ResearchOnline@JCU

JAMES COOK UNIVERSITY AUSTRALIA

This file is part of the following work:

Thorne, Marcia (2017) *Learning for environmental stewardship in the Anthropocene: a study with young adolescents in the Wet Tropics*. PhD thesis, James Cook University.

Access to this file is available from:

https://doi.org/10.4225/28/5acaf5a239e1d

Copyright © 2017 Marcia Thorne.

The author has certified to JCU that they have made a reasonable effort to gain permission and acknowledge the owner of any third party copyright material included in this document. If you believe that this is not the case, please email researchonline@jcu.edu.au

Learning for environmental stewardship in the Anthropocene*:*

A study with young adolescents in the Wet Tropics

Thesis submitted by

MARCIA THORNE
Dip T, B Ed, M Ed (Sustainability), James Cook University, Australia

for the degree of

Doctor of Philosophy
College of Arts, Society and Education
James Cook University

March, 2017

Dedication

"The planet Earth is in a dire state. Natural resources have been overexploited. A significant loss of biodiversity is occurring while a massive rise of carbon levels is leading to climate change and associated extreme weather. Toxic substances are increasingly found in air, water, soil, and flora and fauna. The planet faces desertification, drought and land degradation. Human living conditions have not fared much better. Even though the number of people living in extreme poverty has declined by over 1 billion (United Nations, 2015a), disparities between rich and poor continue to rise. Oxfam recently reported that the world's richest 62 people possess as much wealth as the poorest 3.6 billion (Hardoon et al., 2016). Too many people are trapped in poverty, and lack clean air and drinking water as well as adequate food and nutrition. Many families are forcibly displaced or on the run due to protracted conflict. Wide disparities persist in access to education of good quality. It is out of these concerns that the concept of sustainable development was born."

UNESCO. (2016). Global Education Monitoring Report, opening paragraph, page 3

These concerns make environmental stewardship apparent.
Caring is a learned behaviour.

This research is dedicated to those who care for the planet
and to those who are learning to care.

Marcia Thorne

March, 2017

Acknowledgements

Gratitude fills my being for the opportunity to complete this work and for the marvellous, continual support provided throughout this journey by my supervisors –

Dr Snowy Evans, Associate Professor Hilary Whitehouse and Dr Cindy Woods.

Their leadership and encouragement to assist me cultivate conceptual integrity, hone a methodological framework, conduct statistical analysis and polish my writing skills has made me the recipient of great gifts.

I am forever grateful to my family and friends for their unwavering love.

My 92 year old mother provides wise counsel and believes in me as do my children, children-in-law, grandchildren and extended family.

Friends have intellectually and emotionally nurtured me.

Peter, my great love, friend and husband of forty plus years, is constant, charming, questioning and supportive of me to be my best.

My wish is to extend the caring that is so generously provided to me.

Statement of the Contribution of Others

Nature of Assistance	Contribution	Name
Intellectual support	Concept development	Assoc/Prof Hilary Whitehouse Dr Snowy Evans
	Proposal writing	Dr Snowy Evans
	Ethics application	Dr Snowy Evans
	Statistical support	Dr Cindy Woods
	Editorial assistance	Dr Snowy Evans Assoc/Prof Hilary Whitehouse Dr Cindy Woods
Data collection	Interview transcription	Way With Words Transcription service
Conference Travel	Concept and confidence development	College of Arts, Society and Education Assoc/Prof Hilary Whitehouse

Abstract

The Anthropogenic emergencies of climate change, biodiversity loss and chemical pollution have resulted in a call for planetary stewardship from scientists and educators. Environmental stewardship in this research is defined as action that restores and/or maintains the integrity of a healthy Earth System. Through developing environmental stewardship, capacity is built for response to the complex, unprecedented and uncertain conditions of the 21st Century, the Anthropocene. Environmental stewardship is a learned behaviour developed from informal and formal mentoring and through opportunities to enact an ethic of care for the natural environment. There are few published research studies either internationally or in Australia about the environmental stewardship capacity of Gen Z, the first generation of the Anthropocene. A 2013 Swiss study described this generation as apathetic about the natural environment and living in post-ecologism. But is such a finding true of Australian adolescents living in Tropical Queensland?

This doctoral research aimed to understand the expression of environmental stewardship in Gen Z in a formal, Year 10 state schooling context in the Wet Tropics region of Far North Queensland, Australia. Participants included five teachers and 126 students from three suburban high schools in Cairns and two high schools located in rural towns less than 80 kilometres from Cairns. A mixed methods research methodology following an explanatory, sequential research design was used, involving three phases of data collection interspersed with five stages of analysis. The first phase, a document study, analysed Australian Government education policy documents, frameworks, reports and curricula for the promotion of both environmental stewardship and sustainability (sustainability being the medium through which environmental stewardship is typically developed). The second phase of data collection used an online survey with three distinct sections. Section I of the online survey explored participants' values and used Schwartz's Portrait Values Questionnaire. Data were analysed using Karp's four hypotheses for pro-environmental behaviour. Section II of the online survey was based on a modified version of Milfont and Duckitt's Environmental Attitude Index. Data were analysed to determine attitudes of preservation or utilisation of the natural environment. Section III was authored by the

researcher to understand environmental stewardship knowledge and action and school learning for environmental stewardship. The third phase of data collection involved one-on-one interviews with Year 10 teachers and small group interviews with Year 10 students to enable in-depth discussion about environmental stewardship, if learning to care for the natural environment should occur (and how), knowledge of and opinions about environmental challenges, and how participants viewed the future.

Findings show that environmental stewardship education is largely absent from education curriculum, policy documents and formal schooling, and that environmental stewardship capacities are undeveloped in participating students and teachers. Sustainability education had a very limited presence in the study schools at Year 10. Both Gen Z participants and their teachers demonstrated values that indicate pro-environmental behaviour. Teacher environmental attitudes were pragmatically positioned between preservation and utilisation of the natural environment whilst student attitudes were inclined to preserve the natural environment. Teachers expressed concern that students were ignorant of and apathetic about the natural environment, a sign of post-ecologism, and that environmental stewardship education should be included in formal education to enhance well-being. Students expressed a lack of knowledge about the ecological challenges of the Anthropocene and felt overwhelmed when discussing what they knew (and did not know) about current and future conditions. Many were untrusting of their peers' capacity to care and ability to respond. Students also indicated that environmental stewardship education should be included in school learning.

This research proposes environmental stewardship education develops well-being, scholastic performance, critical thinking and problem solving. Outcomes of this research include a learning for environmental stewardship conceptual framework.

Table of Contents

List of Tables

List of Figures

Chapter One – Introduction

Environmental Stewardship Story

What's happening? Who cares!
Climate crises. Fixed stares.
Plastic oceans. Animals dying.
Carbon air. Anyone crying?

_____

Youth obsessed. It's all about me.
Narcissistic. Celeb TV.
Denatured. No home.
Tech haven. Escape zone.

_____

Learning for Nature. What does that mean?
Care for all. Seen and unseen.
Take time. Engage.
Find vision. New stage.

Marcia Thorne, April 2016

Preface

Reflected in the above poem is the essence of the story told in this environmental stewardship research. Stanza 1 describes today's world, the Anthropocene. Human actions are influencing climate and the ecological environment to the extent that the whole Earth System is destabilised to the point that scientists and citizens are calling for urgent action (Commonwealth of Australia, 2016; Steffen et al., 2015). Environmental crises, which manifest in social, economic and political realms, require urgent action. However, the response from much of the political governance in Australia is tawdry compared with international standards (Dwyer & Preston, 2015) and reflects the ignorance, denial

and/or apathy as expressed in mainstream media (Adel, 2013): recorded in the poem as 'Fixed stares' and 'Anyone crying?' Stanza 2 reflects the first generation of the Anthropocene, Gen Z, whose identities and desires have been actively moulded and commodified by a pre-dominant neoliberal marketplace. It is a *fait accompli* that a worrying number of Gen Z mirror the ignorance and apathy of their elders and choose escape from the difficult realities of life through immersion in technology (Zeyer & Kelsey, 2013), an 'Escape zone'. Stanza 3 is a call for change, and for learning to care about the natural world and for everything 'Seen and unseen'. It is a call for 'all' to engage; and to find a vision of their place in the world to create a 'New stage'.

The visible lack of care for the natural environment (often termed the ecological environment), provided the impetus for this research. The term natural environment is used throughout this research as the name for the other-than-human world and includes the geosphere, hydrosphere, biosphere and atmosphere. It is not an uncritical use of the term, but chosen to frame the research in terms understood and commonly used by teachers and students. In this thesis, caring for the natural environment is called environmental stewardship and is conceptualised as the cultivation of connection with and care for the natural environment. Environmental stewardship is a learned behaviour developed from informal and formal learning mentored through opportunities to enact an ethic of care for the natural environment (Kellert, 2012a; Sobel, 1996). This study investigates the extent to which formal schooling provides opportunities to develop environmental stewardship at Year 10 in the Wet Tropics region of Australia. To date, no published research has explored whether and/or to what extent environmental stewardship is developed in an Australian schooling context, and this research is novel to the place called the Wet Tropics in north eastern Australia.

Environmental stewardship is foundational to sustainable thinking and action that aims to: i) preserve the natural environment as the increasing human population must and will consume resources and dispose of waste; ii) conserve wilderness, protected areas and biodiversity for future generations; and, iii) mitigate and adapt in response to environmental disturbance and disruption like climate change,

ocean acidification and pollution. Learning for environmental stewardship is an important conversation recognising the post-colonial western notion that humanity is separate from nature. However, the separation of nature and humanity is a false dichotomy (Dunlap & Cohen, 2016). The great traditions of Taoism, Buddhism and Hinduism and the mystics of Judaism, Christianity and Islam have written for centuries on the Oneness of Life and the inherent sacredness and connection of every body and every thing, animate and inanimate. Indigenous and (some) ancient cultures lived this knowledge expressed in today's words as natureculture by Whitehouse (2011), in reference to Indigenous Australians' understanding of connection and oneness with country. Terms used in American Indian culture, like 'revelation and continual self-actualisation' by Chris Peters of the Global Oneness Project, also depict an Indigenous connection to land and spirit (2010). Modern western lifestyles are characterised by disconnectedness from the natural world giving the illusion of separation. This is explored further in this and in subsequent chapters.

This chapter begins with an overview of how the term environmental stewardship is used in this research, followed by a discussion of the relationship between learning for environmental stewardship and environmental education (EE), education for sustainability (EfS), education for sustainable development (ESD) and planetary stewardship. Sustainability education in Australia is known as education for sustainability. Globally, sustainability education became included in national education systems under the program the *United Nations Decade of Education for Sustainability* (UNDESD), from 2005 to 2014. The next section, the background to the research problem and the research rationale, provides a brief account of the convolutions of the Anthropocene and the resultant impacts on the three pillars of sustainability – named here as planet, people and profit. Following, is an overview of neoliberal influences on current western education systems. The remaining sections of this chapter set out the research aims and objectives, research questions, research design, research area, study limitations and lastly, a synopsis of following chapter topics.

Environmental Stewardship

Environmental stewardship is a complex concept. In this research, it is conceptualised as development of a deep ethic of care for the natural environment based on affinity with and respect for the beauty and complexity inherent in the multifaceted life support systems that the natural environment provides. Environmental stewardship is an enacted commitment to ensure continuance of these systems, and invokes action that actively shapes the trajectories of the social-ecological system to enhance ecosystem resilience and human well-being (Chapin III, Kofinas, Folke, et al., 2009; Chapin III, Power, et al., 2011). Stewardship is a contested term with theological, ecological and political dimensions. Contemporary interpretations of stewardship stem largely from non-secular widespread usage through mass media, originating from a tradition of stewardship within the Judaic, Christian and Islamic religions (Attfield, 2006; Palmer, 2006). Here, humanity is the appointed trustee of the Earth answerable to God for the use and care of nature. In this research, there is no intended theological meaning where steward means keeper, trustee or manager acting on behalf of another (including God). Nor does this research use environmental stewardship in an anthropocentric context positing humanity as the dominant species with custodial imperative. This research does not position environmental stewardship in an economic capacity, meaning that the world's resources exist for financial profit. In this research, environmental stewardship means taking care to maintain all life provisioning ecosystem services to ensure continuance of the Earth System into the future. Hamilton's definition of the Earth System is used in this research: 'the science of the whole Earth as a complex system beyond the sum of its parts' (2015, p. 102).

Learning for environmental stewardship, sustainability and planetary stewardship.

In Australia, learning to care for the natural environment to develop environmental stewardship has historically been associated with education for sustainability (Australian Government, 1999). However, in following the Oxford on-line dictionary (https://en.oxforddictionaries.com/), the foci of education for stewardship and sustainability are divergent as there is a crucial gap in meaning

between stewardship, *to take care,* and sustainability, *to maintain*. One way to close this gap would be to embed environmental stewardship within education for sustainability.

Eminent scientists call for urgent planetary stewardship (Chapin III, Power, et al., 2011; Folke et al., 2011; Rockström et al., 2009; Steffen et al., 2011; Steffen et al., 2015) which, in turn, escalates the urgent necessity for more education for environmental stewardship in both informal and formal education settings. Planetary stewardship is an emerging term and refers to the global scientific monitoring, care and maintenance of Earth's life support systems to ensure they remain within functioning, healthy boundaries (Steffen et al., 2011; Steffen et al., 2015). Understanding planetary dynamics to achieve planetary stewardship – care of the planet – is the challenge of the twenty-first century (Steffen, Crutzen, & McNeill, 2007) and signposts more of a caring role (environmental stewardship) than a maintenance role (sustainability). (This is discussed further in the following section.) I consider that the development of values, attitudes and knowledge to promote environmental stewardship is fundamental to all named forms of education that focus on the environment (see Figure 1) including environmental education (EE), education for sustainability (EfS), and education for sustainable development (ESD). Also, environmental stewardship is considered fundamental to the development of the skills necessary for active planetary stewardship.

