and how these patterns surround us on all sides. The unit has also enabled students to be more alert to these patterns, and to contemplate what the patterns signify. So while they may feel, on some level, lost in a world of incomprehensible complexity and surrounded, perhaps, by stories they do not have the tools to read, students may also come to realize their involvement in the world. They may begin to think about how they are part of the patterns that surround them. How is each one of us a patterned being in terms of how the body works or moves?

What patterns do each of us participate in, as members of both human and natural communities? We will also want to evoke students' sense of wonder at the richness of the world. They have before them, as Pattern Detectives, a multitude of meanings, some of which they may never truly understand.

6. Evaluation

How can one know that the content has been learned and understood and has engaged and stimulated students' imaginations?

One way to evaluate this unit may be to have students complete projects of their own choosing. Given a basic set of criteria reflecting both the prescribed learning outcomes and also how the topic connects to place, students can demonstrate their understanding of patterns through written, visual or possibly dramatic means. Perhaps students could write a children's book in which they talk about what symmetry, reflection, or tessellation are, and include images or sketches. Students might prepare narratives that they could use as guides of "walking tours" of the area surrounding the school. On their walks they could direct the teacher and fellow classmates to any patterns they have discovered. Students might sketch natural and human-made patterns they discover, and use these as the basis for some creative writing in which they include the definition of what these patterns are as well as, where applicable, their possible functions. Students might create documentary-type presentations of the Pattern Detective Training program in which they highlight how one can, at home, discover the patterns in the world. Throughout the unit, they might keep a journal in which they include reflections on their experiences. In these journals, students could document what they are learning as Pattern Detectives in training. In order to evaluate whether students have been imaginatively engaged in learning, have

developed some Somatic understanding of the concept, and have employed their place-making tool (in addition to establishing whether they have developed a basic comprehension of symmetry, reflection and tessellation) traditional forms of evaluation such as basic testing could be combined with more open-ended activities like those described here.

Suggested Activities

This unit has contained within it a variety of the kinds of activities that can make learning about patterns both imaginative and ecological. In order to emphasize the heroic aspects of patterns around which the unit is shaped, learning activities should be such that students have opportunities to study a variety of kinds of patterns (for example, auditory, visual, or tactile patterns). Students may explore how to create these patterns for themselves through a variety of art projects. They may create mosaics. They may become "shadow catchers" (Van Matre, 1979), capturing on blank sheets of paper the patterned forms of natural objects. They may collect leaves, studying them for pattern and using them to create colour wheels. As Pattern Detectives, students will be well-equipped to go "grokking" (Van Matre, 1974). In this activity, students are told that "grokking" is the act of experiencing something with the whole body, with all the senses in unison, and with an awareness of these senses at work (p. 85). These kinds of activities can frame students' searches for patterns in ways that evoke their senses and that allow them to experience patterns in multiple ways.

Extensions

This unit could very easily become an interdisciplinary study. While the topics are, on paper anyway, related to the mathematics curriculum, there are

many connections to other curricular areas such as the arts, science, language arts, and social studies. All of the discoveries that students are making can be the basis for art projects of every kind. There are ample opportunities for students to explore the fine arts of movement or dance and music. Studying any specific animal, plant or rock provides an opportunity to extend the study in ways that fulfill many aspects of the science curriculum (such as research into different organisms and how they adapt to their surroundings). For example, the study of spider webs or butterfly wing patterns might easily lead into research into spiders or butterflies themselves. Barkman (2005) describes lessons for the science curriculum in which students study patterns of adaptation (in squirrels), patterns of diversity (in fireflies), and patterns of energy (in sunlight) (p. 38-41). One might also study the implications of human beings on the natural world by studying broken patterns. So, for example, like the canaries sent into the mines to determine air quality, frogs might be studied as "water canaries." Their well-being can indicate the health of their environment. Changes in their patterns can indicate changes in their ecosystem.

For English, students can use the patterns they discover in the human and natural community as the basis for creative writing projects. In teaching, one could also include stories about these animals that not only connect to language arts or English curricula, but to social studies as well. For example, Caduto and Bruchac (1988, 1991) describe how the stories of the First Nations people might be used to teach about ecological concepts. One might extend, thus, the study of pattern in relation to spiders' webs by using the Hopi story of "How Grandmother Spider Named the Clans" or the Osage story of "How the Spider Symbol Came to

the People" (Caduto and Bruchac, 1991, p. 29-31).[215] These stories are paired with interdisciplinary types of activities that can support students' Somatic understanding, and deepen their connection with place. By studying aboriginal stories related to one's specific context, one can also connect to the elementary social studies curriculum and the prescribed learning outcomes related to learning about Aboriginal culture.

(un)Sung Heroes: Punctuation Marks

Some of my examples thus far may, for some, seem particularly suitable to teaching in imaginative and ecological ways. Take soil, for example. One can obviously get students outside digging in the soil, gardening or doing other kinds of activities that engage the body in place. There are many fascinating aspects of the soil that can engage students' emotions and imaginations in learning. In this unit I aim to show how something most people would consider quite uninspiring can just as easily be a source of imaginative engagement, not to mention a source of Somatic and ecological kinds of understanding. The imaginative and ecological dimensions of punctuation marks and their rules of usage may not be obvious. This example shows how one might teach about punctuation imaginatively and ecologically.

1. Identifying "heroic" qualities

What heroic human qualities are central to the topic? What emotional images do they evoke? What within the topic can best evoke wonder?

It is common to sing the praises of great historical figures in history. This unit pays attention to some unsung heroes: the period, the comma, the semi-

[215] Caduto and Bruchac's *Keepers of the Earth* (1988) and *Keepers of the Animals* (1991) include stories and related activities that would very easily support the extension of this unit.

colon, the colon, the exclamation mark, and other forms of punctuation. Indeed, punctuation marks play an impressive role in written language. In some ways, they replace what our bodies do in oral language. The period marks the end of a phrase that might be marked somatically by an inhalation. The comma, similarly, indicates a pause in expression, perhaps a breath. Punctuation marks convey subtleties of meaning and express emotion that might be understood easily if looking at someone's face as they speak. Imagine my face. As I utter three words my eyebrows lift, the corners of my mouth turn up into a smile, my body is clearly agitated, "I have news." From this face-to-face encounter my excitement is understood within the words and through my body's emotional expressions. You have a sense that I have some *good* news to share. Now imagine just reading the same words. "I have news." Is it good news? Is it bad news? An exclamation mark can enhance the message. "I have news!" With this neatly compact symbol, emotion and meaning are expressed.

As we teach students about punctuation, we might discuss how various forms of punctuation work, and what they bring to written language. The meaning that they allow is significant. Consider the implications in legal matters if punctuation marks are used improperly and meaning is obscured. People have lost fortunes and even been put to death because of imprecise or incorrect punctuation in legal papers. So, our teaching about punctuation might draw on the punctuation mark as an unsung hero, a conveyor of meaning and emotion, and an important source of clarity.

2. Organizing the topic into a narrative structure

2.1. Initial access:

What aspect of the topic best embodies the heroic qualities identified as central to the topic? Does this expose some extreme of experience or limit of reality? What image can help capture this aspect?

Punctuation is really quite ingenious. One might argue that these small seemingly insignificant marks on a page fulfill, in some ways, a role played by the body in the context of oral language. (I am not suggesting that punctuation can or does represent the full range of human emotion in written language, but only that it seems to play a role in conveying emotion in text that, in oral language, would be conveyed by the body.) One might have students look at a text from which all punctuation has been removed. They will certainly struggle to make sense of the text. One might have students role-play an emotional event (for example, being involved in an accident and needing medical attention, or winning a big cash prize in a lottery). Students could then be given the challenge of writing down what happened, what was said etc., without using punctuation marks. What challenges do they face in conveying the meaning of the event? In particular, how can one quickly convey the emotional dimensions of the event?

If we are teaching about punctuation in a way that connects it to emotion, we might begin by having students look in a mirror. What does a statement they might write using an exclamation mark, look like in terms of their own faces? What does the comma or period look and feel like in terms of the eyebrows, mouth and breath? In the age of email messages and text messaging, emoticons are increasingly being employed in place of punctuation marks. What emoticon is suitable for different punctuation marks—for an apostrophe or a colon? Might we think of the semi-colon as a wink? Grins, grimaces and other facial

expressions are textual ways to convey meaning that we can make more real for students, perhaps, by having them focus on their own faces.

Students might also be asked to think metaphorically about the functions different punctuation marks serve. Might we compare the end of life to a period? Old age, or perhaps a yellow traffic light, to a semi-colon? An exclamation mark to the smashing of cymbals? By focusing on punctuation as a conveyor of emotional meaning and subtleties, students may begin to see punctuation marks as heroes of written language.

2.2. Composing the body of the lesson or unit:

How do we organize the material into a narrative structure to best illustrate the heroic qualities?

This unit aims to elevate punctuation marks to their proper position. They will be *un*sung heroes no longer. To this end, we might introduce each punctuation mark in a way suitable for heroes. Consider, for example, how each form of punctuation might be introduced at an imaginary gala in honour of heroes.[216] The story of each punctuation mark can be framed in a narrative way as follows:

Exclamation Mark

Teachers could introduce the class to the exemplary, highly outspoken and rarely boring Exclamation Mark. Some prefer to call him BANG actually. Exclamation has the power to create a sense of excitement and urgency in the reader. Exclamation can take a sentence that is seemingly ordinary and make it extraordinary. Exclamation adds force to the written word and helps to account

[216] I have adapted these examples from my work in Egan (2006).

for tone, volume, intonation etc. used in oral language to express excitement and other emotions.

Question Mark

Question Mark represents a frontier to the unknown. Question Mark can single-handedly transform something real into something unreal, something certain into something uncertain. For example, "we are going tonight," versus "we are going tonight?" Who knows for sure? Question Mark opens up opportunities for knowing more about the world around us. Without asking questions, without evoking the power of the question mark, would we understand realms of sciences as we do? Would it possible to research the world without using (the) Question Mark?

Apostrophe

Apostrophe is a presumptuous creature who claims things for its owner. For example, it can claim a great idea for John (John's great idea) or coffee for Betty (Betty's coffee). The apostrophe can even replace letters! What power! When two words get together—as they often do when we use language casually—the new word may call upon the apostrophe for help. For example, "do" and "not" call upon the apostrophe to replace the second "o" —don't. In some instances this little hanging squiggle replaces two letters! What a lot of responsibility. For example, I will—I'll.

Students might be encouraged to role-play these various forms of punctuation. They could debate the value of each. What would happen if there were no commas? Can any other punctuation mark take its place?

2.3. Humanizing the content:

What aspects of the narrative best illustrate the human emotions in it and evoke a sense of wonder? What ideals and/or challenges to tradition or convention are evident in the content?

