The Nature of Imagination in Education for Sustainability

by

Sally Kathleen Jensen

BA (Hons)

Submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy.

Deakin University

May, 2014
I am the author of the thesis entitled

The Nature of Imagination in Education for Sustainability

submitted for the degree of Doctor of Philosophy.

This thesis may be made available for consultation, loan and limited copying in accordance with the Copyright Act 1968.

'I certify that I am the student named below and that the information provided in the form is correct'

Full Name: ....  
Signed: ..........  
Date: ............

Signature Redacted by Library

Sally Kathleen Jensen  
10.5.2014
DEAKIN UNIVERSITY
CANDIDATE DECLARATION

I certify that I am the author of the thesis entitled
The Nature of Imagination in Education for Sustainability
submitted for the degree of Doctor of Philosophy:

a. I am the creator of all or part of the whole work(s) (including content and layout) and that where reference is made to the work of others, due acknowledgment is given.

b. The work(s) are not in any way a violation or infringement of any copyright, trademark, patent, or other rights whatsoever of any person.

c. That if the work(s) have been commissioned, sponsored or supported by any organisation, I have fulfilled all of the obligations required by such contract or agreement.

d.

I also certify that any material in the thesis which has been accepted for a degree or diploma by any university or institution is identified in the text.

'I certify that I am the student named below and that the information provided in the form is correct'

Full Name: ...........

Signed: ...........

Date: .................
Acknowledgments

I am grateful to a number of people who have supported this project. I am ever grateful to my principal supervisor Associate Professor Mary Dixon, who has consistently valued and encouraged the possibility of my work. I thank my supervisor Dr Lou Preston for assisting me with positioning this dissertation in the context of Australian Environmental Education research. Thank you also to Dr Kate Hall for her diligent and timely editorial assistance.

I thank the participants very much for sharing their pedagogical stories and contributing to this project. I am indebted to Tracey Gray who has been a solid gold rock of inspiration and clarity throughout the past years of this research. I wish to primarily thank my mother for her bottomless and infinite love. I am grateful to my dear friends Russ and Robbo who support my heart and mind, Gisela for her sisterly reminders that critical research is artful, and Andrew and Yariet who hold my mirror.

I am indebted to educational leaders past and present who feature in this thesis, who have inspired so many with their revolutionary perspectives and dedicated practices of teaching that re-position the marginalised to the centre.

I wish to dedicate this thesis to Jackson, who is the life that inspires my growth.
Publications


# Table of Contents

**CHAPTER ONE: INTRODUCTION** ............................................................... 1

- The environmental crisis and the idea of sustainability ........................................ 2
- Imagining a resolution to the environmental crisis ............................................... 3
- Background: How I came to this work ............................................................... 6
  - An imagined beginning .................................................................................. 6
  - Professional frustrations with cycles of representation .................................... 7
  - Guiding Research questions ......................................................................... 11
  - Discursive strategies .................................................................................... 12

**CHAPTER TWO: THE LOSS OF IMAGINATION** .............................................. 17

- The immateriality of imagination ..................................................................... 17
- An environmental imagination ...................................................................... 18
- Loss of imaginative play in nature .................................................................. 26
- Marginalisation of creativity .......................................................................... 27
- Imagining the Other: apathy or empathy ....................................................... 28

**LOOKING FOR IMAGINATION IN THE LITERATURE** ................................... 30

- The imaginary aspects of materiality across the disciplines ............................ 30
- The mental practice of imagining ................................................................ 33
- The imaginary .............................................................................................. 35

**SEEING IMAGINATION IN EDUCATION** .................................................... 37

- Key theories of imagination in education .................................................... 38
  - Imagination as living knowledge ................................................................ 38
  - Understanding the world develops through imagination ......................... 40
  - Cognitive Imaginations ............................................................................. 41
- Contemporary perspectives on imagination in education ............................... 43
  - Imaginative teaching and learning .......................................................... 43
  - Research into imagination in education .................................................... 43
  - Imaginative Ecological Education ............................................................ 45
  - Imagination as cognitive tool of place-making ........................................ 46
  - Affective imagination .................................................................................. 46
CHAPTER THREE: SUSTAINABILITY AND EDUCATION .................................. 50

THE EMERGENCE OF THE IDEA OF SUSTAINABILITY ....................................... 51
EDUCATION FOR SUSTAINABILITY .................................................................. 53
Education for Sustainable development ......................................................... 54
Environmental Education (EE) and Education for Sustainability .................. 54

UNDERSTANDING SUSTAINABILITY .................................................................. 56
What does understanding sustainability involve? ............................................. 56
New ways of thinking and re-thinking ............................................................ 57
Inferences to imagination and gaps in the research ......................................... 57
The limits to knowing ....................................................................................... 58
Understanding sustainability in Efs involves more than knowing about it ....... 60
Experience and Environment ........................................................................... 61
The need for more-than experience, and the limits of immediacy ................. 63
Experience and imagination ............................................................................ 64
EFS AS STORYTELLING AND THROUGH ECO-LITERATURE ............................ 65
Openings for Efs research into the pedagogical places of imaginative eco-texts ................................. 66
Understanding sustainability in the Australian National Curriculum ............. 68
Educating for worldviews ............................................................................... 69
The world as the environment ........................................................................ 71
Summary ........................................................................................................... 72

CHAPTER FOUR: PHILOSOPHICAL CONTEXTS ................................................. 73

PROBLEMS WITH THE WAYS WE IMAGINE KNOWLEDGE AND NATURE .......... 74
The contradiction of environmental knowledge .............................................. 74
Knowledge imaginaries .................................................................................... 76
Imagining the environment ............................................................................. 78
Imagining nature ............................................................................................... 78
The problem of representing a fixed world ..................................................... 79
Illusion of truth ................................................................................................. 81
A problem of separating human from nature ................................................ 83
False ontologies ............................................................................................... 85
The ontological affects of environmental knowledge ..................................... 86
Ontological and environmental dispossession .............................................. 87
CHAPTER FIVE: THEORETICAL RE-IMAGININGS AND METHODOLOGICAL CONSIDERATIONS

AN EPistemological POSITION: Re-imagining knowledge

Epistemology includes ontology

Imagination in this epistemology

Summary

Re-imagining ‘THE ENVIRONMENT’ AS ALL OF TIME AND SPACE

Summary

Re-conceptualising imagination for research

Epistemological implications in studying imagination

Identifying imagination: a diffraction, not a definition
~ Imagination as images, narratives and metaphors .................................................. 122
~ as ‘taking in’ experience ......................................................................................... 122
~ as ‘metaphorical thought’ ..................................................................................... 123
~ as ‘thinking into otherness’ ................................................................................... 124
~ as ‘serving experience’ .......................................................................................... 127
Summary ..................................................................................................................... 128
Conclusion .................................................................................................................. 129

CHAPTER SIX: METHODOLOGY AND DESIGN ...................................................... 130

Overview of the research ......................................................................................... 130
Designing the research ............................................................................................. 131
Positioning the research: identifying the places of EfS ........................................... 133
The extensive interpretations of EfS ........................................................................ 133
Whole-School Sustainability ..................................................................................... 134
Formal and informal sites for EfS research ............................................................... 135
At the grassroots of EfS ............................................................................................ 136
Interviewing a range of educators: the need for research ......................................... 137
into the pedagogical places of EfS ........................................................................... 137
Learning Stories can focus on pedagogical work ..................................................... 138

THE RESEARCH DESIGN ......................................................................................... 139

The EfS educators ....................................................................................................... 139
The EfS educators’ educational contexts and level they teach .................................. 139
Sustainability concepts taught by EfS educators ....................................................... 141
Content and flow of the interviews ......................................................................... 141
Mentioning imagination in the interviews ............................................................... 141
Process of analysing the interviews ........................................................................ 142
Analysis as crafting the learning stories ................................................................... 142
Participant-observation in a primary school ............................................................ 143
In a sustainable school ............................................................................................ 144
The process of participation and observation: gathering data .................................. 145
Type of EfS at work .................................................................................................... 145
EfS resources as eco-texts: images, metaphors and narratives ................................. 146
TABLES

ANALYSIS: DIFFRACTIVE, NARRATIVE, ECO-CRITICAL, CARTOGRAPHIC ......................... 147
A diffractive way of seeing .................................................................................. 147
The diffractive involves imagination in analysis .............................................. 149
Narrative ............................................................................................................. 150
Eco-critical ......................................................................................................... 151
Material eco-critical ......................................................................................... 152
Cartographic ....................................................................................................... 153
A diffractive, eco-critical, narrative analysis of the cartographies of learning stories ... 154
Summary and implications for research .......................................................... 155

CHAPTER SEVEN: ANALYSING THE LEARNING STORIES .......................... 157
Getting to know the EFS educators ................................................................ 158
What are EFS educator key sustainability concepts that focus their teaching? .... 158
Teaching ways of seeing: crafting the conceptual relation between self and world ..... 161
Imagination: in the learning stories of the EFS educators ............................ 163
Imagining water through story ........................................................................ 163
Attaching realities through experience and imagination ............................... 167
Imagining and re-imagining the experience of energy ..................................... 170
Imagining where ‘away’ actually is ..................................................................... 172
Concluding this section: experiencing and imagining materiality .................... 174
Imagining the dimensions of sustainability .................................................... 175
Immediacy: how empirical ideas of experience and environment affect EFS pedagogy 176
Impossible places: at the edges of experience ................................................. 178
Impacts: imagining contexts and consequences when experience isn’t enough .... 179
Understanding without experience ............................................................... 183
Understanding through narrative that builds imagery ..................................... 184
Attributing the work to imagination ............................................................... 186
Asking EFS educators about imagination ..................................................... 186
Finding differences and contrasts ............................................................... 189
Conclusion: How imagination informs experience and materiality ................ 192

CHAPTER EIGHT: IT STORIES ................................................................. 193
Material eco-criticism ....................................................................................... 195
Re-imagining the narrative agency of matter ............................................... 196
Matter as storyteller ......................................................................................... 197
CHAPTER NINE: SHEARWATER LEARNING STORY ........................................ 221

EVA ............................................................................................................. 222

SHEARWATER LEARNING STORY .......................................................... 222

ENVIRONMENTAL IMAGINATION MAP ............................................... 224

WHO LIVES THERE? ................................................................................. 227

AIR DRAWING: WAYS OF SEEING .......................................................... 229

NARRATIVE SENTENCES: ‘IMAGINATION STATEMENTS’ ...................... 234

IMAGINING THE REAL ............................................................................. 239

COLLABORATIVE ENVIRONMENTAL IMAGINATION MAPPING ............ 243

COLLABORATIVE RESSHUFFLING .......................................................... 246

ENVIRONMENTAL IMAGINATION MAPPING AT THE BEACH .............. 253

BE IN THE MAP, BE YOUR KNOWLEDGE ............................................ 255

IN THE MAP: SCULPTING KNOWLEDGE FROM THE SAND ............... 258

POST STORY .............................................................................................. 264

CHAPTER TEN: A MATTER OF IMAGINATION ...................................... 266

Significance .............................................................................................. 266

Limits and possibilities ............................................................................ 267

Methodological considerations ............................................................... 269

RESPONDING TO THE RESEARCH QUESTIONS ................................... 271

THE NATURE OF IMAGINATION IN EFS ............................................ 271

A living knowledge that is practiced .................................................... 271

Contested and unwanted ......................................................................... 271

Material and discursive .......................................................................... 272

A way of knowing that affects being .................................................... 273

EFS REQUIRES IMAGINATION TO REVISE WAYS OF SEEING THE WORLD 273
~ By attending to ways of seeing experience ................................................................. 273
~ By educating the Imaginary ............................................................................................ 274
~ By imagining what cannot be seen .................................................................................... 275
IMAGINATION RE/ORIENTS THE RELATIONS BETWEEN SELF AND WORLD .......................... 276
Imagining the bigger picture .............................................................................................. 276
Imagining multiple temporalities ....................................................................................... 277
Involving ontological connections and becoming connected .......................................... 277
Oriented by/through In-ness .............................................................................................. 278

CONTRIBUTIONS TO KNOWLEDGE .................................................................................. 280
1. Aligned EfS with the New Materialisms ......................................................................... 280
Re-thinking materiality ........................................................................................................ 281
Re-imagining nature ........................................................................................................... 281
Re-seeing matter ................................................................................................................ 282
2. Re-surfaced undervalued ideas of imagination from across the disciplines .............. 282
3. Located and mapped the dimensions of understanding sustainability .................... 283
4. Re-conceptualised the environment as all of time and space ..................................... 285
Conclusion .......................................................................................................................... 286

REFERENCES ....................................................................................................................... 287
APPENDIX I .......................................................................................................................... 336
List of Figures

Figure 1.1  A ‘Water Cycle’ diagram used in teaching and learning ‘the water cycle’. National Weather Service Educational resource……………………………….. 9
Figure 2.1 Illustration of ‘rocket-powered unicorns’, Clayton, 2008........................................ 21
Figure 2.2 Illustration of ‘magic watermelon boats’, Clayton, 2008...................................... 21
Figure 2.3 Illustration of ‘wishing for a car’ Clayton, 2008.................................................. 22
Figure 2.4 Illustration of ‘practical dreams’ Clayton, 2008.................................................. 22
Figure 2.5 Illustration of ‘losing possibility’, Clayton, 2008................................................ 23
Figure 2.6 The relationship between real and imaginary numbers.................................... 31
Figure 2.7 The Very Hungry Caterpillar by Eric Carle. Copyright ©1969 & 1987 by Eric Carle. All rights reserved. Used with permission................................. 32
Figure 3.1  Screenshot of the Sustainability Priority in the Australian National Curriculum………………………………………………………………………….. 69
Figure 4.1  Rene Magritte, La Condition Humaine, 1933, Oil on canvas................................ 80
Figure 4.2 Eugene Von Guérard, View of Tower Hill, 1855, Oil on canvas. Warrnambool Art Gallery Victoria. Used with Permission..................................... 82
Figure 5.1 This diagram maps a spatial relation of self in time and space............................ 117
Figure 5.2 This diagram maps a spatial relation of self in time and space............................ 118
Figure 5.3 Researchers’ representation of the relations between self and other............... 126
Figure 5.4 Researchers’ visual representation of the relations between experience and imagination......................................................................................... 128
Figure 7.1 This diagram maps a spatial relation of self in time and space............................ 175
Figure 7.2 Dead Laysan Albatross. Midway Atoll. ©Chris Jordan wwwchrisjordancom Used with Permission.............................................................. 181
Figure 8.1 Dead Laysan Albatross. Midway Atoll. ©Chris Jordan wwwchrisjordancom Used with Permission.............................................................. 193
Figure 8.2 A screen shot of Eric ‘on the couch’, Life-pscycle-ology: The Life of a discarded phone (Acaroglu & Kaliincos, 2010). Used with Permission.................................. 198
Figure 8.3 Screenshot from The Story of Stuff (Leonard, 2008)........................................ 203
Figure 8.4 Screenshot from The Story of Bottled Water (Leonard, 2010)............................ 203
Figure 8.5 Understand-a-scope, ©Michael Leunig, The Age newspaper, 17 March, 1984. Used with Permission................................................................. 206
Figure 8.6 Student drawing of classroom ‘going back to nature’..................................... 210
Figure 8.7 Student drawing of the bookcase ‘going back’ to nature.................................. 211
Figure 8.8  Students and teachers participating in the students’ activity……………………215
Figure 8.9  Students at the conference participating in the ‘Food Miles’ activity………215
Figure 8.10 Participants working on ‘Food Miles’ task prepared by the students………215
Figure 8.11 The worksheets Eva’s students created for their presentation……………… 216
Figure 8.12 Participants placing objects on ‘The Earth Calculator’ ……………………… 217
Figure 8.13 ‘The Earth Calculator’ after participants’ objects were replaced by the worksheets……………………………………………………………………. 218
Figure 8.14 Students explaining to government official how the food miles ‘Earth Calculator’ works. ……………………………………………………………………219
Figure 9.1  Conceptual map or time and space map……………………………………225
Figure 9.2  ‘Air Drawing’. Photograph taken during participant-observation……………230
Figure 9.3 Students exploring the island on excursion……………………………………232
Figure 9.4 Students drawing from observation on the island after ‘air drawing’……… 232
Figure 9.5 Students drawing from observation on the island…………………………… 232
Figure 9.6 Student drawing of short tailed shearwater bird from observation………..233
Figure 9.7 Photograph of a shearwater burrow on the island……………………………233
Figure 9.8 Student drawing from ‘imagination statement: ‘The egg: A single white egg is laid in the burrow...The egg hatches in 53 days...’………………………… 237
Figure 9.9 Jessie’s drawing in the classroom of shearwater burrow in response to a narrative sentence…………………………………………………………238
Figure 9.10 Student drawing……………………………………………………………………241
Figure 9.11 Student drawing by ‘Jackson’ of Shearwater birds’ migration patterns………242
Figure 9.12 The first environmental imagination mapping exercise with students………245
Figure 9.13 The class environmental imagination framework after reshuffling of about 15 students’ journals……………………………………………………247
Figure 9.14 Eva’s class at a local beach………………………………………………………..253
Figure 9.15 Eva drawing the centre circle of the mapping framework on the sand………..254
Figure 9.16 Students standing around a time and space map carved in the sand at a local beach…………………………………………………………………………255
Figure 9.17 Around the edges, students listening and playing in the sand………………256
Figure 9.18 Still from video footage. Students placing themselves in the map………..257
Figure 9.19 Students creating sand sculptures of their understanding……………………259
Figure 9.20 Students working together to create sand sculpture of a shearwater burrow with eggs……………………………………………………………………260
Figure 9.21 Conceptual map: the dimensions of sustainability that are imagined…………263
Figure 9.22 Dead Short-Tailed Shearwater Bird…………………………………………264
Figure 10.1 The environmental imagination map: a conceptual map of self in context of time and space………………………………………………………………284
Figure 10.2 Environmental imagination map: the dimensions of sustainability that are imagined……………………………………………………………………285
List of Tables

Table 6.1  This table shows the range of EfS educators interviewed, their general topic focus and the educational context in which they teach………………………… 140

Table 7.1. This table lists ‘EfS educators’ ‘Topic’ of EfS teaching practice next to the ‘Key concepts that focus their teaching’………………………………….159
Abstract

The presence of imagination in understanding sustainability is often overlooked, particularly in education. Imagination has disputed forms, an uncertain existence and has been regarded as inconsequential in matters of knowledge and materiality. The possibility of imagination as environmental knowledge, and as essential to resolving environmental problems, is applied in this research to the contexts of Education for Sustainability (EfS). This thesis investigates and critically analyses the role of imagination in EfS learning and teaching experiences in Victoria, Australia. The theoretical framework guiding this research draws on environmental philosophies, qualitative arts-based educational research, material eco-criticism and the New Materialisms. Rather than fantasy or creative thinking, imagination is approached as a confluence of educational and environmental concerns and is re-positioned through this research as a material force essential for understanding sustainability.

Exploring the nature of imagination in EfS has challenged epistemological assumptions at the heart of environmental education and research. These challenges have greatly influenced the epistemological and methodological directions that guide this work as the relations between knowledge, imagination and environment are re-conceptualised. I introduce this thesis with these problems, my background; how I came to this work as an educator/researcher and I assert the discursive strategies I weave together in this thesis in order to critically encounter and research imagination in EfS.

In the second chapter, I construct the imagination as lost, misunderstood and marginalised in understandings of environmental knowing. This chapter explores a range of notions of imagination and juxtaposes its loss with the material realities of the global environmental crisis. For knowledge-making in research and in education, the critical importance of re/orienting the relations between self and world emerges. I draw upon interdisciplinary artworks and philosophies that repudiate assumptions that the natural world is detached and external to self. I weave stories, images and
philosophies to play with dislocations that separate the physical, natural world from human intelligence and culture. The overlapping texts of this chapter emphasise the relations between entrenched divisions (self/world, knowledge/nature) and present the possibility that imagination is a human capacity that is deeply related with the state of the earth.

In the third chapter, I discuss the literature surrounding Education for Sustainability in the field and context of environmental education and its research. The importance of place has emerged as critical to understandings of knowing and learning. As this study is based upon educators and students in Victoria, Australia, the work is positioned in Australia, with implications and application beyond Australia.

In Chapter 4, ‘Philosophical contexts’, I draw upon New Materialist and environmental philosophies to argue that ways of representing ‘the environment’ require re-vision in and for Education for Sustainability. This continues to set the foundation for re-conceptualising imagination as a way of knowing and understanding environmental knowledge, particularly in Australia. In Chapter 5, I build upon these significant philosophical contexts as I draw together theoretical frameworks and discuss the implications for methodology. I coordinate a palette of inter-disciplinary perspectives and interpretations of imagination as a method of identifying and understanding imagination in this context. I begin to assert the New Materialist epistemological position of the research and I frame Education for Sustainability (EfS) from a New Materialist perspective.

In Chapter 6, I outline the research design, methods of data collection and my diffractive, narrative approach to analysis. The research design involved a combination of interviews and participant observation. Seven interviews with self-identified EfS educators from a range of educational settings in Victoria, Australia, were conducted at their workplaces during 2012-13. The interviews discussed pedagogical approaches to teaching and learning sustainability concepts. I also participated in and observed a grade 3-4 class over 14 weeks at a 5-Star-Sustainable primary school in regional Victoria. This participant observation research examined how imagination occurs in a sustainability education program for students and
teachers. The combined ‘data set’ comprises visual, audio and written data involving interviews with educators and students, notes, and a range of visual material.

During the research I rarely asked directly about imagination, rather I engaged with educators and students through interview, participation and observation to explore what is involved in understanding sustainability concepts in EfS. A concern for appropriate qualitative analysis methods resulted in drawing upon New Materialist and arts-based analytical practices and philosophies. I view the ‘data’ as learning stories with a diffractive lens. My diffractive, narrative discourse analysis of participants’ learning stories (Chapters 7-9) examines how imagination arises in EfS, how imagination is understood in teaching and learning, and the extent to which imagination works to construct and expand ways of seeing the world for students and teachers.

The accomplishment of this project has various dimensions, as discussed in Chapter 10. Importantly, New Materialist perspectives provide new, contemporary conceptualisations of imagination for environmental education practice and research. I conclude this thesis in Chapter 10, ‘A matter of imagination’ with a synthesis of the overall insights in relation to the core questions that guide my research. I advance a new understanding of imagination in EfS which includes the importance of recognising the nature of imagination in pedagogical practice for teachers and learners. Handling the broad, indefinable areas of imagination and sustainability in this research is challenging. Quality educational research needs to be deep rather than broad. Rather than producing definitions, this project maps the relations between experience and imagination in visual and spatial terms. I re-position and re-conceptualise imagination in environmental and ontological processes of knowledge making with important implications for the future of Education for Sustainability.
CHAPTER ONE

Introduction

This research project investigates the ontological and epistemological implications of imagination in education that is concerned for environmental sustainability. Imagination has rarely been the subject of Australian Environmental Education research in Australia. Examining imagination in this context provokes the entanglements of environment and education and a range of inconsistencies have emerged that require critical revision. The work of this research involves re-conceptualising imagination in environmental terms, and re-positioning it in discourses of knowing and learning in Education for Sustainability (EfS).

Historically, the idea of imagination has had an immaterial reputation. Its histories have produced expectations that imagination is synonymous with that which is unreal and untrue. In the process of this research, disparate interdisciplinary literature has been assembled to suggest that imagination is something, is powerful, has material consequences on the body, and is involved in the conceptual organisation of human understanding. This thesis examines the possibility that imagination is a way of knowing that is deeply related to the living materiality of the earth.

By extending understandings of imagination in Education for Sustainability, I aim to contribute to the global project of sustainability. However, imagination occurs indistinctly, so there are uncertainties inherent in this research agenda. Largely, this research examines how imagination is involved in understanding sustainability. But before I examine imagination and the entangled relations between imagination and environment, I first wish to clarify what I mean by ‘environmental crisis’ as a context for sustainability and Education for Sustainability.
The environmental crisis and the idea of sustainability

To bring lucidity to the start of broad discussions of sustainability and education, I first wish to clarify what I mean by sustainability in order to examine how it is taught learned and understood. The idea and possibility of sustainability is a response to the humanitarian and environmental crisis. This crisis involves the globally recognised, unsustainable degradation of environmental systems and cycles that extends from the oceans to the atmosphere, from lands to waters, air and food (Agenda 21, 1992; World Commission on Environment and Development, 1992). The crisis involves pollution, overfishing, extinction, degradation of land, dispossession, de-forestation, water shortage, over-consumption and climate change (Agenda 21, 1992; World Scientists’ Warning to Humanity, 1992). The concept of ‘sustainability’ has emerged to register the need to actively sustain life.

The idea that ‘sustainability’ is exclusively environmental pitches humanity and nature at odds. The concept of sustainability involves perceiving humanity as accountable because of unsustainable practices through which we cut down trees faster than they can grow, fish faster than they can replenish themselves, use more water than it can rain, and release carbon dioxide faster than it can be re-absorbed, and so on. The crisis occurs as environmental because the environment is the source of the air we breathe, the water we drink, the energy with which we power our homes, business and vehicles, and the food that feeds us. The idea of ‘environmental sustainability’ implies that resolution to the crisis requires managing the natural resources humanity relies upon in new ways, and developing sustainable practices that will ensure that global cycles of water, energy, air and biodiversity continue to thrive. This situates sustainability as about managing an external environment.

Meta-perspectives re-constitute ‘the environmental crisis’ as rooted in human being and ways of knowing rather than in an imbalance in nature. These positions oppose technological solutions to environmental problems that aim to resolve specificities in the external world without directing attention toward humanity’s destructive worldviews. Environmental educator, David Orr (1994) suggests: “The disorder of eco-systems reflects a prior disorder of mind” (p. v). A reflexive relationship
between human self and natural world is highlighted by environmental scholars: Thomas Berry’s *The Dream of the Earth* (1988), Freya Matthew’s *The Ecological Self* (1991), Neil Evernden’s *The Social Creation of Nature* (1992), Orr’s *Earth in Mind* (1994) and Jessica Weir’s *Connectivity* (2008). These radical juxtapositions support re-thinking and re-imagining the conceptual relations between humanity and nature; and between the self and the world. The composite ideas of a *naturalcultural* (Harraway, 2008) and *natureculture* (Muecke, 2004; Whitehouse, 2011) have emerged to undo and re-make the “stubborn dichotomies” (Oppermann, 2013, p. 60) and categorical schisms that enforce and perpetuate dualistic worldviews at the source of the environmental crisis. In this thesis, I draw upon these positions to suggest that resolution to the environmental crisis lies in changing ways of thinking and seeing the world rather than a focus on external, human management of environmental problems.

*Imagining a resolution to the environmental crisis*

Eco-critic and literary scholar Lawrence Buell asserts the reciprocity between human imagination and the environmental crisis in his formative book *The Environmental Imagination* (1995). Buell analyses the ways ‘nature’ is imagined in literature and perceives an exchange between environmental existence and the assemblages of imagination. He refers to the construction of reality produced by the ways nature is imagined, and positions the persistence of environmental degradation as accountable to human imagination:

If, as environmental philosophers contend, western metaphysics and ethics need revision before we can address today’s environmental problems, then environmental crisis involves a crisis of the imagination, the amelioration of which depends on finding better ways of imaging nature and humanity’s relation to it. (Buell, 1995, p. 2)

This idea that “environmental crisis involves a crisis of the imagination” (Buell, 1995, p. 2) suggests that environmental understanding requires imagination. The idea that a resolution to the global environmental crisis can be found within human
imagination rather than external management requires re-configuring the structures and expectations of sustainability, and an extensive examination of environmental knowledge systems.

However, perhaps the assertion that the restoration of the environment will be attained through “re-imagining our relationship with nature” (Buell, 1995, p. 2) appears a superficial solution that dismisses the scale and reality of environmental problems. The possibility of a hidden contract between the creative mind and the manifest world seems implausible, fantastical, and imaginary. Or does it echo (post)constructivist thought and Indigenous Australian episto-ontologies? Perhaps the resolution of the conflicts at the heart of the environmental crisis resides within the very assumptions that claim to understand knowledge itself.

A need to address the philosophical legacies that have informed contemporary approaches to imagination, education and environment is evident. A potential parallel between the state of the environment and the condition of imagination, carves new relations between environment and imagination as possibly responsive and reflective of each other. My research can be seen to imagine Buell’s (1995) ideas in an EfS context and apply them to Australian Environmental Education and research. This thesis explores and interprets the ways in which imagining and re-imagining can benefit understandings in and of EfS for students and teachers.

My first two research questions ask:

1) What is the nature of imagination in relation to the environment?
2) How does imagination work in Education for Sustainability (EfS)?

I will now describe the background of how I came to this research work before I elaborate on these two central research questions with three more research objectives. First, I offer a poem.
Subtly, a theme of birds have ushered this thesis. I introduce them with a poem. To me, they signify a need to break from the illusion of independence. They communicate to us, and pierce our comfort, just as the environmental crisis is a communication.

_In these_

_years, people will say, we lost track_

_of the meaning of we, of you_

_we found ourselves_

_reduced to I_

_And the whole thing became_

_silly, ironic, terrible;_

_we were trying to lead a personal life_

_and, yes, that was the only life_

_we could bear witness to_

But the great dark birds of history scream and plunged

_into our personal weather_

_They were headed somewhere else but their beaks and pinions drove_

_along the shore, through the rags of fog_

_where we stood, saying I._

Background: How I came to this work

As a sustainability educator, I became concerned with the ways environmental knowledge was represented in teaching and learning sustainability. Educational teaching materials in the form of diagrams and statistics created a false sense of an external world and framed knowing ‘about’ the environment as external issues detached from self. I became interested in the ways the environment is constructed in Education for Sustainability (EfS) and how these representations produce particular relationships between self and world. De-contextualised representations, particularly of ‘the water cycle’ occurred as “sedentary, categorical and judgmental” (Deleuze, 1994, p. 174) that I felt patronised children’s ability to understand the world. Language, diagrams and statistics occurred as leaflets for an optional brand of knowledge, rather than foundational understandings that enhance experience and expand ways of seeing the world. New Materialisms (Barad, 2001, 2003) in qualitative educational research (Jones, 2013; MacLure, 2013; St Pierre, 2013) and eco-criticism (Oppermann, 2011, 2013) as well as Australian environmental philosophers (Matthews, 1991; Plumwood, 1993, 1999, 2002a; Rose, 1996, 2008; Weir, 2008, 2009a, 2009b) have assisted clarifying these problems, articulating their nuances and finding new ways to consider and approach these issues in EfS.

An imagined beginning

As I began informally researching ‘the imagination’, I saw parallels between the way the environment is imagined and the way knowledge is constructively understood. I remembered, for the first time, how I experienced myself in the world as a child.

*When I was young I went to Sydney frequently on a Qantas airplane by myself. My grandmother would meet me at ‘the other end’ at the airport. I never questioned it, but my geographical understanding of living on earth was not horizontal, broad, or global, but very much vertical and hierarchical. I imagined ‘going up’ to Sydney and ‘coming back down’ to Melbourne literally; that Sydney was located above Melbourne, perhaps, I imagined, on a layer of grass that sat on top of the clouds.*
Upon adult reflection, this was the spatial, imagined structure through which I walked and felt the world. Remembering into this way of seeing and experiencing, my awareness was composed of, and informed by, both my experience and my imagination. The environment I experienced seemed to simulate the conceptual organisation of knowledge. Department stores were arranged in levels, buildings were vertical, hamburgers had layers, and schooling was similarly arranged in vertical structures. Voices advising me to ‘wake up’, ‘get up’, ‘stand up’, ‘chin up’ and ‘grow up’ were all metaphorical, I knew, but occurred as integral directives speaking to the way the world is arranged.

As an imagined beginning to a PhD dissertation, what interested me was first how ways of seeing the world involve imagination. Secondly, there was a feeling of an emerging relationship between the structures that organise knowledge and ways the environment is imagined. The verticalities in the built, urban environment are fitting metaphors for taxonomical hierarchies of knowledge and knowers. I wondered if I grew up in a broader, treed, naturally lit or open landscape my understanding of knowledge might regard growth, expanse or brilliance as metaphors for knowledge. Is my understanding of knowledge constrained by my environment? Can environmental awareness work to expand my epistemological understandings? Why do I imagine knowledge environmentally?

Professional frustrations with cycles of representation

This inquiry was personal yet became reflected in what I was experiencing in my tempered engagement with teaching ‘the water cycle’ as a sustainability educator. The limitations in the teaching formula given to me by my employer, ‘The Water Authority’ prescribed frustrating templates for ‘covering’ all aspects of ‘the water cycle’ for primary and secondary school students in 50-minute workshops. My frustrations increased; I was horrified by the realisation that I was actively constraining my students’ personal relationships with the world. The possibility of a connected, supportive, beneficial and curious relationship with the living world seemed impossible within this framework where learning ‘about’ the environment was done through rote pronunciation and fragmented diagrams and statistics.
My teaching was “crucifying diversity” (Deleuze, 1994, p. 174), ignoring ontology (St Pierre, 2013, p. 645), and eliminating the “wild element” (Deleuze, 2003, p. 23) involved and un-representable in the relational interface between self and world; where learning and knowing is meant to be. The emotive affect of these experiences formed the beginning of my research interests. I changed my teaching. Rather than tell my students information or explain the world, I began to ask my students what they thought, and invite them to imagine. We discussed the coincidence that both our bodies and the Earth are 70% water and I felt I wanted to allow the world to speak to them through their imagination. I found Buell’s *The Environmental Imagination* (1995) whose title and perspective encouraged an active experiment to re-engage with what I knew of the materialities of the water cycle through imagination.

I began to practice actively and attentively *imagining* all aspects of the water cycle that I was teaching. I spent a lot of time looking out to the horizon from the coast. The horizon glowed as a real and orienting yet ephemeral borderline that carved the edges of place and experience and was at the same time suggestive of infinity. I found that imagining ocean evaporation changes dramatically when trying to include the simultaneity of *all* oceans evaporating, *now*, and constantly, and forever. It is easier to represent ‘evaporation’ as subject matter that can be remembered and left, because the reality of its expanse is challenging and difficult. Imagining the vertical evaporative transpiration of trees and plants as a simultaneous reality of every real tree transpiring *now*, all across the world, constantly and consistently... The depths of all oceans, the simultaneous falling, the global drinking of water, absorption, the running of rivers... Successful movements of my global, environmental imagining ebbed and flowed and felt more like a wrapping, rather than witnessing, as I followed lines of relationships and differences. This wrapping involved my self in the living movement of the invisibly present, energetic reciprocity of earth’s aliveness. Whilst I perceive these actions of imagining as constructing and producing reality, my experience of imagining also felt like the world was making itself known to me (Barad, 2007) as I imagined. The agency of this knowledge felt “distributed” (MacLure, 2013, p. 661) and indecipherable, as though I had chosen to imagine something that had also chosen me (MacLure, 2013, p. 661). The places where I found it difficult to imagine emerged as the places I had to learn, not ‘about’ water,
but learn to imagine the dimensions of materiality that water collaboratively encompasses. Through this attentive process, imagining emerged as a way of learning, assessing and understanding environmental knowledge in ways that allowed for the more-real rather than the un-real.

Coincidentally an eight year old girl next door, Maya, had just finished learning about ‘the water cycle’ in her grade 3 primary school class. I asked her casually about her experiences and we spoke at length. She concluded by saying, “We are all connected you know” (personal communication May 20, 2010). I was so stunned I asked her more questions. Despite my inquiries, there was never a point of clarity that could decipher how learning ‘about’ the water cycle became a worldview in which she concluded ‘We are all connected you know’. At what point does/can environmental knowledge become a way of seeing the world? The development of her worldview seemed deeply related to the inter-connected nature of the global water cycle, yet her understanding was not about water, rather, a worldview that included her self in relationship as ‘we’, with ‘all’.

Figure 1.1. A ‘Water Cycle’ diagram used in teaching and learning ‘the water cycle’.
National Weather Service Educational resource.
My initial investigations focused on teaching and learning ‘the water cycle’. I discovered that ‘the water cycle’ is a regular part of every primary school experience in Australia and is presented as a scientific process. Figure 1.1 is an example of diagrams that represent ‘the water cycle’ that explains the cycle through itemising the component parts. Figure 1.1 suggests movement, cycle and relationship simply with red arrows. While some of the problems in water cycle diagrams are discussed within educational literature (Mohan, Dell & Zillmer, 2012), the focus of critiques is on whether diagrams show the correct proportions of evaporation and precipitation (p. 39) or if the images accurately represent the system (p. 38). The objectification of the environment, the ontological implications and the inherent problems of representation were not discussed.

The work of Henrieques (2002), Osborne & Cosgrove (1983), and Tytler (2000) identify student misconceptions in understanding the water cycle, and they worry that these misconceptions persist throughout schooling. Their work does not refer to the imagined, rather focuses on ways of correcting students’ ideas with accurate scientific concepts that are pragmatic concerns with clear ideas of material truth. The development of worldviews, or the notion of a relational understanding of/with materiality is absent. Tytler’s work (2000, 2007) examined how students conceptualise the scientific concepts of the water cycle. His methods involved searching for correct and incorrect conceptualisations. Imagination was not used as a reference nor registered as a way of learning, knowing, conceptualising or understanding. I identify this as a gap in the research.

Education for Sustainability is a critical confluence of knowledge (education) and environment (sustainability). This seems to highlight the inconsistencies and contradictions caused by conceptual habits that distinguish between, rather than connect, environment and epistemology. For EfS, it is not only a profound separation between human and nature embedded in epistemological frameworks, but a separation of knowledge itself from nature.
My formal research project emerged from these experiences that began with resisting
the flat-ened logic\(^1\) and reductionism (Gough, 2009) of representations of
environmental knowledge. From there I have wondered if a greater understanding of
imagination has the potential to develop affective, ecological awareness as well as
more effective research strategies. The philosophical revision required to resolve the
environmental crisis needs to inform Education for Sustainability. I learned from
New Materialist perspectives and material eco-critical worldviews that I draw upon
in this thesis. The New Materialisms theorise a non-anthropocentric, intra-discursive
worldview where human and nonhuman entities are considered agents in
communicating and understanding the world.

**Guiding Research questions**

My tempered teaching experience, my own reflexive imagination, chance meetings
and conversations with children all sourced the imagined beginnings to this research
project. These narrative, lived foundations form the central research questions:

1) What is the nature of imagination in relation to the environment?
2) How does imagination work in Education for Sustainability (EfS)?
3) When does understanding sustainability require imagination?
4) How does imagination develop worldviews or revise ways of seeing the world?
5) In what ways is imagination involved in re/orienting the conceptual relations
   between self and world?

The research questions are explored through a New Materialist, eco-critical research
design. As qualitative educational research I use mixed methods to analyse
imagination. I locate the research amongst EfS educators, the resources they use and
a 14 week participation in a Victorian primary school with a strong EfS program.
The epistemological position of this research necessarily acknowledges imagining as
knowing and learning. I now discuss the discursive strategies employed in this thesis
that communicate by actively participating in imaginative ways of knowing.

\(^1\) I refer to the flattened nature of two-dimensional representations of multi-dimensional materiality,
however ‘flatness’ is used in reference to resisting hierarchies: “all multiplicities are flat” (Deleuze &
Discursive strategies

This research requires participating in the possibility of imagination. Research into how we imagine emphasises that we do imagine. There may be an embedded expectation that this text, as academic research, should be informative, certain and explanatory. It is tempting to be succinct. However, by removing uncertainty, the living dynamics of imagination’s complexity, diversity and plurality may also be displaced. From an Australian Environmental Education perspective, Noel Gough (2009) warns of ‘complexity reductionism’ that refers to theorisations that attempt to find clear solutions rather than value differences and complex entanglements that are difficult to explain.

My diffractive analysis draws upon New Materialist influences in ways that value differences and entanglements as well as similarities and thematic nuances. From an Indigenous Australian perspective Deborah Bird Rose (1996) eloquently advises against generalisations that reflect a tendency of knowers-in-power to produce unsettling abstractions. She argues that too often the “pedantic quality of expository communication” (p. 1) works to hyper-define and therefore exclude deeper, ‘other’ and different perspectives (p. 5). To approach imagination as an excluded, ‘other’, and deeper way of knowing, a range of communication types need to be explored through this writing to avoid limiting the research. Rose (1996) explains:

Some discursive strategies, it is clear, inhibit the communication of certain kinds of deeply held knowledge and belief. By way of analogy, consider the differences between an explanation of love, a love story, a love poem and love song… Each type of communication ~ exposition, story, poem, song, and song-poem ~ offers information. Together they may actually begin to speak to the fullness of the experience of love. (p. 1)

The use of this analogy clarifies the possibilities and purpose of an inter-textual approach. Rose’s (1996) discussion outlines traditional Indigenous Australian methods of representing knowledge in teaching and learning that draws upon stories, songs and poems to express and portray environmental knowledge and experience.
These ‘discursive strategies’ incorporate arts-based forms of expression. I find links between traditional Australian, inter-textual, affective communications and arts-based research in this thesis: “I conclude that the use of creative arts to forge links among people has a higher priority at this time” (Rose, 1996, p. 2). From an arts-based point of view, Patricia Leavy (2009) described the unique function of arts-based research strategies as ways of “exposing what is otherwise impossible to reveal” (p. 138). As a qualitative scholar, she argues that important ways of knowing and learning can be limited by linear processes of explanation and augmented by the arts. The purpose of inter-textual forms of communication in this thesis is to “speak to the fullness of experience” (Rose, 1996, p. 1).

To create a dissertation that can authentically work imaginatively with literature and the data whilst successfully communicating the aims, process and findings of qualitative educational research is a challenge integral to this project. To ‘speak to the fullness of the experience’ of imagination, a range of discursive strategies are employed. The Canadian scholar, Kieran Egan (1978, 1986, 1988, 1997, 2001, 2003, 2005, 2006) whose seminal texts have advocated imagination in education for three decades, argued that the best way to come to know the imagination is “through active identification with it” (Egan & Nandner, 1988, p. xi). This meta-understanding values an inclusive approach, as discussed above, in forming the shape and tone of this thesis.

From this perspective, this work needs to embody as well as explain imagination. Accordingly, I overlap academic and explanatory tones, stories, poetry, visual communication forms and analysis to create a plural and textual discussion. This aims to construct new conceptualisations of imagination in EfS, acknowledge the researcher’s imagination (Gray, Williamson, Karp & Dalphin, 2009; Hart, 1999; Kenway & Fahley, 2009) as well as inspire the imagination of the reader. The researcher is included in this research. The ‘I’ within this text signifies my perspectives and experiences as a researcher and educator. As I am involved in creating this text, I am a living presence through it, and accountable to it. A sense of narrative authorship is part of the discursive strategies used to ‘speak to the fullness of experience’ and imagination that is the heart of this research.
In the next chapter, ‘The Loss of Imagination’, I position the imagination as neglected and lost in human considerations of knowing and I explore the relations between imagination and the material world. I use a range of texts to set the conceptual tone for this research project and the possibilities of imagination. I share a poem I wrote at the start of this journey to express the difficulties of this topic.
They said

'You're just dreaming'

but every

feeling I've ever had is so real

I'm un peeling

like truth

or those waves coming in

(2010, unpublished)
The loss of imagination

In this chapter I argue that imagination has been lost, neglected and misunderstood, and dislocated from materiality. I discuss its immaterial reputation and I explore its materiality. Positioning imagination as ‘lost’ constructs a need for exploration and a call to research. I use a range of texts to argue that imagination has been marginalised from environmental and educational concepts of knowledge for decades. The construction of loss is not aimed to position imagination as something to be explicitly found through this research, but instead to conjure up the need to search for what is lost, and the need for a map. The impressions of loss can create a sense of grief, and can emphasise value. This first section explores inter-textual perspectives to make connections between environmental losses and the loss of imagination. Following Buell, I argue that imagination is required to revise views of the environmental crisis that the global project of sustainability seeks to resolve. I explore imagination in educational literature, and I turn to imaginative texts to gather together the possibilities for research.

The immateriality of imagination

The concept that the mind is immaterial is said to have been held during the Enlightenment (Egan, 1988; 2007; Doidge, 2007; Rifkin, 2010). Whilst this has been revised through embodied understandings of mind (Varela, Thompson & Rosch, 1993), an immaterial reputation of imagination persists. The idea that imagination has no reality, no substance or no relation to material form is reproduced when imagination is polarised against the material, real or true; as in reason/imagination, real/imagined, logical/imaginative. These binary propositions marginalise imagination. A range of research positions participate in constructing these dualisms in order to explain imagination. For example, at the outset of his research into imagination in relation to global media, Misson (2000) characterised imagination, “as a function of the mind that ...is driven by some inadequacy in reality” (p. 1).
Psychologists also clearly position imagination as “counterfactual” (Byrne, 2005, pp. 1-4), and consider the “pathological” dimensions of imagination as an unreality (Hersch, 2003, pp. 37-38), or see it simply as ‘pretence’ (Leeuwen, 2011).

Despite these positionings in psychology other areas of research reconsider the act of imagining as having tangible, consequential impacts on materiality, including the body. Contemporary approaches to the relations between imagination and materiality from a neuro-plastic perspective argue against its immateriality: “everything your ‘immaterial’ mind imagines leaves material traces” (Doidge, 2007, p. 214). This challenges the idea that imagination is immaterial, and calls for the need to further understand the nature and role of imagination not only as a philosophical concept but as a part of the nature of materiality. However, neuroplastic revisions have not yet crossed into educational understandings, pedagogy or theory. This is a critical problem. In this chapter, I examine literature that re-contextualises the importance of imagination in educational ideas and processes of learning. First, I continue to consider the material losses of that which has material substance.

**An environmental imagination**

The possibility that the imagination is an environmental force, with power and agency is mobilised through narrative. According to *The Never Ending Story* (Ende & Manheim, 1984) the environmental force that is destroying the world is named, ‘The Nothing’. The hero of the story is out to fight the environmental force that is killing the world. In the following transcription, the hero boy meets Gmork, the face of *The Nothing*. In this dialogue, we learn that the only way to stop *The Nothing* is to realise that ‘we’ are the creators of the created world; the world is created by human imagination and will be destroyed by the loss of it.

*Atreyu:* I have to get to the boundaries of Fantasia.

*Gmork:* Fantasia is the world of human fantasy. Every part, every creature, is a part of the dreams and hopes of mankind [sic] therefore it has no boundaries.
Atreyu: But why is Fantasia dying then?

Gmork: Because people have begun to lose their hopes and forget their dreams… so The Nothing grows stronger.

Atreyu: But what is The Nothing?

Gmork: It’s the emptiness that’s left. It is like a despair, destroying this world. And I have been trying to help it.

Atreyu: But Why?

Gmork: Because people who have no hopes are easy to control. And whoever has the control… has the power!

(Ende & Manheim, 1984)

The Never Ending Story embraces a post-structuralist possibility that seemingly detached humans/readers have huge agency in the health and vitality of the world. It suggests that our imagination, and how we imagine, directly impacts the environment. The story also gives nature agency and power. Since the 1960’s the rejection of western philosophical traditions through post-structuralism and post-modernity have brought uncertainty and also interest in alternative, marginal, radical and de-centralised possibilities of knowing the world (Deleuze & Guatarri, 1987; Foucault, 1977; Latour, 1993; Plumwood, 1993). For the ‘posts’, the impossibilities of pure knowledge and experience was both a loss and a celebration. During this time, Roland Barthes (1977) announced ‘The Death of the Author’, which referred to end of the autonomous author/creator, and “the birth of the reader” (p. 148), as multi-agents that direct and extrapolate meanings and possibilities from texts and worlds. The Never Ending Story acknowledges this co-agency by enacting an environmental embodiment of the loss of imagination. The complexities that result from the crisis of The Nothing challenge assumptions that conceive the world as separate from selves, and invites the reader to disrupt complicit participation in the world as external and real. The uncertainty tolerated by post-structuralist questioning, built upon the last
centuries of scientific and philosophical thought, have caused hesitation in finding a source of reality. ‘Post’ philosophies rarely turned to imagination, or the force of the environment in knowledge creation. However, Foucault used imagery of environmental instability to describe how the ruptures of post-modern breakages occurred for him during this time, as post theorists and philosophies re-imagined knowledge and reality. Foucault described how he felt:

…a sort of feeling that the ground was crumbling beneath our feet, especially in places where it seemed most familiar, most solid, and closest to us, to our bodies, to our everyday gestures. But alongside this crumbling...beneath the whole thematic, through it and even within it, we have seen what might be called the insurrection of subjugated knowledges. (Foucault, 1976, pp. 6-7)

This environmentally-styled liberation of marginalised ways of knowing gives potency to imagination as a “subjugated knowledge” entity, whose insurrection may become involved in remedying environmental instability. These texts present the possibility that imagination is powerful, as imaginary elements and impressions are included in the re/de/construction of reality. Imagination emerges in revising concepts and assumptions that claim to know the world. The Never Ending Story is premised on the understanding that imagination can be seen as the world. In this sense, imagination is not only human-based but exists as/in an environmental force. These intertwined notions of a connected crisis between environments/worlds and imaginations, involves the dis/orienting inter-relationality between a thinking/imagining human being and a changing natural world.

I refer to a children’s story as a way of reflexively engaging with these ideas imaginatively. Environmental education researchers (Payne & Cutter-Mackenzie, 2009; Cutter-Mackenzie, Payne & Reid, 2010; Wason-Ellam, 2010) suggest that children’s literature can enhance eco-critical understandings in environmental education. Reid, Payne and Cutter-Mackenzie (2010) assert this important area is an opening for further research. The children’s author and illustrator, Clayton (2008) narrates, in rhyme, the ways in which a negligent imagination affects disillusionment
in everyday people. He illustrates how this manifests as an urbanised world that mass-produces simulacra. The author directs readers’ attention to the option-less, predictable, revolving “places in the world” that are repetitively created as a result of dull or complicit imaginations. The story explores how a loss of imagination affects materiality and how both can be regenerated through the freedom of ‘dreaming’. Neglecting the importance of imagination is indeed the dream that the story requests children to wake up from.

There are places in the world, where people do not dream of rocket-powered unicorns,

![Figure 2.1. Illustration of ‘rocket-powered unicorns’, Clayton, 2008](image)

Of magic watermelon boats and candy-cane machines. Instead they dream of furniture, of buying a new hat.

![Figure 2.2. Illustration of ‘magic watermelon boats’, Clayton, 2008](image)

Of owning matching cutlery, can you imagine that?
Instead, they lay awake at night wishing for a car
Not one that runs on jelly beans, but one that’s regular.
They dream of lunch and sandwiches.
They dream of telephones.
Sometimes they even dream of dreams that aren’t even their own.

Yes, there are places in the world where people dream of dreams
so simply un-fantastical and practical, they seem
to lose all possibility of thinking super things...
...Please dream for those who’ve given up, for those who’ve never tried.
...Please dream for those who’ve given up, for those who’ve never tried.
Please use your dreams to make new dreams for all the dreams that died.
And if they say that all your dreams are too big to come true,
You tell them that I told you that’s what dreams are meant to do!
(Clayton, 2008)
In the form of a children’s story, Clayton (2008) examines predictable and generic ways of thinking that take shape as the world. His illustrations (Figure 2.1-2.5) of familiar, concrete urban landscapes are positioned as emblematic of a world that produces the results of being affected by a crisis of human imagination. The state of imagination is embodied by the world and arises as a crucial part of a human being’s conscience, innovation and life-force. Clayton’s reference to ‘dream’ and ‘dreaming’ conjures up an ‘other worldly’ imagination. In the story, a weak and misguided imagination is the source of boredom, listlessness and the mass-production of material ‘things’. By narrating how the creative power of imagining is usurped by the norm, the story invites ways of seeing the world differently. From the perspective suggested by the story, one’s experience of the world is accountable, not to external objects and circumstance, but to one’s own imagination.

The revelation of Clayton’s (2008) story; that imagination affects and influences the ongoing creation of the world, is extended here, with an anecdote told to me personally by Lynn Twist of her experience working with women in the desert in Senegal, in North West Africa. The story tells how women and their knowledge were ignored because it was dreamed, and because they are women. It demonstrates how women, environment and imagination are marginalised as agents in concepts of knowledge-making in contrast to their agentic force. This creates a narrative that de-centres hierarchies of knowledge and power and re-conceptualises marginalised knowledge sources as critical to environmental concerns. The story was published in 2004 (Twist, 2004) and I paraphrase the story below:
‘The Desert expands each year towards the sea. It is a harsh environment, not friendly to life, or even plants and animals...We were there to meet the people of a village several hours into the desert about their need to find a new source of water or a new place to live...It was so bleak that it seemed unimaginable that any human being could live in this climate....Ahead of us, under two baobab trees, about one hundred and twenty people gathered in the precious shade.

They pulled me into the centre of the circle, where the women danced around me and with me. The drums suddenly stopped. It was time for the meeting to begin. People sat down on the sand. The chief identified himself and he addressed his comments to me. They and sixteen other villages were at a point where the scarce water resources were pushing them to the edge of their options. Government services weren’t extended to these people, even in times of crisis. They were illiterate people and weren’t counted in the census. They couldn’t even vote. They had tremendous resilience but their shallow wells were nearly dry.

We sat together in the circle; the men did all the talking. The women were not in the primary circle but sat in a second circle where they could hear and see but did not speak. It didn’t seem possible there could be a solution...

I could feel the power of the women behind me and I sensed they would be key in the situation. Then I asked to meet with the women. They were saying it was clear to them that there was an underground lake beneath the area. They could feel it; they knew it was there. They had seen it in visions and needed our help to get permission from the men to dig a well deep enough to reach the water. The men did not permit it as they did not believe the well was there and also did not want the women to do that kind of work.

After many conversations, the men agreed to let the women start digging. They dug for a year. Over the year they dug deeper into the ground, singing, drumming and caring for each others children...the men watched sceptically...
They reached the lake of their visions. The water was there! In the years since, the men and women have built a pumping system and a water tower for storage. Not just one, but seventeen villages now have water. The whole region is transformed...’ (adapted from Twist, 2004, pp. 15-22)

The vitality and strength of environmental knowledge from the women’s collective dreaming was enabled by their own unwavering belief in the knowledge source. The source of this knowledge was hidden, non-physical, intangible and beneath the surface, like the natural resource. This knowledge was invisible, immaterial, insubstantial, easy to disregard and ignore, particularly from formal discussions of management. New Materialist eco-critic, Serpil Oppermann (2013) writes about agentic Storied Matter, that the world tells stories “whether perceived or interpreted by the human mind or not” (p. 66). She writes that the material world is a mesh of embodied narratives and all matter is discursive (Barad, 2007) in ways that “may or may not always be legible, memorable, or easily identifiable” (p. 66). The communicated presence of water underground was listened to by the women in this story. The women’s understanding seemed source-less in terms of evidence and reason. However, they expressed collective confidence in their dreaming-knowing that arose from somewhere, perhaps from within, perhaps from the earth.