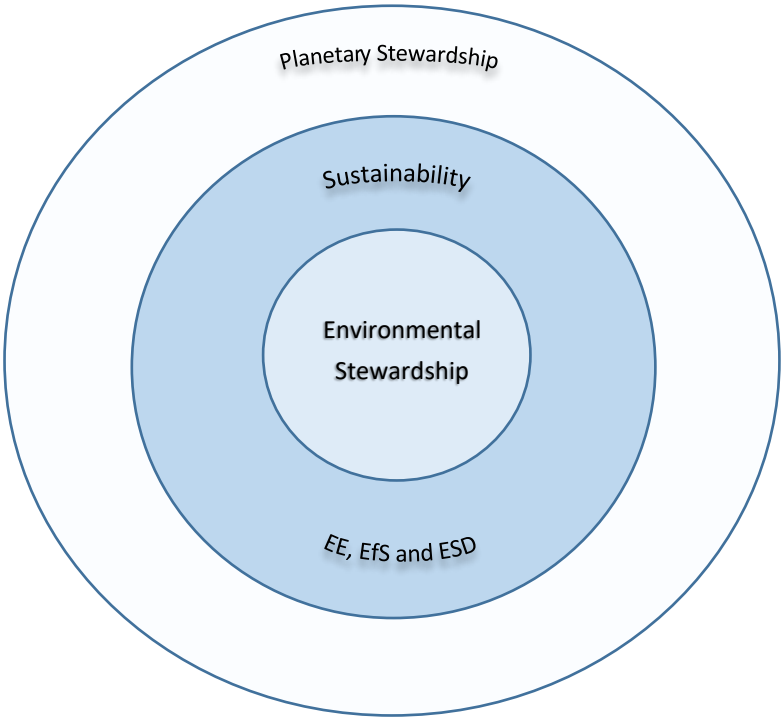


Figure 1: Environmental Stewardship, Sustainability and Planetary Stewardship Relationships.
Source: Author

The Background to the Problem and Research Rationale

Here, the complexities of the Anthropocene are discussed and their impact, in the context of this study, on the three pillars of sustainability– environment, titled Planet – Environmental tipping points; social, titled People – Gen Z, the Alphas; and, economic, titled Profit – the Gen Z and Alpha marketplace.

Today's Earth – the Anthropocene.

The Anthropocene is a term that describes the current geologic epoch marked by human domination of the planet. Humankind has become a global geophysical force with a footprint so large that it is overwhelming the great forces of nature and affecting the whole Earth System (Steffen et al., 2007). Effective planetary stewardship must be achieved quickly to assess and address the complex interferences human activity places on ecological systems before the momentum of the Anthropocene tips the whole Earth System (Chapin III et al., 2010; Folke, 2010; Folke, Chapin III, & Olsson, 2009; Rockström et al., 2009; Steffen et al., 2011). Although much disruption is being scientifically monitored in the Earth System, just one challenge – climate change, also known as

climate disruption and the climate emergency, threatens the foundations of human civilisation (Garnaut, 2012). Climate change has been labelled 'a catalyst for conflict' and an 'accelerant of instability' by retired generals from the United States defence forces, in the 2016 documentary *The Age of Consequences* (theageofconsequences.com).

The impacts of Anthropogenic actions like carbon and plastic pollution are altering the structures of marine, terrestrial and atmospheric biospheres causing unprecedented, complex harm (Steffen, Turner, et al., 2005). The impacts of anthropogenic activity are especially felt in the sensitive and vulnerable ecosystems of the Wet Tropics World Heritage Area (WTWHA) and the Great Barrier Reef (GBR) in Australia, which comprise the research context of this study. Both are diverse bioregions with high levels of endemic species that are highly vulnerable to the impacts of anthropogenic change. In the Wet Tropics, researchers predict a severe loss of the core environment inhabited by rainforest vertebrates, with impending threats of loss escalating to risk of extinction (Kearney, Wintle, & Porter, 2010; Williams, Bolitho, & Fox, 2003). Marine biota are directly threatened by agriculture with herbicide, pesticide and fungicide runoff in waterways flowing into the GBR (Brodie et al., 2012; Haynes, Müller, & Carter, 2000; Lewis et al., 2009; Turton, 2005). Coral reefs have experienced dire impacts from decreasing water quality, sea temperature rise and ocean acidification caused by climate change (Marshall & Johnson, 2007; Pandolfi, Connolly, Marshall, & Cohen, 2011; Veron et al., 2009). A recent coral bleaching event in April 2016 was unprecedented in scale and severity and resulted in coral die-off to over 800 kilometres of the reef between Port Douglas and the Torres Strait islands (Day, 2016; Hoogenboom, 2016; Pratchett & Lough, 2016). This was the worst coral bleaching ever and it occurred concurrent with the hottest two years ever recorded, 2015 and 2016 (Hughes, Schaffelke, & Kerry, 2016). Professor Ove Hoegh-Guldberg, a marine scientist and head of the Climate Change Institute at the University of Queensland, estimates that further coral bleaching events could kill the Great Barrier Reef within 30 years (https://www.youtube.com/watch?v=jLtW0epZc4A). I am a fourth-generation immigrant settler to Far North Queensland and these vulnerable ecosystems are extremely beautiful and important to me. They are home and to be cared for. With grandchildren

currently growing up here, I find it a personal imperative to understand what teaching and learning for environmental stewardship exists in formal education with the overall aim to advance understanding and action.

Anthropogenic challenges to the three pillars of sustainability.

Planet – Environmental tipping points.

Many of these dire conditions may quickly lead to an environmental tipping point where a 'small perturbation triggers a large response' which occurs in 'complex environmental systems' and can produce 'abrupt and sometimes irreversible changes' (Lenton, 2013). Monitoring to ensure safe operating zones and optimal system resilience is necessary to avoid destabilisation and activation of environmental tipping points (Steffen et al., 2015). One way to monitor this is through the Planetary Boundaries (PBs) framework which measures the biophysical processes responsible for the self-regulation of the Earth System (Rockström et al., 2009). The framework identifies safe operating levels for nine PBs essential for supporting human societies. These are: i) climate change; ii) novel entities – chemicals and new types of engineered materials or organisms; iii) stratospheric ozone depletion; iv) atmospheric aerosol loading; v) ocean acidification; vi) biochemical flows; vii) freshwater use; viii) land-system change; and ix) biosphere integrity – which includes functional diversity and genetic diversity (Rockström et al., 2009). Two of the nine PBs are considered at high risk – biochemical flows and biosphere integrity and two are in the zone of increasing risk – climate change and land system use (Steffen et al., 2015). Such risks signpost the need for greater care through scientific measurement, monitoring and mitigation at a governance level and the requirement for greater learning about how to care at the community level and in formal education.

People – Gen Z, the Alphas.

Environmental change presents challenge for human adaptation and mitigation. The first human generation of the Anthropocene are known as Generation Z (Gen Z) born between 1995 and 2009, and Generation Alpha (the Alphas) born between 2010 and 2024. Gen Z and the Alphas will inherit an environmentally damaged planet (Dunlap & Cohen, 2016) and will likely live in a technologically

saturated world with limited nature experiences (David Suzuki Foundation, 2015; Kellert, 2012a; Worthy, 2013). Kellert argues that Gen Z spend more time living and playing indoors than previous generations and spend an average of fifty-two hours per week on electronic media, compared to less than one hour outside (2012a). Scholars argue reduced experience in the outside world has negative impacts on health and well-being and results in a 'de-natured childhood' (Chawla, 2015; Corraliza, Collado, & Bethelmy, 2012; Ewert, Mitten, & Overholt, 2014; Louv, 2005; Ozdemir & Yilmaz, 2008; Pyle, 2002). An inside lifestyle which physically disconnects young people from the outside natural world, but digitally connects them globally with endangered animals and ecosystems is described as ecophobia (Sobel, 1996, 2005; Strife, 2010, 2012).

The Alphas have been called Generation Glass because images on glass screens pacify, entertain and educate them from a very young age: 'glass is the new medium for content dissemination', and it is 'kinaesthetic, visual, interactive, connective and portable' (McCrindle Research, 2015). McCrindle describes the Alphas as 'upagers' meaning they will mature to adolescence earlier and remain there longer; and they will remain at home and be supported by parents longer and they are likely to be more educated compared to any previous generation (2015). Demographers Peter McDonald and Bernard Salt advise that the Alphas will be the smartest generation ever with information at their fingertips, but they may also be the loneliest generation (cited in Hansen & Van Den Berg, 2013). The Alphas may not grow up in a full family embrace and as adults, they will be more likely to live alone than any previous generation (Hansen & Van Den Berg, 2013).

Without intervention, the health patterns of Gen Z and the Alphas may follow the same confronting statistics as the preceding Australian generation, Gen Y, born between 1980 and 1994. In Australia, 12% of Gen Y experience high to very high levels of psychological distress (ARACY, 2013). To date, no corresponding data about psychological distress is available for Gen Z, but a staggering 30% of 5 to 24-year-olds in Australia, which includes Gen Y, Gen Z and the Alphas, are overweight or obese (ARACY, 2013). Similar concerns also exist for the health and well-being of Gen Z in the United Kingdom

(Barr, 2016). As adults, Gen Z and the Alphas face unprecedented ecological crises caused by the intensified impacts of climate change and destabilisation of the fabric of life itself, raising the question: How can learning for environmental stewardship assist to prepare Gen Z and the Alphas for the ecological challenges that will undoubtedly confront them? This topic is explored throughout this thesis.

Profit – the Gen Z and Alpha marketplace.

Neoliberalism is the economic 'engine room' that underpins today's world and is fuelled by worldviews that favour strong individual private property rights, the rule of law, and the institutions of freely functioning markets and free trade (Harvey, 2007). These worldviews are seemingly 'fair' and 'just' on a micro level. For example, an individual operating a coffee shop in a suburban retail centre needs assurity that legal processes will protect their livelihood. But global application of these worldviews has changed western society in the past forty years. Harvey contends neoliberalism originated in a 'coalition that was built in the 1970s between the elite class and business interests intent on restoring their class power' (2007, p. 84). Stiglitz, an economist and a 2001 Nobel Laureate, argues that without regulation markets favour the strong and/or powerful accumulating wealth in a deliberately globalised economy (2013). Stiglitz contends that, in America, the gap has widened between the one percent of the population who hold the wealth and the other 99%. This level of manifest inequality challenges the delivery of basic human rights – like health, education and safety – to low and middle class citizens (Stiglitz, 2013). In Australia, the cherished ideals of a 'fair go for all' have been discarded as young Australians are increasingly disadvantaged by economic, technological and demographic changes that privilege those who have economic resources over those who do not (Rayner, 2016). In May 2015, at the University of Adelaide graduating ceremony address, Martin Parkinson, the then current Secretary of the Department of the Prime Minister and Cabinet, acknowledged that the older generation had failed the younger generation leaving them with less, despite having benefited from massive growth in living standards, income and wealth (Rayner, 2016). This trend is reflected globally. A 2016 Oxfam

report identified global wealth distribution trends in favour of the rich with noticeable widening of the inequality gap between 2011 and 2016 (Pett, 2016).

Neoliberalism is underpinned by a very different philosophy to environmentalism and the human environment dynamic is influenced by the neoliberal marketplace. Neoliberalism views natural resources as commodities with a monetary value. This view is contested by many (Monbiot, 2014). The notion of conserving nature by commodifying it is a paradox and a conflict of interests (Plastow, 2010). When commodifying the natural environment economic terms like 'green infrastructure' are used when referring to hills, forests and rivers, and biodiversity habitats have been referred to as 'asset classes within an ecosystem market' (Monbiot, 2014). This worldview has resulted in an anthropogenic domination of the natural environment and 'neoliberalism has a rather dismal record when it comes to the exploitation of natural resources' (Harvey, 2007, p. 174). A neoliberal worldview for use of the natural environment is all pervasive across business and government sectors. Two examples from the United Kingdom (UK) are the National Capital Committee and the Valuing Nature Program. The mandate of the recently formed National Capital Committee is to view the natural environment as business potential and to maintain integrity and uniqueness of place. In the Committee's second report for the UK Government the chairman wrote: 'the environment is part of the economy and needs to be properly integrated into it so that growth opportunities will not be missed' (Natural Capital Committee, 2014, p. 4). The Valuing Nature Program holds three day workshops called *Valuing Nature Impact School.* Their premise is: 'A failure to properly value nature can present significant risks to businesses, while valuing nature throughout a business and its value chain can present significant opportunities to enhance return on investment and enhance reputation' (Valuing Nature, 2015, para. 4). Another aim of the Business Impact School is to create a Valuing Nature research community, to further develop and enhance business returns from the natural environment. This trend is evident globally. In recent decades, powerful world bodies such as UNESCO have influenced education policy agendas on a global scale to reinforce this worldview (Jickling & Wals, 2008).

An overview of education in the Anthropocene.

Education is an accepted pathway to preparing adolescents for their adult lives. Presented here is the confluence of neoliberalism and education.

Neoliberal ideologies informing education.

Neoliberal ideologies permeate education systems throughout the western world leading to the commodification of education to serve the globalised economy (Hursh, Henderson, & Greenwood, 2015; Lingard, 2010; Slater & Griggs, 2015). In Australia, this occurs through a nationalised formulaic education curriculum called the Australian Curriculum, with standardised testing (called NAPLAN) where literacy and numeracy results are compared and ranked nationally through a government hosted website called *My School* (www.myschool.edu.au). Australia participates in international rankings through the *Organisation for Economic Co-operation and Development's* (OECD) *Programme for International Student Assessment* (PISA). Test results and rankings are the outputs and outcomes of the neoliberal education system to directly serve the global economy (Smith & Stevenson, 2017).

Test results have become more significant than inputs and processes (Lingard, 2010; Uljens, 2007). In Australia, education is one of many services typically delivered through competitive public (and private) institutions. Apple (2011) contends that placing education in a competitive marketplace is an example of just how public services are re-structured away from a 'thick' collective form for the public good, to a 'thin' consumer driven form for private good. In doing so, it changes the meaning of democracy. Apple calls public institutions: 'the defining features of a caring and democratic society' (2005, p. 18) but, public services are increasingly being outsourced to private institutions with profit incentives subject to market forces. Those who can pay are privileged and democracy is compromised (Apple, 2005, 2011). An example close to home was the enactment of policy change under the John Howard Federal Government (1996 to 2007) to further support the privatisation of school education (Davidson, 2013). Between 2007 and 2008, the per capita increase in spending for government schools was $94 and non-government schools was $409.50 (DOGS, 2007). Between 2010 and 2014, real

funding for public schools per student fell by 3% while private school funding increased by 10% (Cobbold, 2016).