Someone, somewhere invented punctuation marks. Someone, somewhere first used some kind of mark to express meaning that, through time and usage, evolved into the forms of punctuation we know and use today. One can emphasize the human meaning of punctuation by discussing the possible origins of punctuation marks. For example, according to the Oxford English Dictionary, the word comma comes from the Greek komma (κόμμα), meaning something cut off, or a short clause. The comma may have been one of the first punctuation marks. In the 3rd century B.C., Aristophanes of Byzantium is said to have developed a system of single dots that separated verses of text. These dots indicated the amount of breath needed to complete each fragment of text when reading aloud. The different lengths were signified by a dot at the bottom, middle, or top of the line. For a short passage (a *komma*), a dot was placed mid-level (·). This has been noted as the origin of the concept of a comma. The mark used today may have descended from a diagonal slash (/) used from the 13th to 17th centuries to represent a pause. In the 16th century, the slash dropped to the bottom of the line and curved, turning into the shape used today. The exclamation mark (called a "screamer" or a "bang" or even a "gasper" or "startler" in computer programming slang) was introduced into English printing in the 1400s. In 1797 it first appeared in German orthography within the Luther Bible. Italian printer Aldus Manutius the Elder is said to have established the practice of

using the semi-colon mark to separate words opposed in meaning, and to mark off independent statements.

So, our teaching about punctuation will aim to bring to the fore the human dimensions of punctuation. Punctuations marks are inventions of great significance for human beings because of the role they play in conveying meaning. Why particular symbols are used makes for interesting discussion. Take the exclamation mark for example. Does it "look" powerful? Is it a suitable mark for the meaning it conveys? Students could be asked to design a symbol they think would be more appropriate. Students might also consider creating punctuation marks of their own to express meanings they consider important. One could tell the story of Martin K. Speckter, for example, who, in 1962, invented the "interrobang," a rarely used English language punctuation mark combining the functions of the question mark and the exclamation mark. The typographical character is a superimposition of those two marks (‽). (The same effect is also frequently achieved by using both marks, e.g., "are you serious!?" or "how could you do such a thing?!") Speckter, then head of an advertising agency, believed that advertisements would look better if rhetorical questions could be conveyed using a single mark. Possible names for the new character Speckter considered included the "rhet," "exclarotive," and "exclamaquest." He eventually decided on the "interrobang", a combination of the interrogative and bang. (*interrogatio* which is Latin for "a rhetorical question" and *bang* which is printers' slang for the exclamation point). Although the interrobang appeared in some dictionaries and was featured in magazine and newspaper articles during

the 1960s, it failed to amount to much more than a passing fad. What new punctuation mark could we use?

2.4. Pursuing details:
What parts of the topic can students best explore in exhaustive detail?

Students might be encouraged to find out all they can about a particular punctuation mark. So they might look for its origins as well as its contemporary usages. Can they collect examples of its use in literature or in popular culture? Can they find examples of it in the community? They might be assigned a punctuation mark that tends to be misused or rarely used such as the apostrophe, semi-colon or colon and find proper and improper uses of it in advertising.

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What cognitive tools support the child's sense of embeddedness in the world?

Teaching punctuation has some clear somatic dimensions. I have already discussed how we might frame our teaching in terms of the ability of punctuation to convey meaning and emotion that replaces, in part, the meanings our bodies can convey through oral language. The body can be engaged in learning about punctuation in additional ways. First, actions might be identified that convey the meaning of various punctuation marks. Teacher may have students act out sentences with different body motions for periods, commas and other punctuation marks. They may march on the spot while a sentence is read and then "act" out different forms of punctuation as required. The action for a period may be the stamping of a foot on the floor, a jump and clap might express the exclamation mark. The action for a comma may be a droopy tilt of the body to

either side in a brief "pause" between other actions. What action might exemplify the colon or semi-colon?

I introduced punctuation marks as unsung heroes. Well, one might make teaching imaginative and ecological if we encourage students to actually sing, or at least vocalize, the characteristics of various punctuation marks. What sound might we use to convey each punctuation mark? Might we think of the comma as "zoop," the period as a "plop," and the exclamation mark as a "wham" or "bang"? By identifying the sounds and movements of punctuation marks we can engage the body's sense of rhythm and musicality in understanding.

We might have students "speak" by using the body and the various sounds created for different punctuation marks. So, for example, students might begin by standing straight and tall to evoke the beginning, capital letter of a sentence. They might "hum" the words in the sentence and act out the punctuation. Imagine that I am standing tall. I begin to hum, say "zoop" with a tilt of my head, I hum some more and finally stamp a foot and say "plop." A sentence. Students' actions and sounds will be diverse. Part of the objective of this type of activity is for students to justify why the action they have chosen is suitable for the punctuation mark they are learning about. In doing so they can express understanding of the various meanings or grammatical rules associated with the punctuation marks. Of course, this kind of activity—imagine humming and plopping in English class! —draws on the inherent humour in language itself. We find plop, zoop, and wham somehow funny but accept frog, bumble and slippers

as legitimate words! What jokes might students create that evoke the meaning of the various punctuation marks?

4. Engaging with Context: Sense of Place

What aspect of the topic might be learned in a way that affords students the opportunity to explore the natural world around them? How might learning about the topic support a sense of belonging in the natural environment?

In order to employ students' place-making tools we need to consider how to support students in learning the topic while providing them opportunities to encounter the natural world around them. Students could be encouraged to get outside and look for visual and auditory cues that they might associate with each punctuation mark. So, for example, what natural objects can students find that share the shape of the various forms of punctuation? Also, students might look to animals for inspiration in thinking about how bodily movements express the grammatical meaning of various punctuation marks. For example, would a bunny's hop or a snake's slither best capture the meaning of a period? What natural sounds might be associated with different punctuation marks? Does the falling of cones from a tree express the period? Does the flash of lightning express the power of the exclamation mark? (Is it a coincidence that the exclamation mark sort of resembles a bolt of lightening?)

The context of the community—the school and the broader community—is also a useful context for students to see how punctuation marks infuse our lives. Find an improper use of punctuation if you can!! (By the way, what kind of punctuation mark might one use to convey, like I have just done, a double exclamation? And what might one call it?).

5. Conclusion

How can one best bring the topic to satisfactory closure? How can the student feel this satisfaction? How can we evoke a sense of wonder about the topic?

I began this unit with the idea that we do not tend to think of punctuation marks as heroes. One might conclude a unit shaped in this way by suggesting to students that the great heroes of human history such as Sir Winston Churchill or Napoleon Bonaparte actually stand on the backs of punctuation marks. The strength of these historical figures lay, in part, in their ability to move people with their passionate ideas. Could written forms of military commands or inspirational messages have had the effects they did if it weren't for punctuation? Would anything be understood—and certainly would messages be understood in the way they were intended—without punctuation marks? We might evoke students' sense of wonder at what other taken-for-granted aspects of our daily lives allow for and support human greatness.

There is, of course, a history to punctuation that we can encourage our students to investigate. By considering the actual heroes who created various forms of punctuation as a means to improve communication, we can connect this unit further with the deeper human meaning of this topic. By studying the history of punctuation, students can also see how various punctuation marks have changed over time. They might also consider why they have changed. What changes to language and to punctuation in particular, can students identify in the modern world?

6. Evaluation

How can one know that the content has been learned and understood and has engaged and stimulated students' imaginations?

Singing the virtues of these unsung heroes seems to me like a suitable means to evaluate student understanding of punctuation. We can, of course, assess their understanding in traditional ways, and should do so, but we can also encourage students to express their understanding somatically and ecologically by composing songs. These songs can be collections of sounds they have assigned to various punctuation marks, as well as natural sounds they have paired with these marks. The songs will be accompanied by actions and descriptive words that express what each mark brings to language in terms of meaning and function. Students might be encouraged to engage in debates about various punctuation superheroes. Who is the greatest of them all? Can they imagine a super punctuation hero that trumps the others?

Suggested Activities

Teaching about punctuation can be tied into activities in which students study various heroes or idols. Students might create hero cards; cards with a picture of a hero on one side and a description of what makes this person heroic on the other. Students might choose historical figures or perhaps athletes or musicians. In addition to the human hero cards, students might be encouraged to do an animal hero and a plant hero in the same format. Might we consider the great strength of a turtle's shell or the turtle's quiet determination? Might we express the navigational wonders of the butterfly? One might create a game in which students use these cards in conjunction with punctuation super hero cards. The teacher (or students) could make up a set of cards reflecting the different

uses of punctuation marks. Take the colon and semi-colon for example. The symbol would be written on one side and a rule of usage on the other side. For example, on the front you would write a giant ':' and on the back you would write one of the colon's uses (such as "used after an independent clause that precedes a list" or "used to separate an explanation, rule, or example from a preceding independent clause"). Cards could be made up in the same way for all the punctuation marks.

A game could be played as a class in which all of the students' hero cards would be in one pile, and the punctuation mark cards in another. After dividing the class into two teams, one student from each team would select a card from each pile. They would be required to use the information provided on the hero they select (or any knowledge they may have of the hero) to give an example of correct usage of the punctuation mark on the card. If they do so correctly they would get a point. I have always found students enjoy games where some sort of race is involved. To spice up the action in this game, a student from each team could first be given their task, and then be required to run up to the board to write down their answer. The first correct answer on the board would get a point. Alternatively teachers could have a "face off," where two students face each other and each selects a card. In order to win a point, the student has to create a sentence using the punctuation mark, and be the first to both write it down and say it aloud correctly. The rest of the students in the class could then vote, by a show of hands, as to whether the application was right or wrong.

Another game based on the hero and punctuation mark cards described above would require the class to form two teams. For each challenge (creating a sentence about a hero using the colon or semi-colon in the way described on the card for example) students would need to use themselves to create the sentences. Each person in a line would be a different word or punctuation mark in a sentence. They would "become" their examples. This activity would promote teamwork and would require full-class participation.

Extensions

This kind of a topic extends easily into other subject areas. Students can practice employing the punctuation marks correctly in any number of areas of study. For the development of ecological understanding, it would be useful to focus on natural topics. What this unit has aimed to show, however, is that a topic seemingly unrelated to nature can be taught in ways that engage the body, develop Somatic understanding, and enhance sense of place.

Exploration: The World As We Know It

Explorers demonstrate courage, determination, and endurance in the face of some of the most extreme conditions imaginable. These are a few of the heroic qualities that can shape an imaginative study of exploration, a topic contained in the social studies curriculum at the secondary school level. In this unit I describe how we might teach about exploration in ways that can engage students' bodies, emotions and imaginations in learning. I also show how we might engage students as explorers in their own right—in their own backyards—in ways that

can both develop a Somatic understanding of the topic, and enhance understanding of the wonders of the natural world.

1. Identifying "heroic" qualities

What heroic human qualities are central to the topic? What emotional images do they evoke? What within the topic can best evoke wonder?