Twist’s (2004) story of her experience with the women in the desert narrates how powerful information can be easily neglected because it arises in distrusted forms and from marginalised voices. A range of evocative relations between human imagination and issues of environmental sustainability emerge; particularly, how environmental knowledge can be known and expressed in non-conventional ways. The story also demonstrates the critical importance of imagined, environmental knowledge. The resonance with New Materialist perspectives occurs in the understood relations between material agency and human understanding. Oppermann (2013) argues that “matter’s expressive and creative capacity cannot be denied” (p. 65). In the context of this chapter, the story performs an argument for the importance and value of imaginative ways of knowing to extend understandings of materiality.
Loss of imaginative play in nature

The scholarly and historical investigation into the relationship between children and nature by journalist and author, Richard Louv (2006) consolidated a range of research on the importance of imaginative play in natural places during childhood. Louv’s scholarship criticises the “criminalisation of nature play” (pp. 27-36) by drawing upon psychologists, pedagogues and social thinkers to emphasise the neglected yet critically significant intellectual and developmental benefits children gain from playing imaginatively in natural environments. Louv perceives imagination as a right of childhood; the physical and personal experiences of imagining need to be allowed and encouraged by adults and education. Louv’s (2006) term ‘Nature Deficit Disorder’ re-positions collective concern for obedient, complicit, independent children, as implied by diagnosis of attention deficiencies, towards concern for the quality, quantity and location of inter-dependent play they freely enjoy. Louv asserts the loss of “free, unsupervised play” time in nature is a contemporary world crisis that results in a loss of full development, intelligence and ultimately the loss of childhood.

Louv’s (2006) work builds upon David Sobel’s (1993, 1996) assertions that making and nurturing connection with nature is essential for children’s wellbeing. These scholars approach nature, imagination and childhood as a confluence of marginalised relations that are central to learning and being. Among others, Louv (2006) theorises how formal education is positioned away from nature by being largely indoors, and away from imaginative play due to a hyper-rational focus on standardised understandings of cognitive development. His work highlights the pedagogical, epistemological and ontological connections between play and nature that hugely enhance the holistic development aims of education. Louv argues for the resurgence of unsupervised, un-interrupted play in nature as a vital force of intellectual development and a humanitarian right of children. He responds to ‘nature deficiencies’ by ‘freeing’ kids from the classroom, and recalibrating imagination and nature as deeply related. This work is particularly significant for education, and has been taken up by Environmental Education researchers (Edwards, Cutter-Mackenzie & Hunt, 2010; Cutter-Mackenzie, Edwards & Widdop Quinton, 2012).
**Marginalisation of creativity**

Within the arts, imagination is often referred to as synonymous with creativity, particularly the creativity of artists and the play of childhood. Elliot Eisner’s (1976, 1985, 1994, 1998, 2002) seminal works in this area focussed on the position of creativity and the arts in educational practice and research. Eisner argues that as long as the creative arts are undervalued and neglected in education, then imagination is in danger of becoming extinct. In his arguments, Eisner challenges the constraints of educational contexts, pedagogies and assessments that disallow imaginative forms of knowing and learning. According to Eisner, the neglect and subjugation of creativity and imagination is a refusal of essential parts of intelligence and ‘mind’ (2002). The educational impact of this loss of imagination occurs as a forgotten void in educational theory that, Eisner argues, is largely responsible for children’s widespread disillusionment with school.

Eisner’s *The Educational Imagination* (1994) asserts that schools need to be re-imagined to willingly include creativity and imagination so that students can flourish within them. His argument builds a standpoint that re-positions the creative imagination from its subjugated position and reconsiders it as essential. His influential advocacy of the ‘art’ in teaching, and as *connoisseurship* (1976) in educational reform (1991, 1998, 2002), in the development of ‘mind’ (2002), and in arts-based research (Barone & Eisner, 1997, 2012), celebrate the importance of a creative imagination in education, and the power of re/imagining educational practices in ways that value uniqueness, creativity and personal expression.

Whilst Eisner does not specifically explore the nature of imagination, he regards imagination as deeply involved in arts education and plural expressions of knowledge. His interpretation of imagination in relation to the arts contends that “an imaginative construction of an idea held clearly in the mind’s eye has no empirical life unless the student has the technical means for expressing it” (Eisner, 2002, p. 99). This suggests that imagination becomes visible and alive through the expressions of the creative arts, but imagination has an intangible existence that nevertheless involves ‘clear’, internal constructions of ideas and imagery.
As well as artfulness, Eisner aligned the importance of creativity and imagination with social conscience, as a way to argue against the oppositional forces that students encounter as education. This aligns with the work of Maxine Greene (1995) who argues that the process of recovering imagination through the arts is empowering because it restores a regenerative sense of pro-active purpose in relating to society and understanding the world (p. 35). Greene (2008) describes a loss of imagination as being “unable to look at things as if they could be otherwise” (p. 18). Greene and Eisner assert that creativity and the arts allow and encourage imagination. Greene and Eisner’s work construct imagination as non-complicit in everyday social ambivalence and as essential for the full personal and social expression of an educated mind.

*Imagining the Other: apathy or empathy*

Centuries before Greene described imagination as encouraging empathy (2008, p. 18), Romantic thinker, Rousseau (1712-1788) believed in liberating or unleashing the human imagination as a political stance that enabled empathy. This empathic imagination was to enable and promote equality (Rousseau, 1755/1984). A Romantic argument for liberating the imagination was historically positioned in reaction to The Enlightenment (1650-1800) that emphasised reason, individualism and material progress. This time was also in the foreground to the egalitarian aims of the French Revolution. In his *Discourse on Inequality* (1755), Rousseau asserted that to be able to imagine the plight of other beings is an essential quality of a fair and just society. To imagine the other is required in order to aid or help those in need, and to make decisions that benefit all rather than prioritise the elite (Rousseau, 1755/1984). From Rousseau’s legacy, imagination emerges from the literature as entwined with an empathic sort of compassion, as well as celebrated as a force of the creative individual during this era (Maguire, 2006). This historical sense of imagination supports the understanding of contemporary Australian research. It resonates with Macknight’s (2009) classroom based study, where imagination occurred as an ability involving “thinking into other perspectives” or “thinking of otherness” (p. 132). I will discuss this research later in this chapter.
Also during the Romantic period the art critic and social thinker, John Ruskin (1819-1900) articulated a connection between ‘caring about’ and imagination. He commented idealistically: “people would instantly care for others as well as for themselves if only they could imagine others as well as themselves” (Ruskin, 1899, p. 231, *italics original*). To imagine the perspectives and experiences of an other in crisis occurs as an affective part of humanitarian and ethical sensibilities of justice. Whilst a creative imagination is often valued in European history as divinely inspired, as in the ‘creative genius’ and/or embodied in works of fiction, poetry and art, a Romantic push for imagination was also connected to ideas of empathy and an affective dimension of democratic goodwill. More recently, writers and researchers interested in imagination have associated imagination with empathy (Greene, 1995, 2008; Macknight, 2008; Rowling, 2008). The British Romantic poet Percy Bysshe Shelley advised: “A man, to be greatly good, must imagine intensely and comprehensively; the pains and pleasure of his species must become his own. The great instrument of the moral good is the imagination” (Shelley as cited in Bloom & Trilling, 1973, p. 36).

These perspectives suggest that imagination is a sensitivity involved in the empathic relations between self and ‘other’, with expectations that this is required for social equality. The evocative and practical suggestions of imagining, in an empathic sense, necessarily evoke the inherent separations, distances and difficulties of ‘otherness’ (Minh-ha, 1989). This possibility of imagination to “think into otherness” (Macknight, 2009, p. 132) in order to understand and ‘care about’ the other, implies that if the capacities of imagination became neglected, devalued or lost, a tendency to be affected by other beings may become inadequate and apathy may result. This is a reminder to the researcher/reader of the ambivalence, apathy and confusion that has resulted from merely ‘knowing about’ the environmental crisis.
Looking for imagination in the literature

I now examine literature that deals with imagination in a range of fields relevant to education. This review is not exhaustive. I continue to argue against the oppositional forces that have marginalised imagination by examining imagination across disciplines that have relevance to learning.

The imaginary aspects of materiality across the disciplines

Despite describing a range of theories of imagination, I have deliberately avoided defining imagination. I argue that imagination is not a fixed entity nor has singular meaning. It is by nature indistinct; embodying or expressing a range of forms. Egan and Nadaner (1988) assert: “No full-bodied description of the imagination, in its diverse narrative and cultural forms exists” (p. xii). But, it is significant that imagination has no definition. Philosopher and educationalist, Gregory Heath (2008) suggests that seeking definition may not be useful: “It is one of those terms that is useful in large because of its imprecision” (p. 117). Critical theorists, Ernesto Laclau and Chantel Mouffe (1985) construct the term ‘floating signifiers’ to refer to a privileged sign in a discourse around which other signs are ordered. Imagination in this sense is like an invisible sign, but imagination is not privileged, and instead occurs across different discourses. Laclau and Mouffe (1985) determined that other signs in the discourse derive meaning from their relationship to the ‘floating signifier’, and thereby each discourse creates a different but unified system of meaning around it. Interpreting ‘imagination’ as a ‘floating signifier’ is useful in showing how a broad range of interdisciplinary literature utilises ‘imagination’ differently, yet within each paradigm the understandings are coordinated.

For example, the signification of the imaginary is used in the mathematical equations of physics, where the symbol ‘\( i \)’ represents an ‘Imaginary Number’, the division of which produces infinite variations (Baez & Huerta, 2011). The function of Imaginary numbers are in contrast to Real Numbers, and are used in Quantum physics to formulate equations and determine probabilities (Turok, 2013). Physicist and educator Turok (2013) describes how the symbol ‘\( i \)’ is used in the most cutting edge
equations that describe the workings of materiality. According to the *Oxford Dictionary of Physics* (Daintith, 2013), the definition of an Imaginary Number is “A number that is a multiple of \(\sqrt{-1}\), which is denoted by \(i\): for example \(\sqrt{-3} = i\sqrt{3}\)” (n.p.). The functional need for Imaginary Numbers in physics suggests that ‘the imaginary’ is used as a way to incorporate the uncertain, infinite and unseen as a crucial component of understanding and hypothesis. In this sense, imagination is utilised to call forth the possible, that which is inexplicable, uncertain, unknown or undefinable.

Figure 2.6 is a visual description of how ‘Real’ and ‘Imaginary’ numbers interact in mathematical thought. The horizontal axis can be read as a number line, where zero is in the centre and positive numbers extend to the right from zero, 1, 2, 3, 4, 5, and so forth, and negative numbers extend to the left from minus zero: 0, -1, -2, -3, -4 to minus infinity. These are ‘Real Numbers’. The vertical axis represents ‘Imaginary Numbers’ that also continue in plus \(+i\), and minus \(-i\) scales from zero. This diagram represents the infinite and endless possibilities of numbers, and so reading this map involves imagining that each number plane extends infinitely. Rather than limited to forwards and backwards, the Imaginary Number plane extends the dimensions of infinite possibility, which is an important concept included in physics (Turok, 2013).
Similarly in biological understandings of cellular formation, the process of a caterpillar metamorphosing into a butterfly is explained in stages: from eggs, to caterpillar, through cocoon and chrysalis to butterfly (Blair, 2003). For science, there are usually traceable elements of what will be in the source. For example, a seed has all the information of a tree in its DNA, and the beginning cells of a human or animal have embodied information of its material result contained within it. However, in the unique process of butterfly making, there is no trace of butterfly in caterpillar. To say it another way, there is no biological, material seed of butterfly in the body of a caterpillar. The cells that create the changes that result in butterfly have no detectable origin and are named *imaginal cells*, or *imaginal discs* to signify that their work is not predictable in the formal sense.

![Image of a butterfly](image.png)

Figure. 2.7. The Very Hungry Caterpillar by Eric Carle. Copyright ©1969 & 1987 by Eric Carle. All rights reserved. Used with permission.

In this context, that which is unknown and without origin is referred to by the attributes that imagination signifies. These examples show how imagination signifies *nothing* exactly, but carries essential, shared and useful meanings that have profound roles in explaining nature and has disciplinary standing.

Discussing these examples further unravels the rich meanings and interpretations that make up imagination’s existence. When ‘imagination’ is said, read or written, it evokes a shared part of human experience, like thinking, like awareness or conceptualisation, but something slightly different, something else. ‘Imagination’ is used to explain the nuances that cannot be easily explained; imagination and its derivatives name and refer to the ‘other’, the alternative, the difference.
The mental practice of imagining

Just as the biological sciences utilise imagination to name the unexplainable, the imagination also features in neuroscience. Neurological literature that addresses imagination as an active, attentive skill treats imagination as a constructive practice. This is important to this research because it contributes to shifting ideas of imagination from being immaterial and inconsequential towards having traceable, physical effects on materiality. Neuro-plastic researcher, Norman Doidge (2007) suggests: “One reason we can change our brains simply by imagining is that, from a neuroscientific point of view, imagining an act and doing it are not as different as they sound” (p. 204). This view is in response to the findings of Alvaro Pascual-Leone’s neurological studies (Pascual-Leone & Torres, 1993; Pascual-Leone et al, 1995; Pascual-Leone et al, 1999). The design of Pascual-Leone’s neurological experiments in the 1990s positioned ‘mental practice’ and ‘physical practice’ in comparative opposition. Doidge (2007) described this work as “imagination experiments” (pp. 197-215) because Pascual-Leone’s research focus “made his imagination experiments possible, and taught us how we learn skills” (p. 199). However, the cited purpose of the studies were to use particular brain stimulation techniques (Transcranial Magnetic Stimulation [TMS]) to visually and spatially differentiate between the neurological influence of ‘physical’ and ‘mental’ practices on motor-neuron pathway development, that is, the energetic pathways that connect the brain and body. These comparative mapping studies contributed to the re-conceptualisation of how learning occurs neurologically (Pascual-Leone et al, 1999) and the emergence of ‘plasticity’ (Doidge, 2007, p. 209).

In the 1995 study, a ‘physical practice’ group practiced a piano exercise for two hours a day, for five days in a row (Pascual-Leone et al., 1995, as cited in Doidge, 2007, p. 202). A ‘mental practice’ group imagined practicing the same piano exercise in the same way and for the same duration. None of the participants had ever studied piano before (Doidge, 2007, p. 202). Transcranial Magnetic Stimulation (TMS) was undertaken before, during, and after the practice sessions in order to identify where, and to what extent, motor-neuron development occurred. The visionary purpose of
the research was concerned with dementia rehabilitation so that physically impaired people might develop skill and ability through ‘mental practice’.

The results were surprising. The ‘mental practice’ group developed 80% of the motor-neuron pathways as compared with the ‘physical practice’ group. Additionally, after just one physical practice session, both groups were equal in physical ability and motor-neuron pathway development (Pascual-Leone et al., 1995). Doidge (2007) summarised: “Remarkably, mental practice alone produced the same physical changes in the motor system as actually playing the piece” (p. 202). The findings of this compelling research seem highly relevant to understandings of learning and the role of imagination in learning. However, the results have been limited to neurology and neuroscientific literature. The research has contributed to ideas of neuroplasticity and the accuracy of the TMS mapping methodology, but with such relevance to understandings of learning, why hasn’t this research appeared in educational discourses? This research demonstrates how imagining has physical consequences in the body/mind to the extent that imagining is almost as effective as physical experience. Whilst experience has been the subject of decades of dedicated educational theory, imagination has fallen at the edges of what is considered important in education and research, despite this evidence.

Another study that explored neurological implications of imagining examined people learning to read Braille over the course of a year (Pascual-Leone & Torres, 1993). The research was interested in how people learn new skills neurologically, and how Braille readers read through their fingertips. The study revealed that the neurological maps for participants’ Braille reading fingers were larger than “maps for their other index fingers” (Pascual-Leone & Torres, 1993, as cited in Doidge, 2007, p. 199). This suggests that the embodied knowledge of the body is map-able, and that the neurological work of learning is flexible and can be strengthened. A similar study measured muscle development in relation to imagining. A 30% increase in muscle was gained as a result of physical exercise, while those who ‘simply’ imagined doing these same exercises, in real-time, enjoyed a 22% muscle increase (Yue & Cole, 1992, as cited in Doidge, 2007, p. 205). These fascinating results demonstrate the material influence of imagination on physical development. Critically, the
assumption that imagination is immaterial or has no reality, or is without consequence, needs to be revised. Research that explores imagination and learning has limited uptake in pedagogical theory and educational discourse. These studies into the practice of imagining suggest that learning is influenced by both physical experience and imagination. There is a need for qualitative educational research into the nature and role of the practice of imagination in learning.

The imaginary

As neurological studies have approached imagination as a skill and a practice, a different range of discourses call upon the signification of ‘the imagination’ to refer to constructed ways of seeing the world. This suggests that ways of seeing the world are imagined. These inferences don’t describe imagination, rather use imagination to discuss and theorise how assumptions about the world are produced. In a range of contexts the fictional, relative and authored ways of conceiving the world consider a social constructionist position on reality. Owen Dwyer’s (2000) ‘spatial imagination’, Wright Mill’s (1959) ‘sociological imagination’, Arjun Appadurai’s (1996) socio-cultural ‘imaginaries’, Anderson (1983), Connery (2001) and Sheenan’s (1998) concerns for idealised social and ‘national imaginaries’, all utilise ‘the imaginary’ in ways that connote a relative and constructed perspective. Concepts of an ‘environmental imagination’ (Benterrak, Muecke & Roe, 1984; Buell, 1995, 2007; Capra, 2005) also call upon the significations of the imagination to refer to the ways in which a person conceptualises and contextualises one’s self in relation with the world. These references construct ways of seeing and understanding the world as imagined, and so construct imagination as a part of understanding the world.

Through these texts, the imaginary is present in awareness, as stories, geographies, sociologies, histories and dreams. In these contexts, the imagined works to resist fixed ideas of truth, reality and knowledge.

Sociological ideas of imagination have emerged since Wright Mills’ (1959) seminal work The Sociological Imagination. In Cornelius Castoriadis’ (1987) social theory, ‘the imaginary’ is an instituted social reality that operates as a material force. According to Castoriadis’ (1987) theory, ‘the imaginary’ is instituted by culture and
informs ways of seeing and perceiving materiality. This ‘imaginary’ constructs socio-cultural norms and perspectives. The term ‘The Imaginary’ was first used by Jacques Lacan (1954) during 1930s-1950s in a psychoanalytic context. According to his Seminars (Lacan, 1954), ‘The Imaginary’ is positioned as distinct from ‘The Real’, which refers to a layer of materiality that is contradicted by representation and cannot be symbolised or put into words (Fink, 1995, p. 24). In psychoanalytic theory “the imagination is constituted prior to reason” (Lechte, 2004, p. 125). Lacan saw ‘The Imaginary’ as a stage to be developed out of, whereas Julia Kristeva saw the affect of the Imaginary as something to be cultivated (Lechte, 2004, p. 128).

Kristeva (1995) seems to experiment with the Imaginary through the fictional character ‘Didier’ for whom his work, art and sense of meaning in social life had ‘broken down’ or ‘run out’ (p. 10). This loss of the Imaginary described a tragedy of a person “locked up in their own projection without any insight in to the fact” (p. 124) and “unable to participate in his own or another’s feelings” (p. 119). Kristeva’s construction of ‘Didier’ responded to Debord’s (1987) idea of ‘society as a spectacle’ that views society as over-run by images so that “appearances have come to take over from being” (Lechte, 2004, p. 117). Kristeva’s critique of the surface appearances of everyday life is addressed by questioning the Imaginary. This advances notions of imagination for this research; emerging as a way to re-examine experience and revise ways of being, seeing and encountering the world. Castoriadis’ (1987) ‘socially instituted’ and ‘radical’ imaginary, and Kristeva’s use of the ‘Imaginary’ (1995, 2001) articulate the danger of a loss of imagination as a personal, affected, internal, radical worldview.
CHAPTER TWO

Seeing imagination in education

Reading interdisciplinary literature has produced layered and different opportunities for discerning and understanding imagination for this research. Differences between generalised assumptions of imagination and discursive practices and functions of imagination are important for education. The idea of imagination in education is often assumed to be an alternative perspective. Imagination is generally considered an alternative, and a radical approach to schooling supported by marginalised pedagogues and educational theories, like Rudolf Steiner (1954, 1996a, 1996b), Maria Montessori (1967, 1992), Reggio Emilia or Loris Malaguzzi (Hall, 2010), who also valued nature in education. Rather than incorporating these theories and methods into educational theory, imagination has been marginalised in mainstream formal education, and often considered relevant only to early childhood and play. Accordingly, imagination is rarely recognised as a part of pedagogical, environmental or educational dialectics.

Imagination is often positioned in direct opposition to academic progress, ‘reality’ and/or reason. Generalisation lacks differentiation so that ‘the imagination’ becomes used, and recognised as an homogenised reference to uncertain, vague and irrelevant ways of learning, knowing and understanding. The influential founder of experiential education, John Dewey (1902) iterated:

There is an idea that imagination stands for something quite mysterious and peculiar; that it has to do particularly with inventing things not true, or with the unreal or the fantastic. The imagination ... is something quite different. It is the power rather of realising what is not present than of making up anything which is unreal. (p. 242)

Generalisations neglect the possibility that imagination has multiplicities, correspondences and supportive relationships with the arguably equally vague words-signs ‘thinking’, ‘learning’ or ‘understanding’. Despite the marginalised virtues of imagination, there have been dedicated theories of imagination. I will now discuss some key theories that are relevant to this research.
Key Theories of Imagination in Education

Many dedicated works have been committed to theorising, understanding and advocating imagination in education. Mary Warnock (1976) and Greene (1988; 1995a, 1995b) sustain diverse arguments for the importance and value of imagination, and take the stance that is has been thoroughly neglected even though imagination is essential. More recently, Marginson, Murphy and Peters (2010) have produced three models of imagination in the context of globalisation and the global knowledge economy, with specific interest in higher education. In this section, I focus on Egan’s, Steiner’s and Vygotsky’s versions of imagination to provide a background to imagination in education. I discuss Dewey’s (1902) perspectives on experience and imagination in more detail in Chapter 3.

Imagination as living knowledge

Austrian philosopher, scientist and educationalist, Steiner (1862-1925) argued that children learn best through imagination (1954). For Steiner, imagination emerges from perception through the senses, causes active thinking and creates ‘living pictures’. The imagined, living pictures are flexible, expandable, refinable, adjustable and malleable and can respond to further experiences and knowledge (1996, pp. 55-57). Steiner contended that ideas should grow and change (1954). He asserted that concepts can be either ‘fixed’ or ‘flexible’ depending on how they have been formed. He maintained that flexible concepts are ‘mobile’, ‘changing’ (1954, p. 144) and have the potential to grow into mature, malleable concepts. For Steiner, ‘flexible’ ways of seeing and understanding are made by developing ‘living pictures’ in the mind rather than ‘fixed’ ideas, as in factual knowledge. Steiner argued for ‘living experiences’ in education to promote the development of ‘living pictures’ to enable ‘flexible’, ‘open-minded’ ways of understanding the world and one’s relationship with it (1996a, pp. 55-58). Therefore, Steiner regarded the role of the teacher as central to providing ‘living pictures’, rather than fixed knowledge-forms, in order to enable imaginative, living considerations of ideas. If not, for Steiner, the point of education is lost:
when we give the child dry, abstract, prosaic ideas instead of living pictures, instead of something that engages the activities of his whole being. These dry, abstract, prosaic concepts must only be there as a kind of support for the pictures that are to arise in the soul. (Steiner, 1954, pp. 139-140)

Van Alpen (2011) described Steiner’s assertions and perspectives:

Steiner (1954, p. 144) maintains there is nothing more hurtful to a child than having to either learn or be asked to form definitions, or be engaged in absorbing fixed concepts, because these have no possibility of growth. Instead, a ‘living experience’, such as presenting a problem without implying the answer will stimulate children’s own perceptions, allowing them to find their own conclusions. (p. 18)

Developmental models of learning tend to generate homogenised views of ‘development’ and re-construct binary extrapolations. For example, at the end of primary school (ages 12-14) Steiner (1996b) postulated that “reason gradually awakens” (p. 109) as though reason is a distinct entity that is different from imagination. He described: “this marks the transition towards intellectual thinking... but feelings need to be continually nurtured to avoid one sided intellectualism; hence imaginative learning will include stories... and images” (pp. 109-111). This reductionism seems to contradict his pedagogical arguments for mobile and malleable knowledge by further producing a dualistic understanding of emotions and intellect. This knowledge framework occurs as hierarchical and dualistic by positioning imagination as emotional rather than intellectual, and on a developmental scale toward progress rather than fluid. The need to define imagination can produce inconsistencies, and the epistemological basis of educational research emerges as central.
Understanding the world develops through imagination

Influential Canadian theorist on imagination in education, Kieran Egan argued that imagination is not in opposition to rational ways of understanding the world (1997, p. 101, 211-212). Egan’s influential work (1988, 1992, 1997, 2002, 2005, 2008) revised the importance of imagination as an alternative to limited notions of thinking in education. He positioned his analysis of imagination within traditions of experiential education and cognitive theory, and interpreted imagination as embodied by/in a range of forms and behaviours. Egan’s prolific work valued pre-literate, sensory and mythic ways of understanding the world (in history and in childhood). The development of literacy in this context is presented as both a gain and a loss. Developmentally speaking, as language becomes the prominent cognitive tool that shapes the way in which the world is seen and made sense of, imaginative ways of reading the world become replaced, neglected and lost (Egan, 1997; Judson, 2010, p. 44) and this forms a platform for the revival and understanding of imagination in education for this research.

Egan’s (1997) central theory mapped the development of imagination that enabled different aspects to be categorised in stages. These developmental stages refer to ways of understanding the world that develop naturally and through education. Egan’s (Egan, 1997) ‘Somatic’, ‘Mythic’, ‘Romantic’, ‘Philosophical’ and ‘Ironic’ understandings are presented as stages that mirror the development of literacy in Western cultural history, as well as the developmental awareness of childhood. Whilst Egan structured these stages as developmental, they are interpreted by related authors as interchangeable (Judson, 2010). Egan (1997) argued that before 8 years of age, the boundaries of the world are not defined but are full of heroes, stories, possibilities, and limitless imagination. At the other end of Egan’s spectrum, a ‘philosophical understanding’ develops at ages 15-20 wherein making sense of the world is governed by discursive and logical truth about self and universe. Later, ‘ironic understanding’ accepts the inadequate limits of what can be known, which elicits the reflexivity of humour.
Egan’s central contributions include this idea that imagination is developed, is cognitive, and that understanding the world involves the development of knowing through imagination. I highlight that within this developmental framework, understanding the world is the prerogative, rather than the institutional goals of getting through school or particular disciplinary understanding. Egan’s legacy has provided a structure for educators to apply a range of disciplines. There are limits to this because the importance of imagination has become implicit within these circles so that research is replaced by advocacy and strategies for imaginative teaching. Egan’s work has also been foundational for contemporary educators applying his ideas to environmental education contexts; as a way of understanding the world.

Cognitive Imaginations

Psychologist and influential educational theorist, Lev Vygotsky (1931, 1932, 1978, 2004) addressed the importance of imagination in education from a psychological and social perspective. He often referred to imagination and creativity as closely related if not synonymous. He perceived: “Imagination as the basis of all creative activity” (Vygotsky, 2004, p. 9). Vygotsky gave two papers and a lecture focusing directly on the development of creative ability: *Imagination and Creativity in Childhood* in 1930 (Vygotsky, 2004), *Imagination and Creativity in the Adolescent* (Vygotsky, 1931), and *Imagination and Its Development in Childhood* (Vygotsky, 1932). Vygotsky addressed imagination as a purposeful, creative act that comes from the freedom of playing. He recognised the relevance of imagination to all disciplines: “an important component of absolutely all aspects of cultural life, enabling artistic, scientific, and technical creation alike” (Vygotsky, 2004, p. 9). Vygotsky also worked to pull imagination out of its context of fantasy and fairy tales and relate it to ‘real experience’ (2004, pp. 12-14). He compared a five-year old child’s made-up story with the ability of scientists to imagine the world through astronomy, geology or physics with the same significance (2004, pp. 27-28). He discussed the interplay between imagining and conceptual thinking, and how imagination is a function that contextualises and conceptualises ideas. He discussed the connections between imagination and real experience and how education can develop the imagination through giving as much sensory experience as possible.
Prolific imagination in education scholar, Egan, utilises Vygotsky’s (1978) production of ‘cognitive tools’ as a way to theorise imagination as a mental function, and as a central part of children’s cognitive development. This positions imagination in the tradition of cognitive psychology that considers knowing as mental, cognitive, and in the mind. For Egan, imagination is rationalised as a ‘cognitive tool’ that develops in stages: “cognitive tools are the things that enable our brains to do cultural work” (2006, para. 7). “The main cultural work that cognitive tools enable our brains to perform is understanding” (2006, para. 14). Through adopting this psychological and sociological approach, Egan developed key principles of understanding childhood learning in ways that include imagination as a cognitive tool. His learning principles reconfigure ideas of thinking in ways that value the agency of children’s understanding:

(1) children are abstract as well as concrete thinkers; (2) children's thinking is powerfully affective; (3) children readily understand content organized into story forms; (4) children are readily engaged by forming images from words; (5) children are prodigal producers and consumers of metaphors; (6) children's learning is stimulated by rhyme and rhythm; and (7) children's learning can proceed by forming binary oppositions and mediating them. (Egan, 2001, p. 1)

Egan, Steiner and Vygotsky bring a range of dedicated insights on the importance and value of imagination in education. They focus on how imagination is a part of understanding the world. Their theories offer new ways of looking at experience, creativity and learning which helps to understand imagination for this research.
**Contemporary perspectives on imagination in education**

Having discussed some key theories of imagination in education, I now examine contemporary perspectives that bring greater insight into the role of imagination in learning with relevance to learning for sustainability and environmental education.

*Imaginative teaching and learning*

A range of literature calls upon imagination across the disciplines to describe ways of thinking intuitively within the field of a particular study. Conroy’s (2004) ‘poetic imagination’ referred to the conceptual dimensions of reading poetry (pp. 137-165). He argued that imagination is needed and important in reading and understanding poetry, and used the evocation of ‘imagination’ to refer to that which is involved in the difference between reading the words of a poem and the process of understanding the imagery, rhythm, play and/or metaphorical associations involved in creating meaning. Similarly, in Mark Fettes’ (2008) science classroom, imagination is referred to as an engaging way of teaching that increases students’ understanding of the concepts. Through imaginative inquiry and creative teaching students engage with being imaginative as an alternative to thinking and remembering and in reaction to the dry documents of curriculum (Judson, 2010; Taylor, 2013). Imagination in education occurs as a signpost of difference from rote teaching and learning. Imagination is also involved in the work of conceptualising subjects in engaging, evocative and effective ways. Similar advocacy for imaginative ways of teaching and learning occur in different disciplines: history (Griffiths, 2009), literature (McKellar, 2008), in learning a second language (Judson, 2008) and mathematics (Wilke, 2008). Imagination is relevant for educational researchers across the disciplines and a difference occurs between imaginative education and research into imagination.

*Research into imagination in education*

In Australia, Vicki Macknight’s (2009) research explored teachers’ and students’ perceptions and experiences of imagination in grade 3-4 primary classrooms. She found that imagination is something teachers define and practice, something they
use, and something they teach (pp. 3-5). Her analysis of experiences of imagination documented a range of embodiments. From participant-observation research, she perceived imagination arising in different ways; as “storytelling” (p. 132), “as thinking into other perspectives” or “thinking of otherness” (p. 132), “as pictures in the mind” (p. 150), “as the ability to relate oneself to one’s surroundings” (p. 3), and as “the ability to make connections and make separations” (p. 194). These diverse abilities involve connecting, contextualising, and/or visualising, and occur as types/ways of thinking. According to Macknight (2009), imagination occurs as an ability that emerges as thinking becomes extended into ‘other perspectives’ or when students needed to orient themselves in context.

Macknight (2009) reported that teachers acknowledged a need to reconceptualise learners-as-knowers as a result of perceiving their students’ imaginations at work. This suggests that the work of imagination provides students with agency in their learning. As a method of conducting research into imagination with loose rather than reduced ideals, Macknight’s methods were conducted with flexible ideals. Her approach to participant-observation research and the way she interprets and articulates teacher and student impressions as findings have been very useful in the development of my research design.

Another study that has been influential to this thesis is Australian outdoor environmental education researcher, Alistair Stewart’s (2009, 2011) theoretical and practical perspectives on imagination in outdoor education. For Stewart, (2011) imagination is a neglected ‘essential element’ of outdoor education (p. 4). He asked how the “geological, ecological or cultural influences on a landscape” be known “without the use of one’s imagination?” (2009, p. 1). As an outdoor educator, Stewart’s ideas emerged from action research as he explored imagination in contemplation (p.2), as vicariously: “walking back in time” (p.2), as a way of “reading the landscape” (p.3), and “thinking about the lives of individuals from different periods” (pp. 3-4). He investigated ways to encourage students’ imaginations, and referred to, for example, “historical accounts, including descriptions, painting, photographs” as stimulus that offered up ways to imagine “what might otherwise be difficult to observe in a landscape” (p. 4). Stewart’s work
grappled with the complex work involved in understanding the inclusive experiences, peoples and times that are embedded in environments. His interest in imagination responds to the limits of experiential learning in connecting to place. He values the embedded histories and influences on place that are intangible and that can fall at the edges of experiential pedagogies in outdoor environmental education. For Stewart, the practice of imagining accesses deeper levels of experience, and through cues from images and stories, formed ways to enhance teaching and learning practice in outdoor education. This study has been useful to methodologically consider how to know and recognise imagination for my research. Stewart’s insights and perspectives influence the ways of coming to know imagination as outlined in Chapter 5. I now explore the Canadian based literature of Imaginative Ecological Education.

*Imaginative Ecological Education*

Egan’s (1988, 1997, 2001, 2003, 2005, 2006) decades-long theorisation of imagination has resulted in the formation of the Canadian ‘Imagination in Education Research Group’ (IERG). Through this, Egan’s theories and perspectives have formed a model of interpreting imagination for a range of educators and scholars. From the IERG, Gillian Judson (2010) and her colleagues launched Imaginative Ecological Education (IEE) to integrate Egan’s theories and advocate imagination in environmental education contexts. Judson (2010) asserts: “We rarely acknowledge that ecological understanding requires imagination, that it has, indeed, an emotional and imaginative core” (p. 1). The objectives of IEE are to promote effective approaches that develop ecological understanding by encouraging imaginative teaching and learning. Judson’s (2010) scholarship acknowledged the constraints of conventional approaches to knowledge in educating for environmental sustainability: “It is becoming increasingly clear that knowledge of ecological crises alone has not changed human behaviour in any significant way” (p. 3). This positioned imagination as an alternative to traditional ways of approaching teaching and learning environmental knowledge.

contexts as a way to forward the goals of environmental education. Blenkinsop recommended ‘Six necessary components’ (2008) of ecological education that are imaginative involving being physical, telling stories and activities to get related to nature. (Blenkinsop, 2008, pp. 139-144). Fettes (2008, 2009) also used Egan’s (1997) framework to re-organise ideas about what aspects of the world we need to ‘grasp’ including: “grasping whole, grasping composition, grasping detail, grasping limits, grasping regularity, grasping agency, grasping possibility, grasping struggle and grasping inconsistency” (Fettes, 2011, p. 123). He argued that these graspings involve imagination and are essential for understanding environmental sustainability.

*Imagination as cognitive tool of place-making*


*Affective imagination*

Another area of research that is important to include here is the emotional activity of imagination that has been widely recognised (Dewey, 1902; Egan, 1986; Greene, 1995; Hall, 2010; Jones, 1995; Judson, 2010; Montessori, 1967; Polyani, 1969; Satre, 1940; Sobel, 1988, 1993, 1996; Vygotsky, 1931). In the context of Imaginative Ecological Education (IEE), Judson’s (2010) argument for imagination centres on the importance of emotional engagement in connecting to place: “Once feeling is found it has lasting meaning” (p. 66). She focuses on the affective dimensions of Egan’s (1997) imagination in an education framework that allows teachers “to emotionally engage students in their world” (p. 1). Judson formulates ‘new cognitive tools’ as explicit imaginative pedagogical approaches aimed at leveraging the learner’s emotional engagement with place.
It was important for this research to review and contextualise how imagination is known in the literature. In this chapter, I have laid down a complex field of interpretations. I positioned the imagination as lost, neglected and deeply significant to conceive of and understand environmental knowledge. I discussed a range of interdisciplinary literature on imagination, particularly in relation to education. This helped to understand the diverse nature of imagination and how it might work in relation to environmental understandings.

Early in this chapter, a belief in dreaming was carried through the fictional stories and narratives. These texts express how imagination is deeply related to the embodied, material world, the state of which is reflective of and accountable to human understandings of knowledge. I incorporated imaginative texts as embodiments of imaginative ways of knowing, so their agentic communication enacted this practice of knowledge making. This involved voices that have been marginalised and has evoked the layered environmental and ontological dangers of the loss of imagination.

I examined how an immaterial reputation of imagination has been refuted by contemporary neuro-scientific research. I also discussed key developmental theories of imagination and research in classrooms and Outdoor Education to discuss perspectives on how imagination, as a living knowledge, is involved in understanding the world. I highlighted how these ideas have been marginalised from mainstream educational theory, and how interest in imagination often involves critiques of educational deficiencies. The loss of imaginative play in nature and creativity in education has been regarded as consequential to wellbeing and social justice. I argued that interpretations of imagination as creativity and play both enhance understandings of imagination as well as perpetuate limited interpretations.
While I have drawn upon a range of perspectives that approach imagination, I do not draw too heavily on these theories. My epistemological interests in imagination have resisted using a particular interpretation of imagination to frame this study. I will discuss this further in Chapter 5. A resurgence of imagination is needed. Imaginative ways of knowing emerge as radical arguments for what is required to contribute new knowledge to environmental education and its research.

The next chapter puts ideas of imagination back into an educational and environmental context. I turn to the literature surrounding sustainability in education in Australia to position my research concerns. Reviewing this literature clarifies what sustainability means for education, and outlines ideas of what understanding sustainability involves across the disciplines and in different educational and research settings.
CHAPTER THREE

Sustainability and Education

My research questions ask, in different ways, how imagination is involved in understanding sustainability in education. I refer to this as Education for Sustainability (EfS):

1) What is the nature of imagination in relation to the environment?
2) How does imagination work in Education for Sustainability (EfS)?
3) When does understanding sustainability require imagination?
4) How does imagination develop worldviews or revise ways of seeing the world?
5) In what ways is imagination involved in re/orienting self and world?

In this chapter, I position my research in the field of Environmental Education (EE) and its research in Australia. The implications of this study extend beyond Australia and I do draw upon research and theory that is not distinctly Australian in this thesis. Whilst I do not wish to limit my research to Australia, the participants’ perspectives, the philosophical discussions in Chapter 4 and the particularly nuanced standpoints of Australian environmental philosophers, compels me to make my findings and assertions within this context.

In this chapter, I position my work as research into Education for Sustainability by discussing the idea of sustainability in education in order to unravel what understanding sustainability means and involves for education, research, teachers and learners. Without an established area of research dedicated to imagination in EfS in Australia, I look to the literature to examine concepts of sustainability and position my research in places where new ways of knowing, thinking or experiencing are called for. I discuss the limits to experience and knowing, asserting the need to reassess the nature of imagination in experiential and environmental pedagogies. In Chapter 6, I locate this research in the pedagogic places of EfS practice.
The emergence of the idea of Sustainability

United Nations conferences and declarations of action from the 1970s have responded to the imbalances between increased human population on Earth and decreased environmental health and equality. Sustainability was defined by the Brundtland Commission in 1987: “to meet the needs of the present without compromising the ability of future generations to meet their needs” (World Commission on Environment and Development, 1987, p. 29). The international conference, *United Nations Conference on Environment and Development* (UNCED) held in Rio de Janeiro, Brazil in 1992, addressed the global environmental crisis in relation to the progress of development and the environmental resources needed to ensure equitable quality of life into the future. This continued to address previous United Nations declarations of the global environmental crisis (UNESCO-UNEP, 1976, 1978). The UNCED conference addressed issues of consumption, over population, technology, biodiversity, energy, food water, accountability and management. This produced *Agenda 21* (Agenda 21, 1992; UNESCO-UNEP, 1993), a sustainability action plan that gained global, voluntary agreement, premised on the understanding that sustainability requires a renewed balance between humanity and the planet to avoid destruction of both human beings and the natural world. Education was recognised as a key part of this revision. I include the first item in the preamble of *Agenda 21* to convey the strength of these global realisations and the scope of the call for change that *Agenda 21* (1992) articulated:

Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can achieve this on its own; but together we can - in a global partnership for sustainable development. (Preamble, 1.1)
From the UNCED Conference (1992), scientists from around the world including 102 Nobel Laureates signed the *World Scientists’ Warning to Humanity* (1992), which emphasised the importance of immediate action in order to sustain life on the planet:

> Human beings and the natural environment are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about. (World Scientists’ Warning to Humanity, 1992)

International commitments to *Agenda 21* have been renewed by hundreds of countries in subsequent United Nations conferences in 1997, 2002 and 2012. The conferences have produced a swathe of treatises and conventions that aim to move towards a sustainable future. *The World Summit on Sustainable Development or Earth Summit* in 2002 in Johannesburg, South Africa, renewed commitment to *Agenda 21* along with the *Millennium Development goals* (United Nations General Assembly, 2010) and other international agreements. A similar renewed commitment was made in 2012 at the third international conference on sustainability, twenty years after the first, *The United Nations Conference on Sustainable Development (UNCSD) or Rio 2012, or Rio+20*, held again in Rio de Janeiro, Brazil. These international documents acknowledge the entangled global severity of over-population, inequality, mass-consumption and the environmental crisis. This background shows the important contexts that Education for Sustainability (EfS) carries. From the idea of sustainability, education becomes involved in profound reassessments of human-nature relationships. This history expresses the capacity of the revisionist objectives that the idea of sustainability aims to achieve.
Education for Sustainability

The terms Environmental Education (EE), Sustainability Education (SE), Education for Sustainability (EfS) and Education for Sustainable Development (ESD) are similar but not necessarily interchangeable. They have varied histories and a range of implications as documented over the last two-three decades. The purpose of my research is directed toward the conceptual work of what it is to understand sustainability. Positioning the work as environmental education research would therefore limit the implications of this study, which is cross disciplinary. I have chosen to use the term Education for Sustainability (EfS) in this thesis in alignment with contemporary Australian literature and documentation (Australian Government Department of Water, Heritage and the Arts, 2000, 2009; Kennelly, Taylor & Serow, 2011; Tilbury & Cooke, 2005). I will continue to elaborate on these terms.

Education for Sustainability (EfS) has emerged because international platforms have recognised the central role of education in resolving the environmental crisis. *Agenda 21* (1992) recognised the central role of education in realising its objectives and in 1987 the *World Commission on Environment and Development* particularly recognised the position of teachers as having “a crucial role to play” (Brundtland, 1987, xiv). *The United Nations Decade for Education for Sustainable Development, 2004-2014* (UNDESD) formed an international foundation for the importance of education in working towards a sustainable future (UNESCO, 2003), to which Australia responded. The *Key Findings* of the Australian Government review of Environmental Education (Tilbury & Cooke, 2005) recognised the international challenge of working towards sustainability: “No country is sustainable or has come close to being sustainable. There is no proven recipe for success”, sustainability is “essentially an on-going learning process” (p. 2). However, these international platforms have influenced the resolution of contemporary educational goals and action plans that emphasise newness and revision. Education for Sustainability refers to “a life-long process of learning, action and reflection involving all citizens” (Huckle & Sterling, 1996, p. xiii) as a key part of creating a sustainable future. Sustainability has since become a component of Australia’s educational goals and curricula.
Complications have emerged between terms partly because the definitions of sustainability and the dimensions of accountability are varied (Williams & Millington, 2004). The implied emphasis on progress and economic development in the term ‘sustainable development’ has been critiqued (Jickling, 1992; Jickling & Spork, 1998; Kahn, 2010; Selby, 2009; Williams & Millington, 2004). Critiques of ‘sustainable development’ question the prioritisation of development at all costs while concealing that sustaining human life motivates ‘sustainability’ (Williams & Millington, 2004). Jickling (1992) argues that human accountability is further concealed by inert constructions of ‘the environment’ that render nature without agency, as a dislocated collection of ‘resources’, and as something to be saved. This paradigm is self-effacing according to environmental educators and philosophers who call for a need to re-think the depth of human accountability and revise ways of seeing the inter-connected dimensions of the crisis (Bateson, 1972; Flannery, 1994; Gough, 1999; Greene, 1995; Griffiths, 2007; Marshal, 1992; Matthews, 1991; Orr, 1991, 1994; Plumwood, 1993; Weir, 2008). I join Selby (2009) and Jickling (1992) in resisting these limiting and contentious dimensions implied by ESD.

**Environmental Education (EE) and Education for Sustainability**

Environmental Education (EE) and Education for Sustainability (EfS) have shared goals and perspectives. Environmental educators and sustainability educators can often identify as the same group, and the aims and nature of EfS and EE can be identical, but EfS is positioned differently to EE. There are many strands and aspects of Environmental Education research. EfS has its heritage in EE as much as international platforms for sustainability. The preposition for in Education for Sustainability is a conscious one, recognising the different orientations that have come from educational research about environmental issues. The Australian Government’s *National Review of Environmental Education and its Contributions to Sustainability in Australia* (Tilbury, Coleman & Garlick, 2005a), in partnership with Macquarie University’s Australian Research Institute for Education and Sustainability (ARIES), consolidated their review by constructing ‘Learning for
Sustainability’ as a strategic “reorientation of Environmental Education practice towards sustainability” (p. 3). They clarify how EfS:

- provides a new approach for current practice in Environmental Education. This new approach attempts to move beyond education in and about the environment to focus on equipping students… reflecting on how they currently live and work… to go beyond individual behaviour change or single actions. (Tilbury, Coleman & Garlick, 2005a, p. 1)

The Key Findings of the National Review (Tilbury & Cooke, 2005) describe the difference between environmentalism and sustainability in Australian education:

- It has been suggested that environmentalism in the past has been a movement against some things – for example stopping pollution and other harmful activities – while the sustainability approach aims to do things differently in the first place, instead of just cleaning up the symptoms of underlying problems. (p. 2)


1) Change the mental models by questioning, reflecting and re-thinking, and 2) Use new learning approaches to explore sustainability, build skills and enable change (p. 2). Whilst seemingly explicit and emphasising new-ness, transformation, re-thinking and change, these formal sites of EfS have produced challenges for education and educators. We are still researching how to educate for sustainability. Studying how the idea of sustainability is understood is not limited to environmental education.
Understanding Sustainability

In this section, I review AEE research that is directed towards a better understanding of what effective EfS involves. I explore suggestions that imagination is significant in understanding sustainability, and I look to areas of EfS research that suggest that something is missing and something is needed, in order to position my study within the AEE research field.

What does understanding sustainability involve?

The goal of EfS is to improve students’ understanding of sustainability. However, EfS research and praxis is still working out what understanding sustainability involves and how to effectively teach for it. Influential environmental educators have outlined key pedagogical principles for sustainability (Capra, 2005; Robottom as cited in Tilbury, Coleman & Garlick, 2005a, p. 55) and the dimensions of ecological literacy (Capra, 2005; Cutter-Mackenzie & Smith, 2003; Orr, 1992a). Key aspects of what understanding sustainability involves have been described through the Organising Ideas in the Australian national curriculum (ACARA, 2014b), through research into the importance of connecting with nature (Orr, 1994; Sobel, 1993, 1996) and gaining experience outside of the classroom (Louv, 2006; Sandell & Ohman, 2010; Waite & Pratt, 2011). Issues have been identified such as the development of ethics and values that are not sustained in students (Preston, 2011), ambivalence (Davison, 2008), the place of content (Cutter-Mackenzie & Edwards, 2006) action (Cotton & Winter, 2010) and the confusion and apathy caused by a pessimism in environmentalism (Nagel, 2005). Measuring tools for environmental attitudes (Dunlap, 2008), studies into students’ concepts of nature and sustainability (Preston, 2011, 2013; Walshe, 2008) and behavioural change models (Kaplan, 2000; Kollmuss & Agyeman, 2002; Prabawa-Sear & Baudains, 2011; Shephard, Mann, Smith & Deaker, 2009) all endeavour to understand more deeply how effective EfS operates and what understanding sustainability involves. My research into imagination is involved in this trajectory.
New ways of thinking and re-thinking

The *National Review’s Key Findings* (Tilbury & Cooke, 2005) describe the types of thinking and learning required for EfS. “Another realisation emerging out of the sustainability literature is that major problems cannot be solved from our current way of living but will require a shift from traditional ways of thinking and acting upon environmental problems” (p. 2, emphasis in original). Just as formal documents suggest that understanding sustainability involves “Transformation and change” (DEWHA, 2009, p. 9) and “Changing the mental models” (Tilbury, Coleman & Garlick, 2005a, p. 2), environmental researchers in a range of fields have argued that understanding sustainability requires revising the “conceptual frameworks” (Plumwood, 1993, p. 9), “intellectual traditions” (Weir, 2008, p. 154), and “the conceptual architecture of modern Western thought” (Muecke, 2004, p. 103).

Australian environmental educator, Hilary Whitehouse (2011) highlights “the fictional divide” (p. 296) between humans and nature in worldviews that govern EfS that are “incommensurate” (Latour, 2001, p. 61), “highly flawed” (Weir, 2008, p. 154) and are environmentally destructive (Muecke, 2004). Environmental philosophers and educational researchers argue that understanding sustainability requires addressing the anthropocentric contradictions inherent in framing ‘the’ environment as something to be rescued and managed in EfS. From these perspectives, understanding sustainability involves shifting away from ways of thinking that cause “confusion” (Smyth, 2005, p. 4), “ambivalence” (Davison, 2008, p. 1284) and “apathy” (Walshe, 2008) for EfS students.

Inferences to imagination and gaps in the research

Rarely has imagination been researched as a part of understanding sustainability in EfS. There are theoretical perspectives on imagination in education, as discussed in Chapter 2, but limited research. In AEE research there are suggestions of the affective influence of imaginative inquiry in outdoor education experiences (Stewart, 2009, 2011) and openings for research through and into imaginative texts (Reid, Payne & Cutter-Mackenzie, 2010; Cutter-Mackenzie, Payne & Reid, 2010, 2011).

Research into open-ended, play-based learning (Cutter-Mackenzie, Edwards & Fleer,
2009; Edwards, Cutter-Mackenzie & Hunt, 2010) suggests new ways forward in educating for understanding. The transformation of thinking required in EfS rarely calls upon imagination to express newness, and change in knowing and belief. However, EfS research interests highlight the need to understand students’ concepts of sustainability and the ways in which spaces/places are imagined (Preston, 2013; Stewart, 2009; Cutter-Mackenzie & Edwards, 2009). The Imaginative Ecological Education (IEE) movement in Canada discusses imaginative teaching strategies in ecological education based upon Egan’s (1988, 1997, 2005) developmental framework of imagination. Fettes (2010) and Judson (2010) apply imagination to ecological education contexts, and Blenkinsop’s (2008, 2012) action research asserts that imagination is an essential part of ecological education. They position imagination as a cognitive tool essential to place-based pedagogical understandings and concepts of affective educational experiences. Whilst there is an increasing degree of reference to their work in education literature, the epistemological, environmental and pedagogical work of imagination has not been examined in the pedagogy and practice of EfS from an Australian perspective.

The limits to knowing

The Canadian ecological educator, Judson (2010) writes, “knowledge of the ecological crisis alone has not changed human behaviour in any significant way” (p. 3). This implies that knowledge is different from understanding sustainability. Developing an awareness of sustainability and consistent practices of living sustainably has been challenging to Environmental Education (EE) and Education for Sustainability (EfS) practice and research. Expectations that knowing about environmental issues will affect attitudinal and behavioural change in human beings has been found to be inaccurate (Kollmuss & Agyeman, 2002; Murphy, Watson & Moore, 1991). Research has found that even when people know about environmental issues their actions can remain unaffected. This area of research suggests the limits to knowing in EfS. In this section, I examine this research space to position my work with the potential to respond to the limits of formal ways and concepts of knowing in this field, and the need to re-conceptualise what the nature of knowing and understanding sustainability is for EfS.
Research has engaged strongly with examining the motivations for pro-environmental behaviour in order to understand how better to teach for it. Many theoretical frameworks have been developed to explain and negotiate the ‘gap’ between knowing about environmental issues and living this knowledge out in daily life through ‘environmentally responsible behaviours’ or ‘pro-environmental behaviours’ (Kollmuss & Agyeman, 2002). These pro-behaviours include turning taps off to save water, not littering or picking up litter, actively recycling, switching off lights to save electricity and so forth. These actions occur in the literature as outcomes of understanding sustainability and effective EfS. Behavioural change frameworks feature strongly in this area of research and include a range of modelling techniques that identify influences to living out environmentally responsible behaviours. Influences include: demographics, social behaviour, empathy and altruism, convenience, affect and social marketing (Kaplan, 2000; Kollmuss & Agyeman, 2002; Prabawa-Sear & Baudains, 2011). This area of AEE research is interested in understanding why people do what they do. Without a definite conclusion so far, the research asserts that it is a complex issue.

In 1991, Murphy, Watson and Moore surveyed Australians’ water saving behaviour and understandings. They found that knowing about water issues, and having a positive attitude towards saving water did not correlate with pro-environmental water-saving actions, behaviour and lifestyles. These entanglements of environmentality, epistemology and ontology are significant. The authors emphasised the inaccuracies in the educative assumption that knowing about leads to learning, understanding and/or change. As a critical environmental and educational issue, they called for the need to reconceptualise the relations between knowing about or having a positive attitude towards, and living consistently; between knowing and being (Murphy, Watson & Moore, 1991). This area of research deflects assumptions that information, values and attitudes are the source of sustainable living. It suggests that knowing and being are entangled rather than linear, and that understanding sustainability involves more than knowing about it.
Understanding sustainability in EfS involves more than knowing about it

Studies into what motivates environmentally responsible behaviour in students have similarly highlighted the differences between learning about the environment and enacting environmentally responsible behaviour. Research studies and EfS program evaluations have shown that knowing about environmental issues and having an environmentally positive attitude does not correlate with behaviours in daily life (Prabawa-Sear, 2010; Prabawa-Sear and Baudains, 2011). The Australian Government’s *National Review of Environmental Education* (Tilbury, Coleman & Garlick, 2005a) criticised the over-emphasis on knowing about the environment in EfS and several studies have called for a re-examination of the assumption that knowing more about environmental issues will result in being and behaving sustainably (Firth & Plant, 1996; Prabawa-Sear & Baudains, 2011). This guides my research because if knowing is the point of learning, but at the same time does not influence sustainable outcomes, then the pedagogy and practice of EfS needs to respond. How the environment is imagined, how environmental impacts are imagined, or how students’ imagine the consequences of their behaviours has not been a part of these research studies.