Choice is forefronted as the imperative for enhancing financial support for non-government schools. Supporters of neoliberal education policy argue that broader school choices improve education outcomes for a greater number of people. Webb and colleagues cite the Greek notion of *epimeleia heautou* – concern to care for the self, as the basis for improved outcomes for individuals in Western education systems, because individuals are able to exercise greater choice regarding schools and subjects (Webb, Gulson, & Pitton, 2014). But, emphasis on care of the self has become disproportionate within neoliberal policy and resulted in the prioritising of 'individual advancement over the collective good and common well-being' (Lingard, 2010, p. 141). With an emphasis on self and position in the marketplace, how does a neoliberal education agenda prepare future citizens for their role as community members responding to the ecological crises of the Anthropocene?

Research Aims and Objectives

In view of the environmental challenges presented by the Anthropocene, the profile of Gen Z and the effects of neoliberal policy on education; the aims of this research are to understand what teaching and learning for environmental stewardship is occurring in formal schooling in my home locality (the Wet Tropics, Australia). In doing so, this research seeks to understand the expressed capacity of the current curriculum and school experience to prepare students for their adult lives in an uncertain world. School curriculum is informed by policy, so it was important to understand the intention and direction provided by government education policy. Research objectives are the tasks or components undertaken to fulfil research aims though they are not necessarily definitive statements. They are more a process for developing holistic thinking about a study (Lankshear & Knobel, 2005). In following this model, the objectives of this research are to:

i) understand the temporal development of environmental stewardship in government policies in Australia between 1999 and the present;
ii) gain an understanding of the expression of environmental stewardship in teaching and learning in a sample of state high schools in the Wet Tropics region of Australia in 2014;

iii) analyse the relationships between the intended, planned, enacted and lived curriculums as expressed by the research participants – that is, the linkages between government policy (intended), written curriculum (planned), lesson plans and teaching (enacted) and student expression of environmental stewardship (lived curriculum);
iv) understand the constructs of pro-environmental behaviour comparative to environmental stewardship behaviour; and,
v) develop a conceptual framework for learning for environmental stewardship.

Research Question and Sub-questions

The research question guiding this work is: What is the relationship between environmental stewardship, Year 10 students and their teachers, and the Australian Curriculum's Sustainability Cross-Curriculum Priority within the Wet Tropics region of Australia; and to what extent is this relationship working to foster environmental stewardship? Sustainability education in Australia has historically been the medium for developing environmental stewardship. The Australian Curriculum maps out how to embed sustainability in all subjects and learning areas through the Sustainability Cross-Curriculum Priority in order for 'students [to] develop the knowledge, skills, values and world views necessary to contribute to more sustainable patterns of living' (ACARA, 2013b). Sub-questions were framed to assist to answer the research question. These are:

i) To what extent and how is environmental stewardship represented in the Australian Curriculum's Sustainability Cross-Curriculum Priority?
ii) How is environmental stewardship, as represented in the Australian Curriculum's Sustainability Cross-Curriculum Priority enacted in the school context?
iii) What environmental stewardship aspirations, values, knowledge, beliefs and action capacities do Year 10 students and their teachers have?
iv) How are the environmental stewardship aspirations, values, knowledge, beliefs and action capacities of the Year 10 students and teachers realised or how do they play out in reality?

Overview of Research Design

A mixed methods, explanatory, sequential research design (Creswell, 2012) was employed to understand the capacity and expression of environmental stewardship and its relationship to sustainability education in a formal schooling context in Year 10 (Gen Z) in five state (government) high schools in the Wet Tropics. In Australia, high school is the generally used term for secondary

school. The research design is discussed fully in Chapter 3. Briefly, understandings were derived from analysis of an aggregated data set from three phases of data collection including: i) document analysis of government frameworks, reports and curricula for promotion of environmental stewardship; ii) online surveys with students and teachers focusing on values, environmental attitudes, and environmental stewardship knowledge and behaviour; and, iii) emergent themes from small group interviews with students and face-to-face interviews with teachers. After analysis, gaps were identified and education research and theories supportive of environmental stewardship education were collated to prepare a learning for environmental stewardship conceptual framework. Figure 2 presents a pictorial overview of the research methodology.

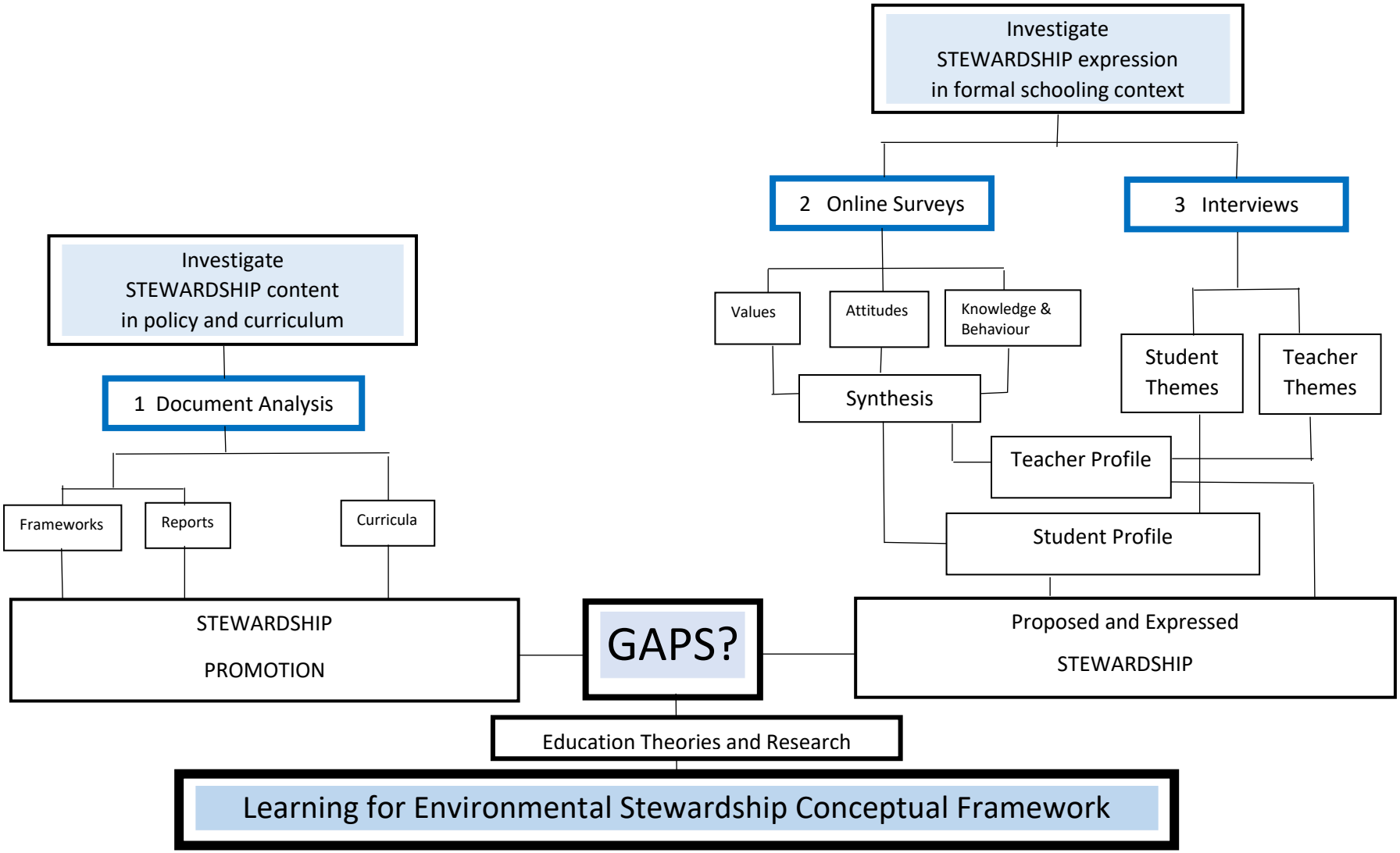


Figure 2: Research Design Overview

Research Area

This research was conducted in five state high schools located in the Wet Tropics region of north eastern Australia. The Wet Tropics stretches approximately 450 kilometres along the northern coastline of the state of Queensland, and equates to about 8,945 km² of breathtaking beauty, rich biodiversity and ancient forests – as described in many travel brochures (see Figure 3 for location of the Wet Tropics in Australia). The Wet Tropics was listed on the World Heritage register in 1988 in recognition of its 'outstanding universal value' and 'the permanent protection of this heritage is of the highest importance to the international community as a whole' (http://www.wettropics.gov.au/home).

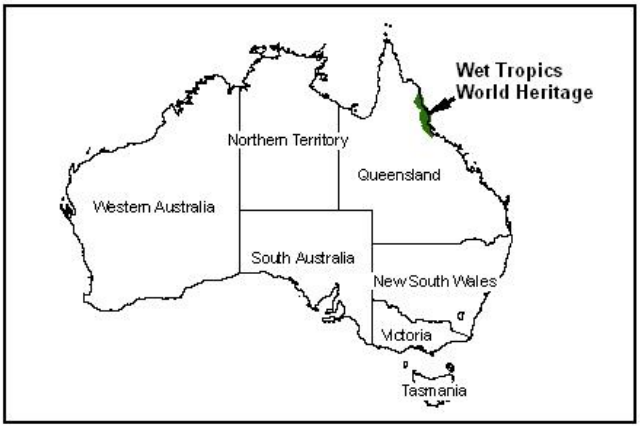


Figure 3: Location of the Wet Tropics, Australia
Source: http://www.wettropics.gov.au/wha-maps

Along with its spectacular beauty and biodiversity, the Wet Tropics is scientifically important as it represents an:

> unparalleled record of the ecological and evolutionary processes that shaped the flora and fauna of Australia, containing the relicts of the great Gondwanan forest that covered Australia and part of Antarctica 50 to 100 million years ago…[which] provide unique insights to the process of evolution in general….and about the evolution of Australia's sclerophyll flora and marsupial fauna in particular (http://www.wettropics.gov.au/home).

The Wet Tropics is a part of Tropical North Queensland (TNQ) which comprises the northern 20% of the state of Queensland, and it sits adjacent to the iconic Great Barrier Reef, which extends almost

the entire Queensland coast with an area of 344,400 km². The Great Barrier Reef was listed as a World Heritage Area in 1981 (see Figure 4 for location in Australia).

Figure 4: Great Barrier Reef and Major River Systems

Source: http://www.britannica.com/EBchecked/topic/242906/Great-Barrier-Reef

Currently, the Wet Tropics is home to 225,000 people with 160,000 residing in the city of Cairns (the only city in the Wet Tropics), and the remainder in 11 major towns and rural areas across the region (http://statistics.oesr.qld.gov.au). Residential population growth in Cairns, as depicted in Table 1, has been steadily and at times rapidly increasing since the arrival of European, Asian and Pacific settlers in 1881. Notably, there has been a 60% increase in population between 2006 and 2016. The population of Cairns has a forecasted growth rate of 40% and is estimated to reach 219,000 residents by 2036 (http://forecast.id.com.au/cairns). Hence, the Wet Tropics and the Great Barrier Reef will continue to experience the effects of ongoing anthropogenic stressers.

Table 1: Cairns Population Growth
http://www.queenslandplaces.com.au/cairns

Census Date	Cairns Population
1881	278
1901	3557
1911	5193
1933	11,993
1947	16,444
1961	25,204
1971	32,747
1981	48,557
1991	64,463
2006	98,349
2011	133,893

The economic sustenance of the region derives from tourism; agriculture – sugar cane, bananas, dairy, grazing and horticulture; forestry; fishing and aquaculture. However, tourism is the major economic driver (http://www.ttnq.org.au/about-us/). In the year ending September 2016, 2.75 million visitors arrived in TNQ (http://teq.queensland.com/research-and-insights/domestic-research/regional-summaries/tropical-north-queensland). TNQ Tourism aims to double tourist visits per year by 2020 (in the next three years) adding more pressure to overburdened, delicate ecosystems.

Limitations of the Study

Research projects invariably are defined by their limitations and strengths (Yin, 2011). Recognised limitations of this study include sample size, implementation of a revised curriculum at the time of the research, major school administrative changes with the state-wide relocation of Year 7 to high school campuses, adolescent pre-occupation with other matters aside from this research topic, a possible confound as teachers chose participants for interviews and, after data analysis, the realisation that certain (emergent) important questions were not asked. Firstly, the study size was small. Time and resource restrictions determined that only seven schools could feasibility be approached to participate in this project. Only five schools volunteered to participate equating to a small population sample – five Year 10 teachers and 126 Year 10 students. Secondly, implementation of the new Australian

Curriculum meant further changes to curriculum in Queensland state schools over the course of the study. Curriculum change can result in instability as teachers become familiar with new teaching content and the (possible) requirement to teach outside their trained discipline (McCormick & Ayres, 2009). This was evident in one teacher interview. Thirdly, in 2015, schools throughout Queensland re-located Year 7 from the primary to the secondary campus (called high school); one reason being to align age and year levels for Australia wide NAPLAN testing (see Lingard, 2011). Although this research was conducted late in 2014, the impending changes from this substantial re-structuring were evident in student interviews.

A perceived study limitation may be that adolescents, compared to younger and older people, experience a lessening in preference for the natural environment over more developed or built areas (Kaplan & Kaplan, 2002; Olsson & Gericke, 2016), and so, participants may have limited engagement with the research topic. This is acknowledged, however the focus of this study is not to compare adolescents with other age groups but to understand the expression of environmental stewardship in formal education relative to preparing Gen Z in the Wet Tropics for their adult lives. Fifteen-year-old adolescents – Year 10 in the Queensland school system – were identified as a more appropriate age group than Years 8 and 9 who may not have had the maturity to articulate their views so extensively. Access to Year 10 was easier than being able to access Years 11 and 12 who are subject to timetabling constraints and more performance pressures. Teachers decided on interview participants to fit with class organisation and scheduling.