It is easy enough to sit with our students in centrally heated classrooms, surrounded by the luxuries of modern life, and talk about explorers setting off from Europe to discover North America, in vessels of questionable quality and equipped with meagre rations of food and fresh water. We want our students to marvel at the danger involved in these expeditions. Explorers sailed into uncharted seas and ventured into unknown lands with only rudimentary instruments. The odds were stacked against them. Explorers had only imprecise evidence at best that the places they sought really did exist! What would that be like? Is it even possible today to set off somewhere with no idea if it exists? Does anything or anyone live where we are headed? Will they be hospitable or hostile towards us? Explorers usually had only limited knowledge of what kind of conditions—human and natural—awaited them when and if they arrived at their anticipated destinations.

The endurance of the explorers is admirable. They struggled to survive difficult conditions, whether at sea or on land, enduring malnutrition, sickness, warfare etc. These challenges of exploration were great but so were the motivations: a lust for gold and glory, missionary zeal to convert the "savages," quest for knowledge, and desire for power over and control of the Earth's resources. Explorers driven by ambition, greed, and a sense of adventure aimed

to accumulate wealth personally and for their homeland. What we can lose in our explorations is great, but great, too, is the power that comes with new knowledge. It takes heroic stamina and ingenuity to establish the hugely expanded knowledge-base about our world brought about by heroic explorers.

Heroic qualities of determination, endurance, and courage are central to exploration, whether it be present day exploration of the deep seas or the adventures of the 17th century. To evoke students' sense of wonder we might provide them with detailed emotional images from specific exploration stories. Imagine, for example, the *Endurance*, Ernest Shackleton's ship, sheathed in glittering ice, locked in solid, 80 miles from its intended base. When ice blocks shot up beneath the Endurance shattering the hull, she keeled over and, irreparably damaged, began to sink. Shackleton ordered everyone off the ship. With a select group of the crew, Shackleton eventually reached rugged and windswept Elephant Island, after 497 days on sea and ice. For another four and a half months, the remaining crewmen huddled under their overturned rowboats, confident that if Shackleton had survived he would return to rescue them.

2. Organizing the topic into a narrative structure

2.1. Initial access:

What aspect of the topic best embodies the heroic qualities identified as central to the topic? Does this expose some extreme of experience or limit of reality? What image can help capture this aspect?

Some days I do not think I can survive without my morning cup of coffee. The hardship! The experiences of explorers take the notion of hardship to a totally different level most of our students will never experience. A human being can survive for only a few days without potable water, and maybe a few weeks

without food. For explorers in the 17th and 18th century, lack of food and water was only one of many potential causes of death. Many were lost at sea, died of illnesses on board ships, were devoured by wild animals on land, or succumbed to harsh climates. What were the most outstanding stories of survival or loss? In looking at the European age of exploration we might have students investigate the longest journeys, the countries that sent off the greatest number of expeditions, the best and worst kinds of ships for expeditions, or which expeditions had the greatest losses of life due to scurvy or other causes. We could focus on the hardships faced by overland expeditions, the kinds of challenges climates (the wettest, driest, coldest, hottest) posed, the hardships and dangers caused by attacking insects or wild animals. We might consider the scope of travel and experiences of explorers in different time periods, beginning with the ancients through to modern day. What are the most amazing stories of survival? How do the survival stories of people who have attempted to climb Mount Everest compare to what it was like for the explorers on wooden ships crossing the Atlantic in the 15th century? What were the most remarkable advances in technology to support these journeys? We could consider modern day exploration into the deepest parts of the ocean, deep into the Earth, or into the far reaches of outer space. What kinds of exploration contain the most risk? Which have potentially the most benefits in terms of human knowledge and understanding? What were the most astonishing discoveries historically? What are the most exciting modern day discoveries? Should we send humans to Mars, or instead let robots do all the exploration for us?

The stories of explorers' courage and endurance in the face of unthinkable conditions on sea and land, represent the kind of extreme content that can best embody the heroic quality around which we are shaping the unit. Shackleton's adventure was, certainly, a remarkable survival story full of extreme challenges. With great endurance and courageous determination, the crew managed to overcome these challenges. After Shackleton and a few men left in a rowboat from Elephant Island to get help, in a direction they hoped would lead them to land, the rest of the crew managed to survive on seals and the odd fish they caught, melted ice and snow, and the limited shelter of an overturned rowboat. If we look closely into the stories of any explorer we will find these emotional charged images of determination that can help students feel more meaningfully what exploration really entailed for human beings.

We will want to introduce students to the stories of famous explorers such as Christopher Columbus, James Cooke and Henry Hudson, as well as those of less well known but equally courageous and determined explorers. We could study women who demonstrated determination not only in their travels, but also in their challenging of social conventions. For example, the Dutch explorer Alexandrine Pieternella Françoise Tinné, best known for her investigations of the Nile River at a time when it was unusual for European women to travel in tropical Africa, Sakajawea (Sacagawea), who, with her son on her back proved an invaluable guide and interpreter for explorers Meriwether Lewis and William Clark from the winter of 1804 through to 1805, or Annie Smith Peck who, at sixty years of age, was the first person to reach the summit of Peru's Mount Huascaran. Peck succeeded after four attempts over five years. (She believed she

had scaled the highest mountain in the Western Hemisphere and also believed, at the time that she had broken the world's altitude record for men as well as women. In actuality the altitude of the mountain had been incorrectly measured and was a few thousand feet lower than she had thought. Nevertheless her achievement is recognized as a remarkable feat in the history of mountain climbing. Peck described the experience as "a horrible nightmare," as one of her Swiss guides lost a hand and half a foot to frostbite.)

2.2. Composing the body of the lesson or unit:
How do we organize the material into a narrative structure to best illustrate the heroic qualities?

Like any other topic, exploration can be looked at as a story full of stories. We might consider the story of exploration itself by first identifying its driving force—the inspiration of the "plot," its climax, and resolution. What fuels/has fuelled it? While we might situate this narrative approach in the context of human curiosity, the great stories of exploration have a much more powerful driving force: greed.

Yes, greed. Not, perhaps, a trait we are proud of, or would generally want to choose in life, but certainly a very real aspect of being human. Our story begins in the drive for wealth and power of the mercantilist nations during the 13th century. It picks up during the Renaissance, with the ambitious well-organized nation-states, such as England, France, Spain, and Portugal. Each looked to expand its power and wealth, and used heroic sailors to push adventurously to find new routes to the great wealth of the far East. But, of course, if they travelled westward then the Americas were in the way. As the explorers we study meet hardship and face seemingly insurmountable obstacles,

conflict ignites. Focusing still on exploration and its heroic quality of determination, we will want to identify the responses emerging in face of the hardship that show determination. What other characteristics contribute to the persistence of the explorers? We could, in this way, create the profile of "the explorer" that demonstrates determination, endurance, and bravery, but also the sense of adventure and dreams of fame and fortune they may hold.

The monarchs of the greatest exploring nations such as England, Portugal and Spain had much to gain from these expeditions. The conquest of land meant access to great wealth in the form of resources, and in the form of new markets for their manufactured goods. Exploration was a struggle for ownership and control. In the game of world domination, whoever possessed the most territory and the most wealth won. What were the long-term consequences for the countries launching the expeditions? What were the consequences for the peoples already inhabiting the supposedly "new" lands? What were the influences over the long term for international relations of these European ventures? How did (and how does) exploration shape the map of the modern world and the shape of its cultures? We could find answer to these kinds of questions by looking at the individual stories of explorers such as Leif Eriksson, Marco Polo, and David Livingstone, and at the narratives of the events driven by their curiosity or greed.

2.3. Humanizing the content:

What aspects of the narrative best illustrate the human emotions in it and evoke a sense of wonder? What ideals and/or challenges to tradition or convention are evident in the content?

Stories of exploration are a wonderful way to highlight the very human context of history. Consider our Shackleton example. He set out from England with the intention of being the first to cross the Antarctic continent on foot from the Weddell to the Ross Sea. His hopes were high as was his determination. The expedition was a failure, and yet the unimaginable saga of survival that followed ensured that it was for this, the failed Endurance expedition, that Shackleton is ultimately most remembered.

Sir Edmund Hillary was the first man to reach the summit of Mount Everest, the world's highest peak. Although Hillary was a beekeeper, he had a passion for climbing mountains, and had climbed the Southern Alps (in New Zealand) and the Himalayas. In 1953 he joined the British Mount Everest Expedition as one of the head climbers. On May 29, 1953, Hillary became one of the first men to reach the highest point on Earth. Hillary was knighted for his achievement later that year.

So, our stories of determination will be demonstrated by looking at a diversity of explorers—famous, infamous, less well-known, young and old, male and female. We will want to introduce narratives depicting the kinds of conditions famous explorers and their seamen faced on the treacherous ocean crossings. We might also have students investigate pirate explorers, men and also perhaps surprisingly, some famous women pirates who, in some ways, controlled the seas. How did these men and women deal with the brutal storms

they faced? How did they keep fed? When malnourished, how did they find the strength to carry on? We might consider the pirate-turned-explorer, Francis Drake's determination as he completed the second successful circumnavigation of the globe, or perhaps the determination that helped the "dangerous" (to the religious establishment anyway) Lady Deborah Moody establish the colony at Gravesend (at Long Island) which was the only permanent settlement in early colonial America planned and directed by a woman. A quick internet search provides many anecdotes and accounts of expeditions that can be used to illustrate the determination and courage of explorers as they faced multiple challenges, both physical and cultural/ideological in nature. We will want to help students feel some of the passion of the explorers, to marvel at their accomplishments and the physical and emotional strength they displayed.

We might juxtapose the perspectives of the explorers, their crew and those supporting them, with the hopes and fears of those they encountered in the "discovered" lands. With the arrival of the explorers, what were the emotional responses of the people who already occupied these territories?

2.4. Pursuing details:
What parts of the topic can students best explore in exhaustive detail?

Individually, or in pairs, students could now explore the explorers. They could search from everything they could find out about the determination of explorers. They could search for stories of their acts of courage and endurance in the face of various challenges. Students could select explorers by nationality or gender (or both), and become experts on their stories, creating profiles of the individuals and of their courage. Alternatively students could investigate a

certain geographical area, identifying all of the explorers who contributed to its current shape, or focus on a specific historical period, or on a particular mode of exploration (those by sea, into space, overland, hiking expeditions etc.). Students could take the role of Ferdinand Magellan, Eric the Red, or Henry Hudson—or one of the crew participating in an expedition. They might research the explorers' lives, reflect on their experiences, how they consistently kept themselves and their crews fed, write about or act out the hardships, the worry, the anxiety, as well as the jubilance and excitement.

3. Engaging the Body: Activeness

How does the body participate in this story? What activities can engage the learner somatically in learning the content of the story? In other words, how can students' sense of relation be engaged? What cognitive tools support the child's sense of embeddedness in the world?