The need to involve students in research has also been called for in order to understand what motivates and influences students to behave environmentally if knowledge does not (Barratt Hacking & Barratt, 2007; Barratt Hacking, Cutter Mackenzie & Barratt, 2011; Prabawa-Sear & Baudains, 2011). The barriers that students experience that prevent or influence their own pro-environmental or ambivalent behaviour was examined in Prabawa-Sear and Baudains’ (2011) study. The authors found: “The least significant barrier was identified by students as ‘Lack of Knowledge’” (p. 226). While amounts of knowledge in EfS appear inconsequential to ontological understandings of sustainability, it is also important to recall research that has highlighted the significant problems with knowing too much because of the negative effects of learning about environmental devastation for children (Sobel, 1996; Nagel, 2005). Understanding the nuanced dimensions of being and behaving sustainably has involved shifting away from learning aimed at knowing about the environment. This area of research highlights the limits to knowing and the
differences between knowing and being or doing. This provides an opening for examining concepts of knowledge and knowing in EfS and an onto-epistemological revision of how knowing, learning and being are entangled. By investigating imagination in EfS, my research is situated to reconceptualise what knowing the environment and understanding sustainability may involve from an Australian perspective, and contributes to the ways in which imagination might be used to understand sustainability.

**Experience and environment**

Focussing on experiences *in* the environment rather than learning *about* it has emerged from the limits to knowledge and the importance of students experiencing lived connections with nature. The centrality of experience in educational theory is informed by the progressive experiential learning in education movement lead by John Dewey in the 1930s. It has also been influenced, perhaps, by the epistemological objectivity of the empirical sciences from which environmental science has emerged. Contemporary academic writing and pedagogy concerned with outdoor, hands-on learning experiences value holistic experience in nature (Hill, 2013; Orr, 1992b; Sobel, 1993, 1996) emphasise embodied learning (Waite & Pratt, 2011), the value of direct encounter (Sandell & Ohman, 2010) and place-based critical pedagogies (Gruenewald 2003; Somerville, 2005; Somerville, Davies, Power & Gannon, 2008; Wattchow & Brown, 2011). In these cases, experiential learning is a constructivist approach to learning that is active, engaging and participatory. A focus on immersion in place, and experiencing sensual encounters with the immediate environment, structure and inform these conceptualisations of experiential learning in AEE (Gruenewald, 2003; Knapp, 1996; Tilbury, Coleman, & Garlick, 2005a, p. 88). Certainly there are differences between experiential learning and empiricism, however the value of experience in EfS is often constructed as direct encounter with the immediate environment through hands-on, student-centred, real-life learning in outdoor environments.

Emphasis on local, outdoor, natural experiences in nature are significant in EfS in order to develop connection, empathy and care. Being *in* nature is a prerequisite for
caring for place (Blenkinsop & Mckenzie, 2006; Sobel, 1996). The philosophical basis is that sensory and local experiences in the natural environment are essential for young children because studying things close at hand builds connection. This is a foundation for understanding distant abstractions later on, and children are haunted with too many concerns about nature while not experiencing enough real contact with it (Orr, 1991, 1994; Sobel, 1996). Influentially, Sobel (1996) asserted that environmental education must allow children to “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” (p. 10). The value of experience, Sobel argues, is essential.

The need for direct experience for affective EfS is highlighted by other research that emphasises the tangible and visible elements of immediacy. Prabawa-Sear and Baudains’ (2011) research with geography students identifies students’ inability to see the outcome of their actions immediately and tangibly as a barrier to environmentally responsible behaviour like picking up litter and recycling paper (p. 226). This is seen as a barrier to effective EfS and a clue to how sustainability is (not) understood. Human geographer and educator, Hope (2009) argues that hands-on direct experience is important to enhance students’ understanding because “when students’ see it for themselves their enjoyment and understanding is enhanced” (p. 169). Hope (2009) argues that outdoor experiences are essential for students’ understanding because they participate actively in their own empirical, affective encounters with places and their meanings; experiences in nature encourage being with, rather than thinking about them (pp. 177-178). The range of pedagogies of experience in EfS research has varied emphasis but is focussed towards hands-on, real life experiences as a gateway to students’ understanding sustainability. The need for direct encounter to foster care and connection with nature, and students’ need for immediacy to understand their context and impact in the world, seems to be entangled. The role of imagination in orienting students’ experience of themselves in connective, oriented relationship with the world is not a part of this research area.
CHAPTER THREE

The need for more-than experience, and the limits of immediacy

Critical views of experience in EfS have involved examining the assumption that real-world experiences ensure that students encounter the truth of reality. In the context of geography, Nairn (2005) questions, “the assumption of the unmediated presence of the truth of nature or reality or experience…will be transparently available to students if they experience it directly” (p. 294). She describes how outdoor experiences can also reinforce misconceptions about the world for students. Nairn (2005) argues that conceptual and social influences have effects on how we understand the world so educators interested in student understanding of the environment need “to attend to the historical and geographical processes” that constitute each place and experience (Nairn, 2005, p. 24). Stewart (2009) discussed this in his outdoor education research as imagination. Stewart found that as his students imagined place embodied by its past and future, their understandings, impressions, memories and connection with place and their own experience advanced. These ideas suggest that limited notions of direct experience in EfS highlight hands-on immediacy but neglect the broader involvement of understanding geographies, which involve imagination.

There are environmental limits to experience. By conceptualising experience as direct encounters with the visible, surrounding environment, only the immediate environment emerges as ‘available’ and is positioned as a more ‘real’ space than ‘other’ places and times. This risks constructing a contracted worldview that ‘narrowly’ orients the self only by that which is seen outside self and locally known (Buell, 2007; Weir, 2008, p. 153). The National Review of Environmental Education and its Contributions to Sustainability in Australia identified the need for “More Than Just Hands-on Experience with the Outdoor or Natural Environment” (Tilbury, Coleman & Garlick, 2005b, pp. 43-44) arguing that Learning for Sustainability involves something more than direct experience. My AEE research into imagination is positioned in this place; to suggest that educational and environmental notions of experience need re-examination. I continue to navigate this space by drawing on Dewey’s (1902) experiential education theories that involve imagination in concepts of experience.
Experience and imagination

The educational value of experience in EfS is not usually considered limited. There are multiple interpretations and perspectives on experiential learning, and rarely do these conceptualisations include imagination, or understandings of a relationship between experience and imagination in EfS. However, as a founder of experiential learning, Dewey (1899, 1902, 1938) emphasised how imagination is an essential part of building experience. “You know how limited our experience would be if it were confined to what is before our senses. If it were not for this power of imaging [sic], the rest of the world would be blotted out” (Dewey, 1902, p. 246). Now more than ever, the ‘rest of the world’ is involved in understanding sustainability, as students are expected to have an understanding of global contexts and multiple dimensions of environmental issues (ACARA, 2014a; Cutter-Mackenzie, 2010b).

For Dewey, both experience and imagination enable reason, thinking and understanding. In Dewey’s neglected lecture *Imagination* (1902) he discussed the relationships between experience and imagination in understanding. Dewey’s position was that teachers need to be responsible not only for the physical experiences they provide for their students but the kinds and range of mental images and impressions their students construct from their experiences. According to Dewey (1902), experience and imagining encourages the development of ‘mental imagery’. Dewey (1902) suggests that experience creates generative images that enable students to imaginatively reason. This essential part of Dewey’s experiential learning pedagogics has been overlooked. Significantly, these ideas suggest that imagination can extend understandings of direct experience for EfS.

In the context of Education for Sustainability, where educational and environmental epistemologies converge, the demands of sustainability require new ways of thinking about intangibilities. For Dewey (1902) imagination is both used to mentally imagine experiences as well as understand perspectives that cannot be experienced directly. The educational and embodied notion of experience, and the immediately, place-based, local emphasis on experience are entangled. The integration of imagination in educational and environmental ideas of experience help to distinguish between
physical experiences in the immediate surrounding environment and imagined experiences of other places and times.

Australian Environmental Education research that meshes imagination and outdoor experiences in nature recognise a fusing of immediate visible experience and other dimensions enabled by imagination. For example, Payne (2010) shows dedication to facilitating experiences in nature that are woven together with imaginary stories about ‘gnome-tracking’. Stewart (2009) recognised that imagination is involved with immersive, meditative encounters with being present to place in ways that bring out histories and meanings. Through imagination, he suggests, other histories and geographies become entwined with presence rather than occurring separately or distantly from experience. I position my research in this area; examining imagination in ways that work toward new conceptualisations of the relationship between experience and imagination in EfS for Environmental Education research.

**EfS as storytelling and through eco-literature**

Having discussed how my research is positioned in relation to knowing and experience, I distinguish a third area of EfS research in order to position my study. Contemporary research into children’s literature in teaching and learning for sustainability investigates the metaphorical, visual and inter-textual pathways for pedagogy that children’s books and stories provide. A special issue of *Environmental Education Research* (2010) dedicated to the value of children’s literature in EE contexts, identified the limited research in this area. However, the value of narrative in environmental contexts (Jordan, 2012; Lejano, Ingram & Ingram, 2013), teaching through storytelling in outdoor education (Payne, 2010; Stewart, 2011) and eco-criticism of creative environmental texts (Bennett, 2010; Payne & Cutter-Mackenzie, 2009; Iovino & Oppermann, 2013) carves an area of EfS research that helps to position my work. Egan writes extensively in *Teaching as Storytelling* (1986) that imagination and education thrive in and through stories. Barone and Eisner (1997) and Eisner (2002) identify the creative arts as a powerful and important medium for education and research. In the context of examining imagination in education, Sutton-Smith (1988) writes that imagination takes form as images, narratives and
metaphorical relations (p. xiii). These intimations show the imaginative elements of environmental texts is an important place to position my research.

Story and environmental education make strong links with Indigenous knowledge and traditional pedagogical practices. Research into story in environmental education contexts reveal the connections between self and other, through times and places and the integrated, inter-related inter-connectivity between the story and the knowledge.

In their editorial of the special issue of *Environmental Education Research* (2010), Cutter-Mackenzie, Payne and Reid (2010) write that stories present other places, perspectives and times to the reader, which may be, “imaginatively construed or firmly rooted in a diversity of realities” (p. 253). This suggests that in EfS contexts, stories can be used to tell unreal stories or narrate ‘real’ happenings of others in other places and times. Stories are “crafted and re/told across a range of times, places, realities and worldviews” (p. 257). This narrative reading helps to position imagination in the context of EfS.

*Openings for EfS research into the pedagogical places of imaginative eco-texts*

Influential Australian Environmental Education researchers, Cutter-Mackenzie, Payne and Reid (2010) suggest that children’s literature is formative in understanding nature in children’s experience (p. 253). Stories in EfS contexts can be “deeply pleasurable as well as troubling”, aesthetic, political, affective compelling and contradictory (Cutter-Mackenzie, Payne & Reid, 2010, pp. 253-254). Whilst children’s literature, stories, images and narratives present focus points for EfS teaching and learning, the dimension of imagination has not been researched in this sense. Children’s literature has been researched through qualitative, auto-ethnographic discussions about the meaning of story, nature, and place (Reid, Payne & Cutter-Mackenzie, 2010). Stories are positioned as resourceful, cultural, dramatic texts that are in the form of visual, textual, graphic novels, hand-made books, visual rhetoric, online texts, green metaphors and vignettes. These textual sites of images and stories are places for my research to examine how images and narratives inform experience in ways that also generate imaginative understandings of nature and one’s relation to it.
Reid, Payne & Cutter-Mackenzie (2010) encourage research into children’s eco-literature and environmental texts as pedagogical places of contemporary EfS. There are a range of ways of interpreting fictional texts for AEE research that suggest imagination. Layers of contrast emerge as online spaces neglect natural spaces; request interactivity yet are screen-based. Morgan (2010) describes stories that work as environmental texts, as texts that invoke a mythopoeic imagination (p. 383) and Cutter-Mackenzie, Payne and Reid (2010) identify reading relevant children’s literature with an ecological imagination. Burke and Cutter-Mackenzie (2010) discuss the imagined elements of being involved in story as an embodied learning experience. They question how children’s literature considers and re-considers environmental learning through ‘other ways of knowing’ including imagination that can empathise with an other and vicariously be with and experience in and through story. The inner place of participating in story, is key to environmental education, yet has been little examined in AEE research. Sloane (2010) analyses the environmental messages of children’s popular fiction. She describes how story carries knowledge but avoids transmission, by positioning the student as “not to receive a message but to play with it” (Sloane, 2010, p. 427). I position my research into imagination in EfS in this collection of EfS research inquiry. The nature of imagination and its role in EfS occurs significantly in this context. Images and stories occur as important parts of learning in EfS that can be formative, engaging and complex. I take up the openings for research and the request that the special issue of Environmental Education Research (2010) provoked. Cutter-Mackenzie, Payne and Reid (2010) express anticipation that this area of AEE research will:

broadly nurture the development of scholarship on children’s ecoliterature, arguing that it is still a nascent field of inquiry that works with limited evidence to justify its purposes or elaborate its values and usefulness, all of which warrant further development. (p. 262)

While my focus is not on story per se, or children’s eco-literature, my research inquiry into imagination as a credible and significant part of EfS discourse may arise in/through a range of eco-texts used by students and teachers.
Understanding sustainability in the Australian National Curriculum

As a national goal statement, *The Melbourne Declaration of Educational Goals for Young Australians* (MDEGYA, 2008) acknowledged that “major changes in the world are placing new demands on Australian education” (pp. 4-5). The result of the declaration promised: “a focus on environmental sustainability will be integrated across the curriculum” (p. 14). Literacy and numeracy within the disciplines are still the cornerstones of Australian education standards, however, in the new Australian National Curriculum, ‘Sustainability’ is a ‘Cross-Curriculum Priority’ for all year levels across Australia (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2014b). In the Curriculum, Sustainability means addressing “the ongoing capacity of Earth to maintain life”, in ways that “enables individuals and communities to reflect on ways of interpreting and engaging with the world” and “building the capacities for thinking and acting in ways that are necessary to create a more sustainable future” (ACARA, 2014a). This description of sustainability was developed in consultation with EfS educators and dedicated EfS organisations and so reflects broader agreement (ACARA 2014b). It constructs ‘the world’ as the subject of EfS learning, as something to reflect on, interpret and engage with. The Australian National Curriculum is a formal document, but it is also a basis of teaching decisions and so it can reflect how teachers’ perceive the scope and nature of sustainability (Kennelly, Taylor & Serow, 2011).

The Sustainability Priority in the Australian National Curriculum is expressed through three Organising Ideas: ‘Systems’, ‘World Views’ and ‘Futures’ (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2014a). Figure 3.1 is a screenshot of the Sustainability Priority in the Australian National Curriculum, showing how it is laid out through the three Organising Ideas (OI).
These Ideas reflect a contemporary understanding of what sustainability means for education and what Education for Sustainability (EfS) involves. The representation of Sustainability in the curriculum has been critiqued as inadequate (Gough, 2003; Kennelly, 2011) and is continually being developed. The demands of understanding sustainability have broad scope, extending to ‘the world’ and into the future.

*Educating for worldviews*

While the idea of educating for ‘World Views’ is expressed through the three Organising Ideas of the Australian National Curriculum (ACARA, 2014a), the meaning of ‘World Views’ is indistinct. The term ‘World Views’ can also be seen as a ‘floating signifier’ (Laclau & Mouffe, 1985) with different meanings and interpretations for individual teachers, researchers and disciplines. It may be assumed
that sustainable World Views may result from experiences in the natural environment or learning about environmental knowledge. However, no research examines how to teach and learn for the development of World Views in this context. There is no explanation as to how the conceptual work of understanding involved in developing World Views are developed, taught, learned and assessed.

The Organising Idea of World Views has two descriptors (Figure 3.1). The descriptors (OI.4 & OI.5) emphasise that environmental knowledge in EfS includes the development of accurate and beneficial ways of seeing and understanding the world as global, plural and inter-connected.

_Chaired Idea.4: World Views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice are essential for achieving sustainability._ (ACARA, 2014b)

Understanding inter-dependence, diversity and social justice involve World Views that emphasise the need to understand the inter-connectedness of all ‘living things’. The use of the term ‘living things’ does not differentiate between human and non-human living things. This suggests that a sustainable World View understands that the right to life, health and longevity extends to non-human beings. Additionally, the description involves valuing diversity and social justice, inferring an appreciation of biodiversity and difference in the context of social justice. Developing World Views as part of understanding sustainability involves revised, ethical and plural ways of seeing, understanding and being in the world.

The fifth ‘Organising Idea’ of Sustainability constructs a World View that understands a national and global context to personal experience.

_Organising Idea. 5: World Views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability._ (ACARA, 2014b)

This strong Organising Idea asserts that “World Views are formed by experiences” and suggests potential links between worldviews and “actions for sustainability”. The
implication that worldviews are linked to community action or behaviour is an assumption that has been contested. While experience is central in understanding environments, imagination may be equally important to understand that which cannot be experienced directly. The teaching of learning of “experiences at personal, local, national and global levels” extends possibilities of experience from immediate local places to multi-spatial, global domains. Further investigation into the differences between personal and global ‘levels’ of experience is required to understand how to provide students with such World View forming experiences.

The world as the environment

The World Views section in the National Curriculum’s Sustainability Priority expressed the need for Education for Sustainability to address ways of seeing and perceiving the world. The curriculum suggests that understanding sustainability involves being/becoming aware of the needs of others, the impact of actions on ‘future generations’, and being aware of spaces that are “shared across local and global communities” (para. 2). From these descriptions, a sustainable World View is one that integrates local and global spaces, entwines the individual and collective, and frames the present and the future as relational. This occurs as a shift away from concrete constructions of environmental knowledge and the expansive appreciation of diversity and justice for human and non-human beings and places.

In these discussions, ‘the environment’ is not confined to an external wilderness of natural environments. Rather, the environment of sustainability encompasses local and global spaces, and historical and future temporalities. Students and teachers are to navigate through these multiple temporal and spatial dimensions of sustainability in and as EfS. My research needs to come to terms with these expansive dimensions of environmental sustainability in which environmental knowledge is also extended beyond experience into other times, places and perspectives. With such broad terrain for thinking, it seems that being able to understand sustainability involves being able to navigate through the multiple and inter-connected sustainability dimensions of materiality.
Summary

Sustainability is a future-focused assertion that lives at the edges of everyday life and requires understanding human-nature relationships and the interconnected multiple dimensions of materiality. My research is positioned in this broad and extensive field. This thesis takes up the need to find ways to navigate the complex, global and multiple terrain of sustainability to investigate how multiple dimensions involved in sustainability issues may involve experience, knowledge and imagination. To investigate the role of imagination in EfS educational experiences, and answer the questions of this research, I need to find ways to interpret how imagination is involved in understanding sustainability, and how imagination forms ways of seeing the world that are multi-dimensional, connected, inclusive, socially just; that expand experience and develop worldviews.

I have established that EfS as not a learning area, or discipline, but an idea and a way of seeing the world. This literature review has acknowledged the difficulties faced by educators in finding useful and beneficial ways to develop both the broad and explicit demands of EfS. I have discussed the extensive terrain of EfS and the breadth of learning suggested by the literature. The integration of EfS in schools is a pedagogical issue and therefore up to teachers to design and enact (ACARA, 2014a). The literature suggests that the pedagogical places of teaching and learning are sites of EfS. This is where I position my research; in places where the tasks of “making sense of our world” (MDEGYA, 2008), developing World Views (ACARA, 2014) and growing knowledge from the ground up (Kagawa & Selby, 2010; Walsh, 2008) are crafted and developed.
The philosophical issues that constrain and support my research are discussed in this chapter. It has become clear that my contribution to knowledge for environmental education and research cannot sit on top of established understandings. As I expressed in the introduction to this thesis, my research interests in imagination in EFSE came from professional frustrations as an educator where I experienced the limits to communicating knowledge when trying to teach for sustainability. In Chapter 2, I positioned imagination in environmental terms and discussed its loss in research, educational discourse and concepts of knowing. Accordingly, this research into imagination in Education for Sustainability (EfS) requires philosophical revisions to the epistemological and ontological foundations of education and environment.

In this philosophical chapter, I present a complex and strenuous argument to critique, revise and re-imagine anthropocentric views of knowledge and nature. In this chapter I discuss the philosophical issues at the heart of Australian environmental education research and introduce the New Materialist trajectories that critique and traverse dualisms. This is aimed to address and avoid the contradictions inherent in epistemological frameworks used to represent environmental knowledge. I discuss these philosophical contradictions and possibilities through analysing artworks as metaphors for representing environmental knowledge. I frame these problems as issues of how knowledge and nature are imagined. After this, I discuss what is needed for revision and explore the cartographic possibilities that can inform a consistent methodological foundation for researching imagination in this field.
Problems with the ways we imagine knowledge and nature

Some see Nature all ridicule and deformity
and some scarce see Nature at all
But to the eyes of the [wo]man of imagination,
Nature is imagination itself. (Blake, 1799)

The contradiction of environmental knowledge

The term ‘the environment’ is a problematic representation. Criticism centres on the anthropocentric objectification of nature enacted by the term that constructs the natural world as fixed, stable, external and ‘other’ than human/culture. Reference to ‘environment’ occurs as a container metaphor (Lakoff & Johnson, 1980) for human life as though human living simply needs a setting in which to accomplish itself. Eco-critic, Buell (1995, 2005) suggested that a sense of belonging and being emplaced has been lost by the objectivism often used to order environmental knowledge. In The Future of Environmental Criticism (2005) Buell wrote of the significance of the term ‘the environment’ as an historical signpost that marked a loss of the natural assumption of belonging in and belonging to place. He identified the term ‘the environment’ as “one among many markers of the erosive effect ...upon the...assumption of belonging” (Buell, 2005, p. 62). This suggests that being is affectively displaced by the objectification of nature enacted by the term ‘the environment’, that signifies a separate external world as distinct from humanity and culture. I argue that the formation of this ontological disconnection is not located distinctly in the past, but is a conceptual structure that continues in contemporary EfS discourses.

The division between knowledge and environment is reproduced in the structures that organise knowledge in education. The conceptual and physical distance between learning and nature results in fragmented understandings of the relations between knowledge and nature. This reductive separation becomes a problem when
environmental concerns meet epistemological ones. Australian environmental educator and researcher, Whitehouse, (2011) observes that the essential contradiction of representing knowledge about ‘the’ environment in Education for Sustainability is the inaccurate picture created through which “a contiguous biosphere is fictionally divided against itself” (p. 298). She argues that the players, the teachers and students, in the fiction cannot support the illusion of autonomy that ‘knowing about the environment’ configures, and that there comes a time when the “tensions and contradictions bear too much weight and the logic collapses” (p. 298).

The problems with the term ‘the environment’ regard a deeper contradiction for Australian environmental education. Among others, environmental educator and researcher, Smyth (2006) argues that environmental education is not a separable package. He writes of the difficulties of the term ‘the environment’ as causing “widespread confusion” (p. 4) because of the oppositional binaries created when something that is everything (the environment) is referred to and enabled as a noun. It becomes as if ‘it’ is a single ‘thing’ differentiated from others and all else. Davison (2008) critiques how this imposed paradigm is antithetical because environmental education continues to ‘ambivalently’ refer to an external and objectified ‘the environment’, and therefore constructs and reproduces this externality. Whitehouse (2011) argues strongly for the elimination of anthropocentric references that continue to construct EfS in contradictory ways.

The connection between knowledge and the earth is not obvious in contemporary schooling. Nature is separated from the central concerns of school life geographically and epistemologically (Louv, 2005). Orr (1991, 1994) advocated re-contextualising the goals of education through the frame that constitutes it. He asked, *What is education for?* (1991), if the living environment which constitutes existence is not included in the activities of learning and growing. This perspective is not new. In 1899, Dewey also identified education as necessarily inter/dependent with nature through the interface of learning. In *School and Society* (1899) Dewey wrote; “All studies arise from aspects of the one earth and the one life lived upon it” (Dewey, as cited in Louv, 2006, p. 203). These problems require profound revision; the need to re-conceptualise environmental knowledge, not as a branch of science, or a discipline, but a constituent attribute of knowledge itself.
From a range of viewpoints, environmental concerns challenge conventional approaches to education that represent environmental knowledge as an optional component of schooling and as a fixed space that can be learned ‘about’ and known. Centrally, the argument is that the living world from which all knowledge emerges appears neglected in the structures that organise knowledge. It seems the relations between epistemology and environment are central in environmental education. Re-imagining both the mediums and embodiments of knowledge emerges as an integral part of crafting the dialectics of educating for sustainability. Examining imagination in this context extends to revising epistemological assumptions and/in discourses of environmental knowledge.

**Knowledge imaginaries**

How do we imagine knowledge? How do we imagine environmental knowledge? Philosophers and cultural theorists have produced images and metaphors to consider and reconsider the nature of knowledge itself. It appears that imagery assists understanding and can revise epistemological concepts. Gilles Deleuze and Félix Guattari’s (1987) ‘rhizome’ utilises the imagery of the disparate underground systems of plant roots to re-imagine how knowledge exists and connects. The rhizome works as a metaphor, providing an imagistic framework for considering a non-linear and non-hierarchical nature of knowledge. Lakoff and Johnson’s (1980) analysis of metaphors in language recognise the imaginary nature of metaphorical thinking (p. 193) and recommend extrapolating every possible meaning from such significations. The figurative idea of rhizomic knowledge produces imaginaries of interconnection and growth: “Every point of the rhizome can and must be connected to every other point…A rhizome can be broken off at any point and reconnected” (Eco, 1984, p. 81). This occurs differently from the metaphorical associations suggested by knowledge as a tree (Genesis, 2:17 New International Version) that signifies that which is above ground, vertical, and hierarchical, with a central trunk, or a ladder. Concepts of ‘scaffolding’ learning (Bruner, 1968) evoke the imagery of construction, as though knowing is at the top of a vertical built environment upon which students are supported to climb up in levels.
It appears that metaphoric imagery can contribute to understanding, by providing the imagination ways of handling abstractions and interrelationships. Australian educational philosopher, Sellars (2008) focused on the imaginary characteristics of Deleuze and Guattari’s (1987) rhizome to construct his “picturing approach” (p. 2) to re-imagining concepts of curriculum as ‘cura’. Sellars (2008) also asserted Deleuze and Guattari’s *line of flight* (1987) as “also imaginary” (p. 3) in that it provides “a way for working with complex thinking” (p. 3). The meaning of metaphors and imagery can be contested, unravelled, and re-imagined. However, whilst imagination is used in philosophy and educational re-conceptualisation, imagination itself still does not have a recognised role in concepts of knowledge.

I notice that whilst many philosophers produce environmental imaginaries that call upon natural and material to imagine knowledge (trees, plant roots, bird flight, plastic) the abstractions rarely consider imagination itself, or the environment itself, with agency in the production of knowledge. In contrast, Australian Indigenous knowledge is considered as embedded in the land, as the land. Cultural and environmental knowledge is communicated as shared through stories that produce imagery and metaphorical associations. In the narrative research account, *Treading Lightly* (Sveiby & Scuthorpe, 2006) a Professor of Knowledge Management, Sveiby, interviewed and learned from Australian Indigenous Nhunggabarra artist and educator, Scuthorpe. In their dialogue Sveiby asked:

Sveiby:    “What is the word for knowledge in your Aboriginal language?”

Scuthorpe: “We don’t have a word for it. Our land is our knowledge, we walk on the knowledge, we dwell in the knowledge, we live in our thesaurus, we walk in our bible everyday of our lives. Everything is knowledge. We don’t need a word for knowledge, I guess”. (Sveiby & Scuthorpe, 2006, p. xv)

This perspective re-imagines environmental knowledge wherein the environment is constitutive of knowledge rather than a branch of it. As discussed, a worldview that reconfigures knowledge as having *always* been about the earth has been argued as
critical to environmental education (Davison, 2008; Orr, 1991; Smyth, 2006; Whitehouse, 2011). The problems of learning ‘about’ a separated environment cause epistemological divisions that have ontological implications. Where knowledge and nature are divided the world is dislocated from oneself.

**Imagining the environment**

Imagination, environment and knowledge are entangled in this thesis. In the previous section, I have suggested that knowledge is imagined through environmental metaphors yet is often considered separate from the environment itself. Through discussion of metaphors and knowledge imaginaries, new images emerge wherein knowledge and nature are interconnected. In this section, I examine the ways in which the environment is imagined, particularly in Australia.

**Imagining nature**

The Australian environment is imagined diversely and powerfully. Representations of nature through legal titles, theatre and film, visual art and poetry, embody imaginaries of homeland, property, real estate, country, ‘down under’, and investment that all involve a constructed relationship between self and world. Rather than assuming that imagining means pretending or conjuring up that which is unreal or untrue, the significance of imagining here refers to the creativity of truth, the construction of vision, and the relative ways of seeing the world that have legal, historical, cultural and environmental implications.

In Australia, relations between place, identity, culture and tradition are entwined in ways that reflect human nature, cultural psyche and spirit as much as external appearances (Malouf, 1998). In Australian narratives, the landscape is a setting and also a character, often portrayed as hostile, unforgiving, and quintessentially hot and dry. In theatre and film the environment is often an adversary bringing fire, flood and drought or great waterless distances to be conquered. The myth of the bush as the ‘real Australia’ arises in paintings, photography and fiction; celebrating the distinguishable uniqueness of Australian light, gum trees, grasslands and bush-life.
In the next section, I continue to examine how the environment is imagined. I read artworks as representations and as metaphors for ways of representing nature and environmental knowledge. I discuss the problems of representation in an environmental philosophical context, and how this affects Education for Sustainability.

**The problem of representing a fixed world**

To approach problems that this research project attempts to address, I draw upon the western tradition of landscape painting as a particular cultural way of representing ‘the environment’. This can be read as a metaphor for ways of representing environmental knowledge. Traditional representations of nature in landscape paintings emphasise visible surroundings yet are blind to the inclusiveness of self and culture and reproduce a “language of binary thinking” (Whitehouse, 2011). Just as a map is not the territory that is, not a representation of materiality but of the map-maker’s perspective, landscape paintings can be seen to represent the perspective of the artist more than true materiality. In the matter of landscape, the process of representation sets up a binary extrapolation of self and other, wherein the world is outside self. However, this important dynamic is rarely included in the representation.

Magritte’s (1933) exposition, *La Condition Humaine*, (Figure 4.1) is a Modernist interrogation of conventional representations of nature in the European tradition of landscape. His 1933 canvas utilised a conventional composition to depict a window frame through which the outside environment can be seen. The centre painting on an easel within the painting is positioned to mask the landscape that he is trying to see, in a way that suggests what is being represented is not the ‘real world’ but the inevitability of the layers of perception; that something of truth and reality is both lost and multiplied in the moment of representation.
Magritte’s visual critique of an ineffable ‘Human Condition’ (Figure 4.1) problematizes the inconsistencies in representing reality and highlights the relative and imagined in ways of seeing. His visual practice communicated how “perception always intercedes between reality and ourselves” (as cited in Barry, 1997, pp. 15-16). Magritte articulated the corollary of representation: “...we see it outside ourselves even though it is only a mental representation of what we experience on the inside” (as cited in Schama, 1996, p. 12). Magritte’s recognition of a dynamic between the inside self and the outside world asserted an implicit, yet inconsistent, reciprocity between artist and artwork, self and world, human and environment inherent in traditional western representations of nature. I draw upon this artwork to argue that conventions of representation involve inconsistencies that can be examined or overlooked, but nevertheless are operative in orienting ways of seeing and being in relation with the world.
Illusion of truth

The western tradition of landscape painting is a production of a way of seeing within a cultural tradition of representation. Like representations of environmental knowledge in education, the tradition of ‘landscape’ carries the assumptions of truth-telling; with a concern for reproducing what is seen faithfully. The tradition of landscape painting produces a frame that values realistic and precise representations of an implicit event of seeing a place from a singular perspective. Sociologist and art historian, Bonyhady wrote *The Colonial Earth* (2000) in which he refers to the successive generations in the European landscape tradition who have claimed to “get the country right” (p. 82). His criticism of traditional Eurocentric dedications to exactitude and correctness concludes that, in time, the ‘telling voice’ comes to represent an un-truth, or at least not the whole truth. This concern for correctness also corresponds with ideals of knowledge and learning. The traditions that carry expectations of correctness do not necessarily correspond with truth or embodied understandings of materiality, but can become enforceable.

The claim that landscape reveals the truth about nature is an assumption of representation that requires examination. Figure 4.2 is an example of how the Australian landscape paintings of south-western Victoria by German painter, Von Guérard (1811-1901) appear like a European countryside. In a recent exhibition honouring the work of this early settler artist, the title *Eugene Von Guérard: True Nature Revealed* (Varcoe-Cocks, 2011) seemed to value ‘revealing the truth about nature’ as the painter’s heroic ambition even as his sensibility retained a contentious European vision. This painting (Figure 4.2) is one of many early Australian landscape paintings that show how representing that which is evidently visible is constrained by that which is already known, seen, practiced and understood. Representations of environmental knowledge are also influenced by worldviews that are practiced and certain about what is already known.
The painting (Figure 4.2) shows Von Guérard’s perspective but does not portray Aboriginal people, the colours, or vegetation of Tower Hill accurately (Gammage, 2011, pp. 39-47). The trees, for example, look European and Indigenous people are painted faceless, black and without clothes. Due to the historical unlikelihood that Aboriginal people in Victoria would have been living without clothes in 1855, the depiction of Indigenous people in this painting, like many colonial paintings, is of the ‘noble savage’. However, the guise of representation carries assumptions of telling the truth about materiality. Titles such as *Lying about the Landscape* (Levitus, 1997) and *Uncertain Ground* (Thomas, 1999) exemplify a critical eye that has come to mistrust the authoritative assumptions of representing the truth about nature. They encourage seeing landscape as relative, as a loss of truth, and as pictures that may conceal as much as they reveal.

As a cultural theorist, Mitchell (1994) argues that representations of landscape are cultural interpretations of nature and instead of portraying nature, they showcase how nature is imagined, like a “social hieroglyph; an emblem of social relations it conceals” (p. 15). For Magritte, that which is concealed is the ‘imaginary’ of the observer. In landscape painting in Australia, the embedded, ancient, already-known,
painted, mapped and sung environmental knowledge of Indigenous Australians are missing, unseen and neglected (Rose, 1996, p. 18; Whitehouse, 2011, p. 299) in traditional landscape representations. In mainstream representations of environmental knowledge in EfS, the self, the imagined and Indigenous Australian people and knowledges are also neglected. The constraints of conventions of representation highlight the limits to knowing through representations.

Analysing these examples shows how representations of the environment embody epistemological assumptions regarding truth and nature. These assumptions can work as contradictions that constrain understanding the fullness of materiality. Encumbered by the problems of representation, these discussions need to inform ways of representing ‘the environment’ and environmental knowledge in EfS. This problem of landscape painting concerned with appearances is a shared problem of research methodology and representations of student learning where moments of knowing can be lost in attempts to represent them objectively. Critical connoisseurship (Eisner, 1976, 1998) rather than ambivalence (Davison, 2008) may be an important task for contemporary educational praxis concerned with environmental realities.

A problem of separating human from nature

The problem in representing a fixed world involves epistemological assumptions of truth and materiality, and these representations have ontological implications that separate the self from the world. These separations are imagined, and result from the conceptual work of thinking in fixed, expected ways. Cultural historian and ecological humanist, Weir (2008) describes: “The conceptual habit of analytically removing humans from their environment is part of the nature/culture dualism – a way of thinking that hyper-separates people from the environment” (p. 154). Binary worldviews are those which conceptually separate nature and culture, or human concerns from environmental ones. In his critique of Modernism, Latour (2007) described how binaries are distinctions that have become polarised; they result from seeking definition by distinguishing between two fixed things.
The contrast between the human and natural, for example, whilst co-constitutive, is “transformed into an insurmountable tension that cannot be resolved” (Latour, 2007, p. 58). This separation also detaches the consequences of environmental problems from the self and from human concerns (Plumwood, 1993; Weir, 2008). As influenced by Latour, Weir (2008) described dualism in an Australian environmental context as a conceptual framework that involves metaphorical processes.

In dualism two fundamental concepts exist in opposition to each other, forming binary pairs...The problem is not that they are identified but that they are hyper-extended into oppositional relationships. If humans are rational, then nature is mindless; if humans are active, then nature is passive... The result is a highly flawed perspective that both increases human power to transform nature and limits human capacity to respond to ecological devastation (pp. 153-154).

Weir (2008) draws from Australian eco-feminist and environmental philosopher, Plumwood (1993, 1999, 2002a, 2002b) who asserts that an essential cause of the environmental crisis are these concepts that consider human selves separate, distinct and removable from nature. The critical resistance of anthropocentric imaginaries perceives the “conceptual habits” (Rose, 1996), “intellectual frameworks” (Weir, 2009) and “conceptual reduction” in thinking (Plumwood, 1993) as responsible for this polarised separation of humans from nature. They argue that these conceptual frameworks give rise to objective, representational thinking that has been causal in the development of environmental problems. The limits of dualistic worldviews involve indifference toward over-consumption and a detached disregard for seemingly dislocated impacts on others.
False ontologies

The false concept of human independence and autonomy is theorised as a consequence of a hyper-reduction of nature. Plumwood (1993) analysed how the conceptual reduction of nature constructs oppositional ways of understanding:

We hyper-separate ourselves from nature and reduce it conceptually in order to justify domination, we not only lose the ability to empathise and to see the non-human sphere in ethical terms, but also get a false sense of our own character and location that includes an illusory sense of autonomy. (p. 9)

The disorienting ontological consequences that anthropocentric concepts and thinking cause are referred to as a central part of Plumwood’s (1993) criticisms. Here, social and environmental justice involves ontology. Her resistance to anthropocentric perspectives advocates being able to see and empathise with the other-than-human as a part of environmental knowledge. In the quote above, Plumwood emphasises that this loss of ‘ability to empathise and to see’, results in ontological uncertainties and a disorienting ‘false sense’ of the ‘location’ of self in relationship with the world. For EfS, knowledge concepts need to be seen to carry ontological implications because representing the environment can reproduce worldviews that affect students’ relationship with the world. The critical difference between relating to the world as an external, surrounding place or as a part of one’s sense of self was articulated by influential environmental critic, Wendell Berry: “Once we see our place, our part of the world as surrounding us, we have already made a profound division between it and ourselves” (1977, p. 22). Environmental philosophy and criticism assert that environmental knowledge affects one’s being, and this can be orienting and located, or disorienting and dislocated. The critical issue of being in environmental knowledge provides a philosophical basis for re-imagining environmental knowledge as an onto-epistemology.
The ontological affects of environmental knowledge

The affect of environmental knowledge on being, as belonging or in dislocation, speaks to the ontological implications of environmental knowledge. In Aboriginal Australian epistemologies, the embedded relations between knowledge and environment are communicated through stories and visual artworks. These powerful texts of Indigenous knowledge operate metaphorically (Sveiby & Scuthorpe, 2006; Ryan, 1998) and are assertions of ownership and belonging (Morphy, 1991; Morphy & Smith, 1999). Australian anthropologist, W.E.H Stanner (1969) infused the undervalued Aboriginal cultural tradition of ‘The Dreaming’, with the significance of deep belonging in his lectures called, *After the Dreaming*. The impact of Stanner’s insights has been used countlessly to evoke the intricate ways in which the Australian environment was/is known, imagined and connected to self for Aboriginal Australians. Australian historian, Gammage’s (2011) seminal work describes how places of belonging were managed with sacred responsibility, just as one would look after oneself; “Country was not property. If anything it owned [the people]” (Gammage, 2011, p. 142). The significance of this in this context is that Aboriginal environmental knowledge is entwined with ontology and is related to a deep sense of belonging.

The evocations of ‘The Dreaming’ in Australia involve awareness that places, knowledges, histories and ontologies are entangled. Stanner (1969) critiqued the limits of his own whiteness, and acknowledged the inadequacies of translations that do not express the extent and breadth of the connection Aboriginal people felt and enacted with land. His ideas about the inadequacies of English and the impossibility of expressing Aboriginal ontological concepts was later published in the book of his essays, *White Man Got No Dreaming* (1979). This implicit conclusion, that white Australians have no Dreaming, points towards the loss of knowledge, absence of belonging, and lack of imagination that encumbers white Australia. The idea of belonging emerges as an ontologically concerned environmental knowledge that is intangibly lost and missing for white Australians.

---

2 The Boyer Lectures began in 1959 produced by the Australian Broadcasting Commission (ABC), now the Australian Broadcasting Corporation, and played on ABC Radio National. The Boyer Lectures continue annually and were named after Sir Richard Boyer, late chairman of the ABC.
**Ontological and environmental dispossession**

In his paper *The Great Silent Apartheid*, Indigenous scholar Mark Rose (2007) drew parallels between how Aboriginal people may have been dispossessed of land through colonisation with how white Australians, more intangibly, are dispossessed of knowledge. He positions both as devastating ruptures in belonging that involve the loss of relating to, knowing and imagining country. Mark Rose’s (2007) work re-imagines the multiple dimensions of dispossession in Australia. This ‘white’ loss of knowledge is not scientific knowledge, but could be compared to a blindness of anthropocentrism. Australian environmental philosopher, Deborah Bird Rose (1996) warns of this blind imaginary: “The egocentric view of landscape wherein one sees oneself or one sees nothing at all, constitutes a kind of blindness; it closes off the evidence of what is really there” (p.18). The unresolved contrasts in worldviews co-existing within Australia are not simply different cultural mythologies or land management practices, but ontological and epistemological foundations that structure and orient knowledge and environment in relation to self. Environmental education and its research is also constrained by the unresolved histories that involved ontological as well as environmental dispossession.
The unresolved problem of colonisation

In this section, I continue to investigate the entanglements of imagination, environment and knowledge for this thesis. I discuss how the cultural geographies of the Australian environment carry both Indigenous and Western worldviews. I explore how non-dualistic, imaginative, cartographic representations of nature and environmental knowledge are produced by Aboriginal Australian artists and land owners. I highlight the unresolved exchange of colonisation in Australia and how this continues to affect environmental education research and practice.

A colonial worldview

A colonial worldview sees only that which is expected, familiar and known, is not open to newness, and disregards ‘other’ ways of knowing (Benterrak, Muecke & Roe, 1984; Muecke, 2004, 2006). Cultural theorist, Kaplan, (1997) describes a colonial worldview as an “imperial gaze” (p. xii). In an Australian context, the underlying assumption of the ‘imperial gaze’ is that if European culture cannot be ‘seen’ in a place the landscape must be ‘unknown’ (Mueke, 2004). The act of colonisation reflects a colonial worldview of settler culture, that saw Aboriginal people as unfamiliar and determined their homeland uninhabited and unknown.

The ghost of terra nullius

A central aspect of colonisation that has produced imperialist ways of seeing the culture and environments of Australia refers principally to the labelling of Australia as *terra nullius* in 1788 by the colonial frontier of settler culture. The title *terra nullius* is a legal term used to determine a territory uninhabited and therefore deemed free to be colonised. The Latin term *terra nullius* is translated as empty land/no man’s land or unknown land. To the colonisers of Australia, the land was not seen as inhabited, known and cherished (Rose, 1996, p. 18), instead Australia was seen as unknown land, unfamiliar and empty. The falsity of this determination has affected Australian Indigenous people, languages and cultures profoundly.
The blindness, or deceit, of determining *terra nullius* epitomises the terrifying power of imposing a worldview on another that can re-imagine the environment. *Terra nullius* has been described as “a legal fiction” (Whitehouse, 2011, p. 299); a national imaginary existent from 1788 until 1992 (when over-turned)\(^3\) that fundamentally ignored belonging, insulted cultural knowledge and “renders Aboriginal people invisible as agents in the landscape” (Whitehouse, 2011, p. 299). Just as Indigenous history and culture is embedded in the land, this colonial history is embedded in the idea of ‘the environment’ and the problematic efforts to ‘save it’. This ghost of *terra nullius* highlights how representations of the environment carry worldviews that are imagined and that can be different from what is true and real.

*Proving traditional environmental knowledge*

Because of *terra nullius*, Australian Aboriginal people have had to prove their knowledge of country in order to be granted its ownership. Willing to acquiesce to this misnomer, in 1997 senior traditional owners of the Great Sandy Desert in Western Australia came together to decide how they would prove their traditional knowledge and ownership of country. Aboriginal Elder, Ngarralja Tommy May (as cited in Behrendt, 2008, para. 8) described:

> ...we were wondering how to tell the court about our country. I said then if Kartiya (whitefellas) can’t believe our word, they can look at our painting. It all says the same thing. We got this idea of using our paintings in court as evidence.

---

\(^3\) In 1992 the Australian High Court overturned the 1788 determination of Australia as *terra nullius*. This overturning is referred to as the ‘Mabo Judgement’ because the recognition of Indigenous Sovereignty was needed to replace *terra nullius*. The Mabo case recognised Eddie Mabo’s traditional ownership of his and his people’s country. This was the first time that Aboriginal Australians were legally acknowledged as not only inhabitants but owners of territory and this formed the significant foreground for the national Apology in February 2008. Because the determination *terra nullius* was a description of the Australian continent and used as a legal explanation for British settlement, the term *terra nullius* refers to physical emptiness, unoccupied territory and an absence of civilised society. A practice of *terra nullius* had been used around the world as premise and permission for land claims and colonisation. Therefore, the overturning of *terra nullius* in Australia through the Mabo decision in 1992 represents an acknowledgement of Aboriginal sovereignty, traditional knowledge and culture, Indigenous ownership and belonging. However Aboriginal people continue to have to legally prove their ownership of country to legally regain ‘Native Title’.
The collaboration between more than 60 artists came together for the creation of the 10 x 8 meter large *Ngurrara* canvas, meaning ‘home’ (Figure 4.3). *Ngurrara* was submitted as sole evidence in the National Native Title Tribunal claim in 1997 as a visual and narrative map of the artist’s knowledge of country. In response to the painted evidence of knowledge, belonging and ownership, the judge, Justice Gilmore (as cited in Behrendt, 2008, para. 13) ruled: “the Court determines that native title already exists...The law says to all the people in Australia that this is your land and that it has always been your land”.

In 1997, Ngurrara canvas legally inscribed traditional knowledge of 76,000 km\(^2\) of embedded culture, history and country (Behrendt, 2008, para.12). I argue that this is essential learning for environmental educators in Australia because it demonstrates the embodied traces of culture in landscape and celebrates the richness of the collaborative imagination to express what has been unseen, marginalised and neglected. This research recognises that Indigenous Australian cultural knowledges are embedded in the Australian environment whether this is seen or rendered invisible. The visual, narrative mapping methodology of communicating knowledge represents new ways of seeing and representing the entanglements of knowledge, imagination and environment.

Just like visual representations of the environment, the knowledge systems of EfS carry worldviews that can limit understandings of environmental knowledge and deny its ontological impacts. I argue that the work of EfS requires critical examination and resistance to the discourses of representation, that assume the world is fixed and separate rather than imagined and connective. Researching imagination in this context has become entangled with what is required for education; the need to find ways of revising out-dated epistemological frameworks and move towards effective and non-contradictory EfS in Australia.

Critically, the problems inherent in representation involve assumptions about truth and materiality. As conventional representation objectifies the external world as separate from the self, this also binds the world to the real and the imagined to the unreal in ways that also have epistemological and ontological implications for understanding sustainability. This forms critical methodological considerations, as this research requires non-representational forms to express new knowledge. This chapter continues to form a philosophical foundation for critiquing limited, ‘old’ material representations of environmental knowledge in EfS. I now discuss the need for new ways of seeing materiality and representing knowledge to educate for sustainability.
**The need for re-vision**

Education for Sustainability is particularly encumbered by the problems of representation and separation that knowledge concepts carry and construct because the frame of EfS causes the relations between knowledge and nature to be re/negotiated. Education for Sustainability is a critical confluence of knowledge (education) and environment (sustainability). This seems to highlight the inconsistencies and contradictions caused by conceptual habits that distinguish between, rather than connect, environment and epistemology. For EfS, it is not only a profound separation between human and nature embedded in epistemological frameworks but a separation of knowledge itself from nature.

In the previous section I discussed the problems of representation and separation. In this section I suggest how this impacts Education for Sustainability. I then introduce the New Materialisms as a philosophical suggestion, and speak to onto-ecological ideas of ‘Connectivity’ (Weir, 2008) as philosophies that aim to revise how nature and knowledge are seen and imagined. I take up onto-epistemological positions as theoretical frameworks and methodological considerations in the next chapter, but I discuss the philosophies of the ideas here.

*The impacts on Education for Sustainability*

The Modernist legacy of Cartesian dualism and the binaries enacted by objectifying the world ‘out there’ and the intelligent self ‘in here’ seems to be a constituent interface that is unresolved in education despite the theoretical influence of post-structuralism and post-modernity. Ways of seeing that separate and compartmentalise have been referred to as the “Modern Condition” (Latour, 1993) and critiqued as responsible for a “hyper-separation” (Plumwood, 1993; Weir, 2008) of knowledge from nature, a “violent disconnection” (Abrams, 1997) of the self from the world and the body from intelligence. The pedagogical implications of working within such an objectified imaginary elicit transmissive pedagogies and content-based curriculum concepts (Doll & Gough, 2002) as learning is imagined as a transferral between binaries (world to self).
The ambiguity and dislocations embedded in AEE discourse are widely critiqued yet unresolved. From his Deleuzian work de-constructing ‘white’ versions of Australian ‘landscapes’, Muecke (2006) was adamant that institutions, like education, “insist on this separation between Culture, where people live, and Nature, which is there for people to use, visit and exploit” (p. 1). He argued (2004, 2006) that so long as the environment represents an external world separate from self/learner/knower, the problem of representation (Deleuze, 1968) is enacted in a way that polarises the self in separated relation to an external world.

**The need for Connectivity**

Australian ecological humanist, Weir (2008) argues for the need to investigate how our conceptual frameworks make our crucial dependency on nature invisible. In the context of her work with Indigenous Australians about the management of the Murray River4 (Weir, 2009a), Weir asserts that the ‘extraction’, ‘production’ and ‘management’ of water as a ‘resource’ has only been made available by “mobilising knowledge frameworks that narrowly perceive” the purpose of clean water as for human consumption (Weir, 2008, p. 153). She asserts that the conceptual dualism set up between human and other-than-human is the basis of representing and therefore managing water as a ‘resource’. Here, anthropocentric representations in language (‘resource’) elicit consequential relations (‘management’). Her reference to a ‘narrow’ perspective infers that the problem is a limited view, a contracted way of seeing, wherein that which is not human becomes the ‘other’, and that which is unseen becomes concealed or rendered invisible. For example, Weir examines how the origins of the water, its meaning, the impacts of poor water quality and drought on ‘others’ occurs silently/invisibly and as peripheral to central rationalised concerns of ‘resource management’ (Weir, 2008, 2009a). She argues that relating to water as a ‘resource’ represents a world view that detaches water from self/human, which is not only inaccurate but has both environmental and ontological implications. Weir calls for the need for profound change in intellectual traditions (2008) to effect

---

4 The Murray River is Australia’s longest river. Geographically, the river divides the states of Victoria and New South Wales, and then crosses through South Australia into the southern ocean. Its management has involved conflict as the river represents diverse ecologies, livelihoods, agricultural irrigation, cultural mythology, and crosses over vast territories.
sustainable water management. This also extends to Education for Sustainability in Australia. Australian environmental education researcher, Whitehouse (2011) contends that Australian environmental education and research is “still largely imagined within colonial framings” (p. 296) evidenced by language that is anthropocentric and “technocratic” (p. 296). The prevalent discourse of ‘resource management’ pervades EfS and can be seen as a knowledge framework that influences ways of thinking about ‘the environment’ and constructions of environmental knowledge. An example of this can be seen in the state funded ‘Resource Smart Schools Program’ (Sustainability Victoria, 2011, p. 64) in Victoria, Australia. The program aims to encourage schools to manage and conserve ‘Resources’ that are named separately as ‘Energy’, ‘Water’, ‘Waste’ and ‘Biodiversity’. These classifications compartmentalise nature. The objectification of environment as ‘Resources’ further imposes an anthropocentric view upon the objectives of sustainability and into the discourses of EfS. The environment is objectified and rendered without agency through this language of representation. In this context, becoming sustainable means becoming ‘Smart’ with managing its ‘Resources’. The conceptual frameworks that regard sustainability-as-managing-resources position schools and their populations as simply consumers of water and energy and producers of waste. This acts to displace the relationship between humanity and nature, students and world, individually and collectively, and is a denial of our dependency on natural systems for wellbeing as well as survival.

These worldviews need re-vision. Weir (2008) argues that resolving the environmental crisis and developing incorporative ways of seeing involves “imagining an expanded ecology” (pp. 153-154) where ontology and epistemology co-exist in environmental understandings. Weir (2008) constructs a conceptual framework called Connectivity that describes ecological inter-dependence as well as cultural and natural co-dependence. Connectivity signifies the constitutively entwined environmental, ontological and epistemological understandings of Indigenous Australians in the Murray River region. As influenced by Latour (1993, 2004) and Plumwood (1993), Weir’s Connectivity extends ecological understandings of inter-dependence into an ontologically affective environmental epistemology. She describes Connectivity as “a way of being in the world as described to me by
Traditional owners” (p. 153). Through *connectivity*, environmental knowledge becomes approachable as a confluence of environmental, ontological and epistemological knowledge, the understanding of which results in a way of seeing and experiencing oneself in the world.

**The philosophies of the New Materialisms**

The New Materialisms are a contemporary gathering of Twenty First Century cultural philosophies that critique the dualisms of post-modernism and undertake revising ‘post’ theories by re-thinking, re-opening, and re-reading. Post theories can be defined as responding to the limits of modernism and structuralism with interests in re-theorising philosophies with new ground. Simms and Potts (2012) position The New Materialism as interested in addressing and revising *How our relationship with the material world can change for the better* (2012). According to De Landa (2006), New Materialism is a cultural theory that is a convergence of critical realism and social constructivism. Dolphijn and Van der Tuin (2012) write that it is both of the sciences and humanities and essentially feminist. This extends to ‘(re)assembling, (re)casting & (re)aligning’ in qualitative educational research (Jones, Osgood, Urban, Holmes & MacLure, 2013). I emphasise the break that the New Materialisms signify; responding to the continuing need for new-ness and revision.