Important questions not asked meant an absence of data from the student findings about the number of hours per week devoted to screen time (and which sites were accessed) comparative to organised outdoor time, and comparative to time spent in the natural environment. Organised outdoor time is defined as time spent in the pursuit of outdoor sporting activities, whilst time spent in the natural environment is defined as recreational time spent walking, swimming, picnicking, camping or other leisurely outdoor activities or hobbies. These data would have provided more nuance in the

compilation of an overall student profile, in particular, about organised time spent outdoors and recreational time spent outside in the Wet Tropics. An understanding of how screen time was divided would also be helpful, for example, to know what percentage of time was spent: i) on social media; ii) learning about environmental issues; iii) finding out information about other topics; or, iv) surfing the net.

Chapter Outlines

Chapter 2 reviews literature concerned with the principles of environmental stewardship and explores the various terms used in multiple disciplines to convey environmental stewardship. The research and theories, frameworks and pedagogies that support environmental stewardship are discussed followed by how values, attitudes and ethics contribute to environmental stewardship. Also defined is the difference between pro-environmental behaviour and environmental stewardship behaviour. Chapter 2 continues with a review of research about environmental stewardship in education in Australia, Canada, New Zealand and Scotland. Finally, literature is reviewed about elements that influence the formation of identity in Gen Z in a market-based neoliberal society replete with non-sustainable behaviours and environmental change. The concepts of ecophobia, post-ecologism and hope are also discussed. Chapter 3 outlines the research methodology undertaken and Chapter 4 presents and discusses findings from the data analysis as relevant to the research question and sub-questions. Chapter 5 is a discussion about the role and leadership provided by education policy in the Anthropocene. Chapter 6 conceptualises environmental stewardship education to present it as an imperative for change so education is for the Anthropocene. A novel *learning for environmental stewardship conceptual framework* is presented from a synthesis of the research and theoretical perspectives supportive of environmental stewardship education. Research recommendations and proposals are also presented. Offered as a postscript, Chapter 7 presents my worldviews about caring for the natural environmental and a personal reflection summarising the pathway that led me to this project. Positioning my worldview at the end of this thesis allows the research, literature synthesis and conceptual framework to be appraised by the reader without the lens of my subjectivities.

Chapter 7 presents other concluding remarks including: a summary of the uncertainties of the 21st century and the theft of the Anthropocene, which raises the question – are Gen Z being neglected in education policy? Chapter 7 also discusses the need to build social-ecological resilience; offers a time tested, pre-colonial view of Indigenous environmental stewardship education and lastly, proposes suggestions for further research.

Conclusion

This chapter began with a poem that introduced the narrative of this study. Given the pressing need to care for the planet and for the Wet Tropics in particular, it is time for a new vision and to engage with and learn to care for the natural environment. This was followed with a definition of environmental stewardship and where it fits within the education constructs of environmental education, education for sustainability and education for sustainable development and with the emerging concept of planetary stewardship. Some of the challenges of the Anthropocene were identified and the impact of neoliberal ideologies on education systems in the western world were briefly discussed. The chapter concluded by listing the research aims, objectives and research questions, an overview of the research design, a description of the research area, limitations of the study and how this thesis will unfold throughout subsequent chapters.

Chapter Two – Exploring the Research Context

Preface

Understanding the relationship between environmental stewardship, Gen Z Year 10 students, teachers and the sustainability curriculum in the Wet Tropics region of Australia guided this research. The shifts in association between environmental stewardship and environment and sustainability education policy between the 1970s and 2015, sets the historical context for educating for environmental stewardship in Australia. Briefly, environmental stewardship was associated with environmental education at its inception in Australia in the 1970s, then, with a shift in focus to sustainability education in the 1980s, environmental stewardship was de-valued. Between 1999 and 2005, environmental stewardship became (once again) associated with environmental education in government policy frameworks, but has been absent from policy since 2005.

Environmental stewardship is a complex topic and an emerging field. Further, the term takes on a variety of meanings across disciplines like education, psychology, social work and science. In some literature, the term is not used but related terms and concepts tell a stewardship narrative. Therefore, to better understand how these concepts are framed across these various disciplines, it is appropriate to separate environmental stewardship into principles, behaviour and education.

This chapter begins with an explanation of the above terms. Following, is an explanation of the devolution of environmental stewardship principles in environmental education (EE), education for sustainability (EfS) and education for sustainable development (ESD), the conduit for developing environmental stewardship. Explored next are metrics to analyse and evaluate the effectiveness of how environmental stewardship principles are developed in environmental education, education for sustainability and education for sustainable development, and critiques of how environmental stewardship principles have been shaped over the past decades. Reviewed next are research, frameworks and pedagogies pertinent to environmental stewardship. This includes: research on biophilia, ecological identity, well-being and eco-wellness; frameworks named the *Earth Charter*,

Common Cause, *Triple Focus and Systems Thinking*, *Responsible Education* and *Ecological Literacy*; and pedagogies known as educating for a sense of place and care pedagogy.

Significant to the promotion of environmental stewardship are environmental values, environmental attitudes, environmental ethics and pro-environmental behaviour. Literature discussing these is reviewed in the next section along with the difference between pro-environmental behaviour: action that benefits or minimises harm to the natural environment, and environmental stewardship behaviour: action based on connection with and care for the natural environment inclusive of a systems thinking worldview that benefits or minimises harm to the natural environment. Agency to act or action competence is defined as: i) knowledge about the environment; ii) commitment to act for change; iii) development of a vision for the student's future; and, iv) action experiences to connect emotions, values, knowledge and action (Jensen & Schnack, 1997). Systems thinking is thinking in terms of relationships and 'the ability to recognise and analyse the interconnectedness within and between systems' (Strachan, 2009, p. 84). The term 'environmental quality' is also used to denote a healthy natural environment that supports the quality of life (Fishbein, 1969). The following sections of this chapter discuss the contribution of environmental stewardship to the education narrative and how environmental stewardship principles are placed in education in Australia, Canada, New Zealand and Scotland. Then, the role of teachers in environmental stewardship education in Australia is discussed.

This research is conducted from the proposition that education must fit the times by addressing contemporary needs. What are the needs of students in the Anthropocene? Who are the children of the Anthropocene? Accordingly, the final section of this chapter focuses on the profile of Gen Z as expressed in the literature and the anthropogenic cultural ideologies influencing identity development. Discussed are the "I" culture of narcissism and celebrity obsession, the increasing invisibility of nature in western society and ecophobia, post-ecologism and climate anxiety, and the importance of developing hope in these uncertain times.

Environmental Stewardship Today

Here, concepts of stewardship, environmental stewardship and environmental stewardship education are discussed as they appear in the literature of various disciplines and as they are defined in this research undertaken in the second decade of the 21st century.

Defining stewardship, environmental stewardship, environmental stewardship principles, environmental stewardship behaviour and environmental stewardship education.

Firstly, distinctions must be made between the terms stewardship and environmental stewardship. The term stewardship has traditionally been associated with non-secular interpretations from the Abrahamic religions of Judaism, Christianity and Islam with humanity the appointed custodian of the planet answerable to God (Attfield, 2006; Palmer, 2006). However, environmental stewardship is a newer term and is used in fragmented ways across multiple disciplines. Defining environmental stewardship in a modern secular context is difficult as it involves feelings, understandings and actions around a contested notion (for some) of valuing nature for itself (see Monbiot, 2014), in opposition to viewing nature in economic terms as natural capital (Foster, 2005). In this research, environmental stewardship is separated from any economic interpretations or associations and draws on definitions used in recent education research where environmental stewardship is defined as 'the **moral** commitment to care for the environment' (Litz, 2010, p. 62) and environmental stewardship behaviour is 'synonymous with environmentally responsible behaviour' (Andrejewski, 2011, p. 14). In this research, environmental stewardship is conceived as an active ethic of care for the natural environment founded in relational systems thinking. The remainder of this section explores how these concepts are developed in other disciplines and what connections may be made to formal education practice.

In this research, the term environmental stewardship principles refers to values, attitudes and ethics supportive of connection with and maintenance of the natural, non-human environment. In environmental psychology and social work, the principles of environmental stewardship are framed

as eco-wellness, well-being and pro-environmental behaviour, as all derive from connection with and time spent in the natural environment. Unequivocal research exists about the positive impact on mental and physical health from communing with the natural world (Ewert et al., 2014; Howell, Dopko, Passmore, & Buro, 2011; Kaplan & Kaplan, 1989; Russell et al., 2013). Many studies have focused on the benefits of nature connection to promote pro-environmental behaviour (Bruni & Schultz, 2010; Davis, Green, & Reed, 2009; De Groot & Steg, 2010; Duerden & Witt, 2010; Hinds & Sparks, 2008; Kaplan & Kaplan, 1989; Kasser, 2014; Kerr & Key, 2011; Schultz & Tabanico, 2007; Steg & Vlek, 2009). In this research, the term environmental stewardship behaviour is preferred over pro-environmental behaviour because it is an expressed ethic of care for the natural environment based on feelings of connectedness and systems thinking.

In the ecological and biophysical sciences, the terms planetary stewardship and earth stewardship are implicitly synonymous with environmental stewardship, as they describe actions to sustainably manage ecosystems at risk in the Anthropocene. The Planetary Boundaries (PBS) framework developed by Rockström, Steffen and colleagues (Rockström et al., 2009; Steffen et al., 2015; Steffen, Sanderson, & Tyson, 2005) is a technique for promoting planetary stewardship. Achieving a planetary stewardship worldview requires a critical transition at the very foundation of sustainability science and thinking; a shift away from a mechanistic, reductionist scientific practice to an ecological practice, where relational systems thinking situates humanity as part of and co-evolving with all other living things (Du Plessis, 2008). In 1997, Capra called this an ecological paradigm and Elgin and Le Drew named it the reflective/living systems paradigm (cited in Du Plessis, 2008). Environmental stewardship is a deep ethic of care founded on affinity with, and respect for, the beauty, mystery and complexity of life. Environmental stewardship is an enacted commitment to maintain and enhance those systems. Environmental stewardship is an ethical value embedded in systems thinking and has the capacity to guide action to actively shape the trajectories of social-ecological systems (such as the Wet Tropics) to enhance both ecosystem resilience and human well-being (Chapin III, Kofinas, Folke, et al., 2009; Chapin III, Power, et al., 2011).

Environmental stewardship is intimately associated with education because, importantly, it is a learned behaviour and it can be taught (Kellert, 2012a). Environmental stewardship principles are 'at the core of environmental education goals' (Andrejewski, 2011, p. 150). Often, environmental stewardship is not formalised or even directly acknowledged in education policy and programs, only implied. An example of this is UNESCO's *Roadmap for Implementing the Global Action Program for Education for Sustainable Development* which follows the *United Nations Decade of Education for Sustainable Development* (UNDESD) from 2005 to 2014 (UNESCO, 2014). The *Roadmap* provides leadership for the implementation of education for sustainable development globally and implies the need for environmental stewardship principles through usage of the term environmental integrity (understood to mean environmental quality): 'Education for Sustainable Development empowers learners to take informed decisions and responsible actions for environmental integrity' (p. 12), but, the ultimate objectives of the program are:

> Objective 1: to reorient education and learning so that everyone has the opportunity to acquire the knowledge, skills, values and attitudes that empower them to contribute to sustainable development, and
> Objective 2: to strengthen education and learning in all agendas, programmes and activities that promote sustainable development (UNESCO, 2014, p. 14).

Whilst the words 'actions for environmental integrity' imply environmental stewardship principles and behaviour, *Roadmap* objectives do not explicitly promote learning to develop an ethic of care for the natural environment. *Roadmap* objectives are clearly focused on contributing to and promoting sustainable development. Care is only implied.

Environmental stewardship education is the inclusion of care pedagogy in environmental and sustainability education programs that provide opportunities for students to learn how to care for the natural environment; to foster innate biophilic needs; to promote eco-wellness and to cultivate a relational, systems thinking worldview. Environmental stewardship education is viewed here as implicitly fundamental to environmental education, education for sustainability, education for sustainable development and planetary stewardship. The term is not used explicitly in the literature.

The development of environmental stewardship principles and behaviours across multiple disciplines like ecopsychology, social work, science and education emphasises and reinforces the value of re-associating environmental stewardship principles with environmental and sustainability education. A conceptual framework for environmental stewardship education based on cross disciplinary research was developed as an outcome of this study. The research and theories that form the basis of the conceptual framework are examined throughout this chapter and the framework is discussed in Chapter 6.

The devolution of environmental stewardship principles in education today.

From its inception in the 1970s in Australia (Australian Academy of Science, 1970), environmental education focused on understanding the interrelatedness of humans, culture and their biophysical surroundings to develop decision making abilities and codes of behaviour about issues concerning environmental quality (Stevenson, 1987/2007). The *Belgrade Charter* (1975) and the *Tbilisi Declaration* (1977) reflect a focus on environmental quality and an ethic of care (Stevenson et al., 2013) and contributed to formalising the field of environmental education in Australia (Gough, 2013). However, a migration away from these core values occurred in the early 1980s, when the United Nations asked the World Commission on Environment and Development (WCED) to address a new era of unsustainable economic growth occurring at the expense of the natural environment. In 1987, the *Report of the World Commission on Environment and Development: Our Common Future* officially linked economic development and education (Brundtland, 1985; UNWCED, 1987) and the terms education for sustainability and education for sustainable development joined the education narrative to capture a new direction for education. This was defined in the WCED report as – 'humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs…technology and social organisation can both be managed and improved to make way for a new era of economic growth' [read – through education] (Gough, 2004, p. 215). The unprecedented economic growth of the 1980s engineered an ideological shift and a name change in the education and sustainability discourse in

international and Australian policy circles and refocused environmental education to education for sustainable development and education for sustainability (Stevenson et al., 2013) with a (possibly unintended) consequence, a shift in focus away from environmental stewardship.