We are all born with tools with which to make sense of the world. Well, in this unit, we might enlist students as explorers in their own right. We might begin by taking students outside, each sitting at a different place on some grass or dirt. They should close their eyes and try to imagine that they are no longer John, Raj, or Iha, but instead are explorers from a remote galaxy beyond the Milky Way, who have just arrived on what looked, from space, to be a big green, blue, and brown ball. They do not know exactly where they are. They do not know what awaits them. They have a few tools with which to make discoveries. They can use their bodies to feel—fingers, toes, cheeks, palms, legs. Students might roll up their sleeves and pant-legs as they sit or lie in the grass with their eyes closed. They could be listening, smelling, feeling for where they are. We can support an unusual type of experience for students if we alter their senses in certain ways. So, we might tell them that, unfortunately, they do not have a good

sense of sight. Indeed, the "Noseeum" species to which they belong must look through a special lens. Students could each be given a magnifying glass and be told that they must keep one eye closed and can only look through the other eye and through the magnifying glass. Or we might limit students' range of vision by having them observe through empty toilet paper rolls. They will encounter, perhaps, some sensory surprises in the process that might help them feel, even a little, as a kind of explorer. We might ask them to document their findings in an explorer's log. To make the experience more unusual for the students one could change the way they write so, for example, they may be required to use their right hand to write if they are left-handed or vice versa. We might even tape their index and middle fingers together, as well as their pinky and ring fingers, thereby changing how they experience writing and how their hands actually feel. We might even ask students to hold their pens in both hands at all times thereby adding something unique to the experience. They can use their noses to smell, their ears to listen, their tongues to taste. These are the means through which they will explore where they are.

We might guide students in envisioning that they are as small as an ant. The grass towers above them. What dangers do they encounter? What do they observe as they foray into the new land? Or, we might encourage students to imagine that the grass is actually thick, dense forest. They are giants in this new land. They tower over these forests and the many, tiny, communities contained within. What can they find out about these other living things? How? As giants, students have the power to impact the life in place they have just "discovered". They can add wind by blowing on it, they can add water to it, they can move or

shake it, they can add to it or take away from it.[217] But how could they establish communications with the native inhabitants? The aim of this type of role-play activity would be for students to imagine what it might be like to arrive in a new place. The activities try to engage the body senses in new and different ways, as they try to document what they are experiencing.

4. Engaging with Context: Sense of Place

What aspect of the topic might be learned in a way that affords students the opportunity to explore the natural world around them? How might learning about the topic support a sense of belonging in the natural environment?

In addition to the knowledge of place that can develop from the exploration of the local natural area described above, one can support students' place-making by researching the history of one's own place and community. What people were involved in its founding? What are the stories behind the street names? Place names often reflect either some historical event, an earlier settler, or a geographical feature of an area. Students can be encouraged to research the history of their places to determine the significance of the names. There could be a "Discovery Board" created in the classroom where students can keep track of the most amazing features of their own contexts. What is the biggest plant they discover in the new land they have arrived in? What is the weirdest shaped bug they discover? What is the loudest natural sound they encounter? Students may be asked to use their knowledge of place to re-enact what the community may have been like in the past. What roles would they take on? Could they re-enact a day in the life of the local human community or

[217] This approach was inspired by Van Matre's (1979) activity called "Magic Planet" (pp. 181-182) in which students use magnifying glasses to closely observe natural objects. He suggests having students encounter a natural object with various life forms on it such as a rotting, mossy log or a lichen-covered rock. The magnifying glasses are portholes through which to observe the life on a new planet.

natural community? Could they do both at once? What challenges would emerge? Could they construct a community "stage" or site for the re-enactment out of doors? What natural objects might they use as props?

Once they find out a little about the history, they might be encouraged to imagine what the place looked like before the schools, roads, houses etc. came along. What is the natural flora and fauna of the area? So what did it look like before human beings changed its appearance? Students might be encouraged to juxtapose what it would have been like to walk in the same location in the modern era (so the sights, sounds, smells etc. that one would encounter in the 21st century) compared with hundreds of years earlier. They might map these ideas. Students could extend their research into their contexts and what it used to be like even decades earlier, by interviewing elderly people in the community that have seen it change. What would one encounter? What kinds of animals? Studying the culture of the First Nations People that first lived on the land in which students now live, would help them to see how the geographical features of the place shaped a certain kind of lifestyle. The architecture, clothing, food and cultural expressions of the Aboriginal people reflect the area in specific ways. Inviting First Nations People into the school will enrich any study of place and its history.

To connect student research back to the theme of determination and courage around which we have shaped this unit on exploration, we will want to have students try to imagine what exploration of their area was like from the perspectives of those arriving, and from the perspectives of those already living in

the area. What courage and determination was required of the people encountering, for the first time perhaps, the arriving European explorers?

5. Conclusion

How can one best bring the topic to satisfactory closure? How can the student feel this satisfaction? How can we evoke a sense of wonder about the topic?

Students could use their expert knowledge (developed above) to write about (or act out) the stories of human determination, courage and endurance that have resulted in the world we know today. They could explore the system of latitude and longitude that guided so many explorers—and guides us still today—in the early intellectual explorations of Ptolemy. We can encourage students to seek out the wonderful in their accounts of determination involved in the discovery or identification of places on Earth. What human passion lies behind the names Mount McKinley, Hudson's Bay, or Newfoundland? What challenges were overcome in the pursuit of knowledge of outer space? Of the deepest oceans? Finally, we might also have students consider what lies ahead for exploration. What is the next frontier in exploration? What dangers possibly lurk there that we are not aware of? What treasures?

6. Evaluation

How can one know that the content has been learned and understood and has engaged and stimulated students' imaginations?

Traditional forms of evaluation would be suitable to assess student learning in this unit in terms of the historical aspects of exploration. In addition to testing, however, one could evaluate student learning by having students role-play certain explorers' lives or specific events, documenting their experiences in formats of their choice. For example, they could write journals documenting the treacherous conditions experienced by Jacques Cartier in the early days of New

France, or the struggles of Champlain as he strove to establish the first permanent settlement. In order to determine whether students' imaginations were involved, we might want to find out if they did any extra investigations or reading, or if they seemed passionate about their projects and the profiles of the people they investigated. Assessing the extent to which this unit contributed to students' sense of place could occur through project work. Students could be encouraged to depict (perhaps through creative writing or artwork) what an explorer travelling to their place might have experienced. Students might also be encouraged to explore alternative perspectives of exploration such as, for example, the experiences of the Aboriginal people as the European explorers arrived in North America. If students are required throughout the unit to keep track of their experiences and thoughts in "travel log" type journals, these may prove to be very useful in assessing what they have learned.

Suggested Activities

The use of role-play is one way to make learning emotionally and imaginatively engaging for students. In our teaching, then, we will aim to change the context of learning by enlisting students as explorers in the various ways described above, whether as famous explorers of the past or as today's explorers of a new planet. We might also consider ways for students to experience endurance or determination by giving them, for example, the challenge of transferring water from one bucket to another across a field. The activity might be introduced as a life or death situation. Their crew will die of dehydration if they do not receive water. With only a few materials provided, students will need to design and build practical "rain catchers." Alternatively, we might engage

them in a game in which teams are given a predetermined amount of food and water and a sea-worthy ship (that might be symbolized in tokens). Then with a roll of the dice they face various hardships. For example, a 1 on the die might symbolize a terrible storm and the loss of 3 tokens for ship damage. If they can repair the ship they can get the tokens back. So if students can think of practical ways to repair the ship using only the most basic tools and supplies, they win back tokens and remain in the game. Now, the teacher rolls the die and—gasp—there is no wind and no rain for days. All teams lose 3 water tokens. They finally arrive on land but now it is the dead of winter—they are freezing. They have no food and the land is encased in ice. What kind of ingenuity is required to overcome these obstacles?

Extensions

There are lots of issues related to exploration that can be developed in this unit. For example, one might study notions of ownership and possession and their implications or, perhaps, the implications of exploration for human rights. Exploration is also a very useful context in which to explore the human-nature relationship. Is the land really ours, as human beings, to claim? We often discuss how European explorers claim to have "discovered" land that First Nations people already occupied. The notion of "owning" land was foreign to most Aboriginal communities and, instead, the concept of sharing the land with all members of the Earth shaped their interactions with nature. When human beings talk of owning the land, who is being forgotten? What gives human beings the right to parcel out the land and claim it? Doing so obviously reflects an understanding of human domination over the land, and can be the basis for

discussion of how one might think and act differently if plants, animals and minerals were given equal rights. Whose land is it anyway? Do plants, animals, and minerals have rights?

Studying exploration in ways that have students imagine being explorers themselves also provides many interdisciplinary learning opportunities. As part of the social studies curriculum, for example, students can study about the climate and geography of their local areas or any terrain covered by the explorers they are researching. They may study the limitations for exploration imposed by the human body (dehydration, scurvy, frostbite etc.) in certain contexts or even by human relationships (tensions, perhaps, around leadership, crew morale, etc.). They may explore concepts associated with mathematics and science through extended research into navigation. There are also many connections to the English curriculum in terms of creative writing and language development opportunities that may emerge from role-play activities.

Conclusion

At the beginning of this project I pondered how we might, through education, support the development of ecological understanding. I identified potential weaknesses in Ecological Education and suggested remedies that involved shaping learning around engagement of the body, emotion and imagination, and cultivation of sense of place. I hypothesized that ecological understanding might require ecological imagination. To conclude this research I outline how the framework I propose for Imaginative Ecological Education can assist in the development of ecological understanding, how it may support the

development of ecological imagination, and how it may resolve theoretical and practical weaknesses in the field.

Imaginative Ecological Education may support ecological understanding in at least three ways. First, by developing the body's tools for making sense of the world, the tools of Somatic understanding Egan (1997) describes plus the sense of relation place-making tool I propose, students may be able to not only directly experience the wildness that surrounds them, but learn to pay more attention to their somatic encounters. While we encounter the world with our bodies all the time, we may not be open to paying attention to, and focusing on, our Somatic understanding. Moreover, by engaging the body in learning in profound ways—what I have called activeness rather than just being active—we may be able to connect students with the wildness that lies within each of them. Like the other creatures with which we share this planet, we are born with a sense of wildness (Livingston, 1994; Traina and Darley-Hill, 1995). Providing students with learning opportunities that develop Somatic understanding and, in particular, with opportunities to experience the heterogeneity of nature, may support their sense of being part of a larger community and interconnected in the world.[218]

A second way this framework of Imaginative Ecological Education may support the development of ecological understanding is its emotional and imaginative core. Shaping Ecological Education around the engagement of

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[218] Livingston (1994) argues that "quality experiences with heterogeneity" can support the development of a broader senses of self (what he calls "self-as-group," "self-as-community," and "self-as-biosphere").

cognitive tools is a new way of thinking about how to develop students' ecological understanding. A cognitive tools approach to teaching means that students are learning in ways that engage their emotions and imaginations. This kind of approach is new to Ecological Education and may increase the effectiveness of learning overall and, in line with the Activeness and Place/Sense of Place principles I propose, support ecological understanding. What students come to understand about their relationship to nature is made more meaningful through a cognitive tools approach.