New Materialist philosophers (Alaimo, 2010; Barad, 2007) discuss moving away from identifying separate entities as having categorical borders, through skin, identities or titles, and towards seeing the entanglements of emerging and ongoing interdependent processes to do with beings that collaborate in their coexistence. This is not only an epistemological position that resonates with environmental concerns. I see the inextricable entanglements of environment, ontology and epistemology, that make my writing co-involve environmental re-visioning and epistemological work as dependant on each other.

Eco/feminist and New Materialist positions on nature (Alaimo, 2008, 2010; Grosz, 2005; Haraway, 2008; Oppermann, 2013; St Pierre, 2013) argue that the self and the world are in a discursive relationship that is constantly emerging, expanding and
contracting through inter-textual discourses. This recognises agency and being in the natural environment so that environment and knowledge are entangled. This coexistence of all human and non-human bodies is critical to integrated understandings of sustainability and to New Materialist ideas of knowing and being.

The distributed agency given to all things in New Materialist worldviews involves re-vised perspectives on nature, being and object-hood that require new ways of thinking/seeing. A New Materialist and eco-centric worldview requires ways of seeing the often disguised actuality that all things/beings co-exist and come from/are nature. New Materialist, St Pierre (2013) asserts, “The new materialisms...contest the notion of nature as merely the inert scenery against which the humanist adventures of culture are played out” (St Pierre 2013). She asserts that examining how ‘we think of nature’ is deeply involved in revising materiality:

As long as we think the nature of being as subject/object, materiality does not matter, and we live in the world accordingly. Deeply embedded in the new ontology are ethical concerns that acknowledge the destruction of the world humanism ... with their man/nature, human/nonhuman binaries. (St Pierre, 2013, p. 655)

This re-positions Education for Sustainability as not a matter of controlling or gaining authority over a body (of knowledge), or of managing resources, but a matter of seeing and witnessing the interplay of knowledge.

As well as appreciating the destruction of the environment in New Materialist ethics, Barad describes the world from a New Materialist position, that echoes Australian Indigenous onto-epistemological understandings as communicated by Rose (1996), Rose (2007) and Weir (2008, 2009a, 2009b). A New Materialist worldview appreciates shared, discursive and indefinite multiple agency. Whilst not ‘environmental’ this renders an expanded environmental position. Barad (2003) describes a non-dualistic ecological understanding as that which recognises that things also be and communicate through the material languages of their being.
In this view agency is not granted but emerges from the co-mingled dynamics of all life:

…the universe is agential intra-activity in its becoming. The primary ontological units are not “things” but phenomena—dynamic topological reconfigurings/entanglements/relationalities/(re)articulations. And the primary semantic units are not “words” but material-discursive practices through which boundaries are constituted. This dynamism is agency. Agency is not an attribute but the ongoing reconfigurings of the world. (p. 818)

To encounter this philosophical prospect, new ways of thinking (St Pierre, 2013, p. 655) and seeing are required so that these philosophies can be lived and experienced. This requires re-imagining materiality and re-vising understandings of being, agency and matter as well as how space, nature and knowledge are imagined co-constitutively.

As I continue to formulate the worldview and epistemological position of my research, I engage with new ways of seeing, encountering and mapping materiality to philosophise and orient imagination in re-reading objects, matter and material entanglements. I explore how imagination works to orient and re-orient the self in relationship with materiality, environmental knowledge and concepts of sustainability. This underpins the philosophical and theoretical contexts of my fourth and fifth research questions.
CHAPTER FOUR

Ways of seeing

My fourth research question asks: How does imagination develop worldviews or revise ways of seeing the world? In this section I draw from the literature and philosophies of education, environment and epistemology that suggest the need for new, re-vised ways of seeing for education. I discuss these attributes of ways of seeing that are needed to produce lived experiences of a New Materiality, and a sustainable worldview. I examine how imagination is involved in embodied, artful and ‘eco-globalist’ ways of seeing.

Imagining a cloud in a piece of paper

Peace activist, author and poet, Nhat Hanh (2002) valued ways of seeing that re-imagine being. For Hanh, the seeing-being is artful, imaginative, environmental and interested in that which is embodied, Hahn describes seeing in ways that makes the embodied life of matter visible:

If you are a poet, you will see clearly that there is a cloud floating in this sheet of paper. Without a cloud, there will be no rain; without rain, the trees cannot grow: and without trees, we cannot make paper. The cloud is essential for the paper to exist. If the cloud is not here, the sheet of paper cannot be here either. So we can say that the cloud and the paper inter-are... we know that the sunshine is also in this sheet of paper. The paper and the sunshine inter-are. And if we continue to look we can see the logger ... we know that the logger cannot exist without his daily bread, and therefore the wheat that became his bread is also in this sheet of paper. And the logger's father and mother are in it too...as thin as this sheet of paper is, it contains everything in the universe in it. (Hanh as cited in Kennedy, 2007 p. 135)

Perceiving the co-constitutive influences of being and matter as ‘in’ it, occurs as a way of seeing that is imaginative, sustainable and New Materialist. The nature of being is involved with being able to ‘see a cloud in a piece of paper’, or a rainforest in a paper cup, or a thunderstorm in a glass of water. For Hanh (2002), the aesthetic
appreciation of the material vivifies meaning, and the inclusive, multi-dimensional inter-connection that coexists in/as the object, that can remain un-recognised and unseen. With a New Materialist influence I argue that Education for Sustainability is deeply involved in re-vising the complicit frameworks that structure superficial, one-dimensional representations of objects and matter. These revisions occur as necessary when moving from an idea of progress to an idea of sustainability.

Imagining the being-ness of things and their becoming emerges as environmental knowledge. An ontological interest in EfS might consider how being is changed by ways of seeing. For example, environmental philosopher, Matthews (1991) asked how more ecological views work to change the ways we understand ourselves. Weir’s (2008) mentorship by Indigenous Australians in an environmental context produced her conceptual framework of Connectivity, as informed by Latour (2007) and Plumwood (1993), that re-conceptualises environmental knowledge as ‘a way of being’. Environmental education scholar, Whitehouse (2011) writes, “The difference is ontological” (p. 294) and requires “ontological interrogation” (p. 297) of EfS discourses. She also asserts the need for environmental education research to include an “ontological interrogation” (p. 297) of discourse as a part of critical research. I align this with a New Materialist resurgence and interest in the ontological implications of ways of seeing and experiencing materiality.

Connoisseurship: re-educating perception

In Bennet’s Vibrant Matter: A political ecology of things (2012) she describes material eco-criticism as a practice that “brings imaginative attention towards material vitality” (p. 19). This suggests that perceiving these layers of material agency and being involve imaginative attention. Australian author Malouf (1998) also spoke of a particular attentiveness required in ways of seeing the world meaningfully: “first of all increasing of our awareness of what is around us…Then of taking all that sensory experience into our consciousness and giving it a second life there, so we possess the world we inhabit imaginatively as well as in fact (Malouf, 1998, n.p). These attentive recommendations for seeing and encountering resonate with influential educator and scholar, Eisner’s (1985, 1998) concept of
‘connoisseurship’. Connoisseurship refers to ways of appreciating that involves critical and poetic ways of seeing the world as an artist. Eisner applied this concept to teaching and learning and described the collaboration of connoisseurship and criticism in the interests of education. For Eisner (1985) the critical interests of connoisseurship are interested in “re-educating perception” (p. 92). The word connoisseurship derives from the Latin cognoscere, meaning to know (Eisner, 1998, p. 6). Connoisseurship involves the ability to see, not simply to look at, the inter/intra-relational dimensions of materiality and experience. Barad (2007) calls this ‘material discursivity’. The relations between educational interests in ways of seeing, and the perception involved in encountering a new materiality emerge. Imagination is involved in taking in the world and perceiving its hidden life.

**Expanding ways of seeing into the global**

Buell (1995) formulated the inter-intra relations between imagination and the environment in *The Environmental Imagination*. From this he recognised that ways of seeing ‘the environment’ can be expanded, and that this is necessary. He named our ability to shift the expanse of our awareness to enable bigger perspectives as an ‘eco-globalist affect’ that “entails a widening of the customary aperture of vision” and “is as unsettling as it is epiphanic in a positive sense” (2007, p. 234). This conceptual ‘aperture’ imagines an expansion and contraction of focus and awareness. As worldview refers to ways of seeing the world, the emphasis is not on a truth of ‘the world’ reality but on conceptual capabilities that perceive and construct it. Imagination is that which we use to conjure the distant worlds of fictional realities conjured by stories as well as that which enables ‘vicarious ways of knowing’ (Fitzgerald, 2000) by putting oneself in the shoes of another who’s experience we have never shared (Rowling, 2008).

Buell’s eco-globalist affect also involves “realisations of responsibility of the present and personal on other lives and places” (p. 234). This incorporation of the ‘other’ in seeing suggests that seeing becomes collapsed with awareness and understanding. This resonates with economist, Rifkin (2010) who suggested that empathy can be extended to the entire biosphere as a part of re-thinking ‘the human narrative’ and re-
orienting our world views. In a similar way, artist and educator, Julia Cameron (2004) also suggested that imaginations can be stretched and developed, but it’s not easy: “It takes practice to expand our imagination and inhabit a larger life” (p.16). Imagination is involved in expanding ways of seeing the world.

It seems necessary to re-imagine space in order to expand our understandings of it. Hegglund (2012) addressed worldviews as ‘meta-geographies’ in a narrative, reflexive sense. ‘Meta-geographies’ refer to large scale ways of seeing and understanding global places as well as the perspectives that encompass holistic, contextual, big picture views. For Massey (1994), a ‘global sense of place’ is determined by a local sense of space, where the particulars of here and now are understood as a pivot point of intersection with global perspectives (pp. 244-261). Connery (2001) asserts that a conceptual ability to conceive of ‘global-space’ is a political issue because the way we imagine can be dominated by the hegemony of Western geographic thought that marginalises ‘other’ histories of lands. Connery’s (2001) inter-textual analysis of ‘global-space’ concepts, highlights the flippant, secular cliche of ‘thinking globally’ and concludes that the global is a “still inchoate imaginary” (p. 174). Images of earth from space have been widely critiqued as responsible for the way global spaces are imagined. Connery (2001) described how these have enabled humanity to imagine the earth as a globe as well as disabled a truer, connective imaginary. But he rendered the images insufficient to enable a truly global imagination that is only “inadequately available as an object of representation” (p. 174). Imagination is involved in the expanded awareness of global spaces and contexts, but perhaps limited by representation.

From the suggestions in the literature, imagination emerges as diversely involved in developing expanded worldviews and nuanced ways of seeing with concern for environmental awareness. To see a cloud in a piece of paper, take in the world imaginatively, expand and stretch imagination to fathom a global environment and conjure up global space concepts, all involves imagination. I have discussed some of the re-vised ways of seeing that are called for that include imagination. I now explore re-vised ways of representing environmental knowledge that can resist stubborn dichotomies, include, rather than detach self, and involve imagination.
Orienting self and world: non-representational cartographies

Maps represent spatial and visual relationships. Cartographies are orientations. The important tasks of understanding the world in education involves somehow orienting what we know in an ontological (self inclusive) relation with time and space. My fifth research question asks: In what ways is imagination involved in re/orienting the conceptual relations between self and the world? In this section I discuss these issues through contemporary cartographic philosophies and practices of mapping. New knowledge is often represented and explored through mapping; mapping the brain, mapping the genome, charting the atom, as well as mapping astronomies, topographies, city-scapes and transport. In these ways, maps express the need to spatially orient the self in the world, as well as the ambition to represent it accurately and succinctly.

Mapping has emerged in environmental education research (Judson, 2013; Sobel, 1988; Somerville & Green, 2012). An interest in cartographies as a non-dualistic alternative to conventional representation has also emerged in New Materialist approaches to knowledge and materiality (Barad, 2001; Dolphijn and Van der Tuin, 2012). Contemporary cartographic theory investigates how space is imagined and represented (Olmedo, 2013; Padron, 2004). I discuss maps as imagined cartographies in order to experiment with the possibility of mapping the imagination in environmental terms and to formulate new ways of representing environmental knowledge/knowing for my research, in ways that orient the conceptual relations between one’s self and the world.

Non-representational cartographies

According to Dolphijn and Van der Tuin (2012), cartographies are preferred over classification (p. 110). As a discursive strategy, cartographies occur as conceptual more than linguistic, and may communicate rather than limit “certain kinds of deeply held knowledge and belief” (Rose, 1996, p. 1). As Barad (2001) discussed the importance of conceptualising matter as inter-active, she discerned the need to conceptualise materiality as “ongoing material-discursive intra-action” (p. 98). To do
this, she described mapping as a practice that is non-contradictory. Dolphijn and Van der Tuin (2012) also described cartographies as “non-dualist approaches to theory formation” (p. 113) in the context of discussing New Materialist practices that can enact as well as theorise thinking newly. These perspectives theorise mapping as a practical way to avoid representational dualisms of mind/body, nature/culture, self/other.

Representing the inter-intra dimensions of environmental knowledge

As ways of handling and representing environmental knowledge, Australian Aboriginal artworks do not depend on depicting a view from a fixed place or from a single person looking out. According to Indigenous Australian art historian, Ryan (1998), Indigenous Australian art describes: “what lies within the order of things” (p. 81). This view contributes to the argument that any representation reveals more about the ‘artist’s’ way of seeing the world than any truth of reality. Aboriginal Australian art discloses ways of seeing and representing the environment that show concern for embodiment and depth rather than superficial appearances. Australian Aboriginal representations of land are described by prominent curator, Ryan (1998) as a practice that:

…reveals through symbols and metaphors an unseen power or spirit essence abstracted from the land. It is concerned to distil what lies within the order of things rather than replicate through mimesis the concrete surface or physical appearance of the natural world. (p. 81)

The powerful imaginative tools of ‘symbols and metaphor’ are used to represent country\(^5\) as more-than physical and apparent. The translation of The Ngurrara Canvas (Figure 4.3) as ‘home’ shows that the painted, narrative map of the artists’ homelands include the significance of belonging in/as the knowledge of place. Through ‘symbols and metaphors’ and visual-narrative mapping, the environment is

---

\(^5\) Country is a word used in Aboriginal discourse to resist the fictional divide between nature and culture implied by terms like ‘the environment’. Whitehouse (2011) writes: “Country is a highly sophisticated recognition and expression of (a) natureculture. No binary is made between human and nature. All country is owned” (p. 300).
communicated as an embodiment of past and future, matter and meaning, culture and humanity. The aesthetic and intellectual property of Indigenous Australian art demonstrates how knowledge and environment are communicated through imaginative rather than mimetic mediums. The visual-narrative mapping represents the inter-intra dimensions of environmental knowledge in ways that suggest that environmental knowledge and cultural knowledge are seen in non-anthropocentric ways; as deeply related to the earth rather than as human knowledge about the earth. This work also highlights differences in Aboriginal and non-Aboriginal ways of seeing and representing country within Australia.

**Representing space and materiality**

Critical cartographer, Olmedo’s (2013) study of contemporary cartographic interests and practices asserts how the conventional practice of scale that is inherent in most maps involves assumptions about materiality: “We think of space as isotropic, that is, space itself is an abstract entity that is found everywhere in the same properties” (p. 326). Isotropy describes sameness in all directions and declares uniformity no matter what orientation or direction something is seen from. The opposite is anisotropy that refers diffractively to exceptions, inequalities, and differences and is dependent on point of view. Ricardo Padron’s (2004) extensive work on mapping described traditional gridded maps as ‘isotropic’ because of their inherent assumptions that white spaces on the map are empty. This resonates with colonial worldviews that saw space as singular and homogenised. Olmedo (2013) writes: “We have long drawn maps ‘as if’ the distances in the images of the world correspond to reality” (p. 325). This refers to mapmaking, and map-reading. Recognising this calls into question the assumptions we hold about space and materiality. Maps often rely on homogenised assumptions of space through scale, and do not always recognise that space concepts are also constructions. Olmedo’s (2013) analysis of ‘mapping epistemologies’ affirms maps as ideas more than revelations; more constructions than discoveries.
Visual-narrative artworks as maps of knowledge

Morphy’s extensive work (1991, 1999) regarding the mapping qualities and meaning of traditional Indigenous Australian artworks analysed the simultaneously metaphorical and representational quality of many artworks as maps. Whilst conventional mapping represents space through isotropy, the mapped qualities of some Indigenous Australian artworks inscribe experience, culture and history onto geographies. Morphy (2000) and Morphy and Smith (1999) examined Aboriginal Australian artists as mapmakers. They named the maps/artworks as having a “double frame” (Morphy in Neale & Kleinert, 2000, p. 131) referring to that which “gives art its power to reveal the inside, linking in a single form things which on the surface appear separate” (Morphy in Neale & Kleinert, 2000, p. 131). A map that simultaneously represents ‘inside’ and ‘outside’ points of view in layers reflects an integrated worldview of the map-makers. It follows that the ways maps are made reflect worldviews and understandings of materiality. With these layered implications, Olmedo (2013) determines the idea of the map itself is not fixed, but is in perpetual social and cultural evolution” (p. 323). The contributions of Aboriginal Australian representations of land offer possibilities for dealing with environmental knowledge in EfS. This discussion shows how representations of environmental knowledge involve visual and philosophical issues that demonstrate how knowledge is imagined, and how the artists see the world.

(accepting) The problem with maps

The problem with maps concern their illusion of representation. Post-modernists worked to subvert the ‘reality’ of maps by arguing that maps do not represent the truth or the territory, but the perception and worldview of the mapmaker. Critiques of maps as representations are tied up with the invisibility of this assumption as concealed by conventional rules of scale and isotropic concepts of space. Contemporary cartographic theories are interested in re-vising ideas of space, spatial pluralities, and the qualitative dimensions of being in place. I draw upon contemporary cartographic ideas that conceive of space as living rather than inert. A contemporary cartographic use of maps involves not hiding the distortion of space
that is usually inherent in mapmaking, “but simply accepting it as a form of construction” (Olmedo, 2013, p. 325). A re-visited approach to mapping does not hide the relative perception of the mapmaker or the process of mapping. As maps become visually appreciative of their own collaborative existence, the representational problem of maps can become reflexively utilised.

Orienting self: How would we imagine time and space without a map?

In a broadcast lecture, the physicist Turok (2012) reminded his audience of the importance of maps and clocks as the implicit ways in which we orient ourselves in the world and navigate through it. This emphasised the purpose of maps as, not to represent, but to orient self in relationship with the world. The process of reading these maps requires imagination. To make this point, Turok (2012) asked his audience to conversely imagine map-less-ness:

How often have you arrived in a strange city or a neighbourhood without a map or a picture of your location? With nothing but your immediate surroundings and no mental image of their context, you are lost. Every new turn you take brings something unexpected and unpredictable... A map brings a sense of perspective. It lets you anticipate and choose where you want to go. (n.p.)

Turok (2012) identifies ‘the mental image of context’ as a conceptual coordination between the self and the map. This focuses on the constructed, imagined relationship between the maps and orienting oneself in the world. According to contemporary cartographic scholar Olemdo (2013), the work of reading maps involves transferring the map’s imaginary spaces where “everything is made flat” (p. 324) onto materiality.

Sobel’s (1988, 1993) research with children’s map-making suggested that mapmaking is a discursive practice that demonstrates the child’s experience of place more than the realities of places. He discussed the use of map-making with children
as highlighting their imagination and sense of place, as distinguished from materiality (Sobel, 1988). More recently, Canadian imaginative ecological educator, Judson (2013) asserted that maps are not only functional but are ‘good for thinking’ (para. 4). From these environmental education perspectives, mapping occurs as working with spatial understanding, highlighting how understanding involves orienting oneself in the knowledge and in relation to a range of contexts.

*Maps can forget time*

Barad (2001) asserts that reconfiguring the entangled relations between space, time and matter are essential parts of the work of the New Materialisms. Maps’ visual and spatial qualities often privilege space and omit time (Carolan, 2005). Padron’s (2004) extensive work on mapping examined other kinds of texts as maps. He identified texts as maps if they demonstrated “a crucial cartographic dimension” (p. 26). I return to Turok’s (2012) physics lecture where time and space are considered relative and connected, and draw upon his use of clocks-as-maps of time. Because clocks function to orient time in relation to self, clocks can be seen to have a ‘cartographic dimension’. Similar to Sobel’s (1988) work with children’s maps, in the context of physics Turok (2012) asked his audience again to consider how concepts of time are not absolute but dependant on experience:

> And how would you think of time without a clock? You could still use light and dark but all precision may be lost in the vagaries of the weather and the seasons. You would live far more in the present, with the past and the future becoming blurred...what happens if you traced time back into the distant past or far forward into the future? (n.p.)

These questions appreciate clocks as maps because they orient self in the world. Clocks and maps can be seen as fixed representations overly concerned with accuracy, but they can also be interpreted as ways to imagine a range of contextual space-times to orient oneself in relation to the multiple dimensions of materiality.
Conclusion

The explorations in this chapter reveal interconnected problems, unresolved issues and hidden complexities that encumber EfS with conflicting worldviews and contradictions. Articulating these issues is critical to the philosophical foundation of this research. The inconsistencies that emerge from discussing the problems of representation and separation become profound contradictions for education and research. Fixed representations of knowledge can construct worldviews wherein a person cannot imagine being a part of the Earth that they know about, or seek connection with. I have argued that the capacity to understand the complexities of sustainability is constrained by these problems that separate and displace knowledge and environment from self.

I suggest that these conflicts can be resolved through re-imagining environmental knowledge as an ontological process of orienting oneself in relationship with the world. Critically, this research requires non-representational methods of forming knowledge. Contemporary cartographic concepts bring sensitivity to the orientations of environmental knowledge. New Materialist philosophies and qualitative research methods inform new ways of seeing and imagining the material world. In the next chapter I develop these theoretical concerns into methodological considerations as I assert my research position.
CHAPTER FIVE

Theoretical re-imaginings and methodological considerations

In this chapter, I develop theoretical frameworks to re-imagine knowledge, the environment, and imagination for this research. I draw upon New Materialist perspectives to re-imagine in non-representational ways and assert the epistemological nature of imagination. I show concern for the ontological implications of imagining as a way of knowing the environment, and describe how this affects the research project.

I outline my epistemological position. My standpoint incorporates the issues encountered so far in this thesis, including the New Materialisms, the lost understandings of imagination as an onto-epistemology, and the constraining divisions and entangled relations of environmental knowledge in Australia. I have found discussing knowledge cannot really be done without discussing the environment and imagination in this context. I then take up the spatial, geographical or cartographic impulse that has emerged to discuss what ‘environment’ means for this research.

The last section of this chapter outlines ways of coming to know imagination for this research. I discuss the epistemological implications of knowing and naming imagination, and how I will recognise imagination if and when it arises with the data. Rather than subscribe to a singular, definable interpretation of imagination, I outline five ways to identify imagination in teaching and learning in the unique frame of this research from interdisciplinary perspectives. This informs the research design as these discussions inform central methodological perspectives. I now discuss the knowledge position of this research in depth.
An epistemological position: re-imagining knowledge

Developing an epistemological standpoint has been central to understanding imagination as a way of knowing and learning in EfS, as it has emerged with environmental, educational and ontological implications and affects. It is a chance to confront *un*-sustainable discourses based in intellectual frameworks that represent environmental knowledge in ways that are contradictory to the prerogatives of sustainability and EfS. To develop my position on knowledge, I draw upon broadly New Materialist positions and Indigenous Australian epistemologies that locate knowledge plurally, in multiple places, with fluid and diverse, ‘material-discursive’ (Barad, 2003) human and non-human agency. This perspective allows concepts of knowledge to be deeply related to the living materiality of the earth, and enables imagination to be apprehended as a way of knowing and understanding it. My position resists anthropocentric and representational concepts of knowledge. The aim is to come to know imagination (in EfS) in ways that will “never be reducible to either ‘side’ of that old duality that separates the material world from the words that putatively represent it” (MacLure, 2013, p. 658).

Discussing approaches to knowledge emerges in ways that also describe the conditions of existence. My position on knowledge is aligned with Barad’s (2007) central affirmation that knowing cannot fully be claimed to be a human practice: “not simply because we use nonhuman elements in our practices but because knowing is a matter of part of the world making itself intelligible to another part” (p.185). This is a resistance to anthropocentrism, not because of ideology, but because the world is not constituted by human knowing. I imagine many ‘parts of the world making themselves intelligible’ to each other in linguistic and non-linguistic ways. I position imagination as a discursive form of communication that can access and understand ‘material-discursive intra-activity’ within and between human and non-human bodies; as a way of knowing. Bennet (2010) describes how things are always “being affected” and “affecting” each other (p. 23) in an *inter-intra*-dependent relationships. This is aligned with ecological humanist, Weir’s (2008) *Connectivity* that emerged
through her work with Indigenous Australians. It also resonates with the seminal ecological philosopher and anthropologist, Gregory Bateson (1972) who determined that ‘the mind’ can no longer be seen as located inside the head: “there are lots of message pathways outside the skin, and these and the messages which they carry must be included as a part of the mental system whenever they are relevant” (p. 458). This approach to knowledge tackles the limiting constraints of separating an internal mind from external nature by incorporating entanglements. This also responds to and connects MacLure’s (2013) call for the need to imagine an expanded materiality and Weir’s (2008) call for the need to imagine an expanded ecology.

_**Epistemology includes ontology**_

My position recognises how being and knowing are entwined, which has implications for knowledge, environment and imagination. Barad (2007) uses the term ‘onto-epistemology’ because: “Practices of knowing and being are not isolable. We know because we are of the world” (p. 185). Bateson (1972) also used the term ‘onto-epistemology’ to implicate inter-dependence between human cultural intelligence and ecological intelligence. In this environmental context, onto-epistemology shares and distributes the agencies of knowledge and the living diversities of ecologies reflexively, within and between all of life. In the context of Indigenous Australian traditional environmental knowledge, Weir’s (2008) assertion of the need for “imagining an expanded ecology” (pp. 153-154) describes an extension of concepts of ecological inter-dependence into ontological dimensions of being, knowing and belonging. I take on these requests for re-visioning and re-conceptualisation. In this research, I see knowledge as a mesh of New Materialist and ecological onto-epistemologies. This standpoint affords room to discuss imagination ontologically and epistemologically.

New Materialist epistemologies (Barad, 2007; MacLure, 2013; St Pierre, 2013) also assert the importance of examining the ontological implications of knowledge concepts, so that diverse theorisations of reality/materiality are also theories of being.
The ontological relations at the heart of this position were asserted by St Pierre (2013) “We are not separate from the world. Being in every sense is entangled” (p. 653). She describes her position as a New Materialist that has ecological resonances:

...I believe that the ‘new empiricism’ and the ‘new materialism’ are signals that the ontological can no longer be ignored. Scholars introducing this work are mobilizing and extending ‘post’ ontological critiques that insist we rethink the nature of being. Importantly, this is an ethical charge. In this ontology, thinking and living are simultaneities, and we have to think possible worlds in which we might live. (St Pierre, 2013, p. 646)

Highlighting the simultaneity of knowing and being forms a strong argument for the inclusion of ontology in contemporary epistemological work. Here I am positioning my qualitative educational research into imagination as such. My discussions of the ontological affects of environmental knowledge in Australia extend this idea so that environmental knowledge is also a theory of being. I imagine ontology as not a fixed state, but a layer of considerations that is inclusive in knowing and has previously been neglected. I take up St Pierre’s (2013) position that “insists we re-think the nature of being” and “re-imagine being” (p. 646) as a part of epistemological revisions.

Knowledge and being have distributed agency across all of life

This environmental/epistemological/ontological position asserts that environmental knowledge cannot fully be claimed to be a human practice. Central aspects of New Materialist philosophies perceive a shared and distributed agency of knowledge as an attribute of coexistence. Perceiving knowledge as a not-necessarily-linguistic discursive practice, and as inter-intra activity between human and non-human beings is a standpoint that has affected the entirety of this research. The intra, in this sense highlights that discursivity does not necessarily have to occur between two parties, as inter suggests. The intra dynamic recognises that knowledge is divergent, multiple and non-linear. This knowledge position occurs to me as a way of seeing materiality where everything is “always affected and being affected by each other” (Barad,
2007, p. 152). It is also a way of understanding knowledge that occurs in other and non-linguistic languages. ‘Material-discursivity’ (Barad, 2003) recognises that matter, and the material world are involved, inclusive players in knowledge making. This is different from epistemologies that occur necessarily in a human mind. The distributed nature of knowledge is a concept of knowledge that is/can be shared between human beings, environments, places, objects and matter. The possibility of a “distributed” (MacLure, 2013, p. 661), and ‘material-discursive’ agency of knowledge translates to experiences where knowing seems to emerge from the world as well as occurs as an application of understanding upon the world. The reciprocity affects my research, as it involves myself in the research as a listening, involved, critical interest. The world of my analysis is a part of an inter-intra active dynamic between imagination and environment in/as knowledge making.

This entangled epistemology affording multiple agency allows all things, beings, animals, plants, earth, matter and people to participate in the production of knowing and being. However, there are difficulties with the idea of attributing agency. The idea that my knowledge position grants agency to all things may occur as altruistic anthropocentric philanthropism. Barad acknowledges this: “the granting of agency is an ironic notion, no?” (Barad in Dolphijn & Van der Tuin, 2012, p. 53). This resonates with the contradictory concept of ‘granting native title’ to Aboriginal Australians. As discussed in Chapter 4, the difficulties were recognised in the Native Title Tribunal Claim of 1997, when the Judge did not grant native title but said: “the Court determines that native title already exists...The law says to all the people in Australia that this is your land and that it has always been your land” (as cited in Behrendt, 2008, para. 13). My understanding of this notion of agency is a way to explore meaning and knowledge as the self-constituting existence of all of life.

The independent forces of the non-human world are entangled inter-intra discursively through and expanded, onto-epistemological materiality. As I describe the entanglements of where knowledge emerges in my knowledge making, the agentic recognises the independent (from human) agency of things and matter. Again, this recognises an inter-intra-activity between my research imagination and the matters of the research project; as I imagine the many languages of being making
themselves known to me and to each other. This also occurs as a way of listening; I imagine this like listening to my mentor assert her opinion; I value the agency of her knowledge as connecting to me but as not dependent on my understanding of it, and not of my own making. Similarly, this listening affords matter, objects, and bodies with agency as they assert their being-ness and knowledge diversely in this research.

*Imagination in this epistemology*

Re-imagining knowledge and being, for this research, involves an understanding of knowledge that includes imagination. Therefore, my epistemological assertions involve imagination, and my research questions and analysis consider the ontological orientations and affects of imagination. Because epistemological agency is encouraged to emerge from a “distributed” field (MacLure, 2013, p. 81), the ontological implications of knowledge are extended to non-human beings and matter (Barad, 2007; St Pierre, 2013). I orient my interest in re-imagining being and knowing as a concern for the neglected, and for all of life.

I position imagination as a discursive form of communication that can access and understand ‘material-discursive intra-activity’ within and between human and non-human bodies; as a way of knowing the world. Imagination appears in New Materialist literature as a way of knowing and orienting self in relation to knowledge. For example, St-Pierre (2013) frames the work of “new empiricism and new materialism to re-imagine being” (p. 646). Instead of ‘thinking’ or ‘constructing’, MacLure (2013) “imagines a materiality” (p. 658). I draw from these discourses to position imagination as a part of New Materialist onto-epistemological investigations. For Lenz Taguchi (2012), imagination is “sensed” (p. 275) and she worked with New Materialist ideas of diffraction to describe how her analysis involved imagining with and from her data (p. 270). I take up New Materialist ideas of diffractive analysis in Chapter Six. These texts involve imagination in expressing ways of seeing and re-seeing materiality, relating with data and including self in the interplay of knowledge making.
Summary

Epistemology for this research is an entanglement of being and knowing that involves and affects imagination, environment and education. This knowledge-position can be seen as a knowledge imaginary that encourages a relational attitude and that allows the world to make itself intelligible intra-discursively to and from, within, around and between and across oneself as an ongoing encounter. Coming to terms with a new materiality as a lived experience requires new ways of seeing and imagining. This influences myself as researcher; I listen as well as assert because I conceive that knowledge emerges as well as is constructed by multiple agents. I argue that knowledge can be imagined and involves imagination. To argue this, imagination is re-conceptualised in this research as a way of knowing and re-positioned from its immaterial reputation as deeply related to living materiality. In the next section I discuss and assert what ‘the environment’ means for this research, in alignment with this epistemological position.
Re-imagining ‘the environment’ as all of time and space

In this section, I bring together environmental philosophy, material eco-criticism and cartographic ideas together to re-imagine ‘the environment’ for this research. Australian environmental educator and researcher, Whitehouse (2011) critiqued the confusing, homogenised term ‘the environment’ because it objectifies an external world, separates ‘it’ from self and the term “gives no clues at all as to where or what is being referred to” (p. 298). Despite the problems in representing a fixed world, ‘the environment’, becomes the “central subject and object of environmental research and praxis” (p. 298). The New Materialisms (Barad, 2003, 2007; DeLanda, 2006; Dolphijn & Van der Tuin, 2012; MacLure, 2013; Simms & Potts, 2012) and material eco-criticisms (Bennet, 2010; Iovino, 2012; Oppermann, 2013) invite a radical re-thinking of materiality. From their assertions, the environment needs to be re- visioned as an “ontologically heterogeneous field” (Bennet, 2010, p. 23), “a dynamic co-mingling of human and non-human agencies” (Oppermann, 2013, p. 63), a “complex web of all possible relationships” (Haraway, 2008, p. 138), “a community of expressive presences”, (Abram, 1996, p. 173), and, I argue, an expanded field (Krauss, 1983) of all time and space.

Through cartography, a practice of mapping knowledge situates knowledge as environmental. Putting knowledge in space and time is a way of thinking about its substance and materiality. A discourse of imagined geographies (Foucault, 1977; Gregory, 1994; Massey, 2005; Said, 1978) use ‘imagination’ as socially constructed perception of space that is created through images, metaphors, text and discourse. Massey’s ‘geographical imagination’ (Massey, 1994) theorised how places are conceptualised, imagined and how the internal practice of embodying place when ‘reading’ maps is a collaborative geographical ‘knowing where’. Reading a map is a relational, discursive, imaginative practice wherein a self is situated in a particular place in/on the world reflecting on that space and other spaces in contextual relationship. The idea of ‘imagined geography’ suggests that imagination is involved in mapping and understanding geographies.
This highlights the conceptual work of situating self in an expanded materiality in relationship with time and space. Knowing where, or orienting oneself can be seen to come from the map and the self inter-discursively. In Figure 4.4, I conceptualise the presence of self in the context of all time and space. A lateral axis signifies the moving dimensions of ‘time’, and a vertical axis signifies a continuum of ‘space’. This orients the temporal and spatial presence of self in context of all time and space. An immediate ‘experience’ is put in a context of multiple environmental dimensions.

![Figure 5.1. This diagram maps a spatial relation of self in time and space.](image)

Forming this ‘map’ (Figure 5.1) occurred progressively throughout this research project as way to, and as a result of, coming to terms with the complexities of ‘the environment’ and environmental knowledge in sustainability education contexts. I followed the cartographic suggestions in the literature to spatially map ones/my self in relation with the environment and environmental knowledge. I imagined the relationships between concepts and mapped them in this form.
The resulting cartography, Figure 5.1 and 5.2 is used as a method to picture concepts, locate ideas and guide parts of analysis. This mapping provided a conceptual framework in which the ‘self’ is centre and inclusive in a context of co-constituting temporality and spatiality. What emerged is a map with a “double frame” (Morphy in Neale & Kleinert, 2000, p. 131) where knowledge and environment coexist as one terrain. ‘The environment’ is not limited to environmental issues, or an external nature, but is re-conceptualised as an infinite terrain of all time and space. Time and space flow through the experience of self as apparitions of here and now.

![Diagram](image)

Figure 5.2. This diagram maps a spatial relation of self in time and space.

This gesture of a map attempts to makes sense of the implications of being the world and knowing about it. The self is located in the moving centre of this environment. In Figures 5.1 and 5.2 the self is recognised as situated presence, in a constant and fluid temporal and spatial flow of ‘Here’ and ‘Now’. This forms the conceptual edges of self, environmentally, and ontologically. Phenomenologically, the body’s possession of space, as existence, is “the primary condition of all living perception” (Merleau Ponty, 1962, p. 109).
In this map, ‘self’ is constituted by present time and space. That which is ‘beyond experience’ in time and space flows through self, all of which co-constitutes ‘the environment’. However, positioning ‘self’ in the centre risks anthropocentrism. This also visually constructs human-centred geographies. Lakoff and Johnson (1980) argued that metaphors can never hold all the understanding and so eventually fail. They assert that this moment of failure is an opportunity for great insight. Perhaps this is also true for this cartography. Whilst this mapping risks corroborating in reductionist problematics of representation, it has also emerged as an authentic methodological consideration, for coming to terms with the data for three main reasons. The process of mapping visually and spatially re-conceptualises ‘the environment’ as all of time and space. It is also formed a method of spatially orienting environmental knowledge in relation to self and experience. This further became a way of discussing imagination without representing it, spatial and temporal terms, in relation to experience. These elements are discussed in the last section of this chapter. The map can be seen as a relative template for coping with how to conceptualise environmental knowing. It comes from the challenges of considering imagination as an environmental knowing and expands what ‘the environment’ means for this research.

**Summary**

In this section I have taken up the criticisms of environmental philosophy and responded to the invitation of the New Materialist and material eco-critics to radically re-think materiality. As discussed in Chapter 4, the problems of representation and separation cause embedded dilemmas for sustainability, education and environmental concerns and affect being and knowing. For this research, I have re-conceptualised ‘the environment’ as, not just natural forms and settings or environmental concerns, but all of time and space. Having asserted my epistemological standpoint, and concept of environment, the next section discusses how I have come to know imagination for this research including the epistemological and methodological implications of researching imagination and asserting its materiality.
Re-conceptualising imagination for research

I have not used a particular theory or interpretation of imagination to guide this research. Nor have I developed a definition, or a fixed representation of imagination. I imagine an artist’s palette with a range of colours that have the potential for infinite variations through mixing. Understanding imagination may be dependent on the lenses used to identify and recognise its colours. The lens of my analysis values and includes interdisciplinary interpretations of its varied dimensions. In my epistemological standpoint, I positioned imagination as a discursive form of communication that can access and understand ‘material-discursive intra-activity’ within and between human and non-human bodies. I positioned imagination as a way of knowing. From the literature, I have identified ways that imagination can be known and recognised for this qualitative educational research. I discuss how this relates to my position on knowledge and what knowing imagination means for this research.

Epistemological implications in studying imagination

Interpretations of imagination carry epistemological assumptions and material philosophies. Western philosophies have consistently positioned imagination in opposition to reason or augmented imagination as subconscious and through creative arts. I assert that each theory of imagination carries epistemological assumptions and therefore has ontological implications.

Even when writers position imagination in the centre, as a focus, the limits to theory arise through epistemological perspectives embedded in the work. This criticism has influenced how I discern imagination for this research. For example, the highly relevant scholarship advocating imagination in ecological education (Blenkinsop, 2008, 2012; Fettes, 2008, 2011; Judson, 2010) has created valuable frames that appreciate the importance of imagination in environmental education contexts. Blenkinsop, Fettes and Judson’s theories and action research maintain a developmental and cognitive perspective on imagination in learning and knowing. Judson (2010) demonstrates an epistemological outlook as she asserts “the human origin of all knowledge” (p. 45) and suggests: “knowledge only exists in the human
mind” (p. 45). This approach justifies the importance of imagining by positioning imagination as mental, however this affords the human mind with all epistemological agency. Whilst this was in the context of validating imagination as a way of knowing, I suggest this is contradictory to the re-conceptualisation of intelligence that researching imagination suggests. In this way, positioning imagination as an attribute within established structures of ‘mind’ does not assist my focus in this research.

Reading interdisciplinary literature produced layered and different opportunities for understanding imagination for this research. Imagination is difficult to define and resists singular definition. As a ‘floating signifier’ (Laclau & Mouffe, 1985) it radiates extensive interpretations across different discourses. As imagination is researched it is constructed. Researching something that does not fit within established considerations of knowledge and intelligence has been challenged by the bulk and diversity of interpretation. It was clear that this research requires revising frameworks to include imagination within understandings of environmental knowledge.

**Identifying imagination: a diffraction, not a definition**

Identifying imagination involves complications and overlap. It is important to resist knowing in advance exactly what I am going to find as I participate and observe classroom life (Jones, Holmes, McRae & MacLure, 2010). I draw upon diversely poetic, semiotic, ontological and visual sources that suggest and frame imagination varyingly: as embodied by images, metaphors and narratives (Sutton-Smith, 1988), as a way of ‘taking in’ experience (Malouf, 1998), as “metaphorical thought” (Lakoff & Johnson, 1980), as “thinking of otherness” (Macknight, 2009), and as a way of learning when direct experience is not possible (Dewey, 1902; Vygotsky, 1967). Through the palette, imagination emerges as a connective, metaphorical and particularly nuanced way of thinking, seeing and orienting oneself in the world. A palette is an artists’ workplace, where individual colours are applied and used but are to be mixed, blended and experimented with in endless
combinations to form new colours. The formation of this methodological palette was developed in response to the terrain of EfS, the research questions, and the New Materialist environmental position of this research. These interdisciplinary interpretations forms lenses with which imagination may be encountered, discussed and analysed in the chapters to come.

~ Imagination as images, narratives and metaphors

Sutton-Smith (1988) discussed the correspondence between thinking and imagination. His title *In Search of the Imagination* (1988) plays on the discovery-mentality of research and the expectations of searching for and finding truth. Instead of a distinct description of imagination, Sutton-Smith (1988) argued that imagination takes “several strong forms” that are “narrative, purely visual imagery and abstract relations” (Sutton-Smith in Egan & Nadaner 1988, p. xiii). This evocative language of imaginative forms acknowledges a plurality of imaginative ways of knowing. Considering imagination arising as ‘several strong forms’, this theorisation can assist with identifying places where imagination may arise in the data. Analysis was therefore drawn to investigate the ways in which any images, narratives or metaphors, as ‘abstract relations’ occur, and examined how these mediums enlist imagination or contribute to imaginative understanding of the learning. I examined images, narratives or metaphors that arose with the data as demonstrations of how imagination is involved in knowing environment and understanding sustainability. I analysed how these visual, narrative and abstract forms present new and expanded ways of seeing the world and the ways imagination is involved.

~ as ‘taking in’ experience

The Australian author and poet, Malouf (1998), described his own process of ‘taking things in’ as a possibility of re-positioning the world ‘out there’ within, through the imagination. This dialectic transference arose in his series of Boyer lectures called *A Spirit of Play: The Making of Australian Consciousness* (1998) where Malouf described his own imaginative research methods.

---
6 The Boyer Lectures are produced by the Australian Broadcasting Corporation (ABC) and played on ABC Radio National.
Malouf suggested that this process of ‘taking in’ is operative in belonging, as people come to know the Australian environment and bring the world into their consciousness. He described this method as spending time in, and becoming attentive to seeing that which is embodied by the visible and apparent. He described the process:

…first of all increasing of our awareness of what is around us so it registers on our senses in the most vivid way…Then of taking all that sensory experience into our consciousness and giving it a second life there, so we possess the world we inhabit imaginatively as well as in fact. (Malouf, 1998, n.p.)

This method of coming to ‘possess the world’ describes ways of knowing that inhabit inward and embodied experiences of self and world. Malouf (1998) advocates an attentiveness of imagining, in order to be able to translate things “out of their first nature into the secondary and symbolic one”\(^7\). This constructs the physicality of materiality as one dimension of an embodied real, that can be known through imagination. Malouf’s imagination occurs as a particularly sensual and attentive way of seeing and being that increases a sense of belonging. Belonging can be interpreted as an ontological way of knowing. This poetic description of coming to know the environment through imagination has informed ways of seeing and recognising imagining in EfS with the data.

~ as ‘metaphorical thought’

Through Lakoff and Johnson’s work (1980, 1999) metaphor emerged as a powerful framing tool that involves imaginative capacities to conjure ideas and position self in relationship. Their influential acknowledgement of the vast scope of “our subjective mental life” (1999, p. 45) examined the ways in which metaphors and ‘metaphorical thinking’ are central to understanding. In their discussions, imagination is described as ‘metaphorical thought’ and as involved in understanding metaphors themselves.

---

Lakoff and Johnson (1980) identified the significant relationship between imagination and metaphor at the core of their work:

_The reason we have focused so much on metaphor is that it unites reason and imagination. Reason, at the very least, involves categorization, entailment, and inference. Imagination, in one of its many aspects, involves seeing one kind of thing in terms of another kind of thing – what we have called metaphorical thought. Metaphor is thus imaginative rationality (p. 193)._ 

Their description of imagination as a part of the thinking involved in metaphor, pairs binary terms; aligning the dualisms of imagination and rationality as relational partners. This constructed imagination as a way of seeing that relates ‘one thing in terms of another’, as a way of thinking, and as a form of rationality. Lakoff and Johnson’s (1980) analysis of the ways in which metaphors spatialise abstractions, and make elusive ideas seem real are approached as pathways to understand the ways in which understanding itself occurs. The authors (1980) further asserted that: “Metaphorical imagination is a crucial skill in creating rapport and in communicating the nature of unshared experience” (p. 231). As a ‘crucial skill’, imagination is constructed as operative when experience is not shared or possible. Influential educator Greene (2008) suggests: “We know that imagination makes metaphors, effecting often unexpected connections in experience” (p. 19). Through Lakoff and Johnson’s work (1980, 1999), imagination emerges as a connective thread of ‘skill and rapport’ that enables that which is not present to be evoked. This work has contributed to understanding how imagination is involved in knowing through metaphor, in thinking metaphorically and as ‘metaphorical thought’ itself.

~ as ‘thinking into otherness’

Australian educational researcher, Macknight’s (2009) classroom based research identified a variety of ways in which imagination occurs as learning and in thinking. Macknight (2009) found that imagination occurred for students in the classroom as “thinking into other perspectives” (p. 131) and she described imagination as
“thinking of otherness” (p. 132). In her account, ‘other perspectives’ and ‘otherness’ refer to other beings, people, places and perspectives. The potential of imagination to ‘think into otherness’ implies that imagination is a response that crosses the boundaries of self. In a similar way, the fiction author Rowling (2008) expressed an alignment between imagination and empathy. Rowling’s (2008) Harvard address constructed imagination as ‘powerful’ and ‘transformative’, and referred to empathy as way of imagining the other:

Though I personally will defend the value of bedtime stories to my last gasp, I have learned to value imagination in a much broader sense. In its arguably most transformative and revelatory capacity, it is the power that enables us to empathise with humans whose experiences we have never shared...Unlike any other creature on this planet, humans can learn and understand, without having experienced. They can think themselves into other people’s places. (para. 22)

This concern for an expanded becoming values imagination as a connecting, border-crossing capacity, to enable a person to understand other people and places without physically sharing experience. Rowling (2008) and Macknight (2009) rendered a way of learning and understanding that acknowledged ‘the other’. This interest in ‘otherness’ suggests that imagination is operative in overcoming or encountering the distance and obscurity of ‘other’ perspectives, places and experiences by bringing them closer, or moving into them.

The dynamics of stretching the self to experience ‘the other’ occurs similarly in research and theory that focuses on empathy. In his dedicated treatise on empathy, social thinker and researcher, Rifkin (2010) attempted to demystify empathy: “We take this for granted but we are actually soft-wired to experience another’s plight as if it we were experiencing it our self” (Rifkin, 2010, para. 5). Similarly, neurologists, Decety and Jackson (2004) described empathy as a non-dualistic, affective dialectic between self and other; “a sense of similarity in feelings experienced by the self and the other, without confusion between the two individuals” (p. 78). These cross-sectoral ideas also describe how empathy ‘thinks into otherness’, without collapsing
identities. These ideas evoke correspondences between empathy, otherness and imagination. As EfS understandings involve perspectives that are not only personal, this interpretation of imagination informed analysis of EfS teaching and learning that occurred as requests to imagine an ‘other’. To further conceptualise these forms of imagination during the process of this project, I visualised them as spatially oriented ideas. Figures 5.3 and 5.4 visually/spatially explore the relations between self and other, and experience and imagination from these discussions.

Figure 5.3. Researcher’s visual representation of the relations between self and other.

In Figure 5.3 I illustrate how I conceptualise these ideas, wherein the self is confined by personal experience and ‘the other’ occupies an outer sphere. The edges of the inner sphere are the blurred boundaries of self and the beginnings of otherness. This simple cartography may be read in terms of how self ‘takes in’ the other through imagination (Malouf, 1998) or how self ‘thinks into otherness’ through imagination (Macknight, 2009). This evaluated the temporal and spatial dimensions of that which is ‘other’ than self, or other than what can be immediately experienced.
Educational psychologist, Vygotksy (1967) afforded a ‘double, mutual dependence between imagination and experience’ (p. 17) when he described: “When we ... find out about... events that we have not directly witnessed… in geography or history, or when we merely learn what has been happening to another person... in all these cases our imagination serves our experience” (p. 17). Vygotksy’s (1967) references to ‘geography’, and the temporal terrain of ‘history’, are framed as the space and time ‘events we have not directly witnessed’. From the perspective of this research, this formed a referential, multidimensional suggestion for mapping the spatial and temporal dimensions involved in imagining in relation to experience. In the quote above, Vygotksy (1967) determined imagination as serving experience “when we merely learn what has been happening to another person” (p. 17). This locates learning that which is ‘happening to another person’ in the territory of imagination and accordingly, self is positioned inside experience. A dialectic between imagination and experience continued to emerge.

Dewey (1902, 1938) also wrote about imagination; his concept of imagination in education was framed in his lecture of 1902. He configured the process of imaginative understanding as ‘getting hold of’ something to make it present. He asked rhetorically:

How can anyone get hold of things which are not directly present?
The answer is, through this power of imagery, the power of forming mental pictures of whatever is presented...imagination is a way by which we mentally present to ourselves things that are not present. (Dewey, 1902, p. 246)

Dewey’s (1902) and Vygotksy’s (1967) descriptions of imagination as a way of understanding that which has not been experienced directly, conjures up a cartographic relationship between experience and imagination. This dialectic is oriented by virtue of what the self has experienced in present time and present place.
“You know how limited our experience would be if it were confined to what is before our senses. If it were not for this power of imaging, the rest of the world would be blotted out” (Dewey, 1902, p. 246).

Dewey suggests that a concern for ‘the rest of the world’ requires the enabling capacity of imagination to be understood. Whilst Dewey (1902) and Vygotsky’s (1967) experiential and developmental theories are foundational in educational theory and praxis, this investigation into imagination exposed alternative perspectives regarding the limitations of experience that are not included in contemporary experiential educational discourse. Their perspectives speak to a co-evolving partnership between experience and imagination, in which experience refers to the location of self, and imagination refers to ways of understanding the other. Becoming aware of other materialities beyond visible and sensual experience requires imagination in this view.

Figure 5.4. Researcher's visual representation of the relations between experience and imagination.

In Figure 5.4, I visualised these ideas. What can be experienced is located in the blurred edges of the inner sphere that suggest the fluid and indecipherable edges of ‘here’ and ‘now’. This cartography draws from Dewey (1902) and Vygotsky’s (1967) interpretations of imagination, where that which is other than experience,
“things that are not present” (Dewey, 1902, p. 246) or “what has been happening to an other person” (Vygotsky, 1967, p. 17) can be imagined in order to be known, and without having to be experienced (Rowling, 2008). Whilst flawed and indefinite, this conceptual process of visually mapping the concepts worked towards forming a method of understanding imagination in environmental education.

Summary

These interdisciplinary interpretations of imagination develop a complex picture with relevance to teaching and learning. The diverse perspectives encounter imagination through relations between self and other in dialectic reference to experience. Malouf’s (1998) poetics described ‘taking in’ the external world through imagination. Macknight (2009) and Rowling (2008) described imagination as ‘thinking into otherness’, as though this crossing is not possible through other forms of thinking. Lakoff and Johnson (1980, 1999) positioned imagination as ‘metaphoric thought’; as the thinking that perceptually encounters the ‘abstract relations’ (Sutton-Smith, 1988) between one thing and another. For Dewey (1902) and Vygotsky (1967) imagination is the work of self imagining distant geographies, other times in histories or ‘that which is not present’. For them, imagination beneficially “serves” experience (Vygotsky, 1967, p. 17). Each of these interdisciplinary interpretations informs the methods of recognising imagination for this research.

Conclusion

In this chapter, I asserted my epistemological perspective on knowledge, re-conceptualised what can be understood as ‘the environment’, and re-considered imagination for this research. I outlined my epistemological position and the 5 ways of coming to know imagination for this research. The cartographic work that has emerged so far in this thesis formed a relevant, non-representational method for dealing with concepts spatially and visually. Contemporary cartographic perspectives recognise imagination at the heart of cartographic readings and mapmaking. The methodological significance of these theoretical frames informed the research design and methods of analysis. In the next chapter, I will draw upon these epistemological and methodological foundations to discuss the research design.
**Methodology and design**

This chapter creates the worldview of my research design through which I begin to analyse my data in the chapters to come. I outline the research trajectory, including the contexts and directions that formed its design. This section returns to the contexts of Education for Sustainability in schools and educational practice in EE. My interest in the nature of imagination in Education for Sustainability examines the relations between knowing and imagination in environmental education contexts. My research responds to pressing needs and gaps in how teaching/learning/understanding sustainability is approached and conceptualised, in order to discern how imagination is involved. My research questions ask:

1) What is the nature of imagination in relation to the environment?
2) How does imagination work in Education for Sustainability (EfS)?
3) When does understanding sustainability require imagination?
4) How does imagination develop worldviews or revise ways of seeing the world?
5) In what ways is imagination involved in re/orienting the conceptual relations between self and the world?

My diffractive, narrative approach to analysis is discussed in depth in this chapter. I argue how diffractive, narrative and material eco-critical approaches are put to work, to analyse the nature of imagination in the learning stories of matter, texts, pedagogies and participants.

**Overview of the research**

The research design is focussed on finding out how imagination works in EfS. Research involved three aspects: interviews with educators, participant observation
at an accredited sustainable primary school, and analysis of educational resources used to teach and learn in EfS settings. I designed the research according to a range of factors that are outlined in this chapter. I was drawn to a combination of participant-observation research and a series of semi-structured interviews with EfS educators because these places emerged as pedagogical contexts where I could try to understand the nature and role of imagination in EfS through the working perspectives of teachers and learners, and my own interpretations. This design engaged with established EfS practices in a range of settings in order to not limit the research to a singular context or area of sustainability. The matter of EfS resources emerged as eco-texts from the interviews and participant-observation research experiences.