In 2001, the *Millennium Ecosystem Assessment* (MEA) documented severe environmental degradation, which in hindsight, should have raised questions about the ideological transition from environmental quality to sustainable development in education policy and praxis, and acted as a catalyst for positive change. The MEA was undertaken by the United Nations (UN) to gauge the extent and consequences of ecosystem damage from anthropogenic impacts and concluded that human actions were depleting the Earth's 'natural capital' and straining ecosystem functions to such an extent that their ability to sustain future generations could no longer be taken for granted. The MEA stated that reversal of degradation is possible over the next 50 years but the changes in policy and practice required are substantial and are not underway at the time (United Nations, 2001). Some 16 years later, it could be argued that the situation remains largely the same.

The MEA was instrumental in the proclamation of the *United Nations Decade of Education for Sustainable Development (2005–2014)* (UNDESD) by the United Nations General Assembly in 2002. This provided impetus for a global change in environmental education terminology, focus and praxis, and formalised the term education for sustainable development throughout much of the world (Gough, 2013). The UNDESD was also instrumental in the development of policies and frameworks that guided education for sustainability in Australia (Australian National Commission for UNESCO, 2005). The transformation of environmental education into education for sustainable development and the subsequent focus change from environment to development, compromised the importance of educating to develop environmental stewardship principles (Kopnina, 2012). The shift away from environmental stewardship principles continued with the launch of the *Roadmap for Global Action Programme* by UNESCO in 2014. The five priority action areas of the *Roadmap* are: advancing policy; transforming training and learning environments; building capacities of educators and trainers;

empowering and mobilising youth and accelerating sustainable solutions at the local level (UNESCO, 2014). This document secures education for sustainable development ideology and terminology exclusive of environmental stewardship principles. As identified earlier, care is only implied. Research about implementation of the *Roadmap* in Australia has been minimal.

Metrics to evaluate environmental stewardship principles.

Metrics have been designed since the 1970s to evaluate the effectiveness of environmental programs to develop environmental stewardship principles and behaviours. These scales measure one or more of the following: attitudes; values; connection and affinity with nature; and motivation and behaviours to care for the natural environment. A list of metrics is compiled in Appendix A. Some link connection to nature with environmentally responsible behaviour; others assess factors influencing children's environmental attitudes, motivation and behaviour and children's implicit connection with nature. Only two (known) studies by Ewert, Place and Sibthorp (2005) and Wells and Lekies (2006) have made the connection between childhood outdoor play behaviour and adult pro-environmental attitudes and behaviours. Only one (known) metric by Stern, Powell and Ardoin (2008) examines the effect of children's connection to nature and outdoor play to environmental stewardship. A later scale by these authors measures environmental responsibility, character development and attitudes towards school (Powell, Stern, Krohn, & Ardoin, 2011). A recent scale by Vezeau, Powell, Stern, Moore and Wright (2015) measures raising awareness, building interest and enhancing cognitive interest (called elaboration) as potential pre-cursors to stewardship behaviour change. Overall, these scales measure aspects of connection with and care of the natural environment and capacity for pro-environmental behaviour. The scales presented in Appendix A span 20 years and it is interesting to note the continued focus on environmental stewardship principles and behaviour, which are not only valued and measured in formal education settings but also in the community.

Since 1994, *Who Cares about the Environment,* a triennial assessment scale, measures environmental stewardship principles held by members of the community in the state of New South Wales in

Australia (NSW Government, 2012). The latest report, *Who Cares about the Environment in 2012 – At a Glance,* identifies the environmental knowledge, attitudes and behaviours of 2,006 surveyed individuals and the findings from interviews with nine discussion groups. The report concludes that environmental concerns have lessened comparative to previous years, and that people value the environment but are confused by the complexity of the media debate about global environmental problems. More than half of the respondents believe there is not enough emphasis on protection of natural habitat, and environmental regulations in mining and property development are too lax (NSW Government, 2012). Another community scale measures motivation in the environmental stewardship networks that flourish in land care management in rural Australia (Bramston, Pretty, & Zammit, 2011). Here, there are three aspects to promoting environmental stewardship motivation: developing a sense of belonging to the land; caretaking the environment; and, expanding personal learning (Bramston et al., 2011).

Critiques of a lack of development of environmental stewardship principles.

Despite a 40 year history of education (as environmental education, education for sustainable development and education for sustainability), increases in environmental degradation suggest that education efforts have failed to provoke sufficient action for (and on) mitigation (Jamieson, 2014; Jickling & Wals, 2012; Saylan & Blumstein, 2011). This failure can be explained (in part) as a lack of development of environmental stewardship principles and behaviours within education programs. Various explanations are forthcoming in the literature about why greater success has not been achieved, including an emphasis on cognitive learning over development of values and understanding (Barrett, 2007), a failure to secure care for and feelings of connection with the natural environment (Mortari, 2004), a lack of transformational thinking and purpose to envision a desirable future (Marcinkowski, 2010), the inability to develop a relational, systems thinking worldview (Blumstein & Saylan, 2007), and little understanding of the *connectedness of things.*

Debate exists as to whether the changed focus of environmental education – with an emphasis on development and a de-emphasis on environment and environmental stewardship principles – is an adequate response to educating future citizens for current and future environmental dysfunction (Jordan & Kristjánsson, 2016). Whilst many education researchers see sustainability contributing to enhancing the relevance of environmental education (Gough, 2013), others see impediments resulting from this refocus. Eminent education scholars Bob Jickling and Arjen Wals are suspicious that education continues to serve a neoliberalist agenda contributing to, or as a catalyst for, continued exploitation of human and natural resources (2008, 2012a). In a neoliberal climate, citizens and educators are often unaware of how neoliberalism constrains thinking, and how environmental issues are shaped and categorised as economic issues to be resolved through financial solutions (Hursh et al., 2015). Blumstein and Saylan (2007) and Luke (2001) express concern that environmental education is now re-directed to the economic and social cycles of production and consumption within an education for sustainable development construct. White's analysis of the definition of sustainability in over 100 journal articles found terminology is concerned with 'growth, increase, and improvement, and so, present[s] a challenge for a world of limited resources and finite scales' (2013, p. 217). In the context of this research, such dilemmas directly stem from the de-association of environmental stewardship principles with sustainable development education priorities.

Calls to engage with environmental stewardship principles.

Humankind is now a dominant force affecting the natural systems that sustain life and must prioritise finding new ways of thinking about how to live in relation to these systems (Jamieson, 2014). The inherited, traditional and time-tested ethics that guide life are outdated in a globalised, technological society where consequences impact continents and generations (Olvitt, 2013). Some scholars advocate for developing new transformational environmental values and a relational systems worldview akin to developing environmental stewardship principles (McAlpine et al., 2015, plus others cited in this section). Environmental stewardship principles support 'the task of nurturing an appropriately engaged citizenry [which] is now recognised as crucial for the survival of humanity and

all aspects of life on the planet' (Hopkins, 2014, p. 115). Advocacy for the development of environmental stewardship principles has been framed as 'ethics for the Anthropocene'; the cultivation of virtues in the form of character traits, dispositions and emotions to reduce humanity's negative footprint on the natural environment and to promote resilience in individuals to live meaningful sustainable lives (Jamieson, 2011). Jordan and Kristjánsson (2016) suggest that sustainability education can draw on Aristotle's *Nicomachean Ethics*, the theory of happiness or human flourishing, in acknowledgment of the interconnectedness and interrelatedness of social and environmental issues. Essential to learning for environmental stewardship is care-based learning which, axiologically, is fundamentally relational and emphasises attachment, connection, interdependence and responsiveness (Nazir & Pedretti, 2016). One approach by Canadian educators is through environmental consciousness raising using experiential and transformative environmental education pedagogy, to connect people to natural environments to encourage compassionate care as well as build agency for living low consumption lifestyles (Nazir & Pedretti, 2016).

Environmental Stewardship Principles supported in Research, Frameworks, Pedagogies

This section discusses research, frameworks and pedagogies all supportive of environmental stewardship principles and collectively, they emphasise the importance of environmental stewardship.

Research supporting environmental stewardship principles.

Understanding the relationship between humans, the natural environment and environmental stewardship principles is framed here as biophilia, ecological identity and eco-wellness. Each of these concepts plays a role in defining aspects of environmental stewardship as investigated in this research project. Table 2, at the end of this section, lists research supportive of environmental stewardship.

Biophilia.

Biophilia translates literally from Latin as the love of life and was first used by E O Wilson (1984) to describe humanity's innate relationship with the natural environment. In subsequent decades, the term biophilia and a *Biophila Hypothesis* have been shaped by E O Wilson and Stephen Kellert.

Biophilia is now understood as values and qualities fundamental to the way that humans attach meaning to and derive benefit from the natural environment. Kellert lists biophilic values as:

> Attraction – appreciation of the aesthetic appeal of nature
> Reason – desire to know and intellectually comprehend the world
> Aversion – antipathy toward and sometimes fearful avoidance of nature
> Exploitation – desire to utilise and materially exploit the natural world
> Affection – emotional attachment, including a love of nature
> Dominion – urge to master and control the natural environment
> Spirituality – pursuit of meaning and purpose through connection with the natural world
> Symbolism – symbolic representation of nature through image, language and design
> (2012a, p. xii).

Biophilic values arise from an innate need to connect. Our fundamental values embody the 'inherent inclination to affiliate with the natural world, [which is] instrumental to people's physical and mental health, productivity and well-being', and 'like much of what it is to be human, biophilia is a biological urge that must be learned and developed to become fully functional' (Kellert, 2012a, p. xii). Distortions in biophilic values have led to widespread environmental degradation and increasing alienation and 'a fundamental shift in human consciousness and the emergence of a *new ethic will be required* to resolve our current linked environmental and social crises' (Kellert, 2012a, p. xiii, italics added). Educating for environmental stewardship is one means for fulfilling biophilic needs. In the context of this research, the key words from Kellert in the quote above are 'learned' and 'developed'.

In *Natural Environments and Human Health,* Ewert, Mitten and Overholt write, 'humans are innately connected with nature, evolutionarily, biologically, emotionally, spiritually, and socially' and that this 'connection is reciprocal' (2014, p. 10). The authors track changing environmental perspectives from the first humans to the era of space travel, the different concepts and theories that inscribe human interactivity with the myriad others, experience with/of those others at developmental stages throughout an individual's life, and the role of education in developing an ethic of care for the natural environment (2014).

Experiential, age-appropriate activities fulfil biophilic needs and promote good health in children and adults (Chawla, 1988; Maller, Townsend, Pryor, Brown, & St Leger, 2006; Wells & Lekies, 2006; White

& Stoecklin, 2008). Direct experiences in the natural environment (over indirect experiences) provide a stronger motivating force for pro-environmental behaviour (Duerden & Witt, 2010; Krogh & Jolly, 2012). Deeply engaging direct experiences develop emotive connections, foster care, build agency and situate the natural environment in an individual's consciousness (Nazir & Pedretti, 2016). Rachel Carson believed, 'that people would protect only what they loved, so she worked to establish a sense of wonder about nature' (Griswold, 2012, para. 10). Extensive research exists about the effectiveness of experiences in the natural environment and some are documented in the scales presented in Appendix A. These metrics use a number of lenses to assess the relationship that humans have with the natural environment, including self-esteem, environmental attitudes and behaviour, environmental responsibility and connectedness to nature, to list some.

Ecological identity.

An ecological identity is defined as the way a person's (or a group's) sense of self connects 'to the rhythms of the earth, the biogeochemical cycles and the complex diversity of ecological systems', and Thomashow states, this is expressed through personality, values and actions (1996, p. viii). Self-identification with the natural environment can provide a baseline for sustainable thought and action translating into conscious participation in the care and maintenance of environments through daily lived experiences (Thomashow, 1996). I see ecological identity as congruent with environmental stewardship principles and behaviour. Ecological identity means valuing the restorative benefits of feeling connected to the natural environment and taking advantage of opportunities for reflective contemplation. Developing an ecological identity is a personal experience that can be learned and cultivated (Thomashow, 1996), which accords with Kellert's point that biophilic values are learned values.

Ecological identity and environmental identity overlap in the research literature. Whilst ecological identity describes a direct human – natural environment relationship (Thomashow, 1996), environmental identity has been framed in a social construct describing an identification with and/or participation in environmental organisations (Clayton & Opotow, 2003; Hinds & Sparks, 2008;

Kempton & Holland, 2003; Stapleton, 2015; Zavestoski, 2003). But, definitions of environmental identity change. Ten years on from her 2003 definition, Clayton described an environmental identity as a direct human – natural environment relationship: 'a sense of oneself as interdependent with the natural world, a self-concept that encourages cognitive and emotional connections between self and nature' (p. 215). This research draws on Thomashow's concept of ecological identity. Direct relationship with the more-than-human world can promote intrinsic rewards (Brown & Kasser, 2005) and environmental stewardship behaviour (discussed further in Chapter 6).

Well-being and eco-wellness.

Well-being is defined as doing well in life and achieving a state of health, happiness or prosperity (Russell et al., 2013). Eco-wellness is 'a sense of appreciation, respect for and awe of nature that results in feelings of connectedness with the natural environment and the enhancement of holistic wellness' (Reese & Myers, 2012, p. 400). The restorative effects of nature are well documented and include psychological, physical and emotional benefits (extensive citations in Table 2). Self-reported levels of well-being, inclusive of ecologically responsible behaviour, are used to provide a measure of eco-wellness (Brown & Kasser, 2005). Daily contact with nature increases children's resilience to stressful events and improves cognitive capabilities (Collado & Corraliza, 2013). Researchers explore how contact with nature develops environmental stewardship and fosters well-being, eco-wellness, happiness, a sense of fate control and community capacity which, in turn, sets the stage for sustainability and resilience (Kofinas & Chapin III, 2009). The relationship between well-being, livelihood, and natural and social capital prospectively underpins the prospects for long term sustainability (Janssen and Scheffer, 2005 cited in Kofinas & Chapin III, 2009).