The third way Imaginative Ecological Education may support ecological understanding is by nurturing sense of place. Employing the tools students use to situate themselves in the world can directly connect students with the natural contexts in which they live. As they learn more about where they live, they may develop lasting emotional connections. The tools of place-making I describe—the sense of relation, emotional attachments to objects, creation of special places and association with ideas—are tools that not only support learning, but that contribute to emotional and psychological well-being. Of particular interest for this research is the sense of belonging that these place-making tools may provide. Students may come to identify with, and develop a sense of self that is informed by, the natural context in which they live. Moreover, because the cognitive tools we employ shape, ultimately, the sense we make of the world, it is possible that these tools, employed in an ecological direction, may support the development of ecological understanding. The possible benefits of place-making for the development of ecological understanding make consideration of place-making

tools, and how they may be engaged in all teaching, an important dimension of Imaginative Ecological Education.

I have argued that ecological understanding and ecological imagination are closely related. In effect, ecological understanding might be considered a reflection or, perhaps, a product of an ecological imagination. At the very least, this work can serve as a point from which to begin further research into the notion of ecological imagination and its implications for the development of ecological understanding. It is my hope that this work can do more than this. I hope that it not only adds to ongoing discussion in the field around the notion of ecological imagination, but also offers a pedagogical approach that may support its development. If, as I have suggested, ecological imagination focuses on relationships, connections and context, then its education will require attention to these interrelated aspects. By teaching in a way that engages the body in place and engages one's emotions and imagination with what is being learned, Imaginative Ecological Education may support deeper and broader understanding of relationships in general, and relationships to the natural world in particular. These understandings may inspire the ecological imagination.

The framework for teaching I propose may also help resolve the pedagogical limitations of Ecological Education in its current form. For example, Imaginative Ecological Education brings the development of ecological understanding to a more central position in the curriculum, by introducing an ecological perspective to all topics. Imaginative Ecological Education takes learning outside, and suggests ways to support students' Somatic understanding.

Specific place-making cognitive tools are described that may be used to cultivate students' ecological sense of place in any context and, potentially, any subject area. Emotional and imaginative engagement in learning of all topics becomes possible through a cognitive tools approach to teaching. Imaginative Ecological Education may realign, thus, the means and ends of Ecological Education. The emotional and imaginative core of ecological understanding may best be nurtured when imagination takes a central, rather than peripheral, position in the theory and practice of education.

This project can serve as a starting point for a transformation in Ecological Education. It outlines the possible limitations of current practice and suggests an imaginative approach to resolving them. It introduces the notion of cognitive tools as a means to make Ecological Education more emotionally and imaginatively engaging, and suggests specific place-making tools teachers may employ to support the development of ecological understanding. What this project does not do is implement these ideas. We need to take the framework I propose for Imaginative Ecological Education into schools, beginning, perhaps, with a few teachers interested in making their practice more ecological and more imaginative. Pilot projects in one or several schools can be supported by further research into the nature of ecological understanding. Student learning may also be enhanced by further research into issues I have not addressed here such as assessment, school reform, or teacher education. The marriage of Imaginative Education and Ecological Education I propose adds new insights to both fields and lays the foundation for further research.

No teacher would deny the educational benefits of engaging students emotionally and imaginatively in learning. For this reason alone, Imaginative Ecological Education may be of interest to all teachers. Of course, I have specific ecological concerns. For teachers troubled as I am with the current state of the Earth, it is very possible that this pedagogy may have much broader, positive consequences for how students make sense of the world around them. Through Imaginative Ecological Education it may be possible to enrich student learning while simultaneously supporting the development of ecological understanding.

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APPENDIX A:
TOOLS OF IMAGINATIVE ENGAGEMENT

(Source: Fettes, 2007a)

Tools for:	*Somatic TIEs*	*Mythic TIEs*	*Romantic TIEs*	*Philosophic TIEs*
Grasping wholes	Joyful participation	Wonderful stories	Heroic feats and quests	Powerful theories
Grasping composition	Pattern of rhythm and movement	Music of spoken language	Beauty of written form	Elegance of argument
Grasping detail	Intent observation (all senses)	Vivid imagery (oral)	Lively description (written)	Fine-grained analysis
Grasping limits	Beginnings and endings	Binary contrasts	Extremes of reality	Universals and anomalies
Grasping regularity	Prediction and control	Naming and characterizing	Collecting and organizing	Systematization and generalization
Grasping agency	Mimesis	Metaphor	Personification	Abstract agency
Grasping possibility	Interactive play and exploration	Gossip and social play	Fantasy and formal play	Hypothesis and experiment
Grasping struggle	Effort and achievement	Conflict and resolution	Revolt and idealism	Contradiction, paradox, and proof
Grasping inconsistency	Incongruity	Jokes	Comedy	Irony and satire

APPENDIX B:
THE COGNITIVE TOOLKITS

The Cognitive Toolkit of Mythic Understanding

(Source: Egan, 2005, pp. 2-6)

Story is one of the most powerful cognitive tools students have available for imaginatively engaging with knowledge. Stories shape our emotional understanding of their content. Stories can shape real-world content as well as fictional material. It is this real-world story-shaping that promises [the] most value for teaching.

Metaphor is the tool that enables us to see one thing in terms of another. This peculiar ability lies at the heart of human intellectual inventiveness, creativity, and imagination. It is important to help students keep this ability vividly alive by exercising it frequently; using it frequently in teaching will help students learn to read with energy and flexibility.

Binary opposites are the most basic and powerful tools we have for organizing and categorizing knowledge. We see such opposites in conflict in nearly all stories, and they are crucial in providing an initial ordering to many complex forms of knowledge. The most powerfully engaging opposites—like good/bad, security/fear, competition/cooperation—are emotionally charged and, when attached to content, imaginatively engaging.

Rhyme, Rhythm and Pattern are potent tools for giving meaningful, memorable, and attractive shape to any content. Their roles in learning are numerous, and their power to engage the imagination in learning the rhythms and patterns of language—and the underlying emotions that they reflect—is enormous. They are important in learning all symbol systems, like mathematics and music, and all forms of knowledge and experience.

Jokes and humour can expose some of the basic ways in which language works and, at the same time, allow students to play with elements of knowledge, so discovering some of learning's rewards. They can also assist in the struggle against arteriosclerosis of the imagination as students go through their schooling—helping to fight against rigid conventional uses of rules and showing students rich dimensions of knowledge and encouraging flexibility of mind.

Mental imagery is a tool of immense emotional importance, influencing us throughout our lives. In societies saturated by visual images, such as those of all Western and most Eastern countries today, it is perhaps increasingly important to allow students space to learn to generate their own mental images. We can easily forget the potency of our unique images generated from words. Often the image can carry more imaginative and memorable force than can the concept. Together they can be even more potent. The use of mental images (as distinct from external pictures) should play a large role in teaching and learning.

Gossip is often thought of as idle pleasure. But it can also play an important role in learning. Gossip represents one of the more basic forms of social interaction; it is easy to engage in, and is usually pleasurable. These are

not good reasons to avoid its use in teaching! It involves a series of skills, including the ability to fit events into a narrative, and can enlarge students' imaginative grasp of knowledge. Gossip can also contribute importantly to students' language, especially oral language, capacities.

Play is a related cognitive tool, or sets of tools. It helps people free themselves from objects with which behaviour is often fused, as in, say, a classroom. By "playing school," for example, children can enlarge their understanding of the norms and limits of school behaviour and get pleasure from parodying what previously had been a world in which they were constrained. Play can also enlarge students' self-control—and their understanding of the importance of self-control. In play they learn they cannot act by impulse but have to follow flexible rules, and they can pretend to cry while getting pleasure from the pretence.

Mystery is an important tool in developing an engagement with knowledge that is beyond the students' everyday environment. It creates an attractive sense of how much that is fascinating remains to be discovered. All the subjects of the curriculum have mysteries attached to them, and part of our job in making curriculum content known to students is to give them an image of richer and deeper understanding that is there to draw their minds into the adventure of learning.

Embryonic tools of literacy will be picked up while students mainly use the tools of oral language, and increasingly the new tools will be engaged as students become more fluent readers and writers. We need to provide

opportunities for students to begin using some of the tools of the later tool kit even if in embryonic form. In Vygotsky's terms, this might be seen as drawing the students forward in their "zone of proximal development."

The Cognitive Toolkit of Romantic Understanding

(Source: Egan, 2005, pp. 78-82)

The sense of reality is one of literacy's greatest potential gifts to us, and one of its great dangers. The development of "disembedded", rational, logically structured forms of thinking is greatly eased by literacy. It has historically been the source of our understanding of the processes by which nature works, and our increasing control over these processes, but can come at the cost of our alienation from the natural world—so that we can see nature, for example, as a set of "resources" rather than as a complex system of which we are a part.

The extremes of experience and the limits of reality are among the features of reality that first and most powerfully engage students' imaginations as literacy becomes fluent. That is, the reality that we first engage imaginatively tends to be "romantic;" it most readily focuses on the extremes, on the most exotic and bizarre features of reality, on the most terrible and courageous events. This kind of material is familiar from sensational newspapers and TV shows, and from publications like *The Guinness Book of World Records*.

Association with heroes is the tool that enables us to overcome some of the threat of alienation involved in the new sense of reality. By associating with those things or people that have heroic qualities, we can gain confidence that

we too can face and deal with the real world, taking on those qualities with which we associate. It gives us the ability to imbue any aspect of reality with heightened importance.

The sense of wonder is a key tool in our initial explorations of reality. It enables us to focus on any aspect of the world around us, or the world within us, and see its particular uniqueness. We can turn this sense of wonder onto anything, recognizing the wonderful in every feature of the world. This tool can provide the gift that allows us to recognize something wonderful behind even the most routine and taken-for-granted things. The starting point of all science and all inquiries is "I wonder why..."

Collections and hobbies exemplify a tool of great power during these years. Students commonly put immense intellectual energy into collecting a set of something or engaging in a hobby. This urge to securely understand something can be used extensively in education.

Knowledge and human meaning is the title I am giving to the tool that enables us to see beyond the surface of any knowledge to its source in human emotion. All knowledge is human knowledge, discovered or invented as a result of some human emotion, and seeing knowledge through the emotions that were involved with its past creation or current use helps us grasp its deeper human meaning.