The research design was also informed by what was not wanted or relevant. The research was not concerned with how sustainability is implemented in schools, or EfS contexts that occur as one-off projects or activities. Nor is the research interested in examining particularly imaginative settings/contexts. Therefore, I did not involve any participants or educational settings that showed any pre-interest in imaginative education, or in settings that were struggling to implement or define sustainability. Research Question 1 and 2 focus on how effective and sustained EfS programs might involve imagination. In this way, finding imagination relied on investigating as it arose in focussed EfS sites, practices, pedagogies and perspectives.

**Designing the research**

I searched for appropriate EfS settings and contexts that reflected “strong and enduring” (Somerville & Green, 2012, p. 74) approaches to sustainability education. There are a range of EfS types in Victoria, and I needed to assess whether an EfS practice is strong or enduring. I will discuss this at length in the next section. I chose and approached a primary school that had been accredited as a ‘5-Star Sustainable School’ by Sustainability Victoria’s whole-school education program that takes several years to complete. I participated and observed their classroom life over 14 weeks. I built a relationship with the key educator at the school who had just won an
‘Environmental Educator of the year’ award. I interviewed her throughout this time and her perspectives, insights and reflective analysis increased the focus of my study.

This research design involved risk. What if imagination did not arise? What if I couldn’t discern imagination among the practices of EfS teaching and learning? I resolved that part of the research design involved this uncertainty. There was no guarantee that participants were going to behave imaginatively, and this would be the finding. The methodological palette of imaginative forms outlined in the previous chapter was used as a guide to remind me of the various ways imagination can arise and be seen. As a researcher, interviewer and participant-observer, I aimed to allow the world to make itself intelligible to me in a range of discursive forms. I noticed students, teachers, bodies, sand, marks, paper, maps, stories, images, discussions and weather.

I conducted a second study of EfS educators’ perspectives through interviews. EfS educators are teachers who focus on Educating for Sustainability, either within a school setting by incorporating this work into their classes, or they work in dedicated sustainability education organisations where they design and facilitate workshops and programs. Being a sustainability educator is rarely an explicit profession. Because of the range of sustainability programs and settings in Victoria, the insights of educators’ voices and experiences from different perspectives was important to research. I contacted twelve experienced and practicing educators. Several educators responded to my email and identified themselves as teachers who taught sustainability concepts, topics or issues professionally. I conducted a series of interviews with seven of them. The seven EfS educators interviewed work in a range of settings in Victoria and this diversity expressed a range of perspectives on sustainability, education and EfS from their established EfS practices and experiences. This is discussed in depth in the next section, ‘The Research Design’.

A third ‘data set’ arose unexpectedly through the interviews and participant-observation experiences. This was incorporated into the research design. I collected a range of images and stories, online videos, and eco-texts that were used by EfS educators to teach sustainability understandings. As objects themselves, these eco-
texts occurred as important agents in the world of EfS education, for educators and for students. Educator’s resources occurred as an important part of EfS discourse. I added to the research design to include an analysis of a collection of these educational eco-texts because stories, images and metaphors can be seen to be part of the language of imagination (Sutton-Smith, 1988, p. xiii) and a part of EfS discourse and pedagogy (Cutter-Mackenzie, Payne and Reid, 2010; Reid, Payne & Cutter-Mackenzie, 2010). The story of matter is also an interest of New Materialist qualitative educational research (Jones, 2013). Analysing the agentic work of the discourse itself occurred as in continuity with my New Materialist position on knowledge, ideas of imagination and the openings for research in EE literature.

These beginnings of the research design required methods of research that constructed qualitative educational data. I needed to be immersed in educational experiences, to study the perspective of others, use photography and video to record student marks and matter, and attentively see and listen to that which is and is not human.

**Positioning the research: identifying the places of EfS**

In this section, I discuss the extensive interpretations and embodiments of EfS practice to outline why I positioned my research in the pedagogical sites of teaching and learning. This involves examining the literature I referred to in refining how this research was designed.

*The extensive interpretations of EfS*

Education for Sustainability (EfS) in Australia has a range of embodiments, from dedicated EfS organisations facilitating workshops, state-wide government bodies delivering programs and teachers in schools incorporating EfS ideas, projects and activities. In Victoria, all scales are involved in the design, delivery and experience of EfS for teachers and students. Environmental Education researchers Margaret Somerville and Monica Greene’s (2012) survey of EfS initiatives in Victoria described sustainability education as having “extensive interpretations” (p. 66),
which “confirms sustainability as a broad and ambiguous construct” (p. 66). The authors found many EfS initiatives relied on minimal short-term, project-based funding, volunteers and partnerships, and “the dedication of particular visionary teachers to contribute over and above their normal teaching work” (p. 74).

The implementation and practice of sustainability in schools has many variations. Across schooling years, teachers are implementing their own versions of EfS that affect school buildings, curriculum and teaching and learning practice within schools (Cutter-Mackenzie, 2010; Kennelly, Taylor & Maxwell, 2008). Experiential learning, place-conscious education perspectives, ecological literacy, behavioural change models, all inform approaches to EfS pedagogy and best practice. A range of dedicated environmental educational organisations and funded programs also work with schools. Karena (2010) reviewed a range of community and corporate EfS programs operating in Victorian schools. They include: “Landcare, Stephanie Alexander Kitchen Garden Foundation, Gould League Multicultural Gardens, Energy Smart Schools Program, Keep Australia Beautiful, CSIRO’s Carbon Kids, Habitat Heroes, Green Cross, Reef Guardians and Jane Goodall’s Roots and Shoots” (Karena, 2010, p. 16). Somerville and Greene’s (2012) Victorian survey of EfS attributed ambiguity in understanding sustainability that affects how it is interpreted, developed and implemented. This scope formed the field of my research; the multiple sites and interpretations of EfS as well as the conceptual places involved in understanding sustainability. My interest focussed on the informal, grassroots and pedagogical sites of EfS experiences and the voices, perspectives and practices of teachers and learners.

**Whole-School Sustainability**

In 2001, the Australian Government in partnership with the States and Territories developed the Australian Sustainable Schools Initiative (AuSSI) to help consolidate the diversity of EfS programs, with the vision that “all Australian schools and their communities can be sustainable” (Australian Government Department of the Environment, Water, Heritage and the Arts, 2003, p. 3). This was a part of the Australian Government’s response to the United Nations Decade of Education for
Sustainable Development, 2005-2014 (UNDESD). In the state of Victoria, AuSSI is managed by the Victorian Government’s Sustainability Victoria, and branded the ‘Resource Smart Schools Program’ (2008). This whole-school sustainability program was developed by environmental educators at CERES Environment Park and the Gould League in Melbourne, Victoria (Tilbury, Coleman & Garlick, 2005a, pp. 17, 22, 25). Its incorporation into the State government’s resource management brand ‘Resource Smart’ means the program is now branded as the ‘Resource Smart Schools Program’ and is delivered to schools across the state through employed facilitators. Schools encounter five Resource Modules, including Core, Waste, Water, Energy, Biodiversity. Achieving 5 Modules means a school is accredited as a 5-star sustainable school.

Formal and informal sites for EfS research

Australian environmental education researcher, Noel Gough (2011) described a ‘jigsaw’ of Environmental Education in Australia, recognising a dislocation between educational practice and research (pp. 264-271). In response to these divisions, EE research has sought clarity into how formal strategies can be translated into practice, and how sustainability and EfS works as a system (Somerville & Greene, 2012). Formal declarations occupy formal spaces of EfS discourse, however teachers apply, innovate and practice EfS in lived spaces. Teachers and learners are often positioned in the ‘informal’ sites of EfS but accountable to formal curriculum, policies and authorities. Gough (2011) writes that changing formal expectations support EfS yet often struggle to realise tensions formed by the actions they formally declare to support.

Kagawa and Selby (2010) identified ‘formal’, ‘non-formal’ and ‘informal’ learning spaces as valuable sites for EfS research. In discussing these divides, they positioned EfS as an interruption to formal education, and suggested that informal and non-formal education play a vital and complementary role in contemporary EfS (p. 118). Their recognition of variation resists linear, top-down, hierarchical understandings of how knowledge is produced in EE research. Kagawa and Selby (2010) discuss how this leads to revising how knowledge is created, and they argue that EE research
needs to attend to the "direction and flow of knowledge both at theoretical and practical levels" (p. 118). They encourage seeing EfS as a permeable learning landscape. They cite Chambers’ (1997) inquiry to question whose reality and knowledge is represented in Education for Sustainability and research:

All powerful uppers think they know
What’s right and real for those below
At least each upper so believes
But all are wrong: all power deceives…
Whose knowledge counts?
Whose values?
Whose criteria and preferences?
Whose appraisal, analysis and planning?
Whose action?
Whose monitoring and evaluation?
Whose learning?
Whose empowerment?
Whose reality counts?
(Chambers, 1997, pp. 100-101)

This highlights the possibilities and value of recognising that EfS teaching and learning have many sites.

At the grassroots of EfS

These authors present new metaphors for EfS knowledge that grows from the ground up rather than from the top down. These conversely rooted locations of power and accountability are addressed by Walshe’s (2008) research that identified “the most exciting and innovative sustainability education initiatives are emerging at grassroots community level, but do not appear in the formal curriculum of school education” (p. 73). This work has been influential to my research design. Researching EfS at the grassroots of pedagogical practice is where I locate my study.
Conclusions from Somerville and Greene’s (2012) study asserted the importance of conceptualising EfS in a way that includes real people and places rather than broad generalisations of sustainable development (p. 73). They called for attention to the ways in which the “extensive interpretations” of EfS are “conceptualised” and “imagined” (p. 73). Interestingly, their research found that the most “strong and enduring approaches [to EfS] were underpinned by deeper philosophical questions around the existential meanings of sustainability action and education” (p. 74). This finding supposes a correlation between enduring approaches and philosophical depth, and accordingly suggests that one-off activities may be related to lack of teacher understanding of EfS. This conclusion also supports the fusion of theory and praxis in EfS educators work. Somerville and Greene (2012) highlight that these sites “have great potential to enrich the pedagogies of education for sustainability” (p.65). In valuing pedagogical sites, the authors call for further research into the nature of these local, embodied, community pedagogies and their important contribution to EfS and AEE research. Perhaps it is at the grassroots, “where the most exciting and innovative sustainability education” (Walshe, 2008, p. 73) grows, that needs to be the basis of quality research that can continue to inform the formal sphere.

*Interviewing a range of educators: the need for research into the pedagogical places of EfS*

Huckle and Sterling (1996) stressed the challenge that EfS presents to education. Their book *Education for Sustainability* (1996) was one of the first publications to bring together environmental educators from a range of sectors to discuss the philosophy, politics and pedagogy of Education for Sustainability. Sterling (2004) addressed the relations between EfS and pedagogical practice, suggesting that as understanding sustainability requires revising ways of thinking and seeing the world, this necessarily affects pedagogical practice in the handling of knowledge.

The Australian Governments National Review (2005) asserts: “Learning for sustainability is not solely about integrating new content into the curriculum, it is also about challenging teaching and learning approaches” (Tilbury, Coleman & Garlick, 2005a, p. 7). Sterling (2004) and Cotton and Winter (2010) argue that more
research is needed into how teachers approach EfS pedagogically. Tilbury (2007) argues that while there are many forms of EfS being increasingly incorporated into schools, there is little research into the pedagogical shifts that have taken place (p. 119).

Sterling (2004) argues that sustainability education provokes a pedagogical shift from transmissive, teacher centred, content based teaching and learning, to discovery, inquiry, collaborative, experiential and learner-centred approaches (p. 58). These perceptions were shifts that occurred in the context of higher education, however these ideas are pedagogically relevant to EfS teaching and learning and research generally. Cotton and Winter (2010) argue EfS requires new pedagogies. They suggest “role play and simulation, group discussion, stimulus activities, debates, critical incidents, case studies, modelling good practice, and reflexive accounts” (pp. 46-50) to enable and promote learning in ways that play with, revise and examine ways of thinking as much as learning about the environment. The literature suggests that EfS educator pedagogies are important sites of research, to explore the ways in which environmental knowledge and understanding is effectively constructed, taught and learned for teachers and students. These sites occurred as places where I could research how imagination is involved in understanding sustainability.

*Learning Stories can focus on pedagogical work*

Whilst research has examined how EfS is implemented, there appears a lack of research into how quality EfS occurs in mainstream schools. Guevara, King and Smith’s (2010) evaluative study of five sustainable schools identified key educators’ stories as pathways to unravel the processes of change and learning. Their ‘most significant change’ methodology encouraged the interviews to be read and narrated as stories. Walshe (2008) also valued learning stories as well as concept mapping in her methodological work that involved assessing concepts of sustainability. These approaches suggest that understanding sustainability is not generated from standardised curriculum, but from teachers’ pedagogical work.
My research was designed from these influences from the literature. My research focuses on the pedagogical practices at the grassroots, in the ‘informal sites’ of EfS that are ‘innovative’ sites of teaching and learning (Walshe, 2008). This positioning was chosen in order to contribute new knowledge to the broad aims of understanding environmental sustainability education, and re-create the emergence of EfS as coming from the ground up.

The research design

The research design aimed to generate qualitative data. In this section I outline the interviews with educators, the participant observation experience and the collection of EfS resources in depth. A range of field notes, photographs, video and voice recordings, associated transcriptions, student work samples and educational resources used in workshops and classrooms make up the data set.

The EfS educators

Seven EfS educators who design and deliver EfS programs in Victoria were interviewed for 1 to 3 hours each for this research. These seven represent a spread of primary, secondary and tertiary settings. They volunteered their time and the interviews took place at their various workplaces between August 2012 to April 2013 over 1-3 hour sessions. Interviews were in the form of open-ended discussions and were followed up with phone calls. They were voice recorded and later transcribed. Fortunately, these EfS educators have strong practices and were generous in expressing their pedagogical perspectives, practices and concerns. I refer to the interview participants as ‘the EfS educators’.

The EfS educators’ educational contexts and level they teach:

The diversity of their workplaces map a field of contemporary EfS education. Of the seven self-identified EfS educators; two work in tertiary settings, three are school teachers and so their EfS work is within schools, and two others work in dedicated EfS organisations that provide workshops and experiences to student groups of all
ages. The educational level in which the educators teach is also varied in this data set. Two EfS educators work with primary school aged students, two work with secondary school aged students, two work with tertiary students, and one works with both primary and secondary students. This range reflects the varied contexts and broad terrain of Education for Sustainability in Victoria. This provided the study with a range of EfS perspectives, settings, topics and practices.

<table>
<thead>
<tr>
<th>EfS Educator</th>
<th>Workplace</th>
<th>Level</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eva</td>
<td>school teacher</td>
<td>primary</td>
<td>general</td>
</tr>
<tr>
<td>Stella</td>
<td>school teacher</td>
<td>secondary</td>
<td>biodiversity</td>
</tr>
<tr>
<td>Jamie</td>
<td>school teacher</td>
<td>secondary</td>
<td>waste</td>
</tr>
<tr>
<td>Ben</td>
<td>EfS organisation</td>
<td>primary</td>
<td>water</td>
</tr>
<tr>
<td>Simon</td>
<td>EfS organisation</td>
<td>prim/secondary</td>
<td>energy</td>
</tr>
<tr>
<td>Olivia</td>
<td>tertiary educator</td>
<td>tertiary</td>
<td>Life Cycle Analysis</td>
</tr>
<tr>
<td>Mike</td>
<td>tertiary educator</td>
<td>tertiary</td>
<td>general</td>
</tr>
</tbody>
</table>

Table 6.1 This table shows the range of EfS educators interviewed, their general topic focus and the educational context in which they teach.

Table 6.1 lists the names/pseudonyms of the seven practicing EfS Educators, their type of educational workplace, the level of the students they most encounter and the area or topic of sustainability they teach. Table 6.1 lists the subject matter that focused their teaching or their area of expertise simply under ‘Topic’. Each participant offered their pedagogical perspective and experience of EfS teaching and learning in their area.

---

8 I briefly explain what each Topic refers to: ‘Biodiversity’ includes understanding ecological diversity in all living things. The topic of ‘Waste’ refers to ideas and practices of recycling, organic waste management and litter issues. ‘Water’ includes the global water cycle, water quality and conservation. ‘Energy’ is about electricity sources, fossil fuels and other greenhouse gases produced from energy production and renewable energy. ‘Life cycle analysis’ regards the specificities involved in measuring the ecological footprint and embodied energy of a product over its whole ‘life’.

‘General’ refers to the primary school educator who works across a range of sustainability concepts.
Sustainability concepts taught by EfS educators:

Since sustainability is not a subject nor a discrete discipline, the educators have varied foci and expertise. The focus of each EfS educators’ teaching was varied (see ‘Topic’ in Table 6.1 and footnote). Due to the varied and non-specific place of EfS in Victoria, a definitive understanding of the subject matter of EfS at the time of research has not been established (Somerville & Greene, 2012). The topics reflect each educator’s area of expertise and the focus of their lessons. The range of topics and settings allowed the data to reflect the broad terrain of EfS in Victoria, Australia. All participants designed their own EfS teaching content and style, and so what and how they teach is attributable to their own environmental and educational understandings and perspectives. This variability provides that research with grassroots interpretations of EfS. Questioning (Appendix I) prompted discussion about educators’ understandings of sustainability and how they go about teaching their key concepts. The seven interviews formed into a strong data set that was transcribed and analysed in response to the research questions using diffractive, narrative analysis.

Content and flow of the interviews

The open-ended discussions were led, to varying degrees, by a set of questions that operated more as conversation-starters and as prompts for the researcher (see Appendix I). These questions did not focus on imagination explicitly but were interested in generating qualitative data. Questioning attempted to draw out the innovation and design work of teachers including their experiences and perceptions of EfS teaching and learning through their practice. In each interview, EfS educators discussed the key concepts that focus their teaching, the way they go about teaching and learning, and the perspectives and experiences they offer their students.

Mentioning imagination in the interviews

The interviews provided data about their perspectives and practices of teaching and learning sustainability concepts. Only towards the end of the interviews did I
mention imagination. Towards the end of each interview, educators were invited to identify imagination within their work. The definition of imagination was open-ended and each educator explored this possibility in his or her own words. Compellingly, none of the educators identified imagination as a definite part of their process or of students learning. This left it up to my interpretation to discern the nature and role of imagination in their teaching and learning from their learning stories.

Process of analysing the interviews

I worked with audio and written transcriptions to understand how the EfS educators’ perspectives may begin to respond my central research questions. Analysis involved re-listening to the interviews and trying to understand participants’ perspectives. I listened for: How does imagination work in Education for Sustainability? When does understanding sustainability require imagination? How do EfS educators think of environmental knowledge? Does it include imagination? How do they conceive of their practice? Do they teach environmental knowledge or ways of seeing the world? How do they describe the goals of their teaching? Are their key concepts, goals and practices oriented towards revising self-world relations? How do they consider sustainability, and educating for it? Then I looked at imagination. Are there any stories, metaphors or narratives in the interview or that the educator uses to teach and learn? Are the imaginaries and worldview at work? What is the relation between imagination and knowledge and experience? What about empathy, does the educator wish students to see things from another perspective?

Analysis as crafting the learning stories

In the initial stages of sorting through data, including getting to know the interviews through transcription and re-listening, I saw that there were some differences between educators’ initial responses and the depth evoked through telling their stories. Sometimes EfS educators would answer briefly or succinctly. More often their responses involved the entanglements that required telling stories of learning and teaching with layers of impressions and reflections. The discussions sometimes
involved a sense of struggle to pinpoint and express the complexities of meaning and
their intention as an EfS educator. During the re-listening and re-reading of analysis,
I noticed that in their sharing of stories, educators’ were creating their own
conclusions, re-wording their identification with their own environmental pedagogies
and reflecting on how this steered, guided and created the ways in which they go
about teaching. The contextual and inter-related nature of their positions, pedagogies
and praxis formed layered, undefined answers.

Educators, including Eva, told stories of learning and teaching to answer my
questions. Their narratives contextualise their insights and approaches to EfS and to
teaching practice. So, I considered the interviews as a series of learning stories in
which multiple players enact and communicate in layers. This was further inspired
by the diffractive approach to analysis. My diffractive analysis of their interviews
involved listening for EfS educator pedagogies and perspectives from both their
stated emphasis as well as the meaning they themselves pulled and consolidated from
their sharing. This is why and how the interviews became analysed as learning
stories.

**Participant-observation in a primary school**

As discussed, the choice to conduct research in a 5-star sustainable school was in
order to explore an already established world of EfS. Rather than evaluate best
practice, construct a case study or suggest how-to implement EfS in schools, this
research design focused on the pedagogical interests of teaching and learning EfS to
discern how understanding sustainability involves imagination. The immersion of
participant-observation in a primary school classroom allowed me to live the
experiences of EfS, as well as witness them. This approach was influenced by the
design of Macknight’s (2009) qualitative educational research on imagination and
MacLure, Holmes, MacRae and Jones’s (2010) reflexive work on researcher ways of
seeing through documenting and participating in primary years classrooms.

The school did not have any ‘imaginative’ interests or any mention of imagination
being a focus at their school. EfS was integrated into this public school through years
of investment in infrastructure, collaborative staff input and a scope and sequence that was based around ‘our sustainable world’. This context enabled my research to be focused on how imagination arises in and as EfS teaching and learning, without it necessarily being a focus for participants. The key EfS educator who managed sustainability at the school, Eva, was willing for me to observe her grade 3-4 classroom for nearly two terms.

In a sustainable school

The regional Victorian primary school was accredited as a ‘5-Star Sustainable School’ within Sustainability Victoria’s state government managed Resource Smart Schools’ framework. 5-Star Sustainable School status meant the whole school had implemented infrastructure and whole-school curriculum in the areas of ‘Water’, ‘Waste’, ‘Energy’ and ‘Biodiversity’ conservation. For example, the school ‘Green Team’, made up of students and teachers, evaluated their ecological footprint and implemented steps to reduce waste, conserve water and reduce energy consumption at the school. The school site was litter free, had a ‘rubbish-free lunch policy’, a kitchen-garden program and comprehensive student-led recycling routines. Whole-school systems were in place to collect biodegradable waste from lunches through composting, worm farms, and chickens. They compensated for their calculated emissions each year by planting trees and investing in renewable energy. Since these initiatives had been established for several years in a public school setting, the embedded and integrated nature of sustainability at the school occurred as strong and enduring.

The school curriculum was framed by a collaboratively constructed integrated curriculum design called, ‘Our Sustainable School’. This was developed by teachers and meant that ‘sustainability’ concepts were integrated into each learning area. These ‘5-Star Sustainable’ accredited examples demonstrated how the school had embedded sustainability education as a part of school life. The range of initiatives within a public school framework demonstrated innovation as a site of Education for Sustainability. This provided an established EfS setting for the research to explore if and how imagination occurred in a quality EfS teaching and learning context.
The process of participation and observation: gathering data

The participant-observation experience was conducted twice a week for 14 weeks in a dedicated grade 3/4 class of 24 students. The focus of research in these sessions was to participate and observe the workings of imagination over this timeframe. I did not declare this focus to the students, rather I engaged with my own process of seeing as informed by the methodological understandings of imagination and the sensitivities of participant-observation (MacLure, Holmes, MacRae & Jones, 2010). I discussed this with the teacher progressively and carefully, so as to not covertly demand ‘imaginative’ action. A digital camera, notepad, and video camera were used to document proceedings. Class-based discussions, excursions, student work samples, assessment and interviews with students and their teacher about class work were voice and video recorded. I found that students changed their behaviour and seemed affected by the use of video in their classroom. I was unable to overcome my own anticipation of students’ fear of video (MacLure, Holmes, MacRae, Jones, 2010) so this was reduced and then avoided. However, the brief footage I took as an outsider is put to work in analysis, enabling a layered recollection of inter-textual voices and forms. Also, Eva regularly used her iPad to take photos of students’ work and to video-record small conversations with them about their learning. This was a regular part of reflective classroom practice and assessment. These images and videos were shared with me for the research, and form another layer as Eva and I analysed the teaching and learning together using these post-accounts. This forms the structure of Chapter 9.

Type of EfS at work

Three units of work were engaged with during the course of 14 weeks. Two shorter learning sequences were experienced after the first 10 weeks. The first began with a story called *Lucky We Live Now* (Atkinson, 2009), which eventuated later into a unit the teacher called ‘Made on Earth’. The second short unit was a brief revision of the previous term’s work about waste and recycling called ‘Where is away?’ I have analysed these shorter learning sequences using a diffractive, narrative approach, as part of the educator learning stories in the first section of analysis, Chapter 7.
The main 10 week learning experience focused on a local population of migratory short-tailed shearwater birds. This involved excursions, classroom discussions, and individual and collaborative student work in a range of formats. The story of this unit became an important part of analysis because the substance of imagination arose in a range of media, events, realisations, environments and discursive strategies. This sequence is analysed as a diffractive narrative in Chapter 9.

**EfS resources as eco-texts: images, metaphors and narratives**

The EfS educators in the interviews and in participant-observation identified images, stories, online narratives and metaphors that they use as a part of teaching and learning sustainability concepts and perspectives. These texts are publicly available, sometimes online, and occurred as a part of the learning landscape of EfS. These ‘resources’ may fall outside the formal lines of EfS in Australia. They are not identifiable components of the national curriculum. However, they nevertheless make up an important dimension of the teaching and learning practices of EfS educators and students in the interviews and participant observation.

Over the course of data collection, these images and videos were referred to by teachers and students as a part of teaching and learning. A collection of visual and narrative forms are seen as agentic, inter-textual sources of EfS teaching and learning. A collection of these educational provisions is analysed in Chapter 7 as ‘environmental texts’ (Buell, 1995), and as eco-literature (Cutter-Mackenzie, Payne and Reid, 2010) through material-eco-criticism (Oppermann, 2013). I examine these eco-texts in Chapter 7 as storied objects that occur pedagogically and reflect representations of environmental knowledge and the discourses and practices of EfS, to contribute to understanding the nature and role of imagination in EfS. A material eco-critical analysis of these text-forms incorporates a New Materialist position on matter and materiality and an eco-critical (Buell, 2005) position on ‘environmental texts’. My analysis shows how both participant narratives and EfS resources call upon imagination. Analysis examines the ways in which they may be effective in teaching sustainability through generating and encouraging imaginative knowing and learning.
Analysis:
diffactive, narrative, eco-critical, cartographic

This section describes the diffactive, narrative, eco-critical and cartographic approaches to analysing the learning stories of the data. In this section I discuss how these approaches to analysis form ways of seeing the interviews and participant observation experiences. This is critical because undertaking this research has involved my learning about how established and embedded knowledge frameworks under-estimate children’s capacity to understand, neglect environment, misunderstand imagination, and constrain effective Education for Sustainability.

A diffactive way of seeing

Diffractive analysis is used as an enabling frame to recognise differences and produce meaning in layers. Barad’s (2007) and Haraway’s (2008) writing inspired my aim of reading data-texts diffractively, into each other, so that the agency of knowledge making is authenticated as collaboratively interdependent. Diffraction is a term appropriated from science. In science, there are many theories of diffraction (Born & Wolf, 1999). Diffraction describes the spread of light waves that interfere and diversify as a result of passing through a narrow aperture. The narrow opening influences how the wave-forms produce and how the light waves overlap, interfere, and disrupt each other (Born & Wolf, 1999, p. 412). So diffraction occurs as a metaphor for and an approach to research. Diffractive analysis extends the metaphor concepts of reflection in relating to data, to suggest that the mirroring assumptions of critical reflection be augmented into the active recognition of diversification, differences and their layered movements (Lenz Taguchi, 2012; Maclure, 2013; St Pierre, 2013). New Materialist philosopher, Barad (2007) uses the layers of water waves in her metaphorical description of ‘the diffractive’. Analysing and reading data diffractively is about reading with the data, rather than from a distance and separated from it (MacLure, 2013). I have drawn upon diffractive analysis to appreciate difference and the diverse, imaginative resonance and pull of working with the data. In an interview, Barad describes the entanglements of reading diffractively:
…a method of diffractively reading insights through one another, building new insights, and attentively and carefully reading for differences that matter in their fine details, together with the recognition that intrinsic to this analysis is an ethics that is not predicated on externality but rather entanglement. Diffractive readings bring inventive provocations; they are good to think with. They are respectful, detailed, ethical engagements. (Barad as cited in Dolphijn & Van der Tuin, 2012, p. 50)

In research, ‘the diffractive’ works to philosophise the importance of differences produced through analysis. This applies Deleuze’s (1994) post-modern re-evaluation of “difference in itself” (p. 174) that appreciates difference in order to re-instate the diversity that is reduced by structuralist practices. This interest in diversity rather than mimesis echoes concerns of Australian environmental philosophers (Matthews, 1991; Orr, 1991, 1994; Plumwood, 1993) regarding the need for understandings based on ecological, epistemological and ontological ‘Connectivity’ (Weir, 2008) as well as the insights of environmental criticism (Bateson, 1972; Buell, 1995, 2007; Oppermann, 2013).

This diffractive approach to analysis is aligned with the onto-epistemological positions of the New Materialisms (Alaimo, 2010; Barad, 2007; Lenz Taguchi, 2012; MacLure, 2013; Oppermann, 2013). Rather than seeking answers and finding truth, a diffractive analysis encourages heterogeneous meaning making and allows for non-uniform, non-linear and non/structured findings and expressions. Diffractive dialogues are not meant to equivocate the ambiguity involved in ‘finding’ imagination in Education for Sustainability. Instead, the New Materialist philosophies of diffraction assist the continual de-centring of anthropocentric knowledge production in research.

The non-representational concerns of diffractive analysis are interested in shattering notions of objectivity by authenticating multiplicities and differences. According to Barad (2007) diffraction is a response to the unrealities of representation and the problematic assumption that representations reflect reality (p. 87). My diffractive analysis produces diffractive, overlapping texts that, I argue, are consistent with the
‘difference’ of imagination and arts-based research methods (Leavy, 2009, p. 138). In this context, it is hoped to operate as an invitation into a willing contract to participate in the imaginaries of the data and develop a “non or post-representational research practice” (MacLure, 2013, p. 658).

*The diffractive involves imagination in analysis*

It has been important to this research to find ways to deal with the problems of representing imagination as the subject and object of research findings. My diffractive, narrative frame also incorporates ways of seeing and recognising imagination in the learning stories of the data. Imagination is a way of understanding with the data. I recognise the involvement of my own imagination as a researcher in the diffractive production of analysis.

New Materialist writer Lenz Taguchi (2012) describes how her diffractive analysis of learning involved imagining. She describes her relationship with the data that involves imagination; how she worked to “install myself in the data and imagine the intra-activity between...” (p. 276). As she imagines a scene described by a teacher, she involves her recollection in her analysis, including a layer of how “I sense the creative energy and imagination” (p. 275) of the child within the story of the data. She refers to “the reality invoked by my diffractive reading” (p. 276) as though this reality is not fixed but imagined by multiple agents. Critical to Lenz Taguchi’s (2012) process of analysing diffractively is an inclusive awareness of her self and her imagination in/as analysis. “Let me now investigate the entanglements of discourse...that emerge in the act of reading the data when making myself aware of my imaginary and bodymind sensibilities” (p. 275). I draw upon Lenz Taguchi’s (2010, 2012) accounts because her diffractive understanding and relationship with data goes beyond the epistemological position and investigative interests of Kenway and Fahley’s (2009) ‘researcher imagination’, which more simply describe a research point of view. These authors assert how imagination is necessarily involved in research and analysis. Lenz Taguchi’s (2010, 2012) accounts involve an appreciation of the imaginary within what can be called the real.
Imagination in diffractive analysis has not been a focus in the literature. Lenz Taguchi (2012) highlights its inclusive role in diffractive analysis: “What emerges in this event of reading the data diffractively is an effect of being affected, where thinking and imagining exceed data and ourselves as researcher” (pp. 276-277). An epistemic appreciation of imagination through diffractive analysis re-positions imagination as a way of knowing, as a part of analysis and with a potential to exceed materiality. I draw upon this diffractive incorporation of imagination to ‘exceed’ the divisions between myself and the data, thought and materiality. I diffractively analyse the interviews and participant observation in ways that include and involve the existence of imagination in materiality and in research.

Narrative

Narrative analysis is a recognised qualitative method of educational research (Barone & Eisner, 1997; Connelly & Clandinin, 1990; Leavy, 2009). Lejano, Ingram and Ingram (2013) discussed the use of narrative in environmental discourses as a powerful medium of exchange. They argued that as narrative is woven into environmental contexts a powerful relation between oration and the earth arises to combat prevalent unsustainable discourses that continue to objectify the world’s environments as ‘resources’. In this way, a narrative analysis of learning stories resists fixed representations, and anthropocentric views of data and knowledge.

Story is a powerful medium of environmental knowledge (Cutter-Mackenzie, Payne & Reid, 2010; Daniels & Lorimer, 2012; Payne & Cutter-Mackenzie, 2009; Reid, Payne & Cutter-Mackenzie, 2010). Story is used to teach and learn in Indigenous and non-Indigenous learning environments (Benterrak, Muecke & Roe, 1984; Carolan, 2005; Daniels & Lorimer, 2012; Egan, 1986; Morphy, 1991; Murphy, 2010; Sveiby & Scuthorpe, 2006). Sveiby and Scuthorpe (2006) write in detail of how “The Country is a Story” (pp. 15-39) and the “Knowledge is in the Story” (pp. 40-58). Stories occur throughout the data as mediums for imagination and as texts that communicate in non-linear ways. The medium of story seems to handle the layered entanglements of imagination, knowledge, environment and sustainability. The confluence of imagination and environmental knowledge in a learning story is
compelling to this research. So, my analysis treated the data as narratives; as layers of learning stories. Diffractively analysing them involves storytelling; the participants tell their stories, I read them as stories, and discourse texts are analysed for their stories.

The story of the research, the perspective of my analysis and the dimensions of EfS learning create layers of overlapping agency. The natural process of diffraction notices that data is always co-authored by multiple players in times and spaces; as a range of events, students, teachers, researchers, objects and their movements. Appreciating differences opens up the ‘material-discursive’ (Barad, 2007) assemblages and entanglements (Deleuze & Guatarri, 1987) that occur lyrically and aesthetically (Oppermann, 2013) in the narratives of the data. My diffractive approach includes how data in one form is transcribed into other forms. For example, from the event of interview, to voice recording, to transcribed text or, from the event of a student drawing, my watching, to wordy description, discussion, writing up, writing down, and so forth. Meaning is made through these layers, and threaded together through a sense of narrative. This problematic layering of voices, recordings, transcriptions and informal conversations produce layers of meaning in the narratives. The data is re/de constructed through an expanding and condensing aperture of diffractive, narrative analysis.

Eco-critical

Eco-criticism (Buell, 1995, 2007; Oppermann, 2013) is concerned for how the environment is positioned and constructed in texts and discourses. Criticism centres on the ways in which the environment is neglected and marginalised. An eco-critical eye is concerned to examine assumptions that conceal power and agency in texts and discourses, in order to restore agency to the non-human world. Buell’s (1995) eco-critical analysis of how nature is imagined in American ‘Nature Writing’ identifies anthropocentrism as a contradiction to environmentalism. His eco-critical analysis involved formulating criteria to evaluate the enviro-mentality of a text (Buell, 1995, pp. 6-8) in order to determine if a text is ‘environmental’ or not and to construct a level of accountability that is required for sustainability. This method of assessing the
enviro-mentality of a text relates to the worldview that authors construct. According to Buell (1995) fulfilling his criteria identifies a text as ‘eco-centric’ rather than anthropocentric (pp. 7-8). Buell’s eco-critical distinction ‘environmental text’ is a unique frame through which to assess the worldview that a text constructs, and to understand how the environment is constructed and positioned in relation to self. I employ an eco-critical eye to ways of seeing in analysis.

Material eco-critical

Fortunately, eco-criticism and New Materialism have a junction in contemporary literature. Oppermann (2011) critiqued eco-criticism because of its material focus and identified how eco-criticism “inadvertently put a rift between nature and culture” (p. 55). She works to re-align eco-critical views in non-contradictory ways by framing eco-criticism through the New Materialisms with the aim of developing a more rigorous epistemic standpoint. Material eco-critical analysis applies a New Materialist perspective to eco-critical work (Bennet, 2010; Iovino, 2013; Oppermann, 2013). In my analysis I use this New Materialist eco-critical work as a part of analysing the discourse eco-texts. This resists the contradictory implications of anthropocentric worldviews by crucially analysing the environmental framings of texts and discourses. This is a way to avoid contradicting the arguments presented by Australian Environmental and New Materialist philosophers already laid out in this thesis. Instead, material eco-critical perspectives necessarily involve revised enviro-epistemological positions.

In Chapter 8, I examine a range of ‘environmental texts’ that involve invitations to imagine. My material eco-critical analysis discusses how texts use, call upon or involve imagination. This material eco-critical analysis examines how imagination arises and how the environmental knowledge is framed and re-framed through imagination.
CHAPTER SIX

Cartographic

Mapping produces a conceptual frame to examine imagination in environmental terms. Cartographic ideas have emerged from interdisciplinary interpretations of imagination in the literature. Ideas of mapping have become a recurring theme in this thesis. This perspective does not value adhering to a singular reality by preserving proportionality, conventional scaling and gridded guidelines. My analysis is interested in mapping imagination in ways that do not depend on fixed notions of self or world. Instead, mapping is used in analysis to visually and spatially encounter imagination as environmental knowledge through the temporal and spatial suggestions and orientations of mapmaking.

The cartographic dimensions of my analysis involve re-conceptualising the environment as an infinite temporal and spatial terrain. Critically, this mapping is a way to relationally interpret concepts, and orient self in the map and that which the map represents. This process re-organises the structures of environmental knowledge cartographically.

Whilst Somerville and Green (2012) used mapping as a geographic tool to survey the field of EfS across parts of Victoria, Australia, their conceptual outline of this methodology recognised an extended potential for maps to encounter more than local environments in EfS and research. They argue: “mapping is an inherently powerful visual tool with the capacity to predict and understand current/future and local/global sustainability issues” (p. 71). This extends the potential of mapping in time and space in the context of this EfS research. Through mapping they found that local places “are connected to the materiality of… their historical and geographical emergence as eco-social units” (p. 70-71). This suggests that mapping can involve more than physical and topographical details, but include expanded temporal and spatial dimensions that are constitutive and contextual. They determined: “the development of visual mapping techniques proved useful and could be extended” (p. 73).

My mapping methodology draws upon their methodological conclusions. Rather than mapping to locate data geographically, my interest is focussed on the affordances of the visual and spatial qualities of mapping as an imaginative and environmental
method. Through analysis, I explore how mapping can be seen as a collaboration of experience and imagination, reality and representation and the limitations of both. Whilst, “maps represent our desire to know” (Hammond, 2000, p. 4) the contentious, problematic, representational quality of maps can be reflexively utilised (Olmedo, 2013).

I draw upon Olmedo’s (2013) examination of contemporary artist-cartographers, and their willingness to become lost in attempts “to show a dimension of space that is not usually mapped” and in order to make the interiority of personal experience more intelligible and inclusive (pp. 323-324). Olmedo argues that contemporary cartographic practices subvert the problems of conventional representation. I argue that mapping no longer requires a fixed notion of self and world, and can be used reflexively to alter the imaginary.

I employ a method of mapping in this research to make sense of sustainability, navigate the extensive field of EfS, re-conceptualise ‘the environment’ and trace the movements and dynamics of imagination. The dimensions of understanding sustainability (Figure 5.3) are used in analysis to investigate imagination as a way of knowing and being, in relation to temporal and spatial environments. Even as a map is a fixed representation, and is extremely problematic, the process of making and reading maps occurs diffractively.

A diffractive, eco-critical, narrative analysis of the cartographies of learning stories

Diffractive analysis is also an onto-epistemic approach to knowledge, and therefore causes new relations between researcher and data. I see this approach as relational as I experience the lure of the data that pulls the analysis as well as the ways the data is pulled by myself as researcher. My diffractive, narrative analysis is an approach and a way of documenting research experiences. I incorporate material eco-critical and cartographic dimensions. The cartographic impulse to map concepts is incorporated into analysis when relevant to the learning stories. Lenz Taguchi (2012) described her presence as a researcher colliding with her data in the narrative of analysis. She imagined her analysis working to “to open up data, to diffract, and to imagine what
nnewness might be incited from it” (p. 270). I draw upon MacLure’s (2013) writing that described knowledge-making in research where “discourse and matter are mutually implicated in the unfolding emergence of the world” (pp. 659-660). This means relating to data as having multiple, intra/inter discursive agency. So that my knowledge making is not created from a singular point of view looking out, but from a view that participates in the inter-discursivity between multiple and layered agentic sources.

Summary and implications for research

In summary, a diffractive, cartographic, narrative analysis of learning stories involves New Materialist epistemologies, material eco-critical insights and ways of reading the imaginative embodiments of thinking in and out of matter and texts. This analytical approach has extended to my way of being with the data during the months of analysis. The ways I perceived and experienced my data were not fixed either, but move and change. My position acknowledges the collaborative intra-inter relations that are constitutive and interdependent in analysis, so that ‘I’ am not separate and distinct from the world of my research, nor am I trying to reveal or uncover it. This has influenced the discursive, visual and narrative strategies employed in this dissertation in the following chapters. Relating to data as learning stories involves the people and practices as a part of larger narratives, that I have found, are inclusive in each learning ‘activity’ and perception of learning for sustainability. Diffractive analysis augments difference and allows for layers rather than definitions. This layered approach to analysis is inter-dependent. The layers fold into each other. They are entangled.

In the next chapter, I begin analysing the data from the EfS educator interviews in as I work with the learning stories. I add a material-eco-critical lens to work with the EfS discourses texts in Chapter 8. I put my diffractive, narrative material-eco-critical cartographic analysis to work in Chapter 9, Shearwater Learning Story.
CHAPTER SEVEN

Analysing the learning stories

In this chapter I begin my analysis. I examine the EfS educator interviews as narratives and present them as learning stories. My analysis aims to understand the nature and role of imagination in EfS teaching and learning. I return to the research questions to orient my analysis:

1) What is the nature of imagination in relation to the environment?
2) How does imagination work in Education for Sustainability (EfS)?
3) When does understanding sustainability require imagination?
4) How does imagination develop worldviews or revise ways of seeing the world?
5) In what ways is imagination involved in re/orienting the conceptual relations between self and world?

In the first section of this chapter, ‘Getting to know the EfS educators’, I examine what understanding sustainability means for the EfS educators, and how they think of and approach EfS. This aims to comprehend their perspectives of EfS, and the key concepts of sustainability that focus their teaching. From these perspectives I analyse their learning stories for imagination.

The following four sections diffractively analyse different EfS educator learning stories. I examine the ways in which understanding sustainability requires imagination and how imagination is involved in developing sustainable ways of seeing the world. I understand the nature of imagination in EfS in its diverse forms through these stories. The last section in this chapter, ‘Attributing the work to imagination’, analyses the ways in which the EfS educators recognise and speak of imagination in the context of their teaching and learning. This examines how they attribute learning and understanding to imagination.
Getting to know the EfS educators

This first section of analysis draws on the interviews with seven self-identified EfS educators. As a group, their practice represents a range of educational levels, EfS settings and subject matter (See table, 7.1). This is reflective of the broad range of subject content and contexts in EfS in Victoria.

What are EfS educator key sustainability concepts that focus their teaching?

In the interviews, I did not ask my research questions directly because I was not looking for an explanation of imagination in EfS. So, analysis depends on understanding the educators’ perspectives. I wanted to understand how educators approach their teaching within the broad interpretations of sustainability education, in order to uncover their perspectives and interpretations of sustainability, and what educating for sustainability means to them. I did this by asking each educator to describe the 'key concepts’ that focus their teaching, how they teach for this, and the ideal outcomes of their teaching they look for as/in their students’ learning (See Appendix I for interview questions). I wanted to understand: their views and approaches to EfS as a pedagogical practice, how they see knowledge, what understanding sustainability means to them and how they position their work in relation to environment and education.

My questions about the ‘key concepts that focused their teaching’ asked what they really aimed to teach and what they wanted their students to learn in relation to the topics that they teach. I expected their key concerns would include the importance of key sustainability concepts like recycling, energy efficiency, saving water, life cycle analysis or eco-footprinting. However, educators did not identify their key teaching and learning goals with content. Their responses were clearly not based on subject matter, but had a broader perspective aligned with purpose rather than outcome. This line of questioning began discussion about their interests within sustainability education as well as their individual pedagogical aims and interests.
All of the educators’ key concepts involved the aim of encouraging students in becoming aware of their inter-connected and influential relationship with nature. The absence of content focus reframes the emphasis of their EfS teaching from content-based knowledge to the broader, conceptual work of becoming aware and understanding. For example; “And I think where I come from is to not take what you do in your life for granted. There is a reason behind the way you live your life” (Mike, interview, July 16, 2012). Mike’s statement has been transcribed, and interpreted as a response to the question about the key concepts that focus his EfS teaching practice. I have included all the EfS educator responses in Table 6.1, below. Their names are listed in the left hand column under ‘EfS educator’, and their responses are listed in the column titled, ‘key concepts that focus EfS teaching and learning’ as transcribed from their own words.

<table>
<thead>
<tr>
<th>EfS educator</th>
<th>Topic</th>
<th>Key concepts that focus EfS teaching &amp; learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eva</td>
<td>General</td>
<td>You leave places better than you found them, because you can.</td>
</tr>
<tr>
<td>Stella</td>
<td>Biodiversity</td>
<td>To develop a greater connection to this town through sense of place.</td>
</tr>
<tr>
<td>Jamie</td>
<td>Waste</td>
<td>We are connected to our environment through how we influence it. There’s a bigger picture involved when you just throw something on the ground or just chuck it away.</td>
</tr>
<tr>
<td>Ben</td>
<td>Water</td>
<td>How we are a part of the environment, we’re not separate.</td>
</tr>
<tr>
<td>Simon</td>
<td>Energy</td>
<td>I am a part of this beautiful thing around me and how can I understand how to tread more lightly and to also re-connect or connect with it.</td>
</tr>
<tr>
<td>Olivia</td>
<td>Life Cycle</td>
<td>Everything around us has a story and a life. Things don’t just exist.</td>
</tr>
<tr>
<td></td>
<td>Analysis</td>
<td></td>
</tr>
<tr>
<td>Mike</td>
<td>General</td>
<td>To not take what you do in your life for granted. There is a reason behind the way you live your life. We are responsible for our world.</td>
</tr>
</tbody>
</table>

Table 7.1. This table lists ‘EfS educators’ ‘Topic’ of EfS teaching practice next to the ‘Key concepts that focus their teaching’.
Each educator’s description of the ‘key concepts’ that focus them generate a deeper understanding of what motivates them as educators including how the topics they teach are conceptually oriented for them. For example, Ben teaches the topic of water. The key concept that focuses his teaching is “How we are a part of the environment, we’re not separate” (Ben, interview, August 30, 2012, see Table 7.1). Similarly, in teaching the topic of waste, the key understanding that focuses Jamie’s teaching is: “We are connected to our environment through how we influence it”, and: “There’s a bigger picture involved when you just throw something on the ground or just chuck it away” (Jamie, interview, Sept 2, 2012, see Table 7.1).

The tertiary EfS educator, Olivia, teaches Life Cycle Analysis (LCA) at a tertiary level. In the interview, Olivia summarised the key concepts that Life Cycle Analysis aims to achieve, and the ideal result of her teaching in the lives of her students in terms of a way of seeing the world:

The way people would see would be, that things don’t just exist. Things don’t just arrive at a shop and then get thrown in a bin, which is currently how most people see the material world. So that’s what I try and get people to see.

( Olivia, interview, April 3, 2013)

As a tertiary EfS educator, Olivia consolidated LCA into an understanding of embodied materiality, asserting her ‘key concept’ that focussed her EfS teaching as “Everything around us has a story and a life” (Olivia, interview, April 3, 2013). Olivia translated the environmental knowledge of LCA into a way of seeing. This suggests that she considers the knowledge of LCA results in understandings that inform ways of seeing. The “way people would see” involves being able to see an expanded presence of a consumer item, that otherwise, according to Olivia, is not recognised for more than its immediate price tag and availability. This shows how EfS produces new ways of seeing materiality and is concerned to teach for this re-visioning.

---

9 LCA is a complex process of scientific analysis that tracks and measures the resource use and pollution of consumables.
These extrapolations are not linear or logical but are concerned with generating awareness of an inter-connected, bigger picture that involves awareness of other agents and understandings of origins, futures and other beings. This helps me to understand how teaching a topic in EfS is contextualised for the educators by revised worldviews in which objects, nature, places and things are not ‘taken for granted’ or as simply existing, but are engaged with as inter-connected, and as having story, life and meaning.

These responses can also be seen to be related to each other in a broader sense of becoming aware of interconnection. In each elaboration the self and the world can be seen to be positioned in partnership, for example: “we are a part of the environment” (Ben, August 30, 2012, see Table 7.1), or “we are a part of this beautiful thing” (Simon, August 12, 2012, see Table 7.1), or “we are connected” (Jamie, September, 2, 2012, see Table 7.1). The responses also evoke characteristics of places that are locatable in between nature and humans, as in “connection” and “sense” (Stella, interview, Sept 2, 2012, see Table 7.1), as “influence” (Jamie, September 2, 2012, see Table 7.1), and as “responsibility” (Mike, July 16, 2012, see Table 7.1). These places in between self and world are also addressed with aims of qualitative improvement as in, “better” (Eva, February, 2012, see Table 7.1), “more lightly” (Simon, August 12, 2012, see Table 7.1), “bigger picture” (Jamie, September 2, 2012, see Table 7.1), “a greater connection” (Stella, interview, September 2, 2012, see Table 7.1). Through these statements of focus EfS educators show concerns for developing awareness that extends understandings of the environment in relation to self.

*Teaching ways of seeing: crafting the conceptual relation between self and world*

In the responses listed in Table 7.1, two educators draw from the negative to contextualise their meaning: “Things don’t just exist” (Olivia), “we are not separate” (Ben) and “to not take what you do for granted” (Mike). These statements are suggestive of an interest in unveiling something that is hidden or unseen. The unveiling or exposing of that which is “taking for granted” (Mike) or “reason behind the way you live your life” (Mike) suggests that EfS learning and teaching involves
uncovering hidden knowledge, that which is beneath and not obvious. As key concepts that focus teaching, these responses value an ability to perceive that which mediates self and world, as in “connection” (Stella, Jamie) “reason” (Mike), “influence” (Jamie) and “story and life” (Olivia). Unconcealing the hidden and unexposed is suggested through ‘reason’, ‘influence’, ‘connection’, ‘responsibility’ and ‘life’ and these elements emerge as key teaching and learning orientations.

The EfS educator responses disrupt generalisations that categorise EfS as ‘about’ environmental issues or about conserving ‘resources’. Rather, their responses reflect the philosophical work that underpins these educators’ pedagogies. Their statements (Table 7.1) construct how ‘the world’ or ‘the environment’ is conceptualised. EfS educators construct self as: ‘I’, ‘we’, ‘you’, ‘everything’, ‘kids’. Collectively, they construct a sense of ‘the world’ or ‘the environment’ as: ‘places’, ‘nature’, ‘our environment’, ‘away’, ‘life’, ‘our world’, ‘this beautiful thing’, ‘everything’, ‘existence’ (Table 7.1). Navigating the relational dialectics between learning, knowledge, environment, and sustainability concepts is the playground for EfS practitioners. All EfS educators interviewed are engaged with ways of seeing the world as a focus for their EfS teaching; crafting alternatives that involve living relationships that orient environmental, epistemological and pedagogical understandings. Themes of responsibility, being a part of nature, developing connection and examining the relationship between oneself and the natural world occur. This has allowed me to understand that their teaching involves ways of seeing the world and orienting oneself in relationship.

To understand how imagination may be involved in developing new ways of seeing the world and orienting one’s self in relationship, I examine how the educators go about teaching for such aims. To explain their pedagogical perspectives during the interviews, EfS educators shared examples of teaching and learning experiences with me. These stories included highlights, memories, anecdotes and the affective impressions of their EfS teaching and learning experiences.
Imagination: in the learning stories of the EfS educators

In the previous section I aimed to understand what sustainability and EfS means to the educators and I gained insight into their ideas of EfS teaching and learning. In the following sections, I work with a number of learning stories diffractively to examine the ways in which imagination arises through teaching and learning. The places and forms of imagination arise subtly and differently. My analysis is attentive to places where any aspect of the palette of imagination may arise in the stories. The focus of analysis is to examine if/when/how understanding sustainability requires imagination, and what the nature of imagination is in EfS through the learning stories and experiences of the EfS educators.

Imagining water through story

EfS educator Ben, focussed his EfS workshops for primary students on waterway ecologies and the ways in which humans impact on water quality. Rather than describing the component parts of the water cycle, or using diagrams to cover a range of scientific processes, Ben used story-based lessons and encouraged students to become immersed in an imagined environment. During the interview, Ben described the key concepts that focussed his teaching as: “how we are a part of the environment, we’re not separate” (Ben, interview, August 30, 2012). When I visited Ben’s workplace to conduct the interview, I observed one of his workshops with a group of 16 primary school children. He didn’t refer to the need to ‘break it down’ so that the knowledge of sustaining waterways was understandable, or ‘tell’ them ‘about’ ‘it’. Ben is a storyteller; he described his teaching in the workshops as: “taking them down the course of a river”.

We start off in the mountains, painting a picture of that, with their eyes closed getting them to feel that... So, taking them down the course of a river. I take them as if they are in the river, ‘alright let’s all jump in the river’, and we are flowing down the river. (Ben, interview, August 30, 2012)
Ben’s description of ‘taking them down the course of a river’ referred to leading students into immersive pretending. By asking his students to ‘all jump in the river’, ‘in their imagination’, students experience going ‘down the course of the river’ together. The impossible experience of a whole river, over time, was the setting for the story and was enacted within students individually, and collectively through their imaginations. Students’ experiences were not of any ‘real’ river out there, but the experience of self and of an imagined materiality. Ben acknowledged the impossibility of the experience and the use of imagination: “…because you know, we are not in the mountains. But I like them to start to imagine” (Ben, interview, August 30, 2012).

Ben described his focus on encouraging students to see imaginatively in order to conjure up a personalised landscape as a vivid canvas for the story/learning. The environment of the river and the mountains in the story are imagined. He didn’t tell his students what to see or feel, but encouraged sensitivity in seeing their river imaginatively. Ben asked his students what they see around them, in their imaginations. I witnessed this, and later he told me: “So I ask: ‘What does it look like? What does it look like around you? What do you see? What do you feel? How do you feel, sitting there in the mountains?’” (Ben, interview, August 30, 2012).