The services provided by natural ecosystems are classified by the Millennium Ecosystem Assessment Board (2005) as: i) provisioning services for the supply of food, water, timber and fibre; ii) regulating services that affect climate, floods, disease, waste and water quality; iii) cultural services inclusive of recreational, aesthetic and spiritual benefits; and, iv) supporting services like soil formation and nutrient cycling. These services are fundamental to life and fundamental to the Physiological needs

listed at the base of Maslow's Hierarchy of Needs (see Figure 5.) When basic needs are met, Maslow's higher order elements of self-esteem and self-actualisation can flourish. Continued provision of basic life supporting needs from ecosystem services are threatened because of human caused global degradation of ecosystems (Millennium Ecosystem Assessment Board, 2005), which may disrupt social and cultural well-being, health and justice (Tedeschi, Bexell, & NeSmith, 2013, p. 226), and the quality of life in the coming decades.

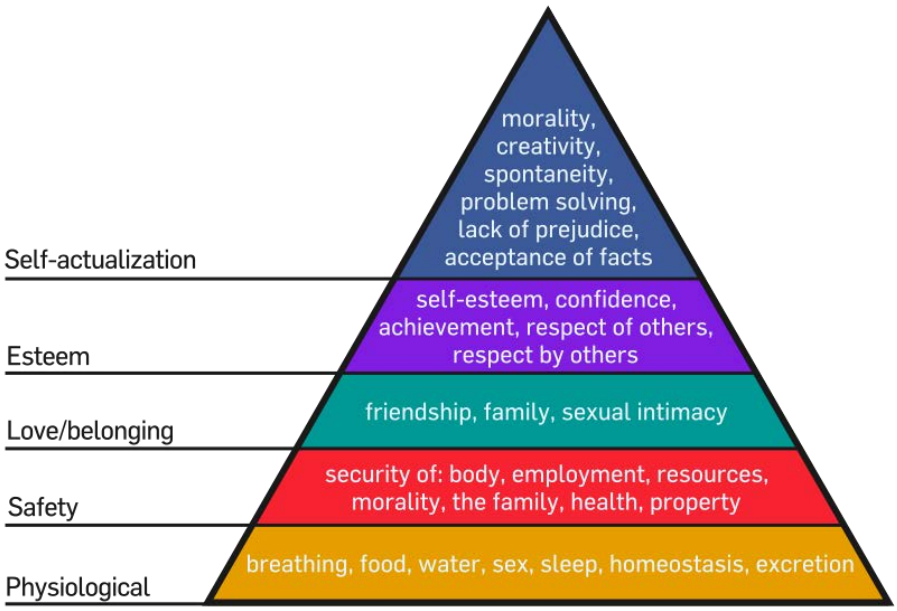


Figure 5: Maslow's Hierarchy of Needs

Source: https://commons.wikimedia.org/wiki/File:Maslow's_Hierarchy_of_Needs.svg

Does this point towards Gen Z living their adult lives with anthropogenic environmental challenges causing them to feel dis-advantaged and dis-enfranchised? Will Gen Z be denied the opportunity to develop according to Maslows' hierarchy and denied the foundations of well-being and eco-wellness? Education for sustainable outcomes must address the affective domain (Key & Kerr, 2011; Sipos, Battisti, & Grimm, 2008) and develop not only cognitive but emotional skills sets to build capacity for unprecedented environmental change.

There are many interdisciplinary theories and research supporting the emergence of environmental stewardship. Because there are too many to discuss individually, groups of theories are provided in sets in Table 2. Some are discussed in this chapter and some will be discussed further in Chapter 6.

Table 2: Research/ers Supporting Education for Environmental Stewardship

Theory and theorists	Synopsis
Biophilia	
Kellert (2012a)	The 'inherent inclination to affiliate with nature remains crucial to physical and mental health and well-being' (Kellert, 2012a, p. x)
White and Stoecklin (2008)	Age appropriate nature experiences to develop biophilia
Wilson (1984)	First proposed biophilia theory
Stewardship Education	
Andrejewski (2011)	Role of residential EE on environmental stewardship attitudes & behaviour
Arango (2009)	Web links for teaching environmental stewardship
Bennett, Cornwell, Al-Lail, and Schenck (2012)	Education for stewardship of the global commons
Blanchard and Buchanan (2011)	Early childhood stewardship education
Chapin III, Power, et al. (2011)	Calls for new science education agenda
Ewert et al. (2014)	Connection with the natural environment is integral for humanity
Fischer (2011)	Stewardship education in middle school
Kane (2011)	Transforming secondary education
Kevany (2007)	Build capacity for stewardship and sustainable development
Krasny and Tidball (2012)	Call for civic ecology initiatives
Litz (2010); Litz & Mitten (2013)	Sense of place, critical thinking, eco-literacy, environmental ethic of care
McAlpine et al. (2015)	Call for transformational change to value the biosphere
Smith (2002); (Smith, 2007)	Place-based education
Vezeau et al. (2015)	Measuring stewardship in children
Waterhouse (2011)	Finding balance between human needs and earth stewardship
Care Theory – Care Pedagogy	
Noddings (1988, 2010b, 2012, 2013)	Care pedagogy
Juujärvi, Myyry, and Pesso (2012)	Empathy and values as predictors of care development
Mortari (2004)	Environmental care pedagogy
Starratt (2003)	Responsible educational leadership to educate the global, caring citizen
Values Education	
Bolderdijk, Gorsira, Keizer, and Steg (2013)	Information does not necessarily mean behaviour change to PEB
Crompton (2010)	The case for working with cultural values
Crompton and Kasser (2009)	WWF Meeting environmental challenges, values and human identity
de Leo (2012)	Integrating values, knowledge and skills into ESD in Australia
Holmes, Blackmore, Hawkins, and Wakeford (2011)	Common Cause Handbook, educating for values
Kahneman and Deaton (2010)	High income value for life increase but not necessarily well-being
Kasser (2014)	Teaching about values and goals – motivation, well-being and pro-social
Schultz, Shriver, Tabanico, and Khazian (2004)	Concern for the natural world founded in degree of connectedness
Schultz et al. (2005)	Relationship between values, environmental concern and PEB
Schultz and Zelezny (1998, 1999)	Values as predictors of pro-environmental attitudes, values and PEB study
Environmental Ethics	
Knapp (1999)	Developing an environmental ethic through outdoor education
Kronlid and Öhman (2012)	Value-oriented and Relation-oriented Environmental Ethics
Martin and Beatley (1993)	Need for environmental ethics in school curriculum

Olvitt (2013)	Need for environmental ethics discussion and inquiry in education
Human Identity	
Crompton and Kasser (2009)	WWF Meeting environmental challenges: the role of human identity
Stapleton (2015)	Role of educating / changing human identity
Eco-wellness – Well-being	
Brown and Kasser (2005)	Compatible – psychological well-being and ecological well-being
Cervinka, Röderer, and Hefler (2011)	Feeling connected to the natural world improves well-being
Chawla (1988, 2001, 2006, 2007, 2008, 2009, 2015)	Importance of contact with the natural world
Ewert et al. (2014)	Comprehensive study of human connection to nature and well-being
Kals, Schumacher, and Montada (1999)	Emotional affinity with nature promotes PEB
Reese and Myers (2012)	Role of eco-wellness, missing in health wellness indicators
Russell et al. (2013)	Knowing and being in nature improves well-being
Stapleton (2015)	Environmental identity development through social interaction
Stevens 2010	The environment may present a new paradigm for well-being
Tabernero and Hernández (2011)	Self-efficacy promotes intrinsic motivation for PEB
Thompson and Aspinall (2011)	Impact of natural environment on well-being
Wood, Bragg, and Barton (2013)	Natural Choices for Health and Well-being Report
Zotti and Branch (2011)	Importance of nature to a child's health and well-being
Ecophobia	
Sobel (1996, 2005)	Ecophobia and place-based education
Strife (2010, 2012)	Expressions of ecophobia
Post-ecologism	
Zeyer and Kelsey (2013)	Defining post-ecologism
Zeyer and Roth (2013)	Further discourse on post-ecologism
Stewardship Behaviour, PEB, Responsible Living, Systems Thinking	
Bekoff (2013)	Ignoring nature no more
Bramston et al. (2011)	Assessing environmental stewardship motivation
Caldwell, Hayes, and Long (2010)	Leadership for stewardship
Chapin III, Pickett, et al. (2011)	Earth stewardship for social-ecological transformation
De Groot and Steg (2010)	Relationships between values, motivation and PEB
Evans et al. (2013)	Self-interest about one cause not enough for PEB
Gatersleben, White, Abrahamse, Jackson, and Uzzell (2010)	Values and sustainable lifestyles
Jagers and Matti (2010)	Ecological citizenship theory
Karp (1996)	Values and their effect on PEB
Ogden et al. (2013)	Stewardship for resilience
Oskamp (2002)	Responsible living
Palmer, Biggs, and Cumming (2015)	Enhancing well-being and environmental stewardship
Pretty (2011)	Understanding sociol-ecological and ecocultural systems
Schrader, Fricke, Doyle, and Thoresen (2013)	Enabling responsible living
Steg, Bolderdijk, Keizer, and Perlaviciute (2014)	Integrated framework for encouraging PEB
Zelenski and Nisbet (2014)	Nature connectedness a predictor of sustainable attitudes and behaviour

Note: PEB = Pro-environmental behaviour, WWF = World Wide Fund for Nature

Frameworks supporting environmental stewardship principles.

Frameworks that support the development of environmental stewardship principles include the *Earth Charter*, *Common Cause*, *Triple Focus and Systems Thinking*, *Responsible Education* and *Ecoliteracy*.

Earth Charter.

The *Earth Charter* was launched in 2000 after a decade of cross cultural dialogue on common goals and shared values and is a declaration of fundamental ethical principles for building a just, sustainable and peaceful global society (Earth Charter Secretariat, 2000). The *Earth Charter* links caring for the earth and caring for people (Jickling & Wals, 2013). However, the Charter has largely remained an aspirational document despite its direct relevance to guide education policy and praxis (Corcoran, 2004). Eight of the sixteen principles in the *Earth Charter* support development of environmental stewardship principles: in the first section, Respect and Care for the Community of Life, in Principles 1, 2 and 4; in the second section, Ecological Integrity in Principles 5, 6, 7 and 8; and in the fourth section, Democracy, Nonviolence and Peace, in Principle 15. The principles in the third section, Social and Economic Justice, relate to human equality (www.earthcharter.org).

Common Cause.

The *Common Cause Handbook* is a steering document written by the Public Interest Research Centre (PIRC), a registered charity in the United Kingdom that promotes compassionate values to create a sustainable, equitable society that values both people and the environment (Holmes et al., 2011). The Handbook sets out ten cross cultural values: universalism, benevolence, tradition, conformity, security, power, achievement, hedonism, stimulation and self-direction. The PIRC has worked closely with activist NGOs, such as the *World Wide Fund for Nature* (WWF) and the *Natural Change Project* (NCP) in Scotland, to explicitly frame values supportive of social and environmental justice. The *Natural Change Project* subsequently secured legislative change for the 'right' of all Scottish children to outdoor education (Kerr & Key, 2013; Key & Kerr, 2011). The values in the *Common Cause Handbook* form the basis of a learning program called *Learning Through Values* (LTV) piloted in nine schools in the English midlands to address global complexities of inequality, environmental decline and

sustainability. Teachers reported increased confidence to engage with complex issues and most teachers (86%) felt values education helped learners cope with difficult issues. Further, learners rated intrinsic values as having increased importance and reported improved levels of engagement with intrinsic values (Bowden, 2013).

Triple Focus and Systems Thinking.

The *Triple Focus: A New Approach to Education* constructs a framework for education starting from One core idea: to understand the profound interconnectedness of the world. Next, Two levels of change: to promote the transformation of classrooms from teacher centric to learner centric and school culture to a learning community culture. Lastly, Three system awareness is awareness of: a) the Self or the inner landscape – the mind-body system; b) Others or the social landscape – relationship for example within teams, groups, larger organisations; and, c) Larger systems or the collective landscape – ecology, economy, society (Senge, 2016). Goleman and Senge argue for students and adults to engage in understanding and caring for these three fundamental levels of systemic awareness because the interconnections between people, objects and the planet are more important than ever before (2015). 'Understanding' in *The Triple Focus* approach relates to cognitive learning and caring about the systems that support the human and more-than-human world. Environmental stewardship principles are implicit in the *Triple Focus* approach, as systems thinking and caring are explicitly linked: 'We are seeing that the more kids are steeped in systems thinking, the more they express their innate predisposition to care at a larger and larger scale' (Goleman & Senge, 2015, p. 66).

Responsible Education.

Responsible Education promotes active responsible citizens and citizenship education. This framework is promoted through an alliance called the *Partnership for Education and Research about Responsible Living* (PERL), a collaboration of 140 educators and researchers in over 50 countries (https://eng.hihm.no/project-sites/living-responsibly). PERL contributed to the UNDESD and now partners with UNESCO in several programs – the *Roadmap*, implementation of the *Sustainable*

Development Goals (SDG) and the 10-Year *Framework of Programmes on Sustainable Lifestyles and Education for Sustainable Consumption and Production* (SCP). *Responsible Education* incorporates environmental stewardship principles through the promotion of values, ethics and education frameworks to create behaviour change and sustainable living (Schrader et al., 2013; Thoresen, Doyle, & Klein, 2015).

Ecological Literacy.

Ecological Literacy is defined as the ability to use ecological understanding, thinking and habits of mind for living in, enjoying and/or studying the environment (Berkowitz, Ford, & Brewer, 2005). The *Centre for Ecoliteracy* established in 1995 in Berkeley California, is a non-profit organisation promoting education for sustainable living. An ecologically literate person is defined as having a basic comprehension of ecology, human ecology and the concepts of sustainability, and also possesses the ability to solve problems (Orr, 2004). Although slightly different terminology is used, Orr's definition of an ecologically literate person is commensurate with environmental stewardship principles. Inherent in ecological literacy is a relational systems thinking worldview, and to achieve this, education must aim to develop new ways of seeing the world based on relationship, connectedness and context (Capra, 2005).

Pedagogies supporting environmental stewardship principles.

Educating for a sense of place and care pedagogy are two pedagogies that can be employed to develop environmental stewardship principles and behaviour and have been included because of their direct relevance.

Educating for a Sense of Place.