Narrative understanding is a tool related to our ability to best make sense of things when we can grasp their emotional meaning. A narrative context for knowledge can establish its emotional importance while also conveying the

knowledge—about physics or mathematics no less than about history or literature.

The capacities for revolt and idealism are related tools during this period of life. Students both resist the adult world while they shift to find a place within it, and they desire to see it as better than it is. Revolt implies an ideal, whose absence justifies the revolt.

Changing the context is a tool that enables the imagination to grasp the richer meaning of any topic. The classroom is often an emotionally sterile place, so routine that one topic after a while begins to look like another. By shifting the context in which knowledge is learned—by use of often simple devices—students' imaginations can be brought vividly to life, engaging the material much more richly.

The literate eye is a tool that develops as students become familiar with texts and such symbolic forms as the list, flowchart, and diagram. The shift to literacy reflects also a shift from a dominance of the ear to the eye in gathering information. Certain activities can facilitate this shift and also show students how literacy can expand their powers to organize and use knowledge.

The embryonic tools of theoretic thinking will be picked up while students mainly use the tools of literacy, and increasingly the new tools will be engaged as students become more familiar with using abstractions and theoretic forms of thought. We need to provide opportunities for students to begin using some of the later tool kit even if in embryonic form. In Vygotsky's terms, this

might be seen as drawing the students forward in their "zone of proximal development."

The Cognitive Toolkit of Philosophic Understanding

(Source: Egan, 2005, pp. 152-154)

The sense of abstract reality is a tool that enables us to make sense of the world in terms of ideas. The developing mind begins to construct an abstract world of general concepts that represent reality in a new way. It permits understanding of the processes by which nature and society work and our increasing control over these processes. It takes shape as part of the development of the disembedded, rational, logically structured forms of thinking.

The sense of agency is a tool that enables us to recognize ourselves as related to the world via complex causal chains and networks. This enables us to become more realistic in understanding how we can play roles in the real world, and understand ourselves as products of historical and social processes.

Grasping general ideas and their anomalies is a tool that enables us to generate abstract ideas about nature, society, history, and human psychology—and then recognize their inadequacy and rebuild them into more complex ideas.

The search for authority and truth is a tool that helps assess the worth of general ideas, testing their validity so that meaning can be derived from them. This takes on particular shape and importance with the development of abstract theoretic thinking, which seeks an objective, certain, privileged view of

reality. Among the historical products of this cognitive tool at work have been dictionaries, encyclopaedias, and textbooks—repositories of secured knowledge.

Meta-narrative understanding is a tool that orders facts or events into general ideas and allows us to form emotional associations with them. That is, we do not just organize facts into theories, we shape even our theories into more general meta-narratives that further shape our emotional commitments.

APPENDIX C:
A MYTHIC UNIT – PROPERTIES OF THE AIR

(Source: The Imaginative Education Research Group, 2008)

We typically take the air around us for granted. One purpose of this unit is to help students to see that the air is among the richest and most varied objects they pass through unseeingly all the time. In the classroom in which they sit, the air is more complex and wonderful than almost any of the other objects they attend to.

1. Locating Importance

What is emotionally engaging about the subject? How can it evoke wonder? Why should it matter to us?

An important function of education is to enrich our everyday environment with meaning. In the case of air, we tend to take it for granted as a kind of emptiness through which we move. One of the delights of education is the discovery of wonder in what is commonly taken for granted. This topic should matter to children because it can enlarge and enrich their perception of the world and their understanding of their experience. It can be affectively engaging through its power to evoke, stimulate, and develop the sense of wonder and engage it with reality.

2. Thinking about the content in story form:

How can we shape the content so that it will have some emotional meaning? How can we best bring out that emotional meaning in a way that will engage the imagination?

2.1 Finding binary opposites:

What binary concepts best capture the wonder and emotion of the topic? If this were a story, what would the opposing forces be?

One usable binary set for a unit on the properties of the air is empty/full. This may seem a bit simple, with no evident affective "pull." But I think we can invest emptiness with the affective components of starkness, nothingness, uselessness to life, and fullness with the opposites—varied richness, complexity, and supportive of life. A possible alternative would be simple/complex.

2.2. Finding images and drama:

What parts of the topic most dramatically embody the binary concepts? What image best captures that content and its dramatic contrast?

One might start with the sense of the air as being empty and dull, and will gradually show that it is in fact the richest, and strangest object, in the room. If possible, darken the room and show a beam of light passing through. Ask the students what the dust is made up of. Tell them that 60% is made up of decayed human skin. So that each time they rub their faces or hands together, tiny bits of skin sheer off and then decay, then float on the air. So when we breathe in...! Or, if you think this isn't going too far, ask them where they think flies go to the bathroom, and what then happens to fly faeces? Well, they too decay and...! Or play a radio in one corner of the room and listen to a voice for a few moments. Then switch it off and go to another corner of the room and change the channel to some music. Ask the students how the noises get to the radio. Some will have heard about radio waves. Ask them what the room looks like to a radio; if they

had an "eye" like a radio that "sees" radio waves, what would the rest of the room look like? Would it see through walls?

2.3. Structuring the body of the lesson or unit:
How do we teach the content in a story form?

What's the story about the air? Well, the obvious one is that we need its gases to be able to live. But how many gases are in the air we breathe? What would the air in the classroom look like if we could see the gases in different colours? And what else is there? Hold out your hand: a million particles from the sun just flashed through it. What are these particles? Are they flowing through us all the time? What is a muon? What would the classroom look like if we could see all the atomic and molecular particles passing through it? Why did someone sneeze? Who is allergic to pollens? How many different kinds of pollens might be floating in the air in the room, and how many pollens in all are there in the room? How about viruses and bacteria? What would they look like if we were as tiny as them and could see them as big as a person? Are bacteria bigger or smaller than pollens? And what are smells made of? What would the room look like if we could see only smells?

A guided discovery activity could have the students close their eyes, and imagine themselves getting smaller and smaller, till they were as tiny as a mote of dust floating in the air of the room. The teacher could then introduce them to various other passing bacteria, Mr. And Mrs. Pollen out for a float, dazzled by the flashing colours of different gases, intersected by endless radio waves passing around them, with muons and neutrinos flashing by, and so on.

Teachers might introduce lessons on many of the constituents of the air, constantly playing on the contrast between what was thought to be empty and uninteresting, adding one layer of complexity and wonder after another, till the air seems thronged with amazing elements, which we are too gross to notice.

3. Conclusion

How does the story end? How do we resolve the conflict set up between the binary opposites? How much do we explain to the students about the binary oppositions? How do we give them some sense of the mystery attached to this topic?

The students could be invited in small groups to represent different constituents of the air. Four or five of them might be the pollens, another small group would be radio waves, another dust, another gases, etc. They would find out, with the teacher's help, as much as possible about their element, and then do two things. First, they could make a presentation to the rest of the class about it, but, second, they would construct a model of their element. They might do the presentation while they are building the models. The aim would be to make their models hugely larger than reality, but sized relative to each other, more or less, and in relative quantities to each other. So we might have five large pollen balls and twenty dust chunks. The conclusion of the unit would come with the students' models being hung from the ceiling, perhaps lines of coloured threads horizontal from ceiling to floor representing the flashing particles from the sun, and thicker wavy ribbons of many colours coming in various directions representing the radio waves. The final result should give the impression of how crowded with wonders the air is, if only we could see it. The room full of models would suggest what it would be like if we were minute.

4. Evaluation

How can one know whether the topic has been understood, its importance grasped, and the content learned?

Any traditional forms of evaluation can be used to assess whether students understand the properties of the air around them. In addition, teachers could assess the degree to which they become knowledgeable in the process of building their models, and can assess their enthusiasm and imaginativeness in doing so. All the comments made earlier under Evaluation are also relevant here.

APPENDIX D:
A ROMANTIC UNIT – THE AMAZING LIFE CYCLE OF THE EEL

(Source: The Imaginative Education Research Group, 2008)

The life cycle and anatomy of this cold-blooded vertebrate may initially seem an unlikely object for romantic engagement. But the mystery of eels' origins, the remarkable story of tracing the source of all the world's eels, and their strange developments as they float on ocean tides for months and years, makes for a mystery story to equal anything in fiction. Even though eels were a delicacy for gourmets for thousands of years, no one had ever seen a pregnant eel. Where did they all come from?

The school curriculum in British Columbia, Canada, directs students to study the life cycle of a cold-blooded vertebrate, so I will take for my topic freshwater eels (Anguillidae—a word I would have students learn). The purpose here is simply to indicate how the "Romantic cognitive tools" framework can help one to shape the topic to make it imaginatively engaging to students.

The framework encourages us to put some of our emphasis on how to tell a good story as well as on how to attain our objective—while using the good story as a better way of attaining the objective. The framework asks the teacher to begin planning by reflecting on the importance they themselves can identify in their own lives and experiences for the topic to be dealt with in class. This needn't be

some heavy-duty self-interrogation, but rather a moment of reflection on something about the topic that can emotionally engage the teacher, even in a small way. Implicit in such an approach is the assumption that teaching will be likely more successful if teachers have located some emotional response to the topic within themselves. We know that our imaginations are engaged by something when we identify some emotional tie to it. Engaging the students' imaginations will likely happen more easily through showing them the emotional importance of the topic. And, if we can identify nothing of any emotional importance to ourselves, then we will likely have a hard time engaging students' imaginations.

1. Identifying heroic qualities

What heroic human qualities are central to the topic? What emotional images do they evoke? What within the topic can best evoke wonder?

In order to help students connect emotionally to the material, teachers need to first identify their own emotional attachment to it. What heroic human quality or emotion—courage, compassion, tenacity, fear, hope, loathing, delight, or whatever—can we identify in the topic of eels? These "romantic" qualities help us—and our students—see the world in human terms and give human meaning to events, facts, and ideas in all disciplines. This first task is the most difficult part of planning the lesson or unit. We are asked to feel about the topic as well as to think about it. If our aim is to engage students' imaginations, we must first alert and exercise our own, and identify the transcendent qualities in the topic that provide a key to imaginative stimulation.

In this unit the main heroic quality around which the unit is shaped is the ingenious persistence in discovering about the life cycle of the eel. (An alternative could be the astonishing journeying of the eel.) We will help our students visualize the Danish scientist Johannes Schmidt on the decks of various ships criss-crossing the Atlantic from Iceland to the Canary Islands, from North Africa to North America, pulling endless catches aboard and examining their contents in his unrelenting attempt to unravel the mystery of the life cycle of eels. He began his search in 1904 and continued for twenty years, suspending his voyages reluctantly during the First World War. His unremarked voyages, single-mindedly pursuing knowledge about eels, challenge those of legendary Sinbads or Jasons, and those of Drake, Magellan, and Cook. And what was he doing all those years, braving the Atlantic Ocean in all weathers? He was looking for younger and younger eels, elvers, larvae, and tracing them by age in order to locate their breeding grounds.