Questioning what students see and how they feel, as well as his earlier description of this practice as ‘getting them to feel that’, suggests that Ben’s understanding of imagination involves more than visual imagery. In Dewey’s (1902) lecture, he described imagination as “the power of forming mental pictures” (p. 242), and qualified at length that ‘mental pictures’ involve more than visual imagery:

Now there are different kinds of these mental pictures, or images. We are most accustomed to take simply the eye pictures, the visual pictures, as they are called; but we also have auditory images, mental reproductions of sounds and tones; motor images, the images of movements, and touch images, images of the feel of different things. (Dewey, 1902, p. 242)

As an EfS educator, Ben seemed to have recognised that imagining involves many senses. The learning through inter-sensual imagining was positioned as a way of
more fully experiencing ‘the river’. The focus of this learning/teaching experience ‘in’ the mountains’ and ‘in’ the river used imagination to experience various places, and place over time, and this was encouraged by teacher-as-storyteller. Ben introduced characters into the story as the narrator, for students to respond to. These characters were animals relying on the river for life, and stereotypes that confronted the river, and the story, with problems and questions. These scenarios prompted students to imagine how water responds to a range of interlopers like litter, detergents, sediment and grease; endowing water with responsive being.

Through becoming immersed in imagining, students were geared to see and experience this river inside themselves. I watched students in a circle close their eyes, and open them freely, without losing the experience, as though the imagining was not only internal but was of the world as well. I saw that having their eyes closed was not a necessity. The group created rain soundscapes by slapping their skin. Students appeared alert to the challenges of navigating down the river and appeared ready to respond to the movements of the story. For example, as they travelled ‘down the course of the river’ they encountered curves, rocks, bends and bumps in the river and their bodies responded by swerving, dodging and ducking. The environment of the story, and their experiences occurred as personal, creative and engaged.

At the end of the lesson, as the group moved out of the imaginary landscapes and back into the timescale of the school day, the educator, Ben, asked them to reflect on what they had seen/imagined, and to make connections between the vision of the story and their ‘real’ life. The place-time events of their imagined river experience were entangled with realness, experience and knowing. In the interview, Ben described his students’ behaviour after the workshop that he assessed through asking questions.

At the end - after seeing all those things and imagining all those things I ask, ‘Has anyone ever seen this before?’ They say, ‘Yeah! There’s plastic in the river near my place’, or, ‘At my park there’s people who don’t pick up their dog’s poo!’. They definitely understand the connections, and make connections from what they’ve seen. (Ben, interview, August 30, 2012)
Ben’s evaluation of his students’ responses arose as a way to assess their understanding, and occurs for this research as a way to evaluate the effectiveness of imagining as learning. Ben described how students showed a sense of having been affected as richly as if they had really been to the mountains and travelled down the course of a river, and seen all those things: “It’s like they’ve been there, and know the animals they’ve seen; they want to help” (Ben, interview, August 30, 2012).

While ‘what’ students have ‘seen’, and ‘where’ they have been in the story have all been imagined, student responses show no difficulty linking their imaginary with present-time and space. Even though they have ‘been down the course of a river’ while sitting in a circle, sometimes with their eyes closed, Ben determined that they ‘definitely understand the connections’ implied between the imagined and the real; and between the ideas in the story and materialities of ‘real life’. Ben’s certainty recognised that what was imagined affected students’ knowledge and understanding of water quality and river systems. This learning may relate to what tertiary EfS educator Olivia, described as an “internalised understanding” (Olivia, interview, April 3, 2013) as distinct from ‘knowing about’. This also recalls Malouf’s (1998) argument regarding the ways in which the outside world is ‘taken in’ and re-possessed as personal knowledge through imagination.

The assumption that the imagined and the real are not connected requires questioning here. This analysis of ‘making connections’ assumes that the imagined and the material are separate and distinct, and in need of connection. An alternative interpretation might be that there is no distinction between the material and imagined, or between the environment of the river and knowledge about it. Students were the river in the story; they were also the story. Through story the river and the knowledge are already connected (Sveiby & Scuthorpe, 2006, see p. xv. & pp. 15-71). Knowledge as story, as river, as material, as imagined constructs an overlapping correspondence between knowledge and the world, the real and imagined. These agentic entanglements are indistinct, but are worthwhile to consider because of what it makes possible: a greater understanding of imagination and experience in learning, and an understanding of materiality that is entangled with the imagined rather than distinctly separated from it.
This learning story demonstrates how imagining enhances experience. When students reflected on what has been imagined as a real experience, they did this from the informed perspective of presence. Having imagined places and events during learning, the other-worldly guise of imagination assumes that the story was simply made up. However it was reflected upon as though it happened in an-other place at an-other time, whilst simultaneously constructing it as an experience and constitutive of presence. Importantly, through evaluating student questions and responses, the students seemed to become oriented by these imagined experiences. Their experiences, whilst imagined, give context to the real. These complications are embraced as diffractions where the overlapping of ‘real’ and imagined spaces/times re-situates concepts of self (learners, educators, researchers, readers) in multiple, unique and shared worlds. In this case, Ben’s teaching and learning approach enabled what had been imagined to occur as a real experience that students can come away from as if they had been there, and seen that. Students found no difficulty in connecting what was imagined with real experience evidenced by how they reflected on what had been imagined as a real experience. This learning story embodies how imagination can enhance experience and can be central in environmental and pedagogical concerns and practices.

*Attaching realities through experience and imagination*

In the previous section, I used Ben’s learning story to underscore how imagining can enhance experience as a central part of understanding the complex relationships between water and people. I now turn to Mike’s story to show how imagining informs his teaching and learning approaches with his tertiary students. In our interview the tertiary EfS educator, Mike, elucidated his concern for transforming the regular and unquestioned ways of perceiving the everyday world as a core component of EfS. This idea that everyday social and cultural experiences are underpinned by meaning resonates with Lakoff and Johnson’s (1980) *Metaphors We Live By* and Castoriadis’ (1987) idea of a ‘socially instituted imaginary’. Mike recognised that they ways students think of everyday objects and situations may not be accurate or beneficial. He strongly asserted that outdoor, on-site, real-life experiences are essential to access and correct his students ways of seeing everyday
encounters. His tertiary curriculum included excursions to ‘follow the structures’ that connect ‘the light switch’ to the power plant, or the tap water to the catchment. Mike described these as: “the structures that facilitate humanity’s quality of life” (Mike, interview, July 16, 2012). This means that Mike’s tertiary students go, as a class, to landfill sites, water catchment areas and the La Trobe Valley coal mine in regional Victoria. Mike described how important this process is for his teaching:

This fundamental element is essential: we go out into the world. We go to the nature that is the city, we will go to the supermarket, the coal mine in the LaTrobe Valley, the landfill, we will get in it. (Mike, interview, July 16, 2012)

Mike’s description of experience as ‘getting in it’, and going ‘out into the world’ positioned everyday appearances away from this immersion. Being in the world or in the environment has embodied connotations that value the physicality of including self in these real places. This emphasis suggests that without experiences these places are invisible abstractions:

We’ll follow the structures that we live in, that shape our being-ness, that we take for granted, that have massive impacts but they’re beyond sight, so beyond thought. We don’t have mental models for them. We try to attach a reality to those bearings. (Mike, interview, July 16, 2012)

Within Mike’s focus on physical experience, he emphasised the need for these excursions in order to influence student conceptualisations of the ‘behind the scenes’ environmental structures that shape and ‘facilitate life’. The design of these experiences ‘out into the world’ are informed by perceiving that much of ‘sustainability’ is hidden, ‘beyond sight’ and ‘taken for granted’ and these concealed elements create blind spots that are ‘beyond thought’ and in need of a ‘reality’. Mike highlighted that the purpose of the experiences was to enable his students to create clear, coherent images of the systems at the edges of everyday experience. The water catchment, coal mine and landfill are the sites that need to be managed sustainably. However, Mike focussed on orienting these sites as places that are connected to experience in order to enable his students to ‘attach a reality’ to them. This was
considered the foundation for later discussions of renewable energy and sustainable resource management in his tertiary classes. Mike iterated an understanding of experience as something that enables imagination, or gives the means to imagination, when he said to me: “So physical experience, seen and felt with the new ways of understanding, together enable the imagination in those precise ways. You don’t need to go back” (Mike, interview, July 16, 2012).

Mike’s attention involves a pedagogical perception that experience enables imagination. This echoes Dewey’s (1902) interpretation of imagination as: “the power of forming mental pictures of whatever is presented” (p. 11). Mike did not approach experience as the goal or the end-point of learning, but to enable his students’ imagination. Mike’s certainty that his students ‘don’t need to go back’ to the coal mine, the landfill, or water catchment, re-positioned experience as informing the conceptual imagery of imagination. He iterated a confidence in the ways that their experiences construct conceptual imagery for the purpose of fleshing out otherwise concealed and ‘taken for granted’ imaginary. It could be said that physical, sensual experience in place produces experiential imagery to fuel imaginary concepts, connections and understandings. The idea that ‘You don’t need to go back’ affirms the non-exclusive place that physical experience has in EfS for Mike. This re-interprets the relations between experience and imagination.

In summary, Mike valued outdoor experiences to enable his students to see and be in places that are connected to everyday materiality but go unseen and unnoticed. His excursions were designed to expose the embodied realities behind, within and at the source of everyday matters of convenience; of rubbish bin, shower, tap and light switch. The point and purpose of the excursions was so that students could later be able to apprehend the source and consequences of daily life with greater context and significance. Mike’s awareness of conceptual imagery assured him that his students would sustain their understandings even after their visible, tangible experiences were finished. The idea that many dimensions of material truth can be both experienced and imagined is extended in the next section through the analysis of Simon’s and Eva’s learning stories.
Imagining and re-imagining the experience of energy

In the next two sections, I use Simon’s and Eva’s learning stories to continue to discuss the entangled relations between imagination and experience in the context of Education for Sustainability. In his interview, the energy educator, Simon, presented an analogy that spoke of the impact of our imagination, and how we imagine, on our direct experience. This version of imagination occurs differently from Ben’s use of imagining in storytelling, and from Mike’s use of experience. Instead, for Simon and Eva, imagination occurs as an implicit way of seeing the world that is filled with particular assumptions that seem taken for granted. I will draw on the work of Lakoff and Johnson (1980) and Castoriadis (1987) to interpret the dynamics of imagination in their learning stories. In the interview, Simon said he used the following analogy in his EfS teaching to examine the way electricity is seen and imagined:

If you walk past a room, and there is a tap running in that room, you are compelled to walk in there and turn the tap off because you instantly identify it as waste. But you don’t imagine that with energy because it hasn’t been instilled in our culture. To leave something on when you’re not using it is a very wasteful thing to do in regards to water. But not when it comes to energy... But in reality, the impacts of energy waste are infinitely greater than the impacts of water waste. Our culture is attuned to water wastage because it’s a physical, tangible, whereas the energy is not. It’s invisible. (Simon, interview, Aug 12, 2012)

Simon’s analogy highlights the differences in how water and energy are ‘identified’ and ‘imagined’ in everyday life for him. The use of imagination is suggested in the third line of this quote: ‘but you don’t imagine that with energy’ which occurs as a form of associative identification. Imagination is further put to work to understand Simon’s concept. As an EfS teaching strategy, the metaphorical relations of analogy operate to transpose ways of thinking about water, to ways of thinking about energy. In their analysis of Metaphors We Live By, Lakoff and Johnson’s (1980) assert, “The essence of metaphor is understanding and experiencing one kind of thing in terms of another” (p. 5). They later described the central role of imagination in the same way:
“Imagination, in one of its many aspects, involves seeing one thing in terms of another kind of thing – what we have called metaphoric thought. Metaphor is thus imaginative rationality” (p. 193, italics in original). So, through Simon’s metaphor, imagination is called upon to enable understanding, through transferring the meaning and significance in ways of seeing water to the matter of energy.

In the last line of the quote above, Simon identified the invisibility of energy to be the difficulty: ‘it’s invisible’. However, it is not only the physical attributes of energy that are invisible. The consequential ‘real impacts’ of energy waste that are ‘infinitely greater’ are also concealed in everyday experiences. This is because these impacts occur in other places and times. The use of metaphor / analogy brings conceptual visibility to energy through association, and according to Lakoff and Johnson this requires imagination to be understood.

In Castoriadis’ (1987) social theory, a society ‘institutes itself’ and its values, through the creation of imaginary significations that result in shared social meanings (Clarke, 2002). Simon also recognised a social influence: “But you don’t imagine that with energy because it hasn’t been instilled in our culture” (Simon, interview, Aug 12, 2012). Simon clearly identified socio-cultural forces as influential in how students experience materiality. This involves EfS with identifying social imaginaries and revising ways of seeing to include the realities that are concealed by ‘instilled’ everyday appearances. Simon’s approach aims at re-imagining, through metaphor, to encourage student reflection on how one sees/experiences/imagines in order for students to re-construct/re-encounter experience. Accordingly, the job of the EfS educator involved re-educating this imaginary in alignment with sustainability.

In summary, Simon consigned wasting energy to an imagined way of seeing. His method of metaphor appreciated the pliability of these imagined associations. The implication here is that re-framing experience is possible through re-imagining. To build upon these ideas, I turn to Eva’s learning story where she examines the unexamined assumptions involved in the everyday acts of throwing away.
Imagining where ‘away’ actually is

In the previous section, I examined how imagination is entangled in material encounters and how Simon used the imaginative work of metaphor to teach better ways of understanding the realities of energy through imagination. In this section, I extend these ideas through the analysis of Eva’s learning story. Eva is the EfS teacher at the regional primary school in Victoria, where I participated and observed for 14 weeks. The main 10 week learning experience from the participation-observation research is analysed in Chapter 8, ‘Shearwater Learning Story’. However, during the course of 14 weeks participant-observation, three units of work were engaged with. I analyse the two shorter learning sequences that were experienced after the first 10 weeks, in this chapter, as a part of the EfS educator learning stories. This learning story is one of those shorter sequences, and is about waste and recycling.

Eva described to me how she collaboratively designed a whole school, inquiry learning unit called ‘Where is away?’ as a part of refining the school’s on-site rubbish bin and recycling bin systems. The title ‘Where is away?’ focuses on the places where rubbish and recycling eventuates. The question brings forth the realities beyond disposal. This title acts to question how thinking about ‘throwing away’ occurs. This is different to the more pragmatic tasks of sorting rubbish or allocating bins to classrooms. Eva qualified the question, “When we throw something away, where is away?” (Eva, March 4, 2013). This questions ‘away’ as an imaginary that is concealed within everyday discourse. It occurs that ‘throwing something away’ constructs ‘away’ as a passive destination, and questioning this acts as an invitation to imagine where ‘away’ actually is. Through this, Eva crafts ways of thinking in order to realise that ‘away’ is an impossibility; a generalisation that conceals the material impacts and consequences of consumption, disposability, waste and litter.

Eva described the impact of the question for her students: “We soon realised there is no ‘away’...and this needs to be realised in order to fully understand what waste is, where it goes and why we recycle” (Eva, March 4, 2013). Eva picked up on this line of inquiry from an online video called ‘Where is Away?’ (Thiermann, May 12, 2011)
made by environmental activists concerned with the impact of plastic litter in the ocean. The video suggests that ‘away’ is not ‘other’ but the matter and reality of the living sea. The point for Eva involved the reality behind the illusion of ‘away’ and the importance of educating students that the discourse and experience encountered as ‘throwing away’ is not the full story. Questioning the immateriality of ‘away’ helps to identify limited understandings of waste. As soon as it is questioned, I can start imagining real places and impacts that ‘away’ might actually refer to. I imagine landfill sites, the lives of people who hand-sort rubbish, complex recycling processes, and global waterways that are impacted by litter. Eva’s ‘Where is away?’ evoked futures that were not previously considered apparent or relevant, but required imagining in order that each bin could be re-encountered as, not an end-point, but a pathway to somewhere.

This work was done the term prior to participant-observation and so told to me as a learning journey that had resulted in re-naming the rubbish bins. “The bins are set up as a series of choices”, Eva said with her students beside her, agreeing. Labels on the bins signified the choices: ‘Compost’, ‘Chooks’, ‘Recycling’ and ‘End of line’. A student said, “The regular rubbish bin was re-named ‘End of line’” (Primary student, personal communication, March 4, 2013). This occurred as a purposeful title more suggestive of its future than its contents. The ‘End of line’ bin was the only bin that was not recycled, not composted, or re-used in some way. Eva’s student clarified the meaning in a simple way that expressed her clear understanding, “End of line means the end of the line” (Primary student, personal communication, March 4, 2013). Eva continued, “Instead of saying ‘just throw it away’ they say ‘put it in the end of line’” (Eva, March 4, 2013). In this learning story, instead of focussing on the management and logistics of recycling systems, Eva worked to question and examine how waste production at school was imagined. This resulted in material changes that revised the infrastructure and discourse of rubbish around the school.
Concluding this section: experiencing and imagining materiality

EfS educators’ pedagogies highlight the influence of how we imagine on the way materiality is seen, understood and acted upon. The rationale for this was that the real dimensions located within a river, or behind a light switch or beyond an act of throwing something away are concealed, dislocated or invisible to everyday experience. The EfS educators examined these imaginaries with their students in different ways, in order to reveal inaccurate assumptions and re-imagine beneficial and sustainability oriented ways of seeing and experiencing. Ben’s use of story for primary students facilitated them being imaginatively immersed in the river to learn about waterways. His learning story demonstrated how imagining can be an experience that can enhance understanding. Mike valued outdoor experiences to enable his tertiary students to see and be in places that are connected to everyday materiality but go unseen and unnoticed. Mike did not approach experience as the goal or the end-point of learning, but in order to enable his students’ imagination. Simon’s analogy of water and energy, and Eva’s metaphorical question ‘Where is Away?’ alluded to the inaccuracies within social imaginaries. They both worked to highlight the realities of energy use and the real events involved in dealing with waste that can’t be seen. These learning stories form trajectories towards understanding the imagined components of ‘real’ experience and the possibility of EfS educating an imagination that is constitutive in our seeing and experiencing.

This analysis has described how the work of EfS educators involved identifying and re-educating imaginaries in alignment with sustainability. In different ways, their EfS practice worked to revise regular, everyday ways of seeing through strategies that expose unexamined assumptions about what is seen and what is concealed. Storytelling, metaphorical thinking and questioning, imagined and outdoor experiences, are pedagogical practices that EfS educators used to examine and revise how the world is seen, thought about and understood. Their pedagogies expose the concealed dimensions of sustainability in order to encourage students understanding of the environment within and all around them. In the next section, I continue to analyse how EfS educators use imagination to inform ways of seeing and experiencing materiality.
Imagining the dimensions of sustainability

In the last section, I discussed imagining through story, experience and ‘the imaginary’ components of ways of seeing and experiencing. In this section I continue to explore the relationship between experience and imagination in EfS through the educators’ learning stories. I will discuss ways in which imagination is involved in apprehending what cannot be seen directly. In this sense, imagination is a way “to get hold of things that are not directly present” (Dewey, 1902, p. 11). This approach relies on a conceptualisation of experience that is located in space and time, as presence: if something is not present, it cannot be experienced directly. The learning stories have suggested that understanding sustainability it often at the edges of experience.

According to this conceptual map (Figure 7.1) that which is ‘beyond experience’ relies on a temporal and spatial conceptualisation of experience. I suggest that the territories beyond experience are the terrain of imagination. This discussion of
experience is environmentally oriented in relation to time and space, which situates self and other. The visual mapping highlights the limitations of immediate experience in context by recognising that physical, hands-on experience is necessarily situated in and confined to here-ness and now-ness. This cartographic frame works towards an environmental epistemology of imagination that constructs self as experience, and as environmentally constituted by all of time and space. From this, both experience and imagination emerge as relative, proximal conditions of self in relation to time and space. That which is ‘other’ than self arises constitutively.

Through this interpretative cartography I understand the sensory places of immediate local materiality as known through experience. Accordingly, I analyse imagination as required to become aware, learn and know that which is beyond experience in time and space. In the following analysis I distinguish between physical experience in the immediate environment, and the presence of other places, times, perspectives through the frame of the time and space map (Figure 7.1). I return to Mike’s learning story, then Jamie’s learning story to discuss the role of imagination when experience isn’t enough.

**Immediacy: how empirical ideas of experience and environment affect EfS pedagogy**

In primary and secondary school-based EfS, concerns for making the complexities of sustainability issues ‘real’ and ‘relevant’ for learners tend toward learning designs that focus on doing environmental activities. For example, if students are learning about biodiversity, they might plant trees or do a garden audit. If they are learning about waste, they look at recycling bins, lunch boxes and schoolyard litter (see Hope, 2009; Karena, 2010; Knapp, 1996; Tilbury, Coleman, & Garlick, 2005a, p. 88). EfS educator, Simon expressed his approach to experience:

One of the things I’ve learnt is that people effectively care about what is involved in their immediate environment. What I mean is their school, their home life, the immediate places where they do most of their living. They largely don’t care about what’s happening over the next hill. (Simon, interview, Aug 12, 2012)
Simon emphasised immediate experience because of the assumption that students, as ‘people’, don’t care about anything else. Simon is interested in focussing his teaching on what he assumes his students care about. It was not clear if this idea came from asking students individually what they care about or how they think or if was an assumption. Nevertheless, Simon’s rationalisation orients ‘care’ in terms of environmental proximity. In the interview, this perspective was offered as a basis for Simon’s pedagogical approach; the design of teaching and learning experiences with the understanding that things need to be seen or touched to be known:

So sometimes when you try to talk to kids or to adults about ‘big picture’ issues; if they do a particular action they will have an impact, down the line, on a whole range of people, whether that is a positive or negative impact, they largely seem to not care. But, if they have that same impact on their immediate environment, that they can see, or that they interact with, like, people around them or their immediate physical environment, they will care a lot more about it because it directly affects them. (Simon, interview, Aug 12, 2012)

Conclusions about the environmental proximity of affect are being made progressively in this quotation. Simon constructed the primacy of the immediate in contrast with ‘impacts down the line’ for young people. He positioned the other-than immediate in a range of locations; ‘over the next hill’, on ‘a whole range of people’ or ‘down the line’. These other more distant places and perspectives are constructed as inaccessible, and as a counterpoint to experiences in the immediate environment. Simon idea assumes that immediate experience is best the way his students learn because it encompasses what they care about. This line of thinking constructs the value of experience in learning for the educator. Simon’s perspective on the visibility of immediate, affective experience dominates his approach:

So what I’ve tried to do in sustainability, in terms of getting people to change culture, is immediacy. It’s things that they can do in their own environment, now. Not the things that they should be doing to affect the future. (Simon, interview, Aug 12, 2012)
Simon’s spatial notion of immediacy, ‘in their own environment’, takes up temporal notions as distinct from the future. This focus on the immediate reduces other temporalities to ‘now’ and spatialities to ‘here’, and other spaces and times are taken to be irrelevant for student learning because they are beyond physical, immediate experience.

*Impossible places: at the edges of experience*

Although Simon focussed on the immediate experience, he also recognised the complex, multi-dimensional thinking involved in understanding the impacts and consequences of actions ‘down the line’ that are entangled in EfS. As discussed in Chapter 2, learning for sustainability involves global, multi-dimensional, holistic and future focussed understandings (Somerville & Greene, 2012). The breadth of thinking and imagining involved in EfS discourses is an issue for these EfS educators. EfS educator Eva remarked how this is challenging for EfS educators:

> Kids are asked to bring in to their world completely impossible conceptual places, and we often measure it by how they turn off the lights and put out the recycle bins. The sustainability landscape is really massive. It’s not on the surface. We have to conjure everything up together and how everything fits in together. (Eva, interview, October 10, 2012)

These ‘completely impossible conceptual places’ are constructed as realities that are beyond the immediacy of the local environment, and at the edges of immediate experience. Eva suggested that in EfS, students are asked to conceive of ‘impossible places’ to contextualise the purpose of environmentally responsible behaviour. The origins of objects like plastic, or the embodied fossil fuel industry in a light switch, the possible futures of a littered plastic bag, and the consequences of consumption on our bodies, make up some of the terrain of the ‘impossible places’ where sustainability becomes invisible and intangible, yet necessary. These ‘impossible places’ are the sites where the origins and consequences of experience become sustainability issues. So these are the impossible places of EfS learning. However, these materialities are only impossible when imagination is excluded from learning.
In the quote above, Eva also pointed toward the conundrum of teaching that involves ‘having to conjure up everything’ and ‘how everything fits in together’ and assessing students’ conceptual understandings through the events of their behaviour. Eva implied that the difficulties involve not knowing how to teach in ways that can ‘conjure up everything’, all at once, and not knowing how to assess for it. In different ways, the EfS educators seem to be experimenting with a range of approaches to teaching and learning the impossible and immeasurable breadth of sustainability; the understanding of which is seen as the basis for environmentally responsible behaviour. In Chapter 8, I analyse some of the resources EfS educators used to encounter ‘impossible places’ and perspectives and I discuss how these demonstrate that the educators are trying to find new ways of communicating the complexity that is beyond experience. In the next section, I continue to examine experience and imagination in EfS teaching and learning. I use Jamie’s learning story to analyse the ways in which imagination works to assist learning when hands-on experiences aren’t enough.

**Impacts on others: imagining contexts and consequences when experience isn’t enough**

In this section, I analyse the secondary school EfS educator, Jamie’s, learning story that involves his reflections on his students’ experiences picking up litter at school. Jamie was challenged by meaningfully contextualising their experiences because the significance of picking up litter was difficult to communicate effectively with his students. Jamie approached waste and litter issues at his secondary school by incorporating them into his maths and VCAL classes. He described to me how he crafted his approach according to the results he wanted (a reduction in litter at school) and according to how he expected his students to learn. Jamie approached litter as a serious, aesthetic, legal, environmental and ethical issue with global impacts on ecological beings and systems. “Plastic is a global issue”, he said, “There’s a bigger picture involved when you just throw something on the ground or just chuck it away” (Jamie, interview, September 2, 2012). Like Simon, Jamie aimed to make this contextual ‘bigger picture’ ‘real’ and relevant for his class, by focussing on visible experiences in the local school environment.
Jamie and his students spent several weeks collecting litter from a local beach as well as the school site, classifying the different types of plastic, and conducting audits of the waste. They constructed a huge transparent cylinder that looked like a lolly jar, to showcase the thousands of plastic bottle tops they collected from the school campus over two terms. This was a successful and well regarded program, however, Jamie spoke of something missing for his students in these experiences: “So even the experience of picking up rubbish, classifying them in terms of colour... it wasn’t quite enough. No it wasn’t” (Jamie, interview, September 2, 2012).

Jamie further elaborated that he realised ‘experience wasn’t quite enough’ when a few of his students questioned him. It seemed the nature of student questions marked a point of his own realisation that ‘something was missing’. His tone moved from describing what happened, to reflecting on how beneficial for him as an educator their questions were:

We organised thousands of plastic bottle top data into tables and graphs - it was my maths class. And they [students] said, ‘Well what’s the problem, why are we talking about it?’ Why? Why litter is such a problem? They didn’t get it? They didn’t get it. Yeah, I was really glad you know, that I had a couple of students pose the question, like, ‘What’s the problem?’ It wasn’t a planned part of my lesson. (Jamie, interview, September 2, 2012)

The students’ questions disrupted Jamie’s expectations that their hands-on experiences picking up litter, going on excursions, collecting data, analysing it and creating tables, would result in understanding. The students’ questioning, and Jamie’s surprise, disclosed his educational expectation that hands-on experiences would produce learning and understanding. Jamie discussed how he designed hands-on activities, excursions and tangible data assuming that when you experience something in your immediate environment it is learning or causes learning, and results in a difference or change. However, Jamie described that for his students’ hands-on experience “wasn’t quite enough. No it wasn’t” (Jamie, interview, September 2, 2012).
The educational value of experience is not usually considered limited. However, the pedagogical significance of contextualising students’ experiences occurred significantly in this learning story. Jamie’s learning and teaching goals, analysed earlier as the ‘key concepts that focussed his teaching’, emerged as significant, underlying pedagogical markers. Jamie described his goals as an EfS educator: “There’s a bigger picture involved when you just throw something on the ground or just chuck it away” (Jamie, interview, September 2, 2012). An awareness of a bigger picture first informed his focus on the experiences of collecting and analysing litter, and then also directed the shift that he encountered as necessary, even as “It wasn’t a planned part of my lesson” (Jamie, interview, September 2, 2012). In that moment he expressed being confronted with the realisation that, still, a fundamental understanding was missing. Jamie described his reaction that inspired him to show his students an image (Figure 7.2):

![Dead Laysan Albatross. Midway Atoll.](https://www.chrisjordan.com)

I said, ‘Right, ok, I’ve got a couple pictures I can show you’. So I got one, just one, I didn’t show them ten, I’ve got lots. Just one. I chose just one to show them. One, that’s it! And I showed them an image of a bird carcass. And inside the bird you could see... bottle top, bottle top, bottle top, cigarette lighter, bottle top, bottle top. And they went ‘Ohhhh’. They made that connection. (Jamie, interview, September 2, 2012)

Jamie’s extended emphasis on the singularity of this image spoke of the impact it had from his perspective. In the photograph (Figure 7.2) the bird’s skeleton is filled with bottle tops and other plastic litter. The affective moment of the students’ ‘Ohhhh’ involved making conceptual connections between the bird’s death and its cause due to ingesting plastic litter. Implicitly, the bird’s death was not natural or inevitable. The image presents its opposite; if there was no plastic litter this bird would not have died. Jamie witnessed, “I saw them make those connections”, identifying ‘making connections’ as that which was missing for students and the point of success for him. Students’ lack of contextual understanding seemed to be resolved by the image; signifying the image as a connection point for a ‘bigger picture’. From Jamie’s perspective the single image worked to ‘make those connections’. The single image affected a conceptual, or contextual, purpose of learning for students in Jamie’s story.

This learning story describes how the single image of a dead bird enabled Jamie’s students to connect their experiences with an expanded worldview concerning plastic litter on multiple scales. Jamie’s initial focus on empirical knowledge in the immediate environment ‘wasn’t enough’ and disclosed the limits of experience in constructing understanding. Because of the global impacts of litter on other beings in this context, the image can be read as a medium that unconcealed ‘the rest of the world’ (Dewey, 1902, p. 246). Dewey (1902) put the onus on teachers to provide students with the opportunity to conceptualise, mentally image, and “to form a picture of what you are talking about” (p. 247). The image triggered students to imagine the dead bird as a site of impact, without having experienced it directly. In response to Simon’s assertions that students, “largely don’t care about what’s happening over the next hill”, it seemed that students became enabled to care about
another being in another place through the imagery of the photograph. This resonates with how imagination occurred to Macknight (2009) as “thinking into other perspectives” (p. 131) and “thinking of otherness” (p. 132). Without having experienced directly, students were able to understand through imagining to relate this to their own experience.

Understanding without experience

Jamie referred to his use of the photograph (Figure 7.2) of a dead bird filled with plastic as the trigger that launched his students into a ‘bigger picture’ understanding. How this occurred, and the way the static two-dimensional image worked in answering their questions is difficult to ascertain. It involved students seeing the image in ways that involved connecting their own experiences of plastic and litter on site, with a meaningful ‘bigger picture’, the devastating impact of plastic litter on another being in a distant place. The real-world consequences of plastic litter on another being in an other place is a materiality beyond experience. This resonates with fiction author, Rowling’s (2008) interpretation of imagination as “the power that enables us to empathise with humans whose experiences we have never shared” (para. 22) is expressed through this learning story, and empathy is extended to the experience of non-human beings. Rowling emphasises the perceptive capacity of the imagination, ‘to think oneself into other people’s places’ (Rowling, 2008, para. 22). She presents imagination as a way of understanding ‘the other’ without experience. In Jamie’s learning story, these crossings into ‘the other’ were facilitated through the imagery of the dead bird; his student’s imaginations were enabled by the single image. The learning story shows that imagining through an image can produce understanding without having experienced directly. This is significant for EfS teaching and learning, suggesting that when something is imagined it becomes a part of experience, offering imagination as a way of understanding without direct experience.
Understanding through narrative that builds imagery

In the previous section, the imagery of the single photograph of the dead bird seemed to function to enable students to imagine the bigger, contextual picture. In this section, I analyse how Jamie became involved with the image in order to understand how the image worked to facilitate students’ understanding ‘when experience wasn’t enough’. In our interview I asked Jamie to elaborate on these moments that signified his awareness of his students’ ‘making that connection’. His description so far suggested that the single image produced an ‘Ohhh’ moment, however I was interested in how this occurred and how imagination may be interpreted in this context. ‘In what ways do you perceive this single image worked?’ I asked. Jamie answered by describing factual information, and then moved into engaging me in the same narrative he created for his students:

Well it’s up to the viewer to interpret what they see. What I explained to them is that our coastal town is full of large marine sea birds like Albatross and Petrels. We are known for it. They have wing spans that are so huge, so that they can hover over the ocean to pick up stuff on the surface. And I said, ‘the number one thing floating are these bottle tops you just collected. The number one thing these birds are eating are your bottle tops.

This bird was an Albatross and it picks them up and it eats it. It first experiences severe pain and then they can’t eat because the food doesn’t process, and so they have severe pain, and then they die. And those same birds pick them up and feed them to their baby chicks. You know those cute fluffy little things? They feed them to their chicks. And you go, oh well why? Or, well, how does a baby bird eat a bottle top? How? Well it’s like picking up a fish and dropping it in, it’s an instinctual thing, the baby birds are able to just swallow it. So the baby birds are full of plastic. So that, that connects, that connects pretty quickly. (Jamie, interview, September 2, 2012)
Jamie’s evocative narrative was provoked by the image. This showed how he became a storyteller through interpreting the image. The text-forms of image and narrative worked together to produce an imagined reality, a ‘living picture’ (Steiner, 1954) of plastic litter floating in the ocean and becoming a part of the food chain as the living bodies of birds. Jamie’s story narrates the potentialities of each piece of plastic litter to damage another being. For me, the narrative creates moving imagery for my imagination. This may have enabled the static image to become fluid, to connect the representational occurrences of litter with the end of the story that the image came to represent for students. The image that builds a narrative occurs as a pedagogical strategy that hovers over territories beyond experience, works to fill in gaps where conceptual connections have yet been made, and produces a ‘bigger picture’. Jamie resolved that understanding occurred promptly: “And all of a sudden they could vision the bigger picture and the future of what their actions will or could do, what they could cause” (Jamie, interview, September 2, 2012).

In this learning story, imagination emerges as a part of students’ understandings that were missing in their practical experiences. Through an interplay of image and narrative, the material impact of one’s hypothetical actions on another being, in another place became real for students. This entanglement of real and imagined, experience and imagination confers, overlaps and is inter-related. Understanding the ‘bigger picture’ was critical for students’ learning in this context. This dimension of sustainability is difficult for educators, evidenced by Jamie’s efforts at hands-on experiences and surprise at his students’ ambivalence. This learning story demonstrates how hands-on experiences are not always enough in EfS. It also reveals students’ need for context, ‘bigger picture’ and that an image and a story that tells of the impact their experience could have on others was a powerful form of teaching and learning. Whilst the photograph of a dead bird was taken at another place and at another time, its agentic communication affected students in ways that oriented them in relation to plastic, the greater world and their own experiences. In the next section I analyse how imagination is constructed by the participants’ language in order to understand what imagination means to them.
Attributing the work to imagination

In the previous sections of this chapter, I have analysed the EfS educator learning stories for imagination. This section examines how imagination is known and understood by the EfS educators. Educators and students spoke of imagination directly and indirectly during the research. In this section, I analyse how imagination is constructed by the participants’ language in order to understand what imagination itself means to them.

Asking EfS educators about imagination

In the EfS educator interviews I was determined not to ask leading questions, rather to allow the EfS educators the space to frame their work through their language and positioning. This also enabled me to understand how imagination works for the EfS educators from their perspectives. However, towards the end of each interview I did ask all the educators directly about the place of imagination in their EfS practices. The EfS educators’ responses produced various notions of imagination, as creativity, vision and planning, engagement and innovation. Their responses often involved metaphors or comparisons in order to communicate. These metaphorical statements explained imagination through other things, times or problems. Rather than telling me about imagination, these direct responses reflect the EfS educators’ ideas of imagination and I examined their language as metaphors.

In Lakoff and Johnson’s (1980) analysis of metaphors, they encouraged extrapolating a range of possible meanings to understand the metaphorical implications of words. I used this process to understand the inferences and meaning of EfS educator statements in response to my direct questioning about the place and importance of imagination in their EfS practice. This resulted in seven pages of analysis. Below, I have included six examples of EfS educator responses. EfS educator quotes are in italics, expressing their different perspectives on the idea of imagination in EfS. I have analysed their responses as metaphors, and I elaborate on the key words or images evoked by their diverse statements below to understand the metaphorical dimensions of their ideas of imagination.
“Well, imagination is where the solutions come from”
(Simon, interview, August 12, 2012).
- means of solving a problem
- means of dealing with a difficult situation
- the answer
- a liquid in which a solid is dissolved

“You need to imagine a bigger picture to imagine the future and move forward”
(Stella, interview, September 2, 2013).
- change position in a particular direction
- re-locate to a better place
- re-position
- advance ahead

“Anything in life besides having a goal is to have a vision, a vision is like an imagination” (Jamie, interview, September 2, 2012)
- able to see
- able to think or plan with wisdom
- a mental visual image
- a dream

“Imagination is important so you can go forwards and backwards in time” (Ben, August 30, 2012).
- progress and retreat
- history and future
- travel through space and time
- plan and remember

“The imagination, the (a) heart, the (b) intuition all that (c) stuff, it (d) can’t be divorced from the (e) thinking and the (f) understanding” (Mike, interview, July 16, 2012).
(a) Heart
- muscle, organ that pumps blood through circulatory system
- love
- region of the chest
- emotions and feeling
(b) Intuition
- understand instinctively
- without reasoning
- insightful
• feeling the way
  (c) stuff
  • matter, materials
  • activities to do
  • belongings
  • equipment
  • baggage
(d) can’t be divorced
  • can’t be separated
  • can’t be disassociated
  • can’t become un-married
  • can’t be undone
(e) thinking
  • process of consideration
  • reasoning
  • having ideas or opinions
  • using rational judgement and intellect
(f) understanding
  • comprehension
  • the power of abstract thought
  • perception and judgement
  • sympathetic awareness and tolerance.

“It makes the experience of learning far more (a) enjoyable and (b) palatable and (c) pleasurable as an experience” (Olivia, interview, April 3, 2013)

(a) enjoyable
  • giving delight
  • pleasure
  • informal and pleasant
  • receptive
(b) palatable
  • pleasant to taste
  • satisfactory
  • agreeable
  • digestible
(c) pleasurable experience
  • pleasing
  • enjoyable
  • fun
  • comfortable

These initial responses show how ‘imagination’, as a floating signifier, represents a broad range of meanings from individual perspectives. These responses place imagination in particular categories and at the same time generalise broadly.
My interpretation of the meaning of their words extends the breadth of how imagination is known and constructed. It seems clear that imagination is not an attributable ‘field’ of learning or interest that one can refer to with particular clarity or confidence, rather, it is descriptive of generally creative, entertaining, pleasurable, or engaging styles of thinking, being and engaging involving vision, seeing, imaging and perceiving.

Finding differences and contrasts

These initial responses and understandings of imagination contrasted with how educator share and describe their work as teachers. In response to my direct question about the place of imagination in her EfS practice, the tertiary EfS educator, Olivia stated:

I certainly hadn’t constructed imagination as being a core component of what we do, other than to say that the kinds of work we make are about using, I would just say, creative explanations or creative ways of explaining complex ideas that are fun and enjoyable. (Olivia, interview, April 3, 2013)

Her phrases ‘certainly hadn’t constructed’ and ‘I would just say’ suggests that she doesn’t see value in making specific statements about an imaginative domain. Olivia does say that imagination is not a core component but she emphasises creativity. At what point to creativity and imagination merge and/or relate? Earlier in the interview Olivia described how she uses animated online videos to help explain the complexities of Life Cycle Analysis (LCA). She described her use of the videos:

So we’re asking someone to possibly buy into the idea that a mobile phone talks and that feels bad because he has been abandoned. And that abandonment is the result of the designer who created it because they didn’t think about the product’s life. You’re asking someone to buy into an idea, a narrative, a story, a conversation that is impossible. (Olivia, interview, April 3, 2013)
In Olivia’s EfS teaching, ‘buying into the idea that a mobile phone talks’ occurs as important way of crafting and igniting new ways of thinking. This strategy could thus be read as imaginative engagement and yet Olivia resists bringing the ambiguity of imagination into the language of her pedagogical practice. A similar resistance occurred with secondary school based EfS educator, Stella. She seemed to prefer not to name imagination as a part of her pedagogical interests. She suggested that it is not useful to call ‘it’ imagination, due to a sense of uselessness or pointlessness in being able to make such a pedagogy credible.

I don’t know if there is imagination there. The powers of state education would want me to be objective. If they are imagining we might not know, we may as well just call it thinking... I believe there is a lot of immeasurable stuff that goes on and it’s really important that that stuff does go on. But, I don’t know if there is imagination there. (Stella, interview, September 2, 2013)

This demonstrates how imagination is constructed in opposition to educational objectives. However, earlier in our interview, Stella described how she teaches biodiversity indoors and outdoors at the secondary school: “The facts are sometimes static but they make it alive in a sense through their imagination. I can show them where Kookaburras live here, sometimes to 30 years, but they need to take that in” (Stella, interview, September 2, 2013). Her description, ‘they make it alive through their imagination’ arose in her language to explain what it was to transform information and statistics into living knowledge.

The secondary school-based EfS educator, Jamie, used a photograph to facilitate understanding when ‘experience wasn’t enough’. Whilst I analyse the workings of imagination in this process, Jamie did not attribute the connective learnings he witnessed to imagination. He recognised that the image encouraged his students to ‘make those connections’ between the image of a single dead bird and what it meant, and/or between their experiences of litter on site with the ‘bigger picture’.
However, as Jamie described the moment of his students’ understanding, he commented that the image lifted the burden of ‘having to imagine’ through an apparent factual materiality of the image:

They didn’t have to imagine it. It was a factual picture. And all of a sudden they could vision the bigger picture and the future of what their actions will or could do, what they could cause. So it’s an actual photo, I guess, can get their vision going about the visual effects of plastic and how they can affect nature and the environment. (Jamie, interview, September 2, 2012)

This description shows how the image removed the need to imagine. Yet, at the same time, Jamie described how the image got ‘their vision going’ in ways that enabled his students to see the bigger picture. However, for Jamie, the photo relieved the burden of imagining and he validated this experience by being factual/actual. Jamie’s statement: “They didn’t have to imagine it. It was a factual picture” has the glow of an interpretative contradiction that seems framed through assumptions that ‘real learning’ and successful education is attributable to logic and fact rather than imagination. After all, the image represents something true and real, not imagined. What occurs is the contrasting, rather than relational, interpretation of the imagined and the factual. Lakoff and Johnson (1980) utilised this contradiction to express the logic of thinking metaphorically when they determined “Metaphor is thus imaginative rationality” (p. 193, italics in original) that paired binary terms. The event of the image was understood, for Jamie, as the medium that produced the connective ‘Ohhh’ moment of learning for students, and occurred to him as visionary, factual and not imaginative.

While imagination didn’t have currency or value for EfS educators, they did express interest in ‘other ways of knowing’. As Stella expressed ‘we may as well just call it thinking’, she suggests that ‘thinking’ is a clearer expression of learning. Olivia didn’t perceive imagination as a part of her EfS practice despite using online videos that anthropomorphised objects into characters. Similarly Jamie interpreted the image of the dead Albatross as factual. These responses indicate the need to reconsider knowing, and re-vise the credible attributes of imagination in EfS.
Conclusion: How imagination informs experience and materiality

In this chapter I have examined EfS educator learning stories and analysed the ways in which imagination is used to facilitate understanding. From this analysis, I argue that the dimensions of understanding sustainability often occur at the edges of immediate experience, in impossible, conceptual and other places, that provoke imagination. Imagination was employed by educators pedagogically and occurred as an integral part of teaching, learning and understanding sustainability. For example, whilst the photograph of a dead bird was taken at another place and at another time, its agentic communication affected students and influenced their ‘Ohhh’ moments of understanding. In the next chapter, I build upon the idea that an image or a story can produce understanding without students having experienced directly. I analyse a range of eco-texts that have emerged during my research from a material eco-critical perspective. Through examining how they are used in EfS, I continue to explore how imagination is involved in understanding sustainability and the nature of imagination for EfS.
It stories

All EfS educators interviewed referred to using freely available images and stories as EfS teaching resources. This use of a range of eco-texts reflects a demand for new ways of communicating sustainability concepts and EfS understandings. In the previous section I referred to Olivia’s use of online animations as a strategy for teaching Life-cycle analysis (LCA). I also discussed how Jamie used an image of a dead bird (Figure 8.2) that provoked a narrative and his students’ understanding. He also showed me another image he uses in his teaching and learning that works in a similar way; to picture the real impacts of litter in the world (Figure 8.1). In this section I analyse these resource objects as agents of imagination. This analysis offers an inter-textual account of representations of environmental knowledge in contemporary EfS discourse. Images and objects are examined as ‘storied matter’ (Oppermann, 2013) as much as stories themselves.

Figure 8.1 Dead Laysan Albatross. Midway Atoll.
New Materialists, Coole and Frost (2010) encourage research to “reopen the issue of matter” (p. 3) and look at ‘objects’ newly because “our very understanding of matter are prerequisites for any plausible account of coexistence” (p. 2). These ‘objects’ include the ‘unlikely’ and ‘everyday’ (Simms & Potts, 2012) as well as the “material force of language and its entanglements” (Taguchi, 2012, p. 658).

The everyday environment speaks of materiality. For example, for teachers and students in urban, industrialised environments, water comes from taps, rubbish is taken ‘away’, electricity appears conveniently, and food comes from supermarkets. The distance food travels, or the spaces to which rubbish eventuates, for example, are collapsed, concealed and become invisible. The material time-places where litter and garbage affect people and environments are concealed by the everyday convenience of disposable options and discourses (Kennedy, 2007). The embodied histories and geographies of tap water or electricity do not visibly appear in the immediacy of objects like light switches, or the habitual practices of using water. Everyday material appearances do not tell the full story that sustainability requires to be seen.

This recognises how EfS attempts to *make visible* the embodied, concealed and multiple invisible dimensions of materiality. Simms and Potts (2012) refer to the ‘old materialism’ that the New Materialisms seek to revise, as synonymous with consumption and consumerism (p. 1). Material eco-criticism involves understandings of sustainability that critique garbage, electricity and waste as alive with narrative agency (Bennet, 2010; Oppermann, 2012, p. 64). Relying on empirical, visible materiality as evidence of truth requires new, revised ways of seeing according to sustainability. While material evidence is valuable in research and experience, philosophy has encountered the destructions caused by these condensed worldviews through globalisation, quantum theories and contemporary culture. A new layer of material encounters concerned with ‘ecological footprints’, ‘food miles’, ‘embodied energies’, ‘life-cycle analysis’ and ‘embodied water’ re-frame the visible as one dimension of a more-real.

From the process of data collection, including the seven interviews and 14 weeks participant-observation, my analysis was gradually directed to these textual resources
by EfS educator interest. I was attentive to EfS educators’ attraction to these new ways of approaching sustainability issues and presenting environmental knowledge. During analysis, I have determined these resources to be ‘environmental texts’ (Buell, 1995) within the EfS learning landscape. This led to finding a mesh of New Materialist views of materiality and eco-criticism, the results of which require imaginative attention to the creative and narrative qualities of matter. These resources are matter.

A range of EfS resources were treated as narrative texts, as data, and as a part of EfS discourse. I analyse three texts in greater depth as representative of EfS educators’ teaching and learning approaches. My analysis uses the EfS educator interviews and participant-observation as context to discuss the ways in which imagination is involved in understanding sustainability through the texts. I analyse how these intertexts particularly involve imagination to engage with new ways of seeing materiality for EfS. The form of the discourse texts, as images and stories, act metaphorically and demonstrate the EfS educators’ concerns for revealing the story behind everyday matters of convenience. My analysis is interested in the discursive strategies of the texts, in terms of how they call upon imaginative capacities for learning, and how their content and format contribute to revising ways of seeing and encountering materiality. I analyse how these texts call upon imagination to understand sustainability and the ways this re/orients the world and the self in relationship. This diverse range of informal EfS teaching and learning texts offer insight into the nature of how imagination works in EfS.

**Material eco-criticism**

Oppermann aligns her revisions of eco-criticism (2011) with New Materialist perspectives as ‘material eco-criticism’. She writes that the New Materialisms, “compel us to envision the physical world as storied matter teeming with countless narrative agencies that infiltrate every imaginable space and make the world intelligible” (p. 57). Buell’s (1995) eco-critical distinctions was opened up by New Materialist perspectives on both matter-objects and eco-criticism. Barad’s material-discursivity’ (Barad, 2007) and Buell’s eco-criticism converge into material eco-

**Re-imagining the narrative agency of matter**

As I examined several online examples of EfS texts, it emerged that stories of things populate this informal dimension of EfS discourse. For my analysis, this demonstrated a need; that stories of objects need telling and the voices of matter insist on being heard. The evocative imagery produced through storytelling and the imagery evoked through narrative in these texts conjures worldviews in which time, space and other beings are agentic, non-linear and eco-centrically entangled. The mechanism of story used to map the sentient travel of objects is not a new phenomenon. Bellamy (2007) documented the ‘it narrative’ emerging in the 18th Century as a new form of fiction, where the story of an object, a ‘thing’ assisted the author’s narrative by bringing new perspectives to the action. An ‘it narrative’ inhabits an imaginary world of an object with conscious life.
The medium of story, in the EfS texts, also manages the immaterial entanglement of imagination and environment. Lejano, Ingram and Ingram (2013) discussed the use of narrative in environmental discourses as a powerful medium of exchange between storytelling and the earth. The imaginative pedagogies of storytelling have been alive in Australia for thousands of years (Wafer & Green, 1989, p. 46), as in other countries (Castellano, 2000). Learning the stories, and learning through stories is an environmentally consistent pedagogy wherein a congruency between self, knowledge and world can be sustained (Sveiby & Scuthorpe, 2006). I suggest an important difference between telling the story of an object, and perceiving the inherent narrative agency in/as matter. This occurs as an issue of worldview, and how matter is imagined. The use of narrative and story occurred across the EfS resource texts in varying ways: as storytelling, through a documentary-style telling the ‘story of’, and what I refer to as ‘it’ narratives.

*Matter as storyteller*

In different ways, the EfS texts transform disenfranchised objects, information and statistics into visual and vocal participants in sustainability discourse. Storytelling from an object’s perspective allows a plastic bag or a mobile phone to tell their story. This recalibrates their object-hood as entwined with time, space and life experience rather than objectively separated from it. The dynamics of stories that position matter with agency enact a materiality in which material things share their knowledge and ‘make themselves intelligible to us’ (Barad, 2007; MacLure, 2013).

The tertiary EfS educator, Olivia, taught Life-cycle analysis (LCA) at a tertiary level. LCA is a complex process of scientific analysis that tracks and measures the resource use and pollution of consumables, from extraction of raw materials, through production, consumption and disposal. LCA develops the scope of ‘value’ of an object to include environmental costs associated over the product’s whole life, from extraction to disposal. Figure 8.2 is a screen shot of an online ‘it’ narrative used by Olivia in her tertiary EfS classes. The online story, called *Life-Pscycle-ology: The Life of a discarded phone* (Acarolgu & Kaliincos, 2010) re-considers ways of seeing a mobile phone, as emblematic of an everyday consumer object.
The 5 minute animation is publicly available online. The story re-imagines the objects as analogous to a human story. The storyline follows the protagonist, the mobile phone called Eric Ericsson, as he undergoes psychotherapy. We are invited to empathise with the fictional character/phone as he is given agency to tell his story from his perspective. The viewer watches vicariously as Eric tells his psychologist about his ‘life’ to try to understand why he has been ‘abandoned’ (thrown away). Eric, the object, undergoes psychotherapeutic treatment and he remembers being dug up in mines, and being manufactured in factories. He re-traces his origins in the global extraction of metals and minerals in multiple countries. He is an embodiment of entanglement.

Figure 8.2. A screen shot of Eric ‘on the couch’, *Life-pscycle-ology: The Life of a discarded phone* (Acaroglu & Kaliincos, 2010). Creative Commons. Used with Permission.

The narrative text applies sustainability concepts of ‘eco-footprint’, ‘embodied energy’ and ‘Life-cycle analysis’ to an object and tells ‘its’ story from the objects’ point of view. The story was of course written by a human, and so tells of Acaroglu and Kaliincos’s (2010) perspective, and anthropomorphises the object so that it speaks English, is male and has a point of view. However, the imaginary of the animated story *feels like* the story of ‘Eric the phone’ and in the context of EfS the learnings involve new ways of seeing the ‘embodied’ ‘life-cycle’ of an object that is the goal of LCA. Olivia articulated the *ways of seeing* that are the ideal outcome of
her teaching. This demonstrates how the animated story works as a teaching resource:

The way people would see would be, that things don’t just exist. Things don’t just arrive at a shop and then get thrown in a bin, which is currently how most people see the material world. That people would see the relationship between all the different materials and components that go into and exist in order to create that product. And they would understand the intricacies of the systems that facilitate that; the inputs and outputs that have to happen in order for that system to exist. So that’s what I try and get people to see. (Olivia, interview, April 3, 2013)

The complex issues that are framed scientifically in Life-cycle analysis are framed through narrativity in the Life-Psycle-ology (Acaroglu, 2010). As Olivia also framed her learning goals in terms of ways of seeing the world, this shows how the online text is used in her EfS teaching and learning as a way of re-vising ways of seeing objects and materiality. This exemplifies how the EfS educator is concerned with teaching worldviews as well as discrete ‘environmental’ information. To do this Olivia calls upon an imaginative, narrative text.

New Materialist and material eco-critic, Oppermann (2013) described the practice of material eco-criticism as unconcealing the narrativity of matter; as revealing how matter is inscribed by stories:

Material eco-criticism is the study of the expressive dynamics of nature’s constituents, or narrative agencies of storied matter at every scale of being in their mutual entanglements. It seeks to explore the narrative dimension of the material world in terms of the stories embodied in material formations. (p. 57)

The objects in the stories are not simply talking about what they see from their corner of the room, but actively telling their own life stories. By using ‘it’ narratives, EfS educators and students engage in these shared imaginaries in EfS educational
settings. The text shows how image, narrative and metaphor, as language forms of the imagination (Sutton-Smith, 1988) are used to communicate ecological understandings. The animated text also constructs a stage in which knowledge is shared by “part of the world making itself intelligible to another part of the world” (Barad, 2007, p. 185). This suggests that imagination is involved as a form of non-linguistic communication that allows these matters to become intelligible.