Outdoor education, place-based education and place and community based education are pedagogical approaches to develop a sense of connection to a specific place (Sobel, 2005; Wattchow & Brown, 2011). Such connection is called *querencia,* a Spanish word for an apolitical abiding love for place that leads to its care, by now and future generations (Lopez cited in Smith & Sobel, 2010). Smith and Sobel argue that from a localised sense of place, a more meaningful global connection to the

natural and cultural world can be learned through engaging emotion, imagination and cognition to develop a sense of place and understanding that humans are part of the natural environment (Stevenson, 2011). In her thesis, Litz explores how place-based pedagogy, when supplemented with critical thinking and ecoliteracy skills, helps students develop a resilient ethic of care for the environment (2010). Following on from this research, Litz and Mitten, and then Ewert, Milton and Overholt describe place-based education, developing an ethic of care, critical thinking skills and ecoliteracy skills as necessary to learning for environmental stewardship (Ewert et al., 2014; Litz & Mitten, 2013). Integrating place-based environmental education inclusive of environmental stewardship principles and behaviours develops well-being and eco-wellness, and enhances capacity for higher order thinking to facilitate problem solving and improved academic achievement (Litz, 2010). Greater well-being (and eco-wellness), to summarise these extensive studies, enhances scholastic performance. Again, the call is for education that develops a more interconnected worldview with real life learning in real places with real issues, utilising sensory engagement with a local context (Tooth & Renshaw, 2009) to develop biophilic tendencies to connect humans with other life forms and their local environments (Suzuki, Mason, & McConnell, 2007).

Care Pedagogy.

Care pedagogy has its basis in care theory in recognition that relationship is ontologically basic for humans and that caring is a relational ethic bound to experience (Noddings, 1988, 2010b). Educating to care is found in the works of Plato and Socrates (Mortari, 2004). It is possible to cultivate a caring ethical disposition, and education is a valuable facilitator of care development (Juujärvi et al., 2012; Noddings, 1992, 2005, 2011). Essential requirements include teacher modelling and affording students' opportunities to care (Noddings, 2010b). This research draws on Noddings care theory which, initially, only applied to human relationships and identified distinct roles – a carer (or one-caring) and the one-cared-for, until it was extended to include animals, plants and things (2013). But, Noddings suggests that the care ethic becomes one-sided as plants and animals (or, the more-than-human world), do not have active capacity to be the one-caring only the one-cared-for (2013). I

propose that the life-giving functions provided by the more-than-human world place plants and animals in the one-caring role and all life on earth in the one-cared-for role. In turn, this creates a reciprocal caring relationship cultivated by environmental stewardship behaviour. Little work has been done in the practical application of an ethic of care to environmental education, but Noddings' interpretation of an ethic of care is a useful framework for incorporating caring into environmental education (Nazir, 2014). Support exists for Noddings' care theory to be central to environmental education (Fien, 2007; Martin, 2003; Quigley & Lyons, 2016).

The lack of an adequate ethic to care lies at the core of the ecological crises (Mortari, 2004), but mass media 'education events' in the last 20 years have had impact (Kellert, 2012a). Education on the near extinction of a species of whales motivated both public and then political will to enact changes in law and policy resulting in many (but not all) species gaining greater protection. Secondly, learning to care for wetlands in the United States (previously referred to as swamps and routinely exploited) resulted in the G W Bush administration declaring a national policy of 'no net loss of wetlands' as nearly half of US wetlands (approximately 100 million acres) had been lost in 200 years of European settlement (Kellert, 2012a).

Developing Environmental Stewardship

How the principles of environmental stewardship are developed through environmental values, attitudes and ethics to create pro-environmental and/or environmental stewardship behaviour are explored next, followed by an explanation of the difference between pro-environmental and environmental stewardship behaviour.

Environmental values.

Values are integral to stewardship and are 'the principles and fundamental convictions which act as general guides to behaviour, and the standards by which particular actions are judged to be good or desirable' (Halstead & Taylor, 2000, p. 169). Values are also defined as 'the psychological representations of what we believe to be important in life' (Kasser, 2009, p. 1) and so, constitute

guiding principles that influence attitudes and action (de Leo, 2012; Heberlein, 2012; Holmes et al., 2011; Schultz et al., 2005; Schwartz, 2009). Cultural values are the meanings, beliefs, norms, symbols and values inherent in a society, and act as guiding principles that contribute to the formation of individual values (Oreg & Katz-Gerro, 2006). Environmental values support positive environmental behaviours and tend to be self-transcendent and intrinsic (Kasser, 2009). However, valuing the natural environment is culturally encoded as a dichotomy between: i) instrumental values – direct valuing of natural resource use in activities like mining and farming and the indirect valuing of ecosystem services like clean water and fresh air; and/or, ii) essential values – valuing the natural environment for itself (Vane-Wright, 2009). Identifying the values that indicate positive environmental behaviour is a complex process. Relevant to this research are Schwartz's 10 distinct values common to all cultures: self-direction, stimulation, hedonism, achievement, power, universalism, benevolence, conformity, tradition and security (Schwartz, 2009). These are depicted in the middle of Figure 6 on either side of the values box. Values are validated (either intrinsically and/or extrinsically) and ranked (to indicate behaviour orientation), and assist with understanding how values underpin environmental stewardship.

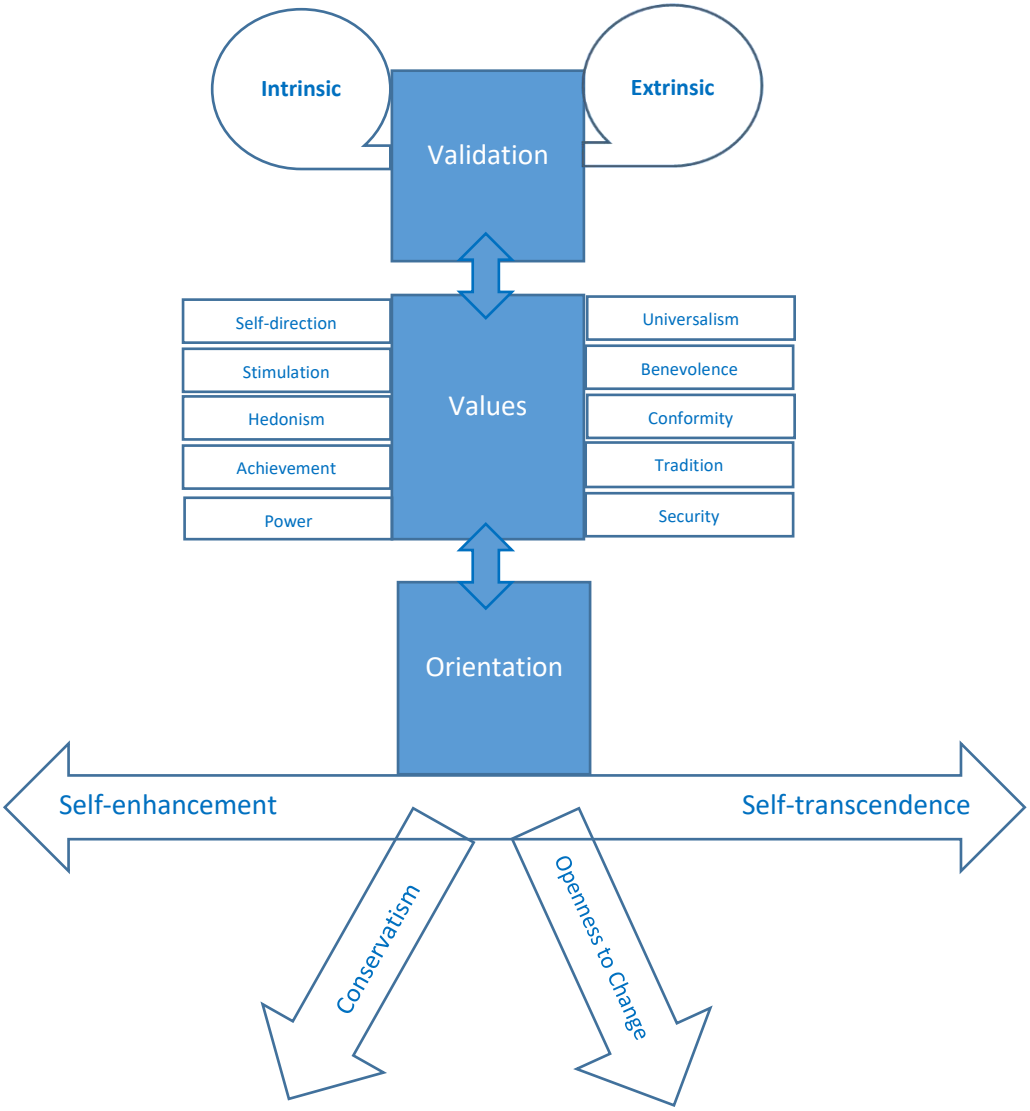


Figure 6: Values, Validation and Orientation

Source. Author

Values are validated through intrinsic self-acceptance, or extrinsically from alignment with the values of a chosen group to gain a better image, more popularity, or financial success (Kasser, 2014). Validation may be both intrinsic and extrinsic. It was outside the scope of this research to study if or how values were validated. Values are grouped to show behaviour orientations (Schwartz, 2012). These are:

i) self-enhancement – values of power and achievement;
ii) conservatism – values of tradition, conformity, and security;
iii) openness to change – values of self-direction, stimulation, and hedonism; and,

iv) self-transcendence – values of universalism and benevolence.

How values are ranked in survey responses can indicate behaviour orientations that an individual or that a data set is inclined towards. To begin analysis, value rankings are plotted on the inner circle of the circumplex devised by Schwartz. See Figure 7 where the 10 values make the inner circle and the four behaviour orientations make the outer circle. As an example, an individual may rank universalism, benevolence and self-direction as first, second and third, which indicates self-transcendence and openness to change.

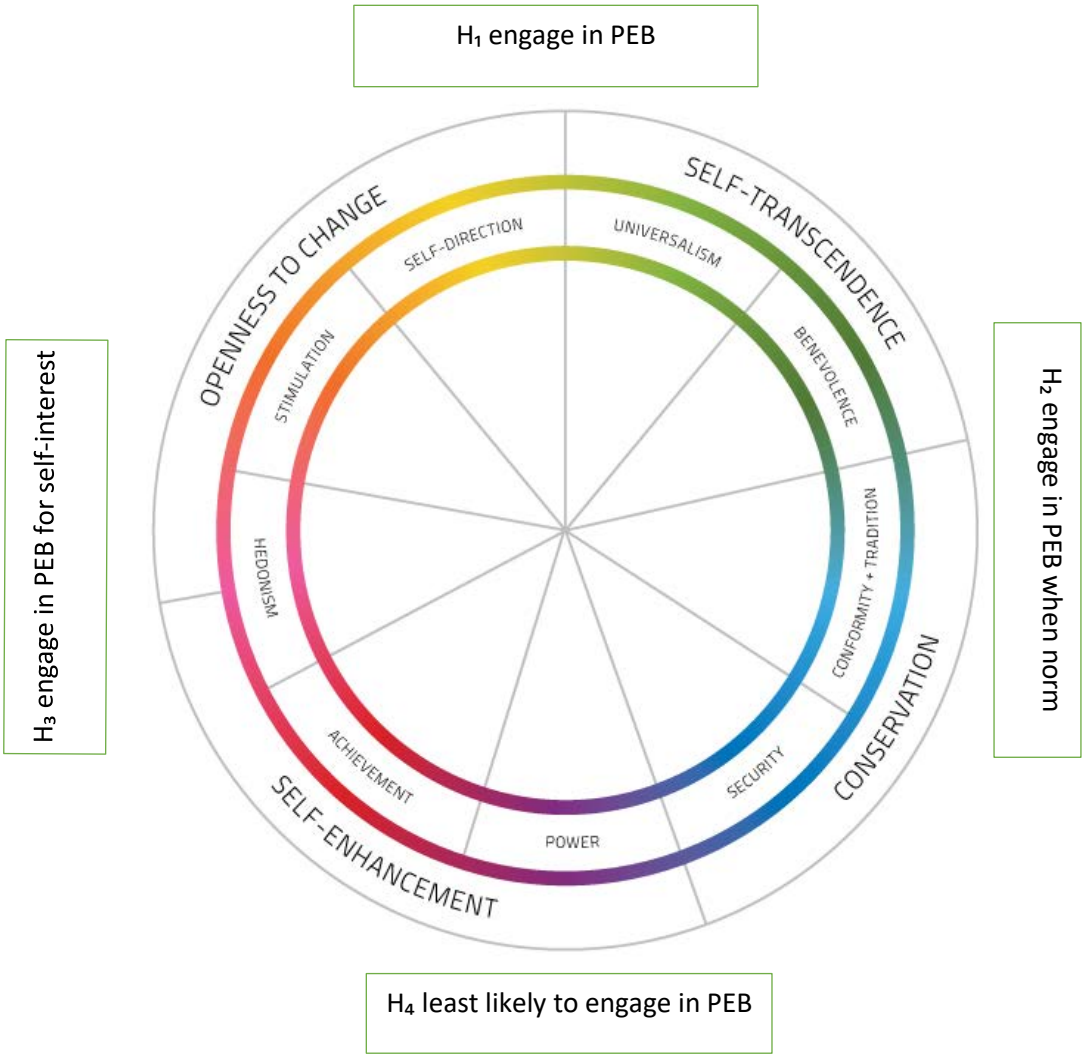


Figure 7: Karp's Pro-environmental Hypotheses in Relation to Schwartz Value Circumplex

Source: file:///C:/Users/jc196802/Downloads/Common%20Cause%20Handbook(2).pdf (author modified)

Note: PEB = pro-environmental behaviour

Karp's hypotheses for pro-environmental behaviour supplements the Schwartz value circumplex (1996). Again, see Figure 7. Behaviour orientations are indicated by the outer circle and these relate to one of Karp's four hypotheses for pro-environmental behaviour. These hypotheses are applied to both teacher and student online survey data and discussed in Chapter 4, and student values are comparatively analysed with data from German adolescents (Musiol & Boehnke, 2013). The four hypotheses are:

H_1 Individuals who strongly value both self-transcendence and openness to change would engage in pro-environmental behaviour.

H_2 Individuals who value both self-transcendence and conservation will engage in pro-environmental behaviour when this behaviour is a normative standard.