2. Organizing the topic into a narrative structure

2.1. Initial access:

What aspect of the topic best embodies the heroic qualities identified as central to the topic? Does this expose some extreme of experience or limit of reality? What image can help capture this aspect?

For the first lesson of a unit or the opening part of a single lesson, teachers are asked to search their own imagination for images that catch the heroic quality that will provide the dramatic structure for the unit. Remember, it is as important to feel the heroic qualities as well as think about them. Rather than focus exclusively on the content and how we will organize that, we should also search our understanding of the topic and its content for those images that best capture what is important about it.

We might begin with the mystery of eels' sex-lives. In the ancient world much knowledge had already been accumulated about all kinds of creatures, but eels presented a bizarre mystery. Eels were very common but no one had ever found a baby eel or even a pregnant eel. The Egyptians, Greeks, and Romans considered eel a delicacy, yet despite becoming expert at catching them, they discovered virtually nothing about their life cycle. Aristotle proposed that the eel was sexless and that its young were created spontaneously out of the mud in river bottoms. Pliny suggested that, when they wanted to procreate, eels rubbed themselves against rocks, and young were formed from the skin thus detached. Other explanations of their birth included that they came from putrefying material in rivers, that they came from the gills of other fishes, that they grew from horses' hairs that dropped into water, or, delightfully, that they were sinful monks whom St. Dunstan in a rage had transformed to do eternal penance (so giving the English cathedral town of Ely its name—the eely place).

2.2. Composing the body of the lesson or unit:

How do we organize the material into a narrative structure to best illustrate the heroic qualities?

The principal heroic quality should provide the drama and conflict in the story. Remember, the heroic qualities should be those that most effectively convey the content of the topic. In making this brief initial sketch, try to capture just the main narrative thread that will carry the students' understanding from the beginning to the end of the lesson or unit.

Our story structure is the solution of a 2,500-year-old mystery, solved only in the 20th century through the heroic persistent ingenuity of Johannes Schmidt. At the end of the century a tiny, transparent, leaf-like fish, quite unlike an eel,

was caught in the western Mediterranean. A few earlier similar specimens had been seen and designated a new genus. This particular specimen was reared in captivity, and by a series of amazing transformations grew into an elver and then into an adult eel. (The larva are called leptocephali—another word for students to learn.) But if eels were so common, why were specimens of eel larvae so very rare? We can take a chronological perspective on the unravelling of the eel's life cycle, though each new discovery only seems to leave us with further puzzles. And we have set up our narrative so that Schmidt becomes heroic through the ingenuity and persistence he displays in tracing the early life of the eel. It might be useful to set-off Schmidt's voyages and discoveries against the social and political background of his time, which forms the focus of most people's attention. While the politicians and soldiers filled centre-stage, wreaking that terrible destruction of the First World War, Schmidt's gradual piecing together of the eel's life cycle added something perhaps small to our accumulating knowledge. The counter-pointing of his slow, persistent inquiry against the cataclysmic events that fill our history texts, might lead to brief meditations on the value of different kinds of activities, and so stimulate some wonder.

Our narrative will follow Schmidt's early explorations in the Mediterranean. He discovered more larvae and found that on average they were larger in size the further east they were caught. So he sailed out into the Atlantic, finding ever-smaller larvae drifting in the currents. Schmidt persuaded more than twenty ship-owners to collect samples for him, and to chart where each was found. He began to hone in on the area where the greatest concentrations of tiny larvae were found, locating their breeding ground between latitudes 20° and 30°

North and longitudes 50° and 65° West, in the strange floating weeds that constitute the Sargasso Sea.

2.3. Humanizing the content:

What aspects of the narrative best illustrate the human emotions in it and evoke a sense of wonder? What ideals and/or challenges to tradition or convention are evident in the content?

Think of how a good movie or novel makes aspects of the world engaging. Obstacles to the hero are humanized in one form or another, almost given motives; they are seen in human terms. To do this, we don't need to falsify anything, but rather we highlight a particular way of seeing it—because this is precisely the way students' imaginations are engaged by knowledge.

A sense of romance can be caught up in the details of Schmidt's voyages and discoveries, in the dedication, the ingenuity, the persistence, the endless miles of the massive Atlantic Ocean in search of tiny larvae. Wonder can be stimulated by the strange life cycle gradually uncovered; the floating larvae carried on currents for months or years and for up to three or four thousand miles, their bizarre transformation from larvae to elvers, their finding—for thousands of years that we know of—the same rivers of Europe and America, their peculiar sexual progress from neuter, to precocious feminization, to hermaphrodite, before settling for male or female conditions, their unfailing migration back to the sea after about ten years in their freshwater home rivers. Awe might be stimulated by just considering the purpose of all this remarkable complexity in eels' life cycle. Why?

2.4. Pursuing details:

What parts of the topic can students best explore in exhaustive detail?

While it is easy to give students a project to do that is part of a topic, it is a little harder to think about what aspect of the topic they might be able to exhaust, i.e. be able to find out nearly everything that is known about it. But there are such parts in every topic, and the security and sense of mastery that comes from knowing nearly as much as anyone about something is a great stimulus to inquiry. Think of something that is intriguing, that can be seen from a variety of different perspectives, or that is alluded to but not examined in detail in the content or in your teaching of it (referring to your notes from 2.2 and 2.3 above should help).

This topic provides a wealth of details that might be fairly exhaustively pursued: charting the changes from larvae to elvers; the foods of eels at various stages of life; Schmidt's voyages; the variety of forms of larvae, from threadlike to saucerlike forms, and the adult forms they grow into; the families of eels; the Sargasso Sea; and so on.

3. Conclusion

How can one best bring the topic to satisfactory closure? How can the student feel this satisfaction? How can we evoke a sense of wonder about the topic?

One wants to end a topic in a "romantic" way, which can have two forms. The first form is to re-examine the images we started from and review the content through the lenses of other heroic qualities, including some that might give an opposite or conflicting image to that of our earlier choice. The second form is to show how the romantic association the students have formed can help them

understand other topics in a new, more imaginative, way. Or one can use both, of course.

One might provide in conclusion a different narrative, this time bringing together the sequential outline of the eel's life cycle, from Sargasso Sea to American and European rivers, and back again. In this telling we might highlight those aspects of their life cycle that are still not known or understood. We still lack, for example, a clear image of how male and female eels reproduce in the Sargasso Sea. We do not know how many of, or even whether, the European eels who set off on their long migration back to the Sargasso Sea ever make it. We do not know the mechanisms that trigger and guide their migrations; we might connect this with other creatures with exotic migration patterns—salmon, birds, butterflies, etc.

4. Evaluation

How can one know that the content has been learned and understood and has engaged and stimulated students' imaginations?

Any of the traditional forms of evaluation can be used, but in addition, teachers might want to get some measure of how far students' imaginations have been engaged by the topic, how far they have successfully made a romantic engagement with the material. In addition, the concluding activities (above) are also evaluative in nature. Various kinds of information, including that derived from discussion, debate, art work, journal writing, etc., can be gained as the unit is being taught. The teacher can also measure the amount of non-required reading students engage in. They might also record what other reading or video-watching they may have performed related to the subject matter of the topic. In

addition they could ask the students to keep personal notes in which they record in an open-ended way any ideas they have had about the topic they are studying.

We might employ various methods to evaluate a unit such as this. We will want to ensure that students have learned in detail about eels and their life cycle, and also that they know which features of eels' lives remain mysterious. We can use traditional forms of evaluation to inform us about students' knowledge, using tests, examining their written work, grading projects, and so on.

Because we have been trying to engage students' imaginations with eels, we will also want to evaluate how successful we have been in this regard. Obviously we do not have well-tried and tested evaluation procedures that will give us precise readings of imaginative engagement, and probably never will have. But we might experiment with plausible ways of getting some kind of reading. We might begin, simply, with teachers' observation. It is usually fairly clear whether or not students are imaginatively engaged in a topic; the degree of their enthusiasm, the way it invades their intellectual activity in general, their pursuit of aspects of it well beyond what is required, their questioning and searching out additional sources of information, their desire simply to talk about it, are all indicators of some degree of imaginative engagement. Students' written work, or other forms in which they present what they have learned to the teacher or to the class as a whole, can yield evidence of imaginative engagement; going beyond what is required, especially when the direction has been determined by the student's perhaps idiosyncratic interests, or taking great care in, for example, drawing different forms of larvae or species of eel, or evidence of knowledge that

has been culled from diverse sources not readily available, or evidence of a kind of obsessive interest in some feature of eels' lives, would all provide some indication of imaginative engagement. Some of the above characteristics of students' work could, of course, be due to other factors, like desire for a high grade or compulsion. But it is an unusually unobservant teacher who cannot tell the difference. These points echo in brief ideas that are elaborated and developed in Eisner's "connoisseurship" model of evaluation (Eisner, 1985).

This is an area in which one might encourage students' self-evaluation. Ask them to reflect on how far they felt they had been imaginatively engaged in the topic, what features of it engaged them most, what had they most enjoyed learning about, and so on. This might also become a useful small group activity, in which each other's interests might incidentally be communicated to the group.

A part of the attempt to evaluate a unit such as this must involve trying to discover how far students grasp the underlying scientific virtue of pursuing knowledge purely for its own sake, and recognizing persistence and ingenuity as appropriately serving this pursuit. Also we will want to evaluate how far students associate with these transcendent human qualities. We can try to get some reading of these from students' work, from their classroom behaviour, and from effects on what they more readily turn their minds to in leisure time. The sensitive teacher will no doubt be able to get an adequate reading on their success, even though it will not be in terms of some precise score. (We decide what it is educationally valuable to do on grounds other than what we can evaluate precisely.)