I view the story as a request to imagine. The request of the story can be seen to “re-open the issue of matter” (Coole & Frost, 2010, p. 3). Its invitation is to empathise with the phone’s feelings and psychosis. The mental and emotional state of ‘Eric’ contrasts with his inert, functional identity. Through the story ‘it’ becomes ‘him’. The emancipatory possibility of Eric being heard, and of being known creates an empathic partnership between the protagonist and the viewer. This recalls Rowling’s (2008) interpretation of imagination as empathy. As discussed in Chapter 2 and Chapter 5, empathy and “thinking into otherness” (Macknight, 2009, p. 131) can be considered the imaginative relations between self and other (Decety & Jackson, p. 78; Greene, 2008, p. 18; Rifkin, 2010, para. 5; Rousseau 1755/1984; Rowling, 2008, para. 22; Ruskin, 1899, p. 231; Shelley in Bloom & Trilling, 1973, p. 36). I argue that these recognitions of empathy that identify as imaginative acts, can be extended to non-human beings and matter. In Life-Pscycle-ology the issue of Eric’s ‘abandonment’ suggests that an aim is to elicit the viewer’s empathy, led by the narrative. The animated story disrupts expectations that the object is inanimate.

Attributing human feelings onto another non-human form occurs as anthropomorphism. The embedded anthropocentric context of anthropomorphism suggests that assuming that objects have human-like lives may be problematic considering the goal is to understand the object as a way of resisting anthropocentrism. A psychological perspective (Epley, Waytz & Cacioppo, 2007) suggests that the motivation of anthropomorphism is essential to consider in determining it anthropocentric, and this often involves a motivation to understand behaviour and affiliate with the other which can be seen as an extension of the self. Educational researchers Byrne, Grace & Hanley (2010) found that whilst children learn well through anthropomorphising the other-than-human (microscopic
organisms) a coalescing anthropocentrism inhibits their ability to understand other aspects of its non-human life. Fisher (1996) and Daston & Mitman (2005) assert that the negative “charge of anthropomorphism oversimplifies a complex issue” (Fisher, 1996, p. 3) which refers to the complexities involved in knowing the consciousness of an other. Waytz, Klein and Epley (2013) suggest that when imagination is considered in the practice of anthropomorphism, the role of imagining the other in anthropomorphism brings new insights. In Life-Pscycle-ology, empathy is called upon through the process of personification, which can be seen as a form of anthropocentrism. In an environmental context, the difficulties of anthropomorphism involve reinforcing the humanism that was the problem in the first place. However, at the same time, imagining the life and perspective of matter, objects and non-human entities occurs as an expanded view that begins to consider the other, as opposed to being blind to ‘its’ existence. New Materialism suggests that the definitions of human and non-human need to be loosened and Haraway’s analysis of cyborgs (1991) and ‘companion species’ (2003) questions the edges and definitions of human. Additionally, I consider how Vygotsky saw how physical tools were used as extensions of self and translated this idea into cognitive tools; the notion that the objects and matters that are seen and handled are extensions of self is not too far fetched.

Two questions arise for this analysis in the context of EfS to address this issue of anthropocentrism in ‘it’ narrative texts. Firstly, how do the anthropocentric problems of anthropomorphism rely on assumptions that imagining (the other) is not a credible way of knowing? The second is, as Haraway (1991) argues that nature is constructed, not discovered, how are we to discover the agentic communications of ‘others’ in our lived experience? The point of this second question is that analysing these texts for the purpose they serve in EfS may not be separate from the philosophical issues that arise, but may be beneficial in order to become more alert to the possibilities of finding new ways of knowing and seeing.

The narrative forms aim to give life and voice to that which has previously been considered inert, fixed and without agency or life. Problems arise when their voices are told by and through human narratives. However it is the imagination of the
viewer that hears and sees the narrative agency of the object. The purpose is to imagine the *thing* with story and life in order to affectively influence students’ encounters of materiality in everyday life. The question should be, does the story enhance or expand ways of seeing materiality? This depends upon whether imagining is considered a credible way of understanding. The anthropocentrism of personifying the object outweighs the anthropocentric perspectives that previously viewed the *thing* as ‘just existing’ as a functional, inert, material possession.

Buell’s (1995) eco-critical analysis of environmental narratives involved four criteria for establishing if a text is anthropocentric or ‘eco-centric’ (pp. 6-8). This is a method of considering anthropocentrism in an environmental context. To be considered an ‘environmental text’ (Buell, 1995), the ‘other’ than human cannot be marginalised, but needs to be given equal or greater presence and, a sense of environmental ethics needs to include human accountability for environmental problems. This means that an environmental text affords the (matter and being of) environment with agency rather than representing it objectively and problematically. These considerations assess the worldview that the text constructs, and this has ontological implications. These EfS discourse eco-texts give the ‘other-than-human’ presence and agency, and form ways of communicating human accountability.

The story demonstrates how ‘Eric’ is made up of the living earth, providing a way of perceiving how everything is made up of nature. There are no behavioural change recommendations, the animation simply occurs as a constructed platform for ‘Eric’ to tell his story. Hyper-realities, complicated materialities and juxtaposed micro and global narrative pathways transform the static matter/object through story. I see the considerations of the human extend to the non-human whose existence is ontologically inscribed and entangled with our own. Using this story in EfS attributes new dimensions to Life-cycle analysis. This re-consideration of object-hood from a sustainability perspective also represents how every *thing* and all matter is made up of environments and relationships. The request is to see differently.
Telling the story of stuff

All seven EfS educators interviewed had used *The Story of Stuff* (Leonard, 2008) or *The Story of Bottled Water* (Leonard, 2010) with their students. These ‘stories’ are publically available online educational narratives that use a unique animated stage to perform a narrated documentary. This innovative genre of ‘environmental text’ meshes animation with documentary, enabling the content to cross between the hypothetical and the real, which are implied by hand-drawn cartoon figures and a live narrator who guides the story in the present tense. The live narration faces the camera so that ‘the story’ is directed to the viewer.

The concept of *The Story of Stuff* (Leonard, 2010) (Figure 8.3) also suggests that matter, things, objects and stuff have histories and their stories need to be told. The origins of ‘stuff’ need to be known because they can include a range of destructive or unsustainable environmental and humanitarian impacts that are not visible on the surface. The premise and format of ‘story’ also exposes concealed multi-temporal and international journeys of ‘stuff’, through ‘us’, into their probable futures. ‘The Story of Stuff’ re-frames the immediacy of ‘stuff’ as a global story, by tracing the origins and consequences of the mass-production and mass-consumption as a ubiquitous human practice. It also attempts to answer questions that challenge the assumptions of urban culture. Why is ‘stuff’ cheap? How did water come to be sold in plastic bottles? (Figure 8.4).
I mapped the knowledge story on a timeline to understand the story’s requests:

<table>
<thead>
<tr>
<th>Where did it come from?</th>
<th>My stuff</th>
<th>What are the impacts of my consumption in the future?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How was it made?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The request of the story is to examine the ways *stuff* is disregarded. The narrator, Leonard (2010) configures a broader, expanded version of inter-related co-existence as she tells ‘its’ *story*. The narrative reveals the hidden story of objects including the practices and processes that occur in other times and places yet are inextricable to its materiality. This invitation can be theorised as a request to imagine an expanded view, as a way of *re*-educating how we have been taught to imagine objects and to create new understandings. The discursive strategies used by these online texts do not focus on behavioural change actions or recommendations, rather they tell stories of objects.

To see inanimate objects as embodied with story and life occurs as a part of Sustainability Education because the process values the earth components that make up their everyday appearances. Giving life to inanimate objects through story, re-imagines how matter is connected to human life and how even industrialised matter has histories that are embedded in the earth and possibly harmful futures. The stories provoke imagining these histories and futures as constitutive and embodied by matter. For EfS, this conceptual work participates in the territories that are beyond direct experience and require new ways of seeing materiality to understand. Whilst the stories are imaginative in the creative and entertaining sense, I argue that their invitations to imagine provide ways of knowing, seeing and understanding that are essential to EfS.
Understanding self: seeing through image and metaphor

In this section I draw on the tertiary EfS educator Mike’s interview to analyse how he approached crafting his students’ ways of experiencing the coal mine, the water catchment and landfill sites during their excursions in ways that enabled imagination. Mike described how he uses an image in class that operates as a layered metaphor to provoke candid discussion with his tertiary students about what it is to look, see, and understand. I return to Mike’s framing of these excursions:

We’ll follow the structures that we live in, which shape our being-ness, that we take for granted, that have massive impacts but they’re beyond sight, so beyond thought. We don’t have mental models for them. We try to attach a reality to those bearings. (Mike, interview, July 16, 2012)

Mike was certain that their excursions were not simply visits, but experiences that enabled imagination to ‘attach a reality’. I have analysed this in the previous chapter. Here I am interested in how Mike qualified their value by emphasising the ways that experiences were ‘seen and felt’: “So physical experience, seen and felt with the new ways of understanding, together enable the imagination in those precise ways. You don’t need to go back” (Mike, interview, July 16, 2012). The active role of ‘new ways of understanding’ occurs as a cohesive part of how student experiences would enable imagination. Mike showed me the cartoon Understand-a-scope (Leunig, 1984) (Figure 8.4) and described how he has used the cartoon many times in his tertiary EfS teaching as an image to initiate discussion. The image enlists the apparatus of a telescope to construct a metaphor for ways of seeing. The cartoon presents a man on a hill looking down on the world to understand. Mike described how the ideas from the image were used as a discussion point with his tertiary students:

The Understand-a-scope itself is a symbol and a metaphor for how we understand; the way we understand, and how to better understand how we go about living in the world, and the structures that make it happen... So how do we make our lives more coherent with what we are coming to
understand about the planet and how we might live better in it? The Understand-a-scope is symbolic of that. It opens up interpretations of micro views or broadening the scope which I like. (Mike, interview, July 16, 2012)

The image of the Understand-a-scope operates as a visual metaphor for understanding, or ways of seeing the world through understanding. The metaphorical work involved in reading the image creates a meta-dialogue between the visual capacities of seeing and more comprehensive involvements of understanding. This diffractive look at seeing/understanding conjures up the apparatus needed for understanding materiality in ways that acknowledge the particular lens of ones’ own experience and worldview.

Figure 8.5. Understand-a-scope, ©Michael Leunig, The Age newspaper, 17 March, 1984. Used with Permission.

Buell (2007) also used the metaphor of ‘aperture’ to refer to an ability to shift the expanse of our awareness to enable bigger perspectives. In The Eco-globalist Affect (2007) Buell described the ‘affect’ as “a widening of the customary aperture of vision” (p. 234) that involves realisations of personal responsibility on “other lives
and places” (p. 234). Through the image (Figure 8.5) the notion of understanding becomes nuanced and intricate as the aperture through which what is seen may be expanded or condensed, blurred or emphasised. Mike described his interpretation of the image that examines ways of seeing as metaphors for understanding: “We develop ‘lenses’ through which to better understand nature and our part in it” (Mike, interview, July 16, 2012). Mike used the image to provoke metaphorical thinking that aimed to expand students ‘customary aperture of vision’ so that their experiences ‘out in the world’ could ‘enable their imagination’ (Mike, interview, July 16, 2012).

Temporalities and spatialities of imagining

_Narrating things: Lucky We Live Now, a story_

During participant-observation at the 5-Star Sustainable regional primary school, the EfS educator, Eva, arrived one morning having read a short story, called _Lucky We Live Now_ (Atkinson, 2009). She told me she had adapted it and re-wrote it ready to read to her class of grade 3/4 environmental science students. It wasn’t a planned part of the curriculum. Eva wanted to share the story that compelled her and touched her and she crafted it in the context of her teaching. Her willingness to share the story emerged creatively and resulted in launching a cycle of learning directed by her students’ provocations. This learning story is narrated through the layers of the story itself, my participant-observations in class and Eva’s post-interpretative discussions that were voice-recorded after classes. I had already been participating and observing for 11 weeks in Eva’s classroom. Eva was now also interested in imagination in EfS learning which is demonstrated in her reflections. I now re-imagine the event of the story from my participant-observation notes and I include an excerpt of the story itself in order to participate in its imaginary:

Eva sits on a chair. The children are cross-legged mostly, on the floor. The protagonist in the story sees and feels the presence of animals around her; there to claim back their provisions. Eva reads to her class. (Participant-observation notes, Feb 26, 2013)
As her eyes adjusted to the light she felt a presence of something watching her. In fact, 100s of eyes looking down on her. Then suddenly a flutter of wings swarming over her heading for the light! Moths everywhere, swarming over her. She tried to scream but was scared they’d end up in her mouth, so she hid under the doona until everything was quiet. Some time later she opened her eyes, she must have drifted off to sleep. The room was well lit now and the moths, well, she must have dreamt them! The next morning it was goats.... (Transcript of Eva reading, Feb 26, 2013, as adapted from Atkinson, 2009, pp. 88-89)

The title of the story *Lucky We Live Now* (Atkinson, 2009) creates a new perspective on ‘now’ by locating the story in the future, and filling it with memorabilia and imagery from the ‘past’. Through the perspective of the story, present contemporary lifestyles and attitudes occurred as a memory, “when electricity could be turned on with a flick of a switch” (Atkinson, 2009, p. 89). The present for students became the past, from the perspective of the future. This future, in the story, was evoked by the protagonist’s vision, as the possibility that animals might one day return to claim back what is theirs, and restore the earth to what it was in the distant past. This narrative guided the imagination of the listeners through multiple temporalities to offer new perspectives from each vantage point. It occurred to me that the temporal movements in the story were navigated without a sense of dislocation or disorientation.

The story narrates how moths, and other animals, return in swarms, flocks or herds, to claim back what they had ‘given’: feather quilts, jumpers, polished floors, food. The evocative language of the story and the perspective of the protagonist are most vivid when the author describes what she sees. This invites the readers/listeners to also imagine this visually. Seeing, dreaming, being watched, looking down on her conjure up visual images and feelings of seeing, being seen and the perspective of animals’ points of view. Rather than anthropomorphising animals’ perspectives and intent, the protagonist is at a loss to control or discern the animals’ purpose. She is left guessing and is stripped back by the forces of animals repossessing themselves from her objects. Time moves agentically, lapping backwards and forwards, as if to
reorganise itself. The entangled, narrative approach of the story as EfS teaching might replace the linearity supposed by explaining how quilts are made with duck feathers, or factual accounts that state how honey is made by bees and leather comes from cow’s skins and so forth. I return to my notes:

Imagine a student says, ‘Honey comes from bees’. This correct information may not necessarily portray an understanding that has fully imagined honey as embodied with the work and efforts of bee communities. It is also unnecessary for all understanding to be displayed creatively. But knowledge can be static in its abstraction and occur as a pretence for the same awareness. I feel the difference between knowing information and seeing in an expanded, inter-connect way. Knowledge of bees that values bees, empathises, imagines their lived experiences, livelihoods, habitats, needs or concerns. This knowing seems supported by imagining. (Participant-observation notes, Feb 26, 2013)

As Eva-as-storyteller finished the story, the ways of seeing materiality suggested in the story were transferred, into a way of seeing in ‘real-time’ and space of the classroom. Student questions and discussions emerged about objects and matter; desks, the bookcase, roofing materials, metal scaffolding: “Metal! What’s metal made of?” asked a student. The discussion led into a task that Eva outlined to me after class: “Students choose one thing in the classroom to investigate. What it’s made of? How it was made, and where did it come from? What earth elements are in it? How far back can you go?” (Eva, interview, Feb 26, 2012).

The request of the learning task was to choose something in the classroom and draw the object ‘going back’. Students used drawing to make this passage visible: how they imagine this might happen. How students constructed the origins within the presence of an object was the thinking/imagining required for this task. I was compelled by the question: How does one know what something is made of? Through the activity, the complex relationships that everything has with time and space emerged. The things of the classroom, for example, metal, bookshelves, plastic, chairs, tables and building materials became identities in question.
The task was not words-driven but involved making conceptual connections by thinking backwards and forwards. After class, Eva reflected on what she saw as her students questioned the materiality of metal, bookshelves, plastic, chairs, tables and building materials and made these translations:

They were looking at how, and what, the room is made of, as though, as if for the first time, they’d never seen it like this. And I’d never really seen them like this. A few of the boys, so enthused: What’s metal? What’s metal made of? What’s it made of? The thinking is within students’ imagination. They’re imagining things back to nature. How do I make sense of the world that is provided for me? Do I ever consider where things come from? What do I know? And where are the ends of my knowledge? (Eva, Feb 26, 2012)

According to Eva, the learning that comes from moving through time, places and different perspectives can be enabled through story. The imagining that occurs through narrative encourages affective, moving imagery. The temporal dimensions within the story, Lucky We Live Now (Atkinson, 2009) crossed presence, future and past inclusively and hypothetically from within the world of the protagonist and her house. Students were guided vicariously through multiple presences, times and places. These multiplicities were entangled in the story, and continue to exist. Through analysis, this discussion crosses and re-traces these temporal dimensions.

Figure 8.6 Student drawing of classroom ‘going back to nature’.
This Grade 3 student drawing (Figure 8.6) visualises desks made of trees laid down horizontally, next to a sheep with the word ‘carpet’ written on it. I heard this student telling Eva that the trees (right hand side of the image) symbolise all the paper in the classroom (Participant-observation notes, Feb 26, 2013). High above this lower stratum is a ceiling dotted carefully with an interpretation of what the roof is made of. The horizontal plane describes the floor area of the classroom as land, which is separated from the vertical height of the roof by a great space. The scale communicates students’ ways of seeing. Students were very interested in the origins and substance of the bookcase:

This was a great focus point as the students were able to use their imagination to appreciate the role of wood, paper and fibre in this context. Students reflected on how many trees there would be in our bookcase, and how the paper in the books that are in it was made. This linked into other prior learning about paper recycling and paper-making in Art for them. (Eva, interview, Feb 26, 2013)

The student drawing (Figure 8.7) shows a large bookcase in the classroom ‘drawn back to nature’, expressing the bookshelf as a tree inhabited with elves, seeds and smaller plants. The branches of the tree extend horizontally as much as they lead upwards. A sense of being in the tree occurs more than a perception that the tree is a distant object or a resource for bookcases.

Figure 8.7 Student drawing of the bookcase ‘going back’ to nature.
**Drawing as evidence of ‘thinking backwards’**

Eva recognised that the demands of thinking backwards and into the embodiment of objects could be made visible and recognisable through drawing. The students’ use of drawing enabled the expression of how the past is embodied by the presence of the objects of the classroom. Their drawing and thinking re-imagined the seemingly inanimate classroom environment as imbued with life through suggestions of its multiple and more valued places and times of existence. For Eva, students’ drawings occur as valuable representations of their understandings and ways of seeing by making visible the ways in which they visualise the objects’ origins and futures.

However, Eva expressed to me that drawing is not quite enough because she has noticed that she brings her own perspective to the drawings, which Eva asserted has been often different from students’ intentions. So, Eva asked each student to speak with her about their drawings. She used a recording device to document these discussions to enable her to understand her students’ meanings more closely. This discussion was a way to assess their learning and was supported by Eva’s interest: “And I love looking at their constructed views. I love that. And I just say, show me what you think, show me what you know, that’s assessment” (Eva, interview, February 26, 2013).

The project beginning with the story *Lucky we Live Now* (Atkinson, 2009) and the ensuing discussions and tasks led to a cross-curricula focus that Eva called ‘Made on Earth’. Eva expressed to me her surprise at how the story worked in class with her students as EfS. She created the task spontaneously from the story and the moments of the children’s responses to it. She was interested in how they took this way of seeing into a new inquiry about the sources and origins of the structures present in the class environment. Eva discussed the unit with staff. The next term, every subject across the school incorporated this theme ‘Made on Earth’. Eva explained to me how this evolved:
Using this story as a starting point allowed a sound connection point for students to consider what it takes to make products and overwhelmingly that everything is made by earth… They really had insights. When you are able to strip it back to its base product…made on earth… This led into studies later on in the year when we looked at ‘made on earth’ as a sequential unit. (Eva, interview, Aug 20, 2013)

The capacity of imagination to move forwards and backwards in time and through the story created surprisingly coherent avenues for students to engage with and understand the non-linear entanglements of presence, origins and consequences in the embodiments of things. Through their drawings, the presence of the objects and materials in present space and time occurred through inquiry as an accumulation of all time and as an embodied result of everything involved in its being. Eva discussed the key learnings from the story after the first class, and later edited this transcript to make her points clearer.

In using the story Lucky We Live Now we were able to use our imagination to create a link between what is known and what we can imagine. The students were able to use the narrative story to reconnect everyday objects with the natural world. The imagination takes over when a story is read without any supporting images. The use of a narrative allows each student their own journey, and their own images to create their own world. The students can expand their thinking beyond the boundaries that are sometimes presented in a visual form as in a picture storybook. Overlaid onto this is their knowledge of everyday objects and how ‘things’ come to be. The story gives life to inanimate objects and creates a connection point with the earth. (Eva, Feb 26 and Aug 20, 2013)

Eva’s post-account regards imagination as a tool, ‘used’ and that ‘takes over’ in ‘expanding thinking beyond boundaries’, and in ‘connecting everyday objects’ with their origins in the earth. The story and imagination merge synonymously, and are treated as agents in the classroom that acted to ‘give life’ to objects, to make connections, and to expand thinking. For Eva, the meaning of the story exists, and was brought to life.
How students teach

‘Food Miles Earth Smiles’

This story describes the ways in which students designed their teaching and so expresses both students’ understanding as well student perspectives of what is involved in teaching and learning sustainability concepts. My analysis of this experience is through my interpretative narrative. I was a participant and I have chosen to allow the story to speak of learning, teaching, experience, knowledge and imagination, to the reader, without over-analysing these porous and inter-connected dimensions.

Eva’s primary school students won a state Sustainability in Schools Award in 2013. A group of students were invited to present for 20 minutes to sixty teachers and students at the Resource Smart School Awards conference ceremony. The students’ chose to design and present a ‘Food Miles Earth Smiles’ activity. I was a participant on the day of the presentation. As I narrate my participant-observation experience I refer to Eva’s students as ‘the students’ and the students and teachers from a range of schools who participated in their activity as ‘the participants’. I allow the agency of this story and its images to suggest the imaginative involvement in their capacities to teach the sustainability dimensions of materiality.

The students prepared for weeks, and travelled four hours to the capital city of Melbourne. They made a video, a play and then prepared an ‘activity’ to “make sure everyone learns, understands what we are talking about” (Student communication, Nov 8, 2013). To prepare for their presentation, they collected packages of everyday products and re-constructed them with sticky tape so, whilst empty, they appeared as if they were new. The packages were mainly food items and everyday consumables that had been carefully chosen for where they had been made, grown or manufactured. The students selected the packages to ensure that a range of different countries and places were represented. The participants at the conference would choose from these packets during the activity. This demonstrated to me that they had learned to see the objects as containers for information, and representations of the places it came from.
Eva watched and assisted but expressed to me how she would not try to control or interfere with their presentation. She described how she was willing to just let go, and let them work through what they wanted to present and share with the group. (Eva, personal communication, Nov 9, 2013).
In the conference room, the students had arranged all the packages they had reconstructed in the centre of the conference tables, around which the participants sat. They had also placed two worksheets for every pair at the tables: 1. A list of places around the world with the distance from ‘here’ in kilometres. 2. A series of questions about the journeys of the object. The students asked everyone to choose an object on their table, as if they were going to buy it. The participants were told to find out the origin of the object by searching for the information on its packaging: ‘Made in Australia’ for example. They were told to find that place on their checklist (Figure 8.11) and measure the kilometres ‘it’ had travelled to get to us, here and now, using the kilometre index. I searched on the packaging of my two objects; one made in Turkey, the other in Vietnam. I listed the places of origin of my two objects and the distance they had travelled on my worksheet, Turkey -14,000km, and Vietnam -7,000km, which was titled ‘How far has your shopping travelled?’

Figure 8.11. The worksheets Eva’s students created for their presentation.
After collating the places where my hypothetical shopping-objects had come from, I reflected that I had participated in an imagined scenario. However the objects in my hand had really been made in other places and come from other people’s work; involving livelihoods, family businesses, cultures, economies and languages. The students had requested an interplay of imagination and reason, pretend and actual facts in my participation.

Figure 8.12 Participants placing objects on ‘The Earth Calculator

They were asking the ‘participants to pretend they were going shopping, and imagine where the object had come from, and map this distance in kilometres. I asked them afterwards why and how they thought of this activity. Two students expressed directly that they “just needed everyone to understand, the different aspects of the whole idea of ‘food miles’” (Student communication, Nov 8, 2013).

After the participants had completed their worksheets, the students introduced ‘The Earth Calculator’ that they had rolled out on the floor. This was a scaled map of distance. The students told us that each section of The Earth Calculator represented 1000 kilometres. Our job was to place our objects onto The Earth Calculator in order to measure the journey of our objects/shopping. I had already read and written the distance my objects had travelled: Turkey, 14,000km, and Vietnam, 7,000km. Participants were to apply this knowledge to the map: The Earth Calculator (Figures 8.12-8.13). Figure 8.12 is a photograph of a participant placing her shopping on The Earth Calculator. The difference of mapping visualised the spatial rationality of distance. This visualised a spatial journey that represented the embodied distance within our objects. After all the objects were placed on The Earth Calculator/map the field looked like a distributed skyline of urban objects. After some discussion and questioning, the students asked everyone to replace the objects with their worksheets so that everyone could see the amount of ‘food miles’ clocked up collectively.
Figure 8.13 ‘The Earth Calculator’ after participants’ objects were replaced by the worksheets.

The participant-observation of this 20-minute presentation and activity demonstrated to me how students-as-teachers communicate what is important and useful in learning. The design of this EfS teaching and learning experience demonstrated the use of visual and spatial, mapping of objects, times and places from students’ perspectives on learning. To do this they called upon participants’ experience, and imagination and ‘imaginative rationality’ (Lakoff & Johnson, 1980, p. 193) to vivify the embodied life of objects in order to enrich an understanding of everyday materiality with issues and multi-spatialities of food miles and embodied energy.
Eva’s students facilitated a workshop in which they were positioned as teachers. I conclude with a photograph (Figure 8.14) of students explaining the concepts of food miles and the significance of understanding the embodied life of everyday objects to a state government minister after their presentation. The eye contact and bodily communication contact speaks of their knowledge and understanding. They appear confident, and able to speak with an adult about their understandings of food miles, their presentation and the choices they had made to facilitate the learning for others.
Conclusion to this chapter

These EfS resources encourage new ways of seeing materiality. The diverse range of stories and images seem to be aimed to re-orient and re-imagine everyday encounters with matter and objects. The EfS resources analysed here were all made from 2007 onwards, and so are recent contributions to environmental knowledge-making for EfS. Their unique genre occurs as a convergence of imagination, New Materialism and EfS. The next learning stories show how students teach a sustainability concept of ‘food miles’. Their strategies show their understanding of the embodied life of objects in multi-spatial and temporal scales. The students demonstrate their view of how immediate consumption embodies concealed imaginaries.
Shearwater Learning Story

This section of analysis is collaborative; undertaken in a dialogue between me, the researcher and the EfS educator, Eva, as we sit together reviewing the images and video taken during my 14 week participation in, and observation of, her primary school-based environmental science class during 2012 - 2013.

The collaborative voices in this analysis move through a range of temporalities. Eva was interviewed throughout the research after classes. Her comments have been transcribed and used in this chapter from four main occasions (Oct, 9, 10, 16, 24). I also draw upon Eva’s various comments made during classes, as transcribed from audio/video recordings and observational notes. Additionally, Eva and I worked together viewing the data (Nov 7) and over the course of a whole day (Nov 26), correlating notes, memories, previously recorded reflections and carving new impressions and understandings. In this way, Eva’s comments narrate the learning story reflectively and she analyses the data with me.

The collaborative structure of this analysis is diffractive; I transcribe teacher and student voices from videos and recordings, include images, transcriptions, narratives and Eva’s reflections in ways that expose the inevitable layering of time, data and analysis. I use the present tense in this section, as a descriptive way to evoke the reader’s imagination. I change tense to invite the reader into the learning environment as a story, and to signal returning to previous texts or impressions when analysing reflectively. This involves an interpretive mapping of connections and differences and I try to articulate the multiple voices and layers involved in this mapping. In this way, writing diffractively explores the multi-dimensional and intertextual emergence of the work of imagination in EfS.
Eva

Eva is the primary EfS Educator at the 5 star sustainable primary school in regional Victoria. She coordinates the kitchen-garden program, the student green team, the waste management practices and provides professional development to her staff as well as networks in the region. She has been responsible for rainwater collection and renewable energy infrastructure on campus; she is very knowledgeable about sustainability and passionate about Education for Sustainability. Through her initiative the school has been accredited as a ‘5 Star Sustainable School’ and Eva has been nominated for a state-wide Environmental Educator of the Year award. I remind the reader that this participant-observation research is not geared to assess how Education for Sustainability has been implemented here. In this established, quality and successful EfS learning environment, I participate and observe Eva and her class with the aim to examine how imagination occurs, is engaged with, constructed and reconstructed. I engage with ways of coming to know the environment and understanding sustainability that use imagination. I also examine how imagination involves ways of seeing the world in which the self is oriented in relationship rather than dislocated. This story is not limited to direct moments of imagination but recognises the porous and entangled world of knowing.

Shearwater Learning Story

As a researcher entering an EfS environment, I expected that I would observe water conservation, waste education sessions about recycling, or particularly ‘environmental’ or conservation issues. But to my surprise, the class is starting a new unit on ‘Short-Tailed Shearwater birds’. As a regional school, students live locally and they are aware of the Shearwaters’ local nesting ground on ‘the Island’. I am interested to see if imagination can be recognised at all in this new context about birdlife. I don’t know anything about Short-Tailed Shearwater birds. I learn that ‘the Shearwaters’ are migratory birds, and ‘the Island’ has international significance.
After the first lesson, Eva described to me her plan and goal; which was not focussed on learning about Shearwater birds, but about developing connectivity and belonging: “If we talk about the end product; we are talking about a greater connection to where we live, and a sense of place and space” (Eva, interview, Oct 10, 2012). Her understanding of how these connections are made for her students occur through ongoing, informal, formative assessments of students’ learning. She frequently fleshes out these learning goals in the first person which places herself as the student. This seems to invite students to check for themselves ‘where they are at’. For example, as Eva explains the learning goals of the Shearwater unit, she takes on a student voice to embody what she wants them to learn. Then she reverts back to being the teacher by referring to her students in the third person, within the same sentence. Eva explains the point of the unit: “So, if I know the Shearwaters are there and they live in a burrow, great. If I know every moment of their life cycle fantastic. But for them to get a connection deeper to this place, well that’s it” (Eva, interview, Oct 10, 2012). A concern for connection that is ‘greater’ and ‘deeper’ and to do with a ‘sense of place and space’ is evident throughout our dialogues. This reverberation of learning goals echo what she wants her students to understand and this concern for articulating layers of learning pulses through her discussions in class and with her colleagues.

Eva’s pedagogical interests appear strongly throughout the 14 weeks. I often hear her say, ‘I want to know what my kids are thinking and how they are thinking’. This emphasis on thinking echoes the positions of the other EfS educators. Frequently throughout the classes, Eva re-iterates these learning intentions to the group, which seems to orient the class direction at different times. It is as though this may influence and direct the course of learning. Eva navigates. It is like steering a boat after a turn is made; to continue on a straight path again is gradual and involves re-assessing direction and absorbing the wake of previous movements. Her approach to crafting student experiences as ‘navigating’ occurred to me as a metaphorical understanding of how learning occurs. Eva disclosed her conceptualisation of teaching and learning clearly through the use of similar metaphors; ‘I see
experiences as central and as fluid movements that can be built upon in layers” (Eva, interview, Oct 10, 2012).

The flow and sequences of learning experiences over the 14 weeks in Eva’s classroom occurred as conscientiously designed and planned because of these navigations, and because she used a range of intertextual, non-transmissive ‘tools’ that seem finely crafted. Despite the finely crafted feeling, later Eva told me (in week 5-6):

  For me, in planning that, it wasn’t formulated, I really didn’t go into it going ok, we need to have images, we need to have this, I’m not conscious of those tools, I’m not that organised or focussed, it’s really just about building their experiences (Eva, interview, Nov 7, 2012).

The way she designed and led her classes, including the way she spoke, arose as offerings more than conducting ‘activities’. Before the first class she described her brief plan:

  Today, we’ll do some image work and then go to the beach. We want to have some quiet time so the kids don’t have to focus on activities, but trying to give them extra time reflecting, getting connected. We often just race around. You know, that’s important (Eva, interview, Oct 9, 2012).

It became clear that Eva didn’t value ‘activities’ or experiences with a one-off purpose. When she planned, even spontaneously, she focussed on ‘building their experiences’ rather than accomplishing tasks or activities, and she valued the time this takes. These considerations assisted me, as participant/observer/researcher in understanding and interpreting the teaching and learning.

**Environmental Imagination Map**

As the possibility of conducting research at Eva’s school emerged, I shared my research interests with Eva. Our discussions were voice recorded and I reflected on them immediately afterwards with hand written notes. Gradually our conversations
unfolded and I eventually shared the idea of mapping EfS with a world view orientation and how this had resulted in this time and space map (Figure 9.1). ‘Two lines with a circle in the middle’, she said, ‘it’s the Venn Diagram of sustainability’. Because the ‘diagram’ emerged through analysing the ideas within my research, I was surprised that the ‘map’ made sense to Eva in a practical way. I was hesitant but Eva embraced the dimensions and orientation of the map that positioned the learner in the centre. She introduced it into her classroom and discussed it with her students.

The scope of this diagram/map enabled the topic, Shearwater birds, to inhabit a range of spatialities and temporalities. Multiple times and places of Shearwater bird’s lives are oriented by the centre which signifies immediate experience and the learner-self in the here-ness and now-ness of the classroom today. Eva navigated the terrain of the Shearwater knowledge using the map during our seated discussions. I draw on my notes to describe her interpretations:

![Figure 9.1. Conceptual map, or time and space map.](image)
She traces some ideas over the map as we sit together. While pointing across it, we hover over it. Eva points to the axis in different places as she describes what students will learn in this unit; about the birds’ life-cycles, how they live and relate on ‘the island’ (here and now) (micro), their global scope (macro), local significance (micro) and historical influence (past). (Participant-observation notes, Oct 16, 2012)

The following transcription has been edited by Eva for clarity. She outlined her understanding of how the learner-self in the centre is pushed and pulled into other regions of time and space during learning about the times and spaces of the birds’ lives. We use the diagram as a map of how understanding and awareness might shift and move inter-territorially during learning.

The global migration of the birds push our experience of them up into a macro perspective. Their underground burrows and their personal, breeding life pull on us to imagine the micro perspectives. Stories about the birds in traditional Aboriginal culture and historical colonisation contexts stretch our understanding into a range of pasts. And the future is implicated here on the map as a question. What will the future be? What’s predictable? What’s possible? The space of the future recognises their life and the wellbeing in the future relies on their habitat and food sources in future times. The whole thing shows us, maps for us, a life-cycle in a new way, the parts of their holistic existence as a species, and the requirements of our awarenesses to go to, or be aware of, all of these places and times. (Eva, spoken and written, Oct 16, 2012)

I am surprised the map is emerging as quite useful in this context. The life-cycle of a Shearwater bird is new knowledge to me and as Eva spoke, I feel my way around the concepts using the map as a learner. By using the map in this way, the idea of short-tailed Shearwater birds are introduced to me as an object or as a subject, but as idea-beings who exist in many times and places. Eva navigates around the bird’s lives using the map to orient the topic in time and space with strange and evocative clarity.
This charts the movements of birds, and the requirements of my imagination and awareness to come to understanding.

**Who Lives there?**

Without the lights on the sun shines in. Eva shows photographs she has already taken of the local habitat on ‘the Island’ in the dimly lit classroom. With subtle background music, the images are aimed to evoke a ‘sense of place’ from a range of perspectives. Then Eva announces, ‘We are going to go to ‘the Island’, a local place. She asks if anyone knows ‘Who lives there?’.

‘Who lives there?’ occurs as an empathic statement, conjuring ‘Who?’ rather than ‘What?’ This gives identity to the birds, as opposed to a generalised reference ‘bird’ or the objectification implied by ‘what’, as in ‘What species is that?’ Instead, ‘Who lives there?’, is a statement of value because it creates a feeling that ‘we will be visiting’ in a way that values the place as inhabited. This further draws upon understandings that ‘we are respectful when we visit someone’s place’. Visiting someone (rather than something) connects the place and its inhabitants to the local community and environment. The project of knowing wildlife is not a colonist act of bringing knowledge to terra nullius. ‘The island’ is presented as inhabited and students, and myself, are positioned as visitors ready to learn about what they already know.

The introduction of the ‘topic’ in the form of images and the question ‘Who lives there?’ introduces Eva’s role as storyteller. This highlights to me how, not only ‘the story’, but the way the teacher tells the story communicates value and guides perspective in a range of ways. This construction of teacher-as-storyteller occurs as an alternative to ‘introducing a topic’, because instead of being the holder of knowledge, Eva becomes the teller of stories. I notice that her focus is not on ‘telling’ students ‘about’ content but instead, guiding the approach. While this approach seems more passive than active, in 6 weeks Eva will tell me that the aim was to not tell about and discuss information:
... we still don’t have the big verbal discussion about Shearwaters. We haven’t sat down and told them about Short-Tailed Shearwaters, not told them any information at all. They are showing me the understandings they are creating on their own, in their own view. (Eva, interview, Nov 7, 2012)

At the end of the first class, Eva has shown images with quiet music, and asked a simple question ‘Who lives there?’ that constructs a sense of valuing the ‘subject matter’ as beings and inhabitants of a shared environment and community. The production of knowledge occurs in narrative form. The learning is linked to local place that is, so far, being imagined, and constructed as a part of this narrative.
Air Drawing: ways of seeing

This part of the story is a week later and I draw from my notes to describe the experience:

Students carry their Learning Journals. They’ve walked a fair way from school. They sit down for a break before entering the Shearwater’s protected area, at ‘the Island’. It’s very windy. Eva points to the Island with her finger to direct the student’s focus, through space. Kids are starting to sit down. Her outstretched arm points to describe where the island begins and ends. The kids follow this line created by her finger to understand the parameters, scope and size of ‘the island’ from this viewpoint. (Participant-observation notes, Oct 24, 2012)

Eva asks them to do some ‘air drawing’ to ‘warm up their eyes’ before they walk further towards ‘the island’ (Figure 9.2). The students obviously understand this concept of ‘air drawing’ as none of them open their journals. Instead they sit or kneel, and all get their drawing-fingers ready and they start relating to the air as a free canvas. What they see is described by their fingers as they outline and draw on top of what they see, in the air. It makes me smile to see so many kids attentively ‘air draw’. They become absorbed and focussed on their own bits of air. Some kids are sitting cross legged, others are standing right up on their knees, balancing with faces that are clearly concentrating. The way their bodies are still, their looking and the way they move their fingers so slightly, seems that they are committed about each brushstroke and seek certainty with their air drawn lines. They might seem like they are doing nothing, and although there are no material consequences, this imaging is real for them and is contributing to their experience. The kids ‘air draw’ for many minutes. They are all silently engaged with drawing in the windy air in front of them (Participant-observation notes, Oct 24, 2012).
Fortunately this next moment was recorded and below is a transcription of what Eva says to the large group of students. Below is a transcription of what Eva said to the group of students as they continued to ‘air draw’. I include Eva’s words because she guided students’ approach to ‘air drawing’ that engaged a particularly attentive and artful way of seeing. Her descriptions of the qualitative involvement of seeing engaged students. This developed a thickness of concentration that connected students experience with an imagined layer, and encouraged/allowed creative components of experience and seeing. The length of her monologue was fluid and shows how attentive students were during this time. She reminds students simply, that when they look they are using their eyes. This seems to turn the focus onto one’s own eyes as well as what is being looked at. She differentiates between ways of seeing; encouraging ‘observation’, ‘really looking’, ‘very closely’ as attributes of being a scientist and an artist. Students are listening and air drawing as she guides their approach:

What we’re doing when we’re air drawing, as you know, is we are using artist’s eyes. That means really looking at things very closely. We’ve been doing it in class with smaller things. Artist’s eyes are very, very similar to scientists’ eyes. Because scientist’s eyes have to really, really look as well.
So it’s observing things. That’s the key to it. Observing. Really looking hard. Hard as you can. So we’ve got artist’s eyes and we’ve got scientist’s eyes and we’re using both of them when we work together. With this, your Journals become a way of recording what you’re observing. ...Your Journal becomes your art book, your artist’s notebook and scientist’s notebook. We’ll be recording data you might find; recording in drawings and recording in writing. This is what your book is for. Any of these things.

You might, just as you are walking along, something might enter your head. Write it down. Even as you walk along...There is no right or wrong answers. You might start thinking about other things, start imagining different things that come about because of what you’re looking at, because of what you’re experiencing. Any of that information in your journal is useful for you to learn from. (Eva, Oct 24, 2012)

For Eva, the practice of ‘air drawing’ worked to increase students’ attentiveness and was aimed to ‘warm up their eyes’ in preparation for drawing what they saw and found on ‘the island’ in their journals. I watched and listened as she performed the monologue while students were all ‘air drawing’. They were listening. Her voice directed their attention to multiple places and in a range of ways, all at once. Naming students’ eyes ‘artists’ eyes’ and ‘scientists’ eyes’ spoke of nuances and differences between ways of looking and seeing without defining them. These differences and the attention given to this practice, altered and highlighted students’ experiences with what they were seeing. Perhaps they were ‘taking in’ the world imaginatively (Malouf, 1998). This visual and imaginative approach of ‘air drawing’ guided the impressions of outdoor experiences by using imaginative dimensions within seeing to enrich what is seen, and how it is seen, and therefore enrich and alter experience. For Eva, students’ skills of attentiveness and observation become visible and are reflected in their later drawings.

After air drawing, the group continues to ‘the Island’. They spend two hours drawing what they see on the island in their journals.
Students choose what to focus on, what to observe. Some students move with a friend, others are alone. The teachers seem to value the time the children have here and their right to their own perspectives.
Figure 9.6 is a student drawing of a Shearwater bird during this excursion in the afternoon of this first day. I include this image because it tells something about the way the bird was seen. The un-even-ness of the size of the wings show a sense of movement, and that this bird was seen rather than drawn as a generalised ‘bird’. The differences in tone between the lightness of the head and the darkness of the body portray shadow and depth. The way in which the eye is drawn on the side of the face shows attentive observation and portrays a sense of character and a sense of the bird’s individual attention. These differences in wing shape and tone recognise the uniqueness of this bird and demonstrated to me, as participant/observer, that ‘warming up your eyes’ or becoming attentive to seeing may alter the detail and depth of observation of the real and material. There were lots of detailed drawings.

Drawings emerge as assessable evidence of student’s attention and ways of seeing. A student called Jessie asks me to take a photograph (Figure 9.7) of a burrow that she takes me to and shows me. I take this image and show her on the viewfinder of my camera. After 2 excursions drawing from observation on the island the class returned inside to reflect.

Figure 9.7. Photograph of a shearwater burrow on the island.
Narrative Sentences: ‘imagination statements’

Eva hands to each Grade 3 student a strip of coloured paper with a title and a sentence of about 50 words. Each strip is two lines long and describes aspects or moments of the Shearwaters’ life and habits. They begin with a short title and end with ‘...’ (dot dot dot). This implied endlessness seems to signify that there is more to the story. Each student is given one coloured sentence each and are aware that their snippet is a part of a larger whole. Some examples of the narrative sentences include:

The egg: A single white egg is laid in the burrow...The egg hatches in 53 days...

Waiting together: The Shearwater parents take turns to sit on their eggs. They will sit on their eggs for two weeks at a time...

Oil bottles: The parents feed their chicks an oily mix. It stays in their bellies. Early settlers once came and picked the birds up to make the oil come out...

Fat fluffy chicks: The chicks grow and grow...they become so big that they can’t fit out of the burrow...

Eva calls the coloured strips of narrative sentences; ‘imagination statements’, which occurs as an instruction as well as a description. It is communicated that students are free to interpret the meaning evoked as they wish. Additionally, the title might communicate that their purpose is geared to provoke imagery more than information. The translation of these facts into narrative form evokes the imaginative effort of its author. Eva reflected on these moments with a sense of what was not there:

There was no prior discussion about who and what the birds are and what they do, it was just, here are your statements, remember your experience on the Island, show me what you think. (Eva, interview, Nov 7, 2012)
Eva walks to each student sitting on the floor-rug to hand out the statements without selecting or controlling which student gets which strip. I notice there is not much noise in the class at all. Students stand up and return to their tables with their Journals. Eva’s instruction ‘Show me what you think’ guides students, which means that their task is to draw from the statements. I watch students paste this narrative strip in their Journals and begin drawing from its evocations, they are approaching the task as though they are illustrating a page of a great book. They understand Eva’s instructions ‘Show me what you think’. It is implicit now that their teacher values aesthetic and arts-based representations of their understanding. Each unique piece of narrative text signifies ‘impossible places’ beyond what can be experienced directly.

On top of the world: Shearwaters fly around the Pacific Ocean to the Aleutian Islands on top of the world...

Moon birds: Shearwaters are known as Moonbirds as they migrate by the moon around the world...

Return of the bird: As the days get longer the birds return home. They arrive on the island near the spring equinox, on 22nd September every year!...

The small pieces of factual information occur in narrative form. They have many centres, lots of sensitivities and create multiple foci and viewpoints. The physicality of the cut-out coloured sentences evokes each statement’s part in an unknown larger context. Eva later describes some of the concepts involved in learning about the birds as ‘completely impossible conceptual places’ that include global migration routes, underground burrows and historical evidence of how they were used in the past. Impossible to experience, and impossible to see, Eva asks her students to nevertheless construct these places from inter-textual offerings. Approaching these impossibilities through drawing what students interpret from the ‘imagination statements’ seems to allow students to create and construct their understanding progressively. It could be seen to involve imagining because the students don’t know any information about the birds yet. I recall Eva’s reflection: “There was no prior
discussion about who and what the birds are and what they do, it was just, here are your statements, remember your experience on the Island, show me what you think” (Eva, interview, Nov 7, 2012). In this way Eva is trusting the island, their experience and their imagination to produce understandings without having been told anything about the Shearwater birds yet.

This process also engages in intertextuality. She is asking for her learners to make connections between what they have already seen and experienced on ‘the Island’, and their snippets of the narrative. Making these connections may involve links or disruptions and Eva is asking for synthesis. By giving students different ways of making meaning, her students are learning to manage a range of texts to develop understanding.

By giving students multiple textual modes and asking for synthesis, students explore and express understandings in ways that need to be analysed for meaning and for evidence of learning and understanding. Eva and I walk around the room looking at students drawing. We sit with students and ask about their work. Eva values how her students are thinking and emphasises that evidence of learning and understanding is not only in their drawing but requires students to talk about their work. She says that their learning can’t be read by a teacher’s interpretation of their drawing alone.

I listen as Eva asks a student about his drawing (Figure 9.8) and he explains how his drawing is his thinking. He reads his narrative sentence: ‘The egg: A single white egg is laid in the burrow...The egg hatches in 53 days...’ and described his process of drawing:

It’s a bird what I’m thinking of on my paper. Mine’s on an underground nests of one egg, and I’ve got to draw 53, and it’ll crack on the 53rd one. I’m writing about the days it takes to hatch an egg’. (Student communication, Oct 24, 2012)
Figure 9.8. Student drawing from ‘imagination statement: ‘The egg: A single white egg is laid in the burrow...The egg hatches in 53 days...’

His drawing illustrates the imagery of the narrative sentence and uses his knowledge of the birds’ habitat on the island that he had experienced on the excursion. He described his drawing as ‘writing’, and as thinking; ‘what I’m thinking about on my paper’. There were no words or writing on his work. This suggests that he identifies writing and drawing in similar ways, or that his drawing has been made as though he was writing about the birds. This description shows his relationship between himself, his work and the ideas. He was writing his thinking through his drawing and the mini-interview enabled Eva and himself to become aware of this visual and textural process. Eva’s reflection while looking back at the data was voice recorded, and speaks about her understanding of the process of teaching and learning. She described, with hindsight, where we were up to in the class:

They’ve done their drawing, made sense of their statement, now they are showing me what they’re thinking, synthesising from their different experiences. They still don’t have the big verbal discussion about Shearwaters. We haven’t sat down and told them about Short-Tailed
Shearwaters, not told them any information at all. They are showing me the understandings they are creating in their own view. (Eva, interview, Nov 7, 2012)

Another student’s description of his drawing evokes an understanding that his ‘imagination statement’ is a part of a narrative that involves himself learning about them. In his drawing and in his verbal response he includes the presence of himself watching the birds, and being watched by the birds as he investigates their burrows:

I am drawing about burrows in the sand... Here is me with my art journal looking at the Shearwater burrow and here. The Shearwater is coming behind me to just check out what I’m doing in case it was her hole. And there are two eggs in that one, and one egg bunched up in that one, and I am trying to get the plants (Student communication, Oct 24, 2012)

The completely engaged focus this student brought to his drawing and description of it helps to construct and articulate his understanding. The act of drawing creates a visual map of how students know and conceive and this can be read in conversation between the learner and teacher.

Figure 9.9. Jessie’s drawing in the classroom of shearwater burrow in response to narrative sentence.
The student, Jessie, who asked me to take a photograph (Figure 9.7) of a burrow during our excursion on ‘the island’, drew (Figure 9.9) from her impressions from memory in response to her narrative sentence: ‘Burrows: The burrows are 1-2 meters deep...and lined with soft grasses...’. Her drawing extends across two A3 pages in her journal to express the depth of underground connections between burrows. The circular forms are the entrances, and the leafy, vine-like details represent the soft grasses and shrubbery of the island habitat. Her experiences on the island, drawing from observation with new ways of seeing afforded by the practice of ‘air drawing’, contributed to an accurate body of imagery that she has taken into her work reconstructing the burrows depth and lining through personal drawing in her journal.

**Imagining the real**

The significance of experiences on the island, and drawing from observation encouraged imagery and impressions that informed drawing for Jessie (Figure 9.9). However, Eva sits with two boys who are confused about the realities evoked by their narrative sentences which stated:

Bird rafts: The Shearwaters never touch land except when they are at home on the Island. They make rafts of birds in the sea to rest.

Eva reflected on her conversation with them after class:

Another great couple of boys, Harry and Luke, their statement was about the birds forming a raft. They initially struggled to figure out how the birds formed rafts. (Eva is laughing). They were exploring the possibilities of the birds actually making a wooden raft. So I encouraged them to explore how the birds could make a raft in other ways. So, they, in their partnership, they worked through the uncertainty in that statement. It was hard for them to imagine how birds could construct a raft. I think it was Harry who ended up saying, ‘oh, they actually make the raft themselves, they form the raft, they don’t actually build it.’ (Eva, interview, Oct 24, 2012)
The link between the uncertainty the students encountered in that statement and the difficulty they had in imagining it, speaks to a profound link between what is known and what can be imagined. It suggests that rather than imagination signifying that which is unknown, to imagine something requires knowledge, imagery or impressions. Here, Eva encourages processes where students encounter ambiguity through the non-explicit snippets and work to fulfil the challenges involved in not knowing by working it out themselves. The statement alluded to something real however trying to imagine it was difficult. From Eva’s reflection, she didn’t tell them what the statement really meant. She encouraged them to evaluate the plausibility of their images, and re-imagine the possibilities accordingly. She didn’t tell them the ‘true’ meaning of ‘bird rafts’. In fact, the ways Eva crafted the ‘imagination statements’ in the context of the learning allowed this not knowing.

This suggests that the goal here as not to know, but for students to experiment with their ideas, undertake imagining, develop a range of imagery in order to construct their understanding of this particular aspect of the birds’ life. Eva had emphasised that valuable learning is realised and demonstrated to her within student responses and dialogue regarding their drawings, and not necessarily within their drawing alone. This part of the learning story shows how experiences develop imagery to enable understanding and imagining later. It also shows the need for students to develop cohesive imagery in coherent and non-contradictory ways (Dewey, 1902, pp. 246-247). Excursions, drawing and the imagery evoked by narrative, act to attend to this process, as opposed to a more direct focus on facts and information in language that can be reiterated correctly without the educator knowing anything about the imagery and impressions being constructed and developed by the students.
Another student drawing positions the bird’s nest in a tree. Generally ‘birds’ nests are in trees’, however experiences on the Island and images shown in class have communicated to other students how the Shearwater birds live in burrows in the ground. The way the student imagines the bird’s nest in a tree: ‘I’m drawing an island with birds flying around it, going to their mother’s nest which is going to be up in the tree’. His reference to ‘an island’ shows no specificity, and his language about his drawing shows an abstracted or generalised understanding of birds, rather than Shearwater birds. This may be an example of simply not listening to the task, or not understanding it. It shows the influence of experience on the imagination. I recall Dewey’s emphasis on imagery for understanding: “If they could image a thing they could reason about it. Because they cannot, there is nothing in their minds to reason about” (Dewey, 1902, pp. 246-247).

In this case, this student’s imagination does not seem linked to the real, but a generalised, and so shows a lack of understanding. This is important for Eva to know as it emphasises the connections between the real, the experienced and the imagined that are implicit in the task. I discussed this with Eva and she pointed out that this student had not come on the excursion. This was his first class for the term. The drawing and his description shows an imagined environment that is creative, but not
accurate according to the knowledge focus of the topic. Eva told me that he was
drawing freely. This analysis shows how student drawings can be useful in
formatively assessing understandings so that which is imagined is developed in
alignment with the materiality. The movement of this learning story shows how
experience influences the imagination, like the position of birds’ nests and the shape
of burrows, and that imagination is required to imagine real things that are beyond
experience, like bird rafts.

Figure 9.11: Student drawing by ‘Jackson’ of Shearwater birds migration patterns.