H_3 Individuals who strongly value self-enhancement and openness to change will engage in pro-environmental behaviour when there is a clear link between pro-environmental behaviour and self-interest.

H_4 Individuals who strongly value self-enhancement and conservation are the least likely to be pro-environmental.

Whilst Karp's hypotheses are useful to indicate pro-environmental behaviour, opinions vary about how values inform behaviour. Some argue values predict attitudes and behaviour preferences (Steg, Perlaviciute, van der Werff, & Lurvink, 2014), and others that values are not always predictive of behaviour as situations can cause value conflicts to arise (Dreezens, Martijn, Tenbült, Kok, & de Vries, 2008). Value orientations can indicate pro-environmental behaviour, for example, a biospheric value orientation is more predictive of pro-environmental behaviour than altruistic and egoistic value orientations, but, all values are subject to a range of self-determined motivational 'types' ranging from amotivation (lacking motivation) to intrinsic motivation (De Groot & Steg, 2010). An individual with a biospheric value orientation would not enact that value if they lacked motivation, or could not be enticed to act. Social psychologists have positioned values as central to goal framing theory. Whether pro-environmental behaviour occurs (or not), is directly related to the goal/s an individual pursues: hedonic goals seek to improve feelings in a particular situation; gain goals lead to improvement of status and resources; and normative goals prompt behaviour appropriate to a given situation (Steg, Bolderdijk, et al., 2014). It is apparent then, that this field is somewhat contested. In this research, values indicating behaviour orientations are analysed following Karp's hypotheses.

Environmental attitudes.

Defining environmental attitudes is difficult (Cheng & Monroe, 2012), but it is generally understood that affect (emotions and feelings) is important to environmental stewardship (Pooley & O'Connor, 2000). Values are seen as general in nature and attitudes are seen as more specific and directed at an object/s. Opinions and beliefs which inform attitudes are driven by the emotion that an individual attaches to their opinions and beliefs (Heberlein, 2012). In *Navigating Environmental Attitudes*, Heberlein argues: attitudes tend towards consistency but are not necessarily consistent, attitudes formed by direct experience tend to have greater stability but direct experience can change them, and attitudes tied to an identity tend to be more emotional and difficult to change, but they do change when an individual's sense of identity changes (2012). Understanding how attitudes are formed and how they can be changed to better educate for responsible care of the environment is seen as crucial to achieving effective environmental education outcomes (Collado & Corraliza, 2013). In Bolderdijk, Gorsira, Keizer and Steg's research, pro-environmental behaviour is influenced *'when recipients value environmental quality'* (2013, p. 2, italics original). Creating new attitudes by developing a connection and learning how to value an environment is related to positive change (Heberlein, 2012). Experiences can create new attitudes deploying affective elements such as emotional affinity, empathy and sympathy, enjoyment of and interest in the natural environment and emotional attachment, connection and a sense of inclusion (Cheng & Monroe, 2012; Collado & Corraliza, 2013; Gillett, Thomas, Skok, & McLaughlin, 1991).

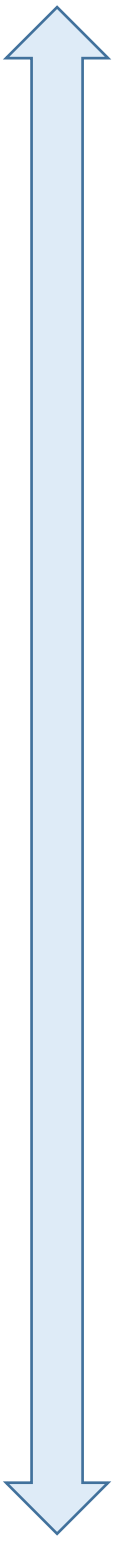
To understand student environmental attitudes, a shortened version of the Environmental Attitude Inventory was used for Section II of the online survey (Milfont & Duckitt, 2010). This is explained further in Chapter 3. Findings about the environmental attitudes of students in the Wet Tropics were comparatively analysed with New Zealand university students (Milfont & Duckitt, 2010) and discussed in Chapter 4.

Environmental ethics.

An ethic is defined as a set of moral principles (Oxford on-line dictionary, 2016). Environmental ethics are defined as being 'concerned with the fundamental basis of humanity's relationship with, and moral obligations to, the earth community' (Martin & Beatley, 1993, p. 117). Environmental ethics, a subfield of philosophy, emerged in the early 1970s in response to the growing environmental consciousness and social movements of the 1960s (McShane, 2009). Environmental ethicists formulate ethical theories about human moral obligations to the non-human, 'natural' world contrasting the interrelatedness of ecological, social, political and economic justice (Martin & Beatley, 1993). Arguing the original world has value independent of humans, an ethic *of* the environment rather than an ethic *for the use of* the environment is necessary (Regan, 1981; cited in McShane, 2009, p. 408). Older, western environmentally based ethical theories were of anthropocentric construction and assumed that human beings and/or their interests were morally more important than anything else (McShane, 2009). Today, environmental ethics embrace many philosophical viewpoints from an anthropocentric to an earth centred worldview (see Table 3). Knapp (1999) proposes that most people fit in the middle of the continuum with philosophies shifting according to situations and/or conditions, and developing and living by an environmental ethic is a lifelong endeavour.

Table 3: A Continuum of Environmental Ethic Types

Source: Knapp (1999), author modified



Anthropocentric Worldview

WILD USE MOVEMENT

Wise use, philosophy promoted by Gifford Pinchot (1865-1946), the founder of professional forestry in the US. Access to all natural areas. Private property rights should take priority over public property rights.

SOCIAL ECOLOGY AND JUSTICE

Acknowledge ecological crises threatening the survival on life on Earth. Redesign social and political systems to lessen impact on the socially constructed idea of nature. Murray Bookchin.

ECOFEMINISM

Address the unequal status and oppression of women to understand better how patriarchal societies have treated nature in similar ways. Jim Cheney, Elizabeth Dodson Gray, Susan Griffin and others.

STEWARDSHIP / CONSERVATION / ECOMANAGEMENT

Responsibility for protecting ecosystems and their inhabitants - managed for society's benefit. Use resources for the greatest good, to benefit the greatest number for the longest period of time. Dominant view in Western culture, management abilities contested.

ECOLOGICAL CONSCIENCE OR LAND AS COMMUNITY

Develop an ethic of respect and love, in caring for natural communities. Aldo Leopold and others.

REVERENCE FOR LIFE

Treat all organisms with deep respect, compensate (in some way) for the loss of life. Albert Schweitzer and others.

DEEP ECOLOGY / BIOREGIONALISM / ECOSOPHY / ENVIRONMENTAL EDUCATION PHILOSOPHY / BIOPHILLIA

Live simply to have minimal impact on fellow Earth dwellers (which have value apart from their use by people) because all the planet's inhabitants deserve to reach self-realisation. Arne Naess with historical foundation provided by Henry Thoreau, John Muir, Theodore Roszak, Lewis Mumford and others.

TRADITONAL OR INDIGENOUS

Live in harmony and reciprocity with other sacred inhabitants of this nurturing and life giving Mother Earth.

ANIMAL WELFARE / RIGHTS

No harm to animals capable of feeling pain by performing experiments, killing for sport, or raising for food. Treat animals with the same rights as humans. Peter Singer, Tom Regan and others.

RADICAL ECOACTIVISM

If necessary, use extreme measures, which do not injure other humans, to prevent individuals from harming nature, even if the tactics are illegal. Greenpeace, Sea Shepherd Society, Earth Liberation Front and others.

Earth Centred Worldview

Environmental ethical ideologies encompass a broad spectrum of ethical viewpoints and are contested and the centre of lively debate. This research explores the development of an ethic of care for the environment in formal education, not the development of an environmental ethic, as ethical choices are many and varied and express an individual's fundamental right.

From pro-environmental behaviour to environmental stewardship behaviour.

Pro-environmental behaviour is defined as 'behaviour that harms the environment as little as possible or even benefits the environment' and promotes environmental sustainability (Steg & Vlek, 2009, p. 309). Environmental degradation results from a lack of pro-environmental behaviour (Hinds & Sparks, 2008; Ramkissoon, Weiler, & Smith, 2012). The ecological crises of the Anthropocene reflects an internal crises of values that prioritise maximising economic growth, pursuing self-interested desires and high levels of consumption to develop humanity's home, over and above values that prioritise pro-environmental behaviour, resulting in great damage to humanity's home (Kasser, 2009). Pro-environmental behaviour is informed by a suite (or continuum) of intertwined values and attitudes that change in priority according to circumstances. Researching how development of pro-environmental behaviour occurs is complex and researchers are striving to understand the relationship between environmental values, attitudes and pro-environmental behaviour (Halpenny, 2010; Kollmuss & Agyeman, 2002; Ramkissoon et al., 2012). Yet, some social psychologists see the challenge to fostering pro-environmental behaviour as a simple four step process: identify the behaviour to be changed; examine the underlying factors; apply interventions; and evaluate interventions (Steg & Vlek, 2009). Given that self-determined individuals are more motivated to engage in pro-environmental behaviour than individuals who rely on external regulation, one approach could be to foster intrinsic motivation for self-determination to develop capacity for pro-environmental behaviour (Cooke, Fielding, & Louis, 2015). A focus on environmental stewardship principles is an alternative approach.

I argue that environmental stewardship behaviour differs from pro-environmental behaviour because stewardship explicitly embeds an ethic of care founded on feelings of connectedness with the natural environment and a systems thinking worldview. For example, participating in a Clean Up Australia Day program (http://www.cleanupaustraliaday.org.au/) can be identified as pro-environmental behaviour because particular value orientations and validations are in place on that day. Such participation can also be viewed as environmental stewardship behaviour if the individual values a litter free environment and cares about environmental quality enough to act on their care ethic. To sum, environmental information influences pro-environmental behaviour '*when recipients value environmental quality*' and how people act on their environmental knowledge hinges on whether they care about the natural environment and environmental quality (Bolderdijk et al., 2013, p. 2, italics original). In this research, emphasis is placed on understanding if, and how, Gen Z (in Year 10) value environmental quality. Here, pro-environmental behaviour is considered a subset of environmental stewardship behaviour.

Environmental Stewardship in Education

To achieve a more global perspective about educating for environmental stewardship, it was important to understand what occurs in education systems in other countries with a similar societal organisation based on democratic principles. Discussed in the following sections is a brief account of the inclusion of environmental stewardship in environmental education (EE), education for sustainable development (ESD) and education for sustainability (EfS) in Australia and in education systems in Canada, New Zealand and Scotland. Canada and New Zealand were chosen because of their similar histories of colonisation to Australia. Scotland was chosen because of its world leading initiatives in education for environmental stewardship and evidence for a grass roots effort in a 'bottom up approach' to elicit change within a national education system.

Environmental stewardship in Australian education.

At the Australian Academy of Sciences conference – *Education and the Environment Crises*, in 1970, the conference chair, Sir Otto Frankel, communicated the urgent nature of environmental problems

and proposed that a fuller understanding of the biosphere, new values and new perceptions of humanity's role and responsibilities were needed (Australian Academy of Science, 1970). This conference was the first formal recognition of education's place in creating 'an environmentally responsible society' (Gough, 2004, p. 215). Environmental education did not fit easily within formal curriculum (and still does not) due to its interdisciplinary nature and complex values (Gough, 2004). Over subsequent decades, Australia experienced haphazard environmental education curriculum development and delivery, documented in *The Australianness of Curriculum Jigsaws: Where Does Environmental Education Fit?* (Gough, 2011). The development of environmental stewardship has been equally haphazard.

Between 1999 and 2005, environmental stewardship received some prioritisation in Australian Government education policy. In the First National Action Plan, *Environmental Education for a Sustainable Future* (2000), goal 1.7 states 'when students leave school they should have an understanding of and concern for **stewardship** of the natural environment and the knowledge and skills to contribute to ecologically sustainable development' (Commonwealth of Australia, 2000, p. 6). This focus was short lived. Collaboration with the UN to officially launch the UNDESD in Australia resulted in a shift in focus to education for sustainable development, known as education for sustainability in Australia. Notable milestones are: establishment in 2003 of the Australian Research Institute in Education for Sustainability (ARIES), and in 2004, the Australian Sustainable Schools Initiative (AuSSI). By 2012, the first iteration of the new Australian Curriculum was ready with sustainability education presented as a cross curriculum priority to be infused into learning from Kindergarten to Year 12 at the discretion of individual teachers and/or schools. Appendix B provides a brief summary of international and domestic events influencing the development of education for the environment in Australia.

At the Ministers of Education of the Australian States and Territories 2003 Ministerial Council meeting (MCEETYA), valuing the natural environment and learning how to value it was not recognised as

important. Nine value sets were developed following discussions at MCEETYA. These value sets are to be fostered in Australian schools and are considered consistent with Australian democratic values. The 2004 National Framework for Values Education in Australian Schools (NFVE) became the guiding document (de Leo, 2012). The nine value sets are listed in Appendix C. Notable, is that taking care of the environment is only one aspect of responsibility. The values are divided into 11 domains to facilitate curricula integration (de Leo, 2012). The domains are listed in Appendix D. Notable again, is that there is no domain for the environment. It can be presumed that no priority was given to developing values to care for the environment.

International expressions of environmental stewardship principles in education.

Presented here is a summary of environmental education initiatives that develop environmental stewardship principles and behaviours in Canada, New Zealand and Scotland.

Canada.

In Canada, education is the responsibility of the ten provinces and three territories all of which have goals relating to environmental education but lack a coordinated approach to the development and advancement of environmental education (Canadian Environmental Grantmakers' Network, 2006). Five provinces/territories have sustainability specific curriculum documents with two featuring environmental stewardship goals – Ontario (Ontario Ministry of Education, 2009) and in Nunavut territory in the Yukon (McGregor, 2012). In Nunavut territory, students are expected to develop *'Avatimik Kamattiarniq'* [the concept of environmental stewardship] as environmental stewardship competency fostered through understanding mutually interdependent relationships embedded in an Inuit Education Framework (McGregor, 2012). In Alberta province, the fifth student value in the curriculum framework is 'Innovation and Stewardship….