APPENDIX E:
WEB SITE RESOURCES

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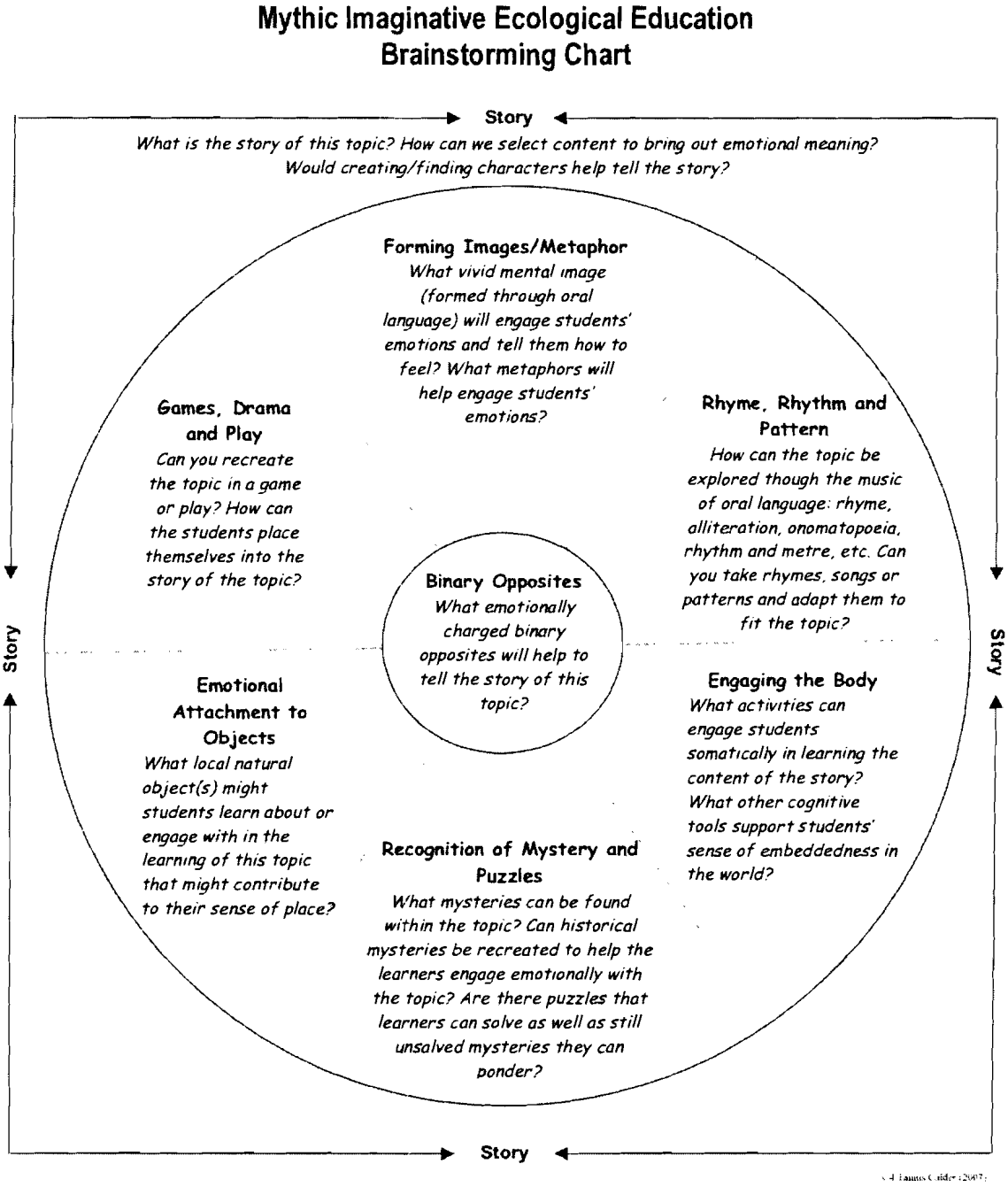
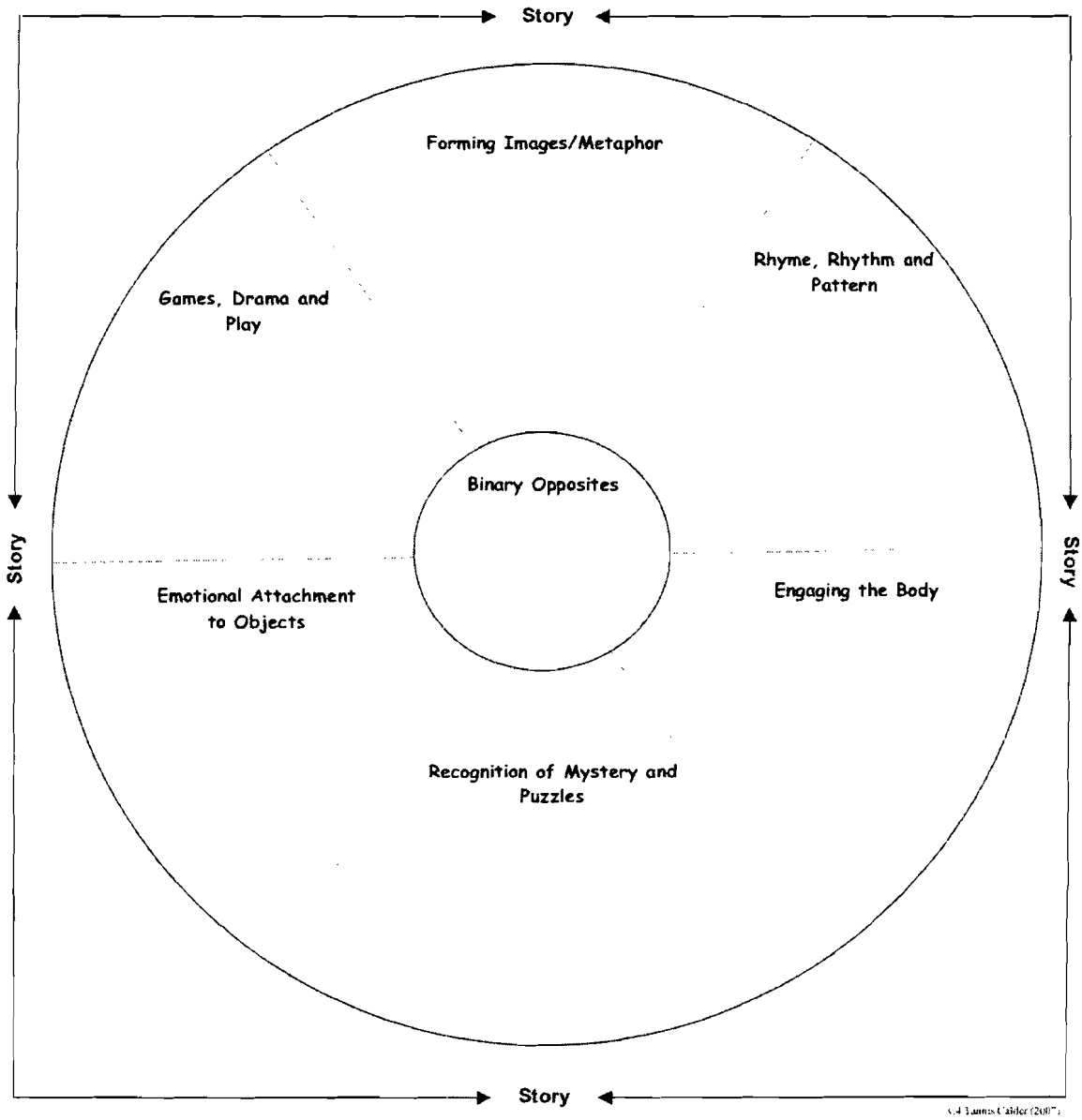
APPENDIX F: BRAINSTORMING CHARTS

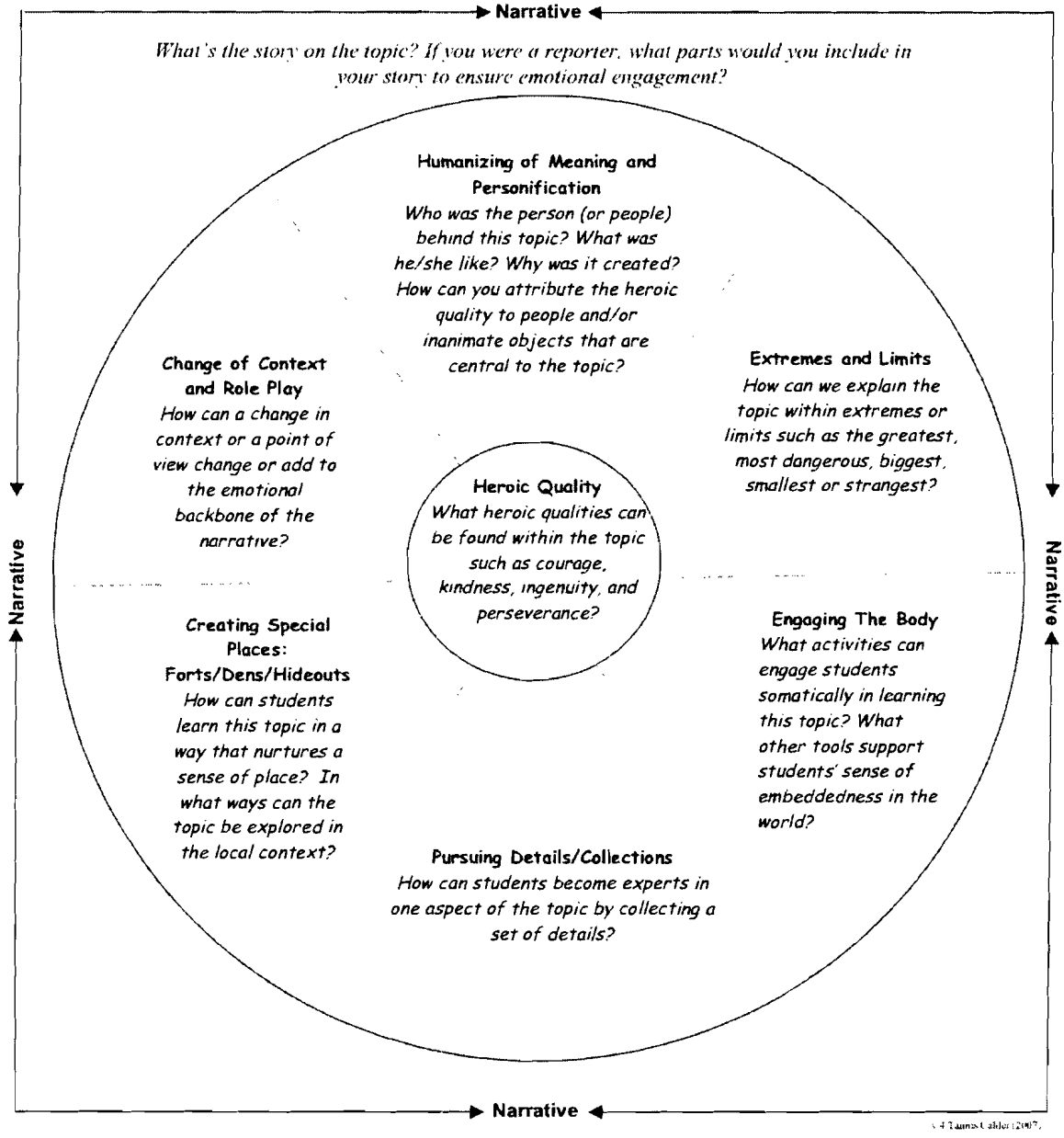
(Based on Calder (2007) after Egan (1997))



Mythic Imaginative Ecological Education
Brainstorming Chart



Romantic Imaginative Ecological Education
Brainstorming Chart



Romantic Imaginative Ecological Education
Brainstorming Chart