I choose one more student drawing to analyse, from the perspective of imagination.
Jackson’s drawing (Figure 9.11) shows that a Shearwater bird is not an isolated
object by the way he represents his understanding of his ‘imagination statement’:
“Moonbirds: Shearwaters are known as Moonbirds as they migrate by the moon
around the world”. Jackson’s drawing shows his choice to split the picture into the
world of sky and earth, showing he has already decided that the bird lives in two
worlds, so he needs both worlds in his drawing. In order to represent the Shearwater
bird from his experience and from the ‘imagination statement’ he needs the
foreground and distance, above ground, sky and underground. The hill in the centre
has a bush with complex root systems drawn in great detail. He has made a spatial
decision to position this ground half way up the page. This creates room for the
world of underground. A cross-section makes visible the underground root system
and shows his understanding of the birds’ multiple worlds. The drawing emerges as
an important visualisation of understanding that encounters multiple time scales and
space dimensions in one picture.
I have analysed the drawing visually, inter-textually and in terms of imagination, understanding and experience. A cartographic interest in Figures 9.8 – 9.10 and Jackson’s drawing (Figure 9.11) appreciates the plurality of space concepts in reading and understanding environmental knowledge. This interpretative encounter with students’ drawings afford the drawings to be read in terms of the visual and spatial decisions students have made; how they have mapped their understandings. Interpreting the drawings as not only aesthetic representations but as a synthesis of intertextually lived and imagined impressions, works to appreciate the student as a map-maker and as an artist involved in navigating and orienting themselves in relation to a range of related environmental knowledges. Valuing visual lines, depth and tone reflect sensibility as well as decisions made by students as related to their understanding of the topic. From this analysis, I suggest that these understandings are environmental, not only because they are ‘about’ biodiversity but because of the spatial and temporal imagination evidently involved in this understanding that has mapped and placed the knowledge in environmental ways. The extent of this work evidences an expanding worldview for the students so that their encounters with the birds can involve inter-related, multi-dimensional understandings.

Collaborative Environmental Imagination mapping

After drawing from ‘imagination statements’, the class stands in a loose circle around the room. Eva walks across the room saying ‘this is all time’ and places handwritten signs, ‘Past’, and ‘Future’ at either end. ‘Now’ is in the centre. She carves out a ‘space’ axes by walking across the floor. The word ‘Micro’, is placed near the whiteboard, and ‘Macro’ is hand written on paper and placed at the opposite end. Back in the centre where the axes meet, she says; ‘Our experience, here and now is in the centre where the axes cross’. After clarifying these dimensions, she asks students to choose a place to put their journals on the floor, open to the page of their drawings, in the location that might best represent their ideas. As students walk into the circle Eva continues to ask and guide their thinking:
Is it a global thing? Is it a micro thing? Where will you place your journals in the map according to where you think your knowledge might belong? Your choice. And you can’t get it wrong, there are no wrong answers. (Eva, Oct 24, 2012)

Students walk with their journals open to the pages of their narrative sentence-drawings, into the circle and lay them in different places on the floor. We hear discussions as a range of choices are being made. After a short time students return to the edges and stand back in the circle. They are looking around the floor, talking about what they see. This is the first map. Eva requests a ‘Gallery walk’ and everyone starts moving around looking at all the drawings and their context. In our collaborative analysis, Eva and I refer to this (Figure 9.12) as ‘the linear version’ or ‘the first draft of the map’. There are large groupings of journals around the centre, most of the journals follow the lines along the axes.

This (Figure 9.12) is the first orientation of their work in the shape of the map. We see the kids placing their work along the lines of the axis. The kids have really just started to make a connection between their particular piece of work and the map. It’s like the first step. I think that is the introduction. Very linear. (Eva, interview, Nov 26, 2012).

Students’ journals are open to their Shearwater drawings made from their ‘imagination statements’ and have been placed according to where the students feel/think their knowledge about the birds rests or lays. During reflection, Eva continues to use this to assess for learning by examining how this process is showing her what and how her students are thinking by finding connections and differences.

I see the micro strongly; the birds themselves, nests, eggs, and burrows are strong in that layout. The micro is strong. It’s probably the entry point, showing me that students can make a close connection to the local, micro aspect of our Shearwater topic. (Eva, interview, Nov 26, 2012)
A concentration of the many overlapping journals around the centre and into the ‘micro’ occurs strongly in the centre of Figure 9.12. The mapping shows how these areas are used by students to signify the local place, sitting on eggs, hatching and so on. The micro area, from the centre towards the left hand side of Figure 9.12, locates drawings of underground burrows beneath the centre/present. It is as though the spatial location of ‘ourselves as centre’ represents the surface of the earth for students. The vertical dimension is interpreted as allowing for underground and above ground dimensions of space. The distribution appears even across all axes, suggesting that students lined them up. The linearity of this ‘first mapping occurs to Eva and she begins to speak to the class about the map. She emphasises that the map begins in the centre and she acknowledges that students have chosen to follow the lines of the axes rather than read the dimensions of the map.
Collaborative reshuffling

Layers of experience, memory, reflection and analysis inter-relate and contribute to telling this story. Eva’s memory of Jackson’s role re-emerged strongly during reflection. We watch the video footage together showing Jackson kneeling over the floor looking closely at a few journals. He raises his hand and speaks to the class.

Jackson: I'm having a look on the classroom floor, and I think one or two, I think, are in the wrong place

Eva: Yeah but that’s ok isn’t it Jackson. Because it’s about our personal perception isn’t it. It’s about what ‘I’ think, about what ‘I’ imagine, how I feel about where I belong. There is no right or wrong. (Pause...)

There might be a few students who might like to change where they put their drawing. Let’s take a minute to do that now (Eva, Oct 26, 2012)

This re-evaluation was triggered by Jackson’s discomfort and critical eye. While Eva’s first reaction resisted the dualisms of correctness and failure, Jackson’s comments came to demonstrate the reality that the map was per/forming. I transcribe Eva’s reflection immediately after class regarding what she saw as a discomfort in some students and how this was acted upon and what it may show her as the educator. We reflected on the movement from ‘the linear version’ and the suggestion of ‘reshuffling’. Below I recount our conversation:

Eva: I could just see, I could just see their brains saying: ‘ooh, I’ve put mine in the wrong spot, and I get it now so I need to move it.’

Researcher: That changed the whole shape of what we were seeing.

Eva: So it was very linear at the start, as in everything was lined up along the axis. I saw lots of kids, who, as a result of the talking we’d already
done, I could see that there were lots of kids who were feeling uneasy about where they had put their Journals on the two lines. I just felt that they needed to go and fix it. I just felt that.

Researcher: And about 15 kids probably did and then there was a new shape of it. There was more up in the global, there was more in the underneath?

Eva: Yeah and it was less linear. They started going sideways, thickening it. That was the best. ‘Hey they don’t all have to go along the line’.

Researcher: Yes! Jackson was the one who said: ‘hey they don’t all have to go along the line’. He instigated the reshuffle. This fascinates me.

Figure 9.13. The class environmental imagination framework after reshuffling about 15 students’ journals.
During the class, Eva and I watch with interest as at least 15 students come to the floor, grab their books and walk around. They look at other drawings in the same area or along the axis to evaluate where their work might belong. Some students seem careful to nudge theirs into the ‘right’ place; seeking a belonging or a fit. The photographs of the re-drafted map show a less linear formation. This suggests that students are engaging with the concepts of the axes rather than their representations as lines. The pages of their journals occur like open birds’ wings and collectively, a formation. The mapping is not a linear cross anymore; the bunching up of journals in the past/micro and a group separated from the centre up in the macro, shows agreement and relationship. The future maintains linearity which may reflect linear concepts of how time moves into the future. Eva assesses/evaluates:

The re-shuffling shows more synthesis and connection. The re-evaluated map is where kids are really conceptually starting to build an understanding of it. I see them evaluating and re-evaluating the map as well as others’ choices. The space between the centre and the global occurs strongly. The bunching up shows me similarities, not in their drawings but in their thinking. It isn’t as linear, and still can be read as our map. I think there is a bigger connectivity. (Eva, interview, Nov 26, 2012)

During the class, after everyone has placed their work and stepped back into a circle. The first impression of the second re-evaluated version shows that students seem happier to move into the spaces of global-future, or global-past, rather than stay along the lines. The overall map now is far less linear. This takes a few minutes and students return to sit at around it in a circle. Eva asks her students to describe where they put their work and why:

There is an obvious change... I would be interested in each and every one of your stories about why you placed your Journals like that. You change your place. We are starting to use this tool and hopefully we are starting to work out how it works and what it means. I’m going to ask 3 people why they put their journal where they did. Max? (Eva, Oct 26, 2012)
Max: Mine’s in the past, mine’s ‘the parents give their chicks an oily mix’ (reads).

Elsa: Oh that’s the same as mine (interrupts).

Max stands over his work in the area of the past. He shares what his drawing is about and how he oriented it. He reads his imagination statement from his Journal. Elsa’s interruption shows realisation, how they placed similar ideas close to each other on the map. Eva reflected on the significance of this part of the process as a peer assessment and recognition of connection:

They (Elsa and Max) found their individual imagination statements were the same and they were interested that they oriented themselves quite closely on the map too. This, to me, is great because that’s the ideal of the framework, to make sense. What matters is why they put it there. They both oriented their work about the parents feeding the chicks, in the past. That’s interesting. It’s great to see how they are conceiving of the life cycle ideas of the bird in terms of the present, the past and future. So it has a place for them.

To me that’s what you do when you build knowledge...Over time you expand your view, your knowledge and fill in the gaps. I experience my students having an imaginary concept base to build that framework. That to me is how you create your knowledge (Eva, interview, Nov 26, 2012).

In the lesson two more students share where they put their work and why:

Megan: I put mine in the past because in the early days the mutton birds used to be hunted for meat

So Amy’s statement is quite clear. It is more clearly historical. There is a reference to ‘the olden days’ in her statement. Others were broad. She put hers in the past that can be seen as correct. (Eva, interview, Nov 26, 2012)
Jessie: Mines about the nests, and about how they can be one to two meters long.

Eva: I’m interested in why you put your book in that particular position

Jessie: I’m not really sure.

Eva: Do you think it’s in the right sort of place, are you happy with where it is?

Jessie: Um, I’m not really sure.

Eva: Well that’s ok. I think that’s great to feel a bit unsure. We are learning and our ideas are going to grow and we will start to get more comfortable about where things might belong. (Audio transcript of video footage, Oct, 26, 2012)

In an interview after this event Eva says:

When I look back on that, that’s exactly what I think. Yes that was interesting. Jessie had the burrows in the past that was interesting. The kids need to know that it’s not black and white, and that it’s not a fixed position. The whole line is about that. It’s the moving centre, your viewpoint, and can be expanded and contracted and moved in different ways. It’s that plasticity. Because I want our kids to know that our learning moves and grows. Their placement on the map framework is important because they are starting to map according to expanding from the centre, it’s not just one-dimensional concepts of past or future. Sequential sessions would uncover a bigger expansion, whereas this is just the beginning; the starting point. (Eva, interview, Nov 26, 2012)

Later in the same reflective interview, Eva described:
Whilst I talk about students sharing their relative reasoning, there still is a degree of logic as to how the map works. This is something that I wasn’t sure if they would get. But they really did. There was a surprising sense that there are right places for ideas to go on the map. And _different_ right places. Like their drawings, the dialogues are important for me to understand their thinking and also help the other students realise, ok, so that’s how the axes work. (Eva, interview, Nov 26, 2012)

I return to the lesson where students are mapping their work on the floor. Eva asks Jackson about his reasons for putting his book on a particular place on the map:

**Eva:** Ok Jackson?

Jackson stands up and shares

**Eva:** Where did you put yours and why?

**Jackson:** I put mine in the global and slightly towards the future… because… when the birds are migrating they fly at night.

**Eva:** Why did you put yours in the global Jackson? (didn’t hear him)

**Jackson:** Because they are going around the world.

As Eva and I sit together and re-visit the experience weeks later, immediately after this video footage, we discuss how Jackson seemed so clear about his understanding.

**Researcher:** He seems quite clear about it.

**Eva:** Yes, he is very clear. Clear about his intent and his decision making. He was clear about the meaning of his statement. By using the word ‘migrating’ and placing his work in the ‘global’, he is showing me his conceptual understanding about how these birds fly in a global space.
Jackson is really showing a higher level of understanding about the birds. In terms of differentiation he is entering at a higher level than some others.

Researcher: I love that he said ‘global and slightly towards the future’. Such interest in accuracy.

Eva: I think he can really see the concept of the environmental imagination map quite clearly. He can see how it works. He was the one who said, ‘hey they don’t all have to go along the line!’ He was the one who instigated the reshuffle.

Researcher: Why, or what do you think it was that impressed you here?

Eva: Because of who he (Jackson) is as a person, as a learner, and what this mapping has done for him. I’ve learned about how he learns, how he thinks. I’ve learnt new ways to get him to show me his thinking and his knowledge.

And...I’ve got one more thing to say about Jackson, is that this activity or this way of teaching is incredibly important for a person like Jackson, who has a higher order of thinking and a big knowledge base. In our classes, the kids choose how to show me their learning. You’d only ever see him do written reports. Actually you’d never really get much work out of him. But you’d know it was there.

I really wasn’t sure about how he would go about processing the knowledge content in an imaginary way. But he was a stand out. And I was so incredibly excited by the way he was able to do the imaginary drawing (Figure 9.11) and represent his knowledge like that. Jackson has struggled before to creatively show his knowledge. I think, for me, he was one of the biggest stand outs within that session, that made me go, yeah, yep I can see this working.
After the collective mapping, students chose a focus to investigate further. They performed a physical movement piece to enact the life cycle of the Shearwaters. All the students and Eva ‘fly’ around the world, form a raft on the sea, ‘migrates’ to the Allusion Islands, then everyone ‘flies’ back home over the Pacific ocean. These processes enable students to embody the information of the Shearwaters’ life.

**Environmental Imagination mapping at the beach**

The collaborative analysis continues to express the layers of events, reflections and performances of learning and understanding diffractively in this learning story. The class walked down to the beach and sat in a huge circle discussing the learning journey so far.

![Image](image.png)

Figure 9.14. Eva’s class at a local beach.

Down at the local beach on excursion. We re-introduced the map ideas here on the sand, as a way to talk about the Shearwater’s whole life. We stood around the map, and the kids started drawing and playing in the sand. So we’ve drawn two lines in the sand that represents all time and all space, moving through the
dimensions of the map…I drew a circle around the centre axis with my toes in the sand. This space in the centre where the lines cross, is the self, the learner. It maps student centred learning environmentally. Which is what you want. (Eva, interview, Nov 26, 2012).

In the map, the self is centre, bringing the being of self into the learning landscape, and bringing their present experience at the beach into the ideas that cover multiple times and spaces. Students’ experiences are included in the map of the shearwater birds. I show Eva this image (Figure 9.15) of her drawing in the sand with her toes. ‘This glows for me. What were you feeling, or thinking?’ I ask.

Figure 9.15. Eva drawing the centre circle of the mapping framework on the sand.

Eva: So while this circle is the last drawn element on the map, the whole thing is about stretching the here and now into these other dimensions. The kids can only ever really be in the centre, but here we are asking them to be in their knowledge. Be and stand in what they know.
Be in the map, be your knowledge

Researcher: When did you get the idea of doing the map on the beach?

Eva: I think I wanted something that the kids could physically be in. Physically being in it and putting themselves on ... To physically stand on the map, ‘in’ the map is probably to the point here. I want kids to identify what they know about in this spatial way, to know and orient what they know in this imagined environment; creating a physical experience of the actual map and how you can be a part of it. The self is at the centre but to get in the map, puts themselves really in it. When we stood on it, in it (Figure 9.16) there is another process that goes on, that is triggered by physically being in it and putting yourself in it. (Eva, interview, Nov 26, 2012)

Figure 9.16. Students standing around a time and space map carved in the sand at a local beach.
Eva continued:

It is a very engaging way to teach and learn. How often do kids get asked to put themselves in there, in that process, in the learning, in the knowledge, in the topic? This process asks them, and allows them, to be a part of this. Students are the centre of this map. It’s a highly student-centred tool and process (Eva, interview, Nov 26, 2012).

We watch the video footage of the students mapping the Shearwater’s knowledge and life at the beach over and over again (Figures 9.17 - 9.19). They choose a place to stand on the map that represents what they know about most. In the video footage Eva encouraged students thinking and directed their attention using a range of questioning as she located herself in the map with her students.
That’s the past, now you must orientate your self. Have a look now at the map. If we are looking at the future, what kind of things will we see in your future? So do you know more about their life journeys and the bigger pictures or do you know about the little smaller things about them, their little habits of their lives…? (Eva, Nov 26, 2012)

Rather than an external representation, this process, is an embodied, kinaesthetic experience. Ontological implications of standing in it, physically asserts the map is inclusive. Other times and places are imagined through their knowledge of the Shearwaters’ lives. The knowledge of the Shearwaters has come and been constructed in many forms. Using the mapping framework at the beach applies their knowledge to environmental dimensions and not only do students imagine the where and when existence of their knowledge, they also locate themselves in this map. The horizontal and vertical axes are drawn out on the sand, representing dimensions of all time and all space. Eva emphasises to her class that each student is the centre, on the map and in their own learning. “There’s such a process going on there. It’s about orienting yourself on the map and projecting the lives of Shearwaters on it too” (Eva, interview, Nov 26, 2012).

Figure 9.18. Still from video footage. Students placing themselves in the map.
We watch it again and again. I’m compelled by the way all the students move from sitting down on the sand in a circle, into the map. They are thoroughly fleshing out all dimensions of the inside. They are all choosing, orienting themselves in relation to their knowledge. Students talk with each other. Other kids are listening. I hear kids making connections about, ‘well I had the oil’, or ‘I had the birds with the meat’ and ‘our books are sitting close together’. The process of being in it and creating dialogue creates a process of co-aligning themselves. This makes the knowledge about Shearwaters not fixed and static but relative and situated in particular places or times. ‘The environment’ has many directions and possibilities. They move purposefully. They are choosing a place to stand. When I ask about how Eva perceives the map to be working, Eva explains:

The flexible logic of how the map works. The sense of it is something that I wasn’t sure if they would get. But they really did. There was a growing sense that there are right places for ideas on the map. These ideas and the dialogue also help the other students realise, ok, so that’s how the axis works.

The thing is, the kids show me what they know, or what they’ve learnt because I really want to know. The thing is...what I think the mapping is amazing for is that I want to know what my kids are thinking and how they are thinking and this tool is a discussion point that tells me and shows me so much. As a teaching and learning tool I’ve not encountered anything that allows me into that. (Eva, interview, Nov 26, 2012)

**In the map: sculpting knowledge from the sand**

Eva stands in the map and speaks aloud to the class. Her words are inaudible at the beach. Standing in the map. The boys who learnt about how ‘parents give their kids an oily mix’ worked with students who learnt that ‘in the olden days early settlers tipped the birds up to get the oil out of them’. They started acting the stories out together, carrying each other; acting out bird families and settler bird handling. Two students lifted another up and tipped them, pouring oil out of them like the early settlers did to the birds. In other areas kids were enacting sitting on eggs, burrowing,
and migration. Eva seems to have no problem with this messiness. The appearance of ‘messiness’ can allude to a lack of clarity about learning or being off task and not really learning. Eva explains her perspective:

From the surface one might think, oh they’re just playing, but when you really listen to them, you can learn so much more about what they know and what they are learning. But their knowledge is evident despite the loud, and messy or chaotic appearance, because you can ask them and they say, yeah, we are doing this part. (Eva, interview, Nov 26, 2012)

Figure 9.19. Students creating sand sculptures of their understandings.

There are differences between the indoor collaborative map on the classroom floor and performing the mapping outside at the beach, in a place where the earth can be moved and felt like play. It engages physicality. Earlier and inside the kids were
engaging with the map from their experience on ‘the Island’ and their snippet of information. The mapping inside involved orienting those pieces of knowledge on a bigger stage. At the beach, now, they are all aware of the whole story of the Shearwater’s life. They have a sensory involvement; smell, salt spray, wind, sound and sand. They know the range of spaces they move in during their lives.

Eva reflects on the video clearly remembering the day and the process:

Yes. It strikes me effectively; they are all playing in the sand. On review of the video, you can see they are listening and processing, some kids have drawn the map on the sand in front of themselves. (Eva, interview, Nov 26, 2012).

Figure 9.20. Students working together to create a sand sculpture of a shearwater burrow with eggs.
Students sit down in the sand, form groups and start building that part of the shearwaters’ life in the sand. Nests, burrow, eggs, bird rafts and global flocks, even the sky is being made in the sand, orienting around the time and space dimensions of the environmental imagination map. Eva comments insightfully on the seeming ambiguity of the learning tasks but contrasts this with the reality that students are engaged and ‘getting it’:

There can always be that moment when you ask kids to do something and they stand there and go, what? Not one of them does that. We didn’t need to be over explaining. They get it, (laughs) really. Each kid has told different parts of the story. So here, the life cycle was put on the map using sand sculpture. (Eva, interview, Nov 26, 2012)

There is only the sound of the wind. Kids are thoroughly engaged in their sand sculptures that are situated in various and particular areas within the map. The sand is well trodden, with tracks and traces of thinking and imagining everywhere.
**Concluding reflections**

Environmental philosophers and New Materialists contend that ways of understanding human relationships with the world need to be revised in order to include more accurate and inclusive understandings of materiality. The many layers of imagined knowledge forms in the Shearwater Learning Story, through image, metaphor, narrative and creative acts of drawing and drama, testify to the many forms of imagination as ways of knowing. Through air drawing students engaged in ways of seeing. Their learning about wildlife involved multiple dimensions of environmental realities that are beyond what can be experienced. Through mapping, the imagined dimensions of environmental knowledge was situated and negotiated. Students placed themselves _in_ this knowledge. As Eva said: “The kids didn’t have to be told what to make in the sand. They weren’t told, ‘ok you’re in micro, you make a burrow with some eggs’. They are showing us that they get it” (Eva, interview, Nov 26, 2012).

In this learning story, the knowledge of the Shearwater birds was analysed through the dimensions of the mapping framework (Figure 9.1 and 9.21). The temporal and spatial dimensions of the map re-imagined ‘the’ environment as all of time and space. Students located themselves and their knowledge in their mapping; on paper, in sand, in story, with their bodies, drawn lines and in sculpture. This mapping was a way to understand the dimensions of sustainability and the cartographies of the Shearwaters’ life. It was also a way to situate and orient the environmental knowledge in relation to the world and in relation to self. On the map, the world, the self, the Shearwaters’ lives and the knowledge are simultaneities. Students’ bodies and experiences become the fluid compass through which time and space flow, and experience and imagination worked together to develop understanding. This work has produced a conceptual map the dimensions of sustainability that are imagined (Figure 9.21).
The main points I have learned from this analysis is the level of conceptual work involved in learning environmental knowledge, and the cartographic possibilities of representing knowledge and nature in ways that do not objectify its substance. The Shearwater Learning Story can be read as a pedagogical story, where, through not telling, Eva allowed the students to listen to the birds make themselves intelligible to them, through the communication of experience, attentive seeing, narrative and time and space mapping. The ways of seeing the world produced by learning about Short-Tailed Shearwater birds is conceptualised in Figure 9.21 that maps the conceptual dimensions involved in understanding and imagining environmental knowledge. The effectiveness of the learning for myself is narrated through my post-interpretative account below, from which I wrote a poem.
Post story

As I walked along the beach months after my formal research experiences, I walked through gatherings of birds. I instantly recognised them as Short-Tailed Shearwater birds. There were hundreds of them. Without having ever seen them before in real life, I knew they must have passed this coastline on their way back from Alaska to ‘the island’. I knew that they rely on each other during their flight, rest together as rafts on the sea, and navigate by the moon at night. I knew that they would be returning to their partners and their chicks would be hatching. However, they looked exhausted. I picked one up in my hands. It didn’t have the energy to fly. I felt the salt of the sea in my eyes, as the bird died. Later I would read in the newspaper that flocks of Short-Tailed Shearwater birds had washed up on south-coast beaches, speculating that they were hungry and exhausted, but no one, not even scientists knew why.

Figure 9.22. Dead Short-Tailed Shearwater Bird.
Finding imagination: a cartography of bird flight

The nomadic creativity of imagination breaks through caged systems and reveals open space beyond. The trajectory of its multiplicities that connects with other multiplicities is felt.

My imagination understands horizon. Its line of flight is the vanishing point in a painting: an implicit knowledge that materiality continues but can only be imagined.

Fleeing grasp eluding definition, flowing, leaking, and disappearing into the distance mapping the imagination, like a cartography of bird flight uncovers a new materiality.

(Author, 2013, unpublished)
A matter of imagination

This study has examined the nature of imagination in the context of Education for Sustainability (EfS) in Victoria, Australia. Through a New Materialist reading employing a diffractive, narrative analysis of EfS educator interviews, participant-observation and EfS texts, new orientations and interpretations have emerged regarding the place of imagination in Education for Sustainability contexts. The questions that have guided this thesis are used as headings in this concluding chapter.

1) What is the nature of imagination in relation to the environment?
2) How does imagination work in Education for Sustainability (EfS)?
3) When does understanding sustainability require imagination?
4) How does imagination develop worldviews or revise ways of seeing the world?
5) In what ways is imagination involved in re/orienting self and world?

In this concluding chapter, I argue how my research has answered the research questions. I evaluate if my approach has been successful and I discuss the limitations of my research and suggest possible futures for inquiry. I assert the contributions to knowledge that have been made through my research, epistemologically and methodologically.

Significance

This thesis has responded to the need for profound change in our intellectual traditions to affect sustainable outcomes and quality Education for Sustainability. I have followed suggestions that Australian Environmental Education research should look more closely at the pedagogical practices and epistemological positions that affect teaching and learning. The need to re-imagine our relationship with nature has
been applied to EfS in this thesis, and it has emerged as a priority for Australian Environmental Education and research. I began this research by carving new relations between environment and imagination as possibly responsive and reflective of each other. At the conclusion to this work, I assert that imagination is a way of knowing and a way of learning in EfS that is not limited to the constraints of direct experience and does not represent knowledge in fixed ways. This thesis presents imagination as a way of attentively allowing the multi-dimensionalities of the world to make itself intelligible; a way of knowing that is inseparable from the life of our planet.

*Limits and possibilities*

Words to describe imagination at the conclusion of this study seem contradictory, because imagination is diverse, contested, unwanted, prevalent, multi-dimensional and provocative. It is a challenge to research and has required ontological, epistemological and methodological re-conceptualisation. Imagination is important to Education for Sustainability and New Materialist philosophies because both are interested in revision. In this sense, imagination is not a *thing* to be found, but a practice, that connects, and works at the edges of experience, knowledge and materiality.

I have formed new ways of understanding imagination, and new ways of approaching sustainability. But, there are limits to this research due to the nuanced nature of imagination and the immense global drama evoked by discussing the environmental crisis. Imagination is indefinite, uncertain and its diverse forms and uses have more differences than similarities. My analysis was necessarily limited by my own interpretations, language and interests. I concede that my position, which has been deeply interested in imagination, may have caused more advocacy and less critique of its shortcomings. Jones (1995) expressed this problem, as a romantic custom of “extolling imagination’s virtues without soberly critiquing its limitations” (p. 313). However, Gough (2009) expressed the hazards of reducing complexity in EfS research in order to gain certainty in results. A critique of imagination’s shortcomings was not within the scope of this research. I instead expressed the
educational and material dangers of a loss of imagination and provided narratives and cartographies rather than classifications to avoid complexity reductionism.

My work has attended to re-positioning imagination at the educational and environmental crossroads of EfS with onto-epistemological New Materialist perspectives. This has considered the destruction caused by fixed and definite epistemological frameworks and the ways in which representations of knowledge can occur as contradictory to the problems that sustainability and EfS seek to resolve. The outcome of this research is hoped to advocate a willing, participatory dialogue about imagination in EfS, as a way of opening up the issue of matter, including ontology and revising concepts of environmental knowledge.

Another limitation of this research is the lack of students’ voices. Whilst students’ bodies, work, drawings, voices and participation feature in the learning stories, there is a greater focus on EfS educator perspectives and educational practice as a whole. This was the research design, however the challenges of understanding how students imagine more deeply would require detailed and nuanced research with students to uncover their experiences of imagining. While there have been experiments in assessing ecological worldviews (Dunlap, 2008), this has used survey questions and has not been done with a cartographic, or non-dualistic epistemology. In designing my research I steered away from attending to imagination directly with participants, because of a feeling that it would dissolve or become pigeonholed by thoughts about it. However, with a better understanding of imagination, as a credible part of teaching and learning in EfS, a more direct investigation may be possible with students in the future. This has limited the research, however this approach would have also been limited by students’ recognitions of imagination, their own learning processes and the language used to convey these intersections. These challenges call for new ways of mapping and tracing, recognising and talking about imagination, environmentally and epistemologically. A pedagogical dialogue about imagination in Education for Sustainability is necessary in order to more fully understand the working possibilities that may emerge if imagination was considered a critical part of understanding and sustainability.
I have drawn largely on Barads work for engaging with New Materialism. A possibility that was not taken up in this research is a stronger engagement with the large body of intricate post-modern philosophies of Deleuze and Guatarri (1987, 1994) that are very much *in* this research. Examining imagination in EfS together with their use of environmental metaphors and ideas of nature and knowledge, could provide another layer of how imagination is involved in re-conceptualising nature and knowledge in EfS. Stewart (2011) has begun this work by drawing on their idea of ‘Becoming’ in outdoor educational research. Further work could be done on the emergence of birds in this thesis through Guatarri’s (2008) work on ecologies and the *lines of flight* that connect these ideas with imagination and their philosophies. Together with Haraway’s (2008) critique of their anthropocentrism, it is a possible future of this research. The next three sections respond to the research questions.

*Methodological considerations*

I have made several methodological gatherings and assemblages in this thesis in order to re-conceptualise imagination. I drew together eco-critical and New Materialist readings of matter through material eco-criticism, and aligned EfS with these onto-philosophical perspectives. My diffractive analysis also worked through narrative; enmeshing narrativity and diffraction in analysis. This considered the agency of all stakeholders and relationships in this thesis, and resulted, during analysis, in considering imagination as an agentic communication; a way of hearing and recognising the distributed material-discursivity and intra-action of entangled matter, people, times and space elements in my knowledge making.

The cartographical methods of analysis emerged from the literature that suggested that imagination participated in multiple times and spaces. Re-considering imagination in the environmental contexts of Australian Environmental Education and Education for Sustainability furthered the cartographic impulse. At the end of this thesis, I realise the congruent rather than contradictory contributions of this cartography.
In Figures 9.1 and 9.21, the self is in/at the centre of the intersections of time and space. This present experience has no opposite in the map, rather, that which is beyond the boundaries of presence is distributed in all directions across multiple times and spaces. This map emerged through imagining what understanding sustainability involves. For contemporary critical philosophies and AEE, rather than continue to oppose ideas, a new, revised framework is required. The methodological contributions and possibilities of my cartographic handling of imagination in this thesis is expressed by Barad. Barad’s (2001) description of what New Materialism needs to continue to enact and practice revised ways of reading materiality, occurs as a call to position these cartographies in a New Materialist future:

What we need are genealogies of the material-discursive apparatuses of production which take account of the intra-active topological dynamics that reconfigure the spacetime manifold. In particular, it is important that they include an analysis of the connectivity of phenomena at different scales…the topological dynamics of space, time and matter are an agential matter and as such require an ethic of knowing and being. (pp. 103-4)

Cartographies that draw boundaries, and that can shift and transform, inter-act within and between time and space and include the self discursively, have been drawn through the emergent environmental imagination in this thesis. This forms a contribution to New Materialist cartographic experiments, and contemporary cultural philosophy.
Responding to the research questions

The next three sections respond to the research questions. I discuss the findings of the research and argue that the nature of imagination in EfS is required to enabled teachers and students to examine and revise ways of seeing and being with the world.

The nature of imagination in EfS

The nature of imagination in EfS occurred prevalently, as a living way of knowing and learning. It has diverse forms and has been taken for granted. Educators contest its value in educational contexts, however I analysed imagination and found a material-discursive practice.

A living knowledge that is practiced

My analysis of the learning stories showed the diverse ways that imagination is put to work. In some learning stories, imagination became positioned as that which facilitated understanding. It emerged in places where experience ‘wasn’t enough’, or when knowledge was ‘static’ and imagination signified that which made ‘knowledge come alive’ for students. Eva reflected on imagination as a tool, ‘used’ and that ‘takes over’ in “expanding thinking beyond boundaries”, and in “connecting everyday objects” (Eva) with their origins in the earth. This suggested that imagination operates at the edges of what is known. Eva described her students’ learning as ‘using our imagination’ in order to “to create a link between what is known and what we can imagine” (Eva).

Contested and unwanted

Imagination is different, diverse, un-defined, yet even this can be misunderstood. Despite clear evidenced-based research suggesting that imagination has material consequences (Doidge, 2007, pp. 197-215), can enhance learning (Pascual-Leone, 2001) and is a central part of education (Egan, 1988; Macknight, 2009) particularly in relation to experience (Dewey, 1902; Vygotsky, 1967), no EfS educators in this
study described imagination as part of their pedagogy. They were not comfortable in saying about their students, ‘yes they were imagining’, or ‘yes, I do want them to imagine’.

In my analysis, there arose a plethora of loose or vague interpretations of imagination. This is evidence of its diversity, and of the lack of attentiveness given to other ways of knowing in educational discourse. Educators in this study would rather not call their teaching or learning imaginative: “I wouldn’t say there was imagination there, we may as well just call it thinking” (Stella). “I certainly haven’t constructed imagination to be a part of what we do other than to say we engage students with entertaining styles of learning” (Olivia). These statements testified to the lack of credibility given to the work of imagination in learning. While the nature of imagination in EfS cannot be readily defined, I argue that its prevalence in EfS suggests it is a significant part of teaching and learning that can no longer be ignored.

Material and discursive

Imagination arose in teaching practices, inter-textual forms, in learning experiences and through the attentive work of students’ thinking/imagining and seeing/imagining. My New Materialist lens analysed imagination in ways that saw it as a discursive practice. As a way of knowing, imagination created inter-active understandings without displacing self from that which is being understood. Imagination is as a discursive practice between human and non-human agents; it was a way of knowing and being known; a way of giving and receiving non-linguistic communications that are multi-dimensional. This nature of imagination presents opportunities for EfS by refusing to dislocate knowing from that which is being imagined. Instead, the nature of imagination is integrative, shared yet internal.
A way of knowing that affects being

I interpreted the materiality of imagination as an onto-epistemology, as explained by Barad (2003) as to do with self/world and self/knowledge relations: “[we] do not obtain knowledge by standing outside of the world; we know because ‘we’ are of the world’ (p. 829). Through the multiple forms of imagining and imagination in the learning stories matter was seen as having a story and a life, knowledge was shifted from stasis to living, flexible and dynamic, and bodies, ideas, and understandings shifted through it. If the results of knowing end in knowledge, the outcome of imagining affects being.

EfS requires imagination to revise ways of seeing the world

The importance of ways of seeing the world was established at the outset of this thesis, through confronting the ‘blindness’ of anthropocentrism that has resulted in egoistic ways of seeing and reading the country. In discussing World Views as formal goals of EfS in Chapter 3, I constructed worldviews as ways of seeing the world that can be imagined, and re/produced by imagination. In Chapter 4, I discussed the philosophical problems with representing fixed views of the world for Environmental Education. In analysing EfS educators’ learning stories, I noticed where worldviews, or ways of seeing the world were attended to. Educator’s attention to ways of seeing emerged in the learning stories as expressions of imaginative work in many complex ways. This involved educating ways of seeing experience as well as questioning the imaginary aspects of how materiality is experienced.

~ By attending to ways of seeing experience

Some of the EfS educators spent time with students to reflexively inquire about the differences between seeing and looking. This involved bringing imaginative attention to students’ own eyes, to the practices of looking by outlining distant places by drawing in the air, by drawing in detail from observation, and by discussing the meaning of seeing or the differences between ‘scientists’ eyes’ and ‘artists’ eyes’.
Other EfS educators worked to craft their students’ ways of seeing through storytelling (Ben), animation (Olivia), image (Jamie, Eva), experience outdoors (Mike, Eva), narrative (Jamie, Olivia, Ben, Eva), analogy and metaphor (Simon, Eva) to imagine the extended and contextual dimensions of materiality that cannot be seen. Imagination was treated as an agent of learning in Eva’s and Ben’s classrooms that acted to ‘give life’ to objects, to make connections, and to expand thinking.

~ By educating the Imaginary

My analysis showed how the EfS educators in the learning stories found ways to examine and educate the imaginary components of how materiality and experience is seen, appreciated and understood. This framing of ‘the imaginary’ was informed by Castoriadis’ (1987) use of ‘the imaginary’ in his social theory (also Lacan, 1954 and Kristeva, 1995) as well as Lakoff and Johnson’s (1980) analysis of “metaphorical thought” as “imaginative rationality” (p. 193). Through my analysis, the nature of ‘the imaginary’ in the context of EfS has taken form. EfS educators addressed ‘the imaginary’ in a range of ways. Whilst the seven EfS educators in this study worked with different focus and expertise, their teaching involved highlighting the pathways, implications and inaccuracies of materiality and experience that are difficult to see. They worked to revise ways of seeing the world by crafting and inquiring into that which is involved in seeing and understanding materiality within and beyond experience.

I briefly return to the learning stories to give examples: Mike designed fieldwork for his students to ‘go to’ the structures that are hidden ‘beyond sight’, ‘behind’ and ‘within’ everyday objects and matters of convenience. Simon consigned wasting energy to an imagined way of seeing. Olivia aimed for her students to develop a way of seeing everyday objects as embodied with a story and a life, rather than inert and without context. I participated in the work of EfS educators radically re-educating the imaginary elements of ways of seeing in alignment with sustainability. Their various methods appreciated the pliability of these imagined associations.
The implication is that re-framing experience is possible through re-imagining. Through this thesis, EfS educators’ work can be understood as re/educating ‘the imaginary’, through accessing and helping students’ revise the imagined dimensions of seeing and understanding materiality. This constructs sustainability as not only about possible futures, but ways of re-crafting the imaginary components of experience so that encountering materiality involves, and can account for, that which is embodied, concealed, unseen, assumed and hidden.

~ By imagining what cannot be seen

The purpose of educating ‘the imaginary’ for the EfS educators was so that students could perceive and encounter ‘nature’ in and as everyday matters. My analysis showed how they used imagining to work through these dislocations. EfS involved learning about the journeys of stuff, the histories of things, the origins and source of everyday objects and the make-up of matter. Through my focus on imagination, analysis showed how a culture of convenience and encounters with disposable objects depend on valuing immediacy. In a range of cases, immediacy and immediate experience concealed the sustainability dimensions and greater significance of matter and experience.

In the learning stories, the origins and consequences of matter were unavailable to learn through direct experience. Imagination was put to work in order to encounter the complex, multi-dimensional realities that constitute the emergence and existence of objects and matter. Seeing an everyday matter of switching off a light (Simon) sitting beside a bookcase (Eva), using a mobile phone (Olivia), or throwing something away (Eva) involved imagining an object’s sustainability context. Teachers and students inquired into ways of seeing the hidden dimensions of sustainability and discerned that whilst objects and things appear still, they cannot be imagined as fixed and inert. This demonstrated that imagining, rather than simply pretending, was used to apprehend and experience inaccessible materialities. These more-materialities were temporal and spatial and required expanded understandings of matter, ecologies and environments.
Imagination re/orients the relations between self and world

It has been established that Education for Sustainability aims to develop inclusive World Views (ACARA, 2014b). However the way this is accomplished is uncertain. Having discussed how imagination was involved in crafting world views and ways of seeing the world in the learning stories, the ontological significance of imagining was analysed to examine how imagination affects the conceptual relations between self and the world. A focus on hands-on experiences in nature in Australian Environmental Education (AEE) research and practice has emphasised the importance of experience in nature as the foundation of developing connection, care and a sense of place. However, in my analysis of the EfS educator learning stories and environmental texts, I found that the dimensions of sustainability involved concepts and sites that were beyond experience, and this provoked or was the site of imagination. The dislocated locations of pasts, futures, global perspectives and micro realities, arose as imagined sites of sustainability. These territories beyond experience are the terrain of imagination; and are navigated, traversed, related to and constructed by/through imagining.

Imagining the bigger picture

EfS educators used a range of strategies to enable their students to imagine intangible contexts and connections: “students are asked to bring into their world completely impossible conceptual places” (Eva). The need for understanding the ‘bigger picture’ referred to expanding and contextualising experience and knowledge beyond the edges of present experience. Ben described: “You need to imagine a bigger picture to imagine the future and move forward” (Ben). Through storytelling, students experienced multiple places and scenarios affectively. Stories, storytelling and narrative dimensions to pedagogies enabled other things and beings to be perceived with agency, and evoked connections between matter and its global impact. Imagining the bigger picture featured significantly in the learning stories, to contextualise experience and generate understanding in ways that resist dislocating environmental knowledge from students’ sense of self. This highlighted how the
dimensions of sustainability occur at the edges of experience and require imagination.

Imagining multiple temporalities

In the learning stories, moving forwards and backwards in time through stories, metaphorical relations, images and ideas were non-linear, non-representational and necessary parts of coming to terms with complex ideas. Noticing how imagination was involved in traversing temporalities and spatialities emphasised how understanding sustainability involves being able to navigate conceptual temporal and environmental relationships. Imagination involved non-linear and overlapping ways of navigating through ideas when trying to make connections. Thinking backwards and forwards occurred as a part of thinking sustainably. For example, EfS educators used images that presented a hypothetical future while documenting the past. Students imagined different perspectives to include the unseen consequences of present dynamics on future times. Through story, students imagined other places and times to enable everyday objects to be imagined as embodied by their origins and futures. The EfS educators and students moved forwards and backwards in time through storytelling (Ben), drawing things “back to nature” (Eva) and understanding the embodied material (Olivia) in new ways. Knowing where matter comes from, and goes to emerged as important dimensions of understanding sustainability, and educators and students imagined in various ways in order to navigate materiality’s multiple temporalities.

Involving ontological connections and becoming connected

Rather than dislocating self from the knowledge through representation, the imagination in EfS moved through local and global spaces, and backwards and forwards in time. Mapping these movements (Figure 9.1) helped to perceive an ontological cartography of environmental knowledge. This provided two ways of locating imagination onto-epistemologically; as connectivity, and in-ness.
Through analysing the learning stories and EfS discourse-texts, imagining emerged as an act of orientation, of orienting self and world. Making connections and perceiving connections occurred as learning in the learning stories. Making connections and perceiving connections occurred as learning in the learning stories. The purpose of Eva’s Shearwater learning project was for students ‘to make those connections’ between themselves and their local environment. Imagination emerged both as a connective way of understanding and a way of learning about connections. Making connections through imagination arose as being able to transfer imagined experiences into ‘real life’ (Ben), connecting personal experience with a bigger picture (Jamie, Mike, Simon), making connections between the suggestions of an image and ‘real life’ (Eva, Mike, Jamie). Making connections through imagination also occurred as the moment of understanding itself, as in “I saw them make those connections” (Jamie). Through story, image, narrative and metaphor, imagining occurred as a way of orienting knowledge in context, and re-orienting self in relation to the worlds of environmental knowledge.

Oriented by/through In-ness

The idea that imagination is a human capacity that is deeply related with the state of the earth (Buell, 1995; Sveiby & Scuthorpe, 2006) repudiates assumptions that nature is detached and external to self. My research suggested that further attention to the ‘in’ side is essential to understand materiality. In-ness refers to inside self and inside the world as the location of embodiment and reciprocity. Using the time and space map in the Shearwater learning story showed how the students were oriented by the knowledge, and included in the knowledge as much as the knowledge was mapped. My analysis and reading argues that imagination is locatable simultaneously both in the embodied material and the self. The EfS educator, Ben showed concern for students to take in the idea of water by embodying the river through imagining all ‘jumping in the river’. This created learning as not ‘about water’ but in the water. These students responded to the challenges of the story from the river’s perspective. Malouf (1998) described ‘taking in’ the world through the imagination in order to belong; to experience knowing a place “imaginatively as well as in fact” (Malouf, 1998). Educators described a location of understanding as ‘internalised’, that arose as
distinct from formal knowing. This was operative when students imagined the embodied life of objects, as though an embodied materiality emerges in partnership with an embodied mind. Additionally, educators referred to the idea of *in*-ness, when encouraging students to respond to being *in* place, and ‘taking it in’. This described being *in* the environment *in* a personal way. ‘Taking *in*’ locates the internal human component within a reciprocity of imagination and environment. A concern for ‘*in*’ occurs differently through the interviews, however the nuances of taking *in* are suggestive of the ontological dimensions of environmental knowing that occurs *in* being. From this place, the environment is not external but known imaginatively.
Contributions to knowledge

1. Aligned EfS with the New Materialisms

I have investigated imagination in Education for Sustainability through a New Materialist onto-epistemology. My New Materialist and material eco-critical standpoints provide a new view of EfS as having New Materialist orientations. My analysis of EfS educator learning stories and the discursive narrativity in environmental texts showed how EfS involves revising ways of seeing materiality, re-imagining matter, and re-considering the multiple and intra-discursive agency of non-human beings and practices. This has re-framed EfS learning and teaching as concerned with re-visioning ways of seeing and encountering materiality. The shifting and shared agency of knowledge is recognised and handled in EfS in a range of ways. From my work in this thesis, EfS can be seen as having New Materialist and material eco-critical practices that have onto-epistemological interests and accountabilities.

This alignment is a contribution to knowledge and to Australian Environmental Education (AEE) research. I argue that New Materialist concerns and philosophies re-invigorate EfS perspectives and re-conceptualise sustainability understandings. The perspectives of the New Materialisms and material eco-criticism have assisted me in this thesis to understand the re-visioning that EfS requires and to perceive the ways in which EfS involves constructing new views of materiality. This alignment is a contribution to AEE efforts to move away from the problematic frameworks of representing environmental issues and prescribing correct behaviour, by re-visioning limited, inert conceptions of what understanding sustainability involves. My thesis has demonstrated how imagining and imagination is a part of re-seeing and re-encountering a fuller, inter-connected, material-discursive world. This is a contribution to New Materialist philosophies and Australian Environmental Education research.
As I have positioned EfS and New Materialisms with related, entangled concerns, I highlight some of the ways in which both Education for Sustainability and the New Materialisms involve resisting anthropocentric worldviews, re-imagining the dimensions of nature, and engaging in the agentic stories of matter. These are new ways of seeing the world that are necessary for sustainability education and the New Materialisms.

Re-thinking materiality

Both the New Materialisms and sustainability invite a radical re-thinking of materiality. (Barad, 2003, 2007; DeLanda, 2006; Dolphijn & Van der Tuin, 2012; MacLure, 2013; Simms & Potts, 2012). In this thesis, understanding sustainability has involved re-thinking how materiality is seen, thought of, and experienced. Through focussing on imagination, I have demonstrated how educators and students empathise to understand the other; as bird, river or bookcase, re-imagine the expanded materialities involved in immediate conveniences, and re-think the material realities beyond and embodied by visible experiences. The beneficial alignment between Educating for Sustainability and the philosophical perspectives of the New Materialisms enhances understandings of EfS theory and practice and positions EfS educators, as educating for a new materiality.

Re-imagining nature

New Materialist philosophers have criticised limited and fixed concepts of nature that ignore its being and agency. They have suggested that the environment needs to be re-visioned as an “ontologically heterogeneous field” (Bennet, 2010, p. 23) and as “a dynamic co-mingling of human and non-human agencies” (Oppermann, 2013, p. 63). From this thesis it is clear that understanding sustainably also requires re-imagining nature as constitutive rather than separate and classifiable. Educators and students engaged with imagining the distributed origins and consequences of objects and experiences are providing new ways of valuing the entangled and multiple forms of nature. This showed how EfS involves perceiving the inter-relationships between and within materiality with which oneself is a part.
Re-seeing matter

Oppermann (2011) critiqued materiality in alignment with sustainability, arguing that the New Materialisms “compel us to envision the physical world as storied matter teeming with countless narrative agencies that infiltrate every imaginable space and make the world intelligible” (p. 57). I applied this view to analysing the learning stories in this thesis, where EfS educators invited students to re-imagine what objects and experience are made of, where they come from and what the related implications are for its futures. My recognition and analysis of eco-texts has highlighted how contemporary EfS practices engages with new ways of seeing objects and matter; as agentic, storied, embodied with natural resources, places and times, and as valuable players in material-discursive and sustainable world views.

2. Re-surfaced undervalued ideas of imagination from across the disciplines

My research has resurfaced undervalued ideas of imagination in interdisciplinary literature. I have emphasised the significance of neurological research that has found material evidence of imagination, and I questioned why this has not been included in educational understandings of learning. I have drawn upon Dewey’s (1902) work on imagination and argued for renewed attention to his contribution regarding understanding experience in learning. This work has highlighted how imagination rarely occurs as a part of experiential learning discourses. Additionally, this thesis has productively made use of the significant role of imagination theorised in Lakoff and Johnson’s (1980) work. I have incorporated how they positioned imagination as ‘metaphorical thought’ and at the core of their discourse analysis (pp. 191-232) into my methodological considerations. The work of imagination in their work is similarly, rarely highlighted. Theorising imagination as a critical part of experience, learning and metaphorical thinking could contribute to understandings and approaches to EfS and behavioural change.
3. Located and mapped the dimensions of understanding sustainability

This research has discussed the environmental dimensions of sustainability in relation to experience and time and space. I produced a conceptual map of the dimensions of sustainability that are imagined. Through being attentive to the diverse embodiments and practices of imagination, this work has helped to better understand the conceptual dimensions of sustainability in relation to materiality, for education. The formation of this conceptual map during this research re-conceptualised ‘the’ environment by conceiving of matter, experience and imagination in multi-temporal and multi-spatial scales. As well as enabling my research, this framework may be important for future EfS research and practice. It contributes a way to understand sustainability which could be applied to any subject matter, experience or object. As expressed in the Shearwater Learning Story, it is a framework for teaching and learning, and a way to map worldview.

The development of this mapping framework occurred throughout the process of this research (Figure 10.1). It maps an enviro-mentality of imagination and so considers imagination cartographically. In the conceptual map the self is in the centre in order to imagine time and space moving through self as presence. The map describes how self is related to that which is temporally and spatially beyond self. To learn about that which is other yet constitutive, the self needs to be oriented by the knowledge rather than detached from it. As discussed in Chapter 4, the problems of representation result in ontological disconnections and dilemmas. These have been seen as causes of the environmental crisis and contradictory to the intentions of Education for Sustainability. Given the ontological implications of knowing and of knowledge concepts, the ways in which EfS orients and reorients students in relationship with, to and as the world is of central importance. The mapping conceptualises the student of sustainability as being cartographically and ontologically oriented by environmental knowledge. Experiences of materiality depend on being attentive to this moving, personal centre. The circumferential edges of self and experience move and expand as a self imagines.
This environmental imagination map has formed a way to chart the environmental relations between experience and imagination for EfS. For the EfS educator, Eva, the circle was seen as an aperture of awareness (Buell, 2007; Leunig, 1984) that expands and contracts according to what is experienced and imagined. According to this reading, if the self is isolated by immediate experience and detached from the expansive, contextual dimensions of time and space, then worldview is condensed.

Figure 10.1. Environmental imagination map: a conceptual map of self in context of time and space.
In Chapter 4, I discussed the problem of representation for post-modern and environmental philosophies. The problem of representing a fixed world is contradictory and a huge problem for Environmental Education research and Education for Sustainability. The map (Figure 10.1) re-conceptualises the environment as all of time and space to account for the expanded dimensions of sustainability. The self is included in this environment, and interacts in all directions through experience and imagination. Figure 10.2 maps the dimensions of sustainability that are imagined. This can contribute to EfS more broadly as a teaching and learning tool, self assessment tool or framework for mapping sustainability concepts and dimensions.

Figure 10.2. Environmental imagination map: the dimensions of sustainability that are imagined.
Conclusion

My work has aimed to shift the credibility of imagination by re-conceptualising its agentic dynamics and repositioning it as an onto-epistemological environmental knowledge. Considering the demands of the environmental crisis and the emergent philosophies of the New Materialisms it is timely to re-vise ways of understanding imagination in relation to materiality. The penetrating work of metaphor, story, imagery and empathy involves imagination and proliferates as effective strategies of teaching and learning in my analysis. My research has suggested that understanding sustainability occurs at the edges of experience, which, I have argued, is the terrain of imagination. My research asserts that understanding sustainability requires imagination, and the nature of its prevalence recognises Education for Sustainability pedagogies as critical practices that educate for a new materiality.
References


REFERENCES


REFERENCES


REFERENCES


REFERENCES


REFERENCES


REFERENCES


*Teaching 360: Effective Learning through the Imagination* (pp. 67-74). 
Rotterdam: Sense.

Williams, C.C., & Millington, A.C. (2004). The diverse and contested meanings of 

Knopf.

*Journal of Child Psychology and Psychiatry and Allied Disciplines, 7*, 89-100. 
fs/docs/icb.topic862383.files/Wood1976.pdf


*World Scientists’ Warning to Humanity*. (1992). Union of Concerned Scientists, 
scientists.html


Xui, Y. (2013). What are metaphors we live by? *Theory and Practice in Language 
Studies, 3*(8), 1467-1472.

3-15.

Yue, G., & Cole, K. J. (1992). Strength increases from the motor program: 
Comparison of training with maximal voluntary and imagined muscle 
Appendix I

Open-ended interview/discussion questions

What do you mean by Sustainability Education?
What is the substance and purpose for you?
What makes you focus as a sustainability educator?
What concepts do you think are the most important for your students to understand?

What are the key concepts you teach?
How do you hope the knowledge will live with them?
Is this knowledge something you hope they will live with in their everyday life or help them in other ways? In what ways do you think student’s could best ‘think about’ these areas.

Describe your goals as a sustainability educator?
Ideally, what do you want your students to be able to imagine at the end of your work?
How does this differ from your experience of them at the start of your teaching work?
Do you have any stories to tell?

How do you approach developing these understandings with your students?
Do some concepts or aspects seem hard to imagine for people? In what ways?
How do you approach this in your work? with your students?
Do difficulties in understanding often involve an incomplete picture, or a missing framework?
What do you think are the reasons or source of misunderstandings or incomplete pictures?
Is there a relationship between that which is misunderstood and that which is hard to imagine?

Does understanding key sustainability concepts result in clarity? What sort of clarity? Clarity in what? What is unclear, what is usually unclear for people? What and how does your teaching work towards clarity?

How are student’s knowledge and understanding made visible to you?
How do you/they fill in their gaps in knowing?
What are some generalizations or concepts or mental images that students commonly hold?
How do you see your role in crafting these mental images?
Do you think some concepts are taken for granted? What? Why? How?

What resources do you use in your teaching with your students?
What experiences do you offer your students?
What is usually enough to create understanding and change for them?
What do you think this does for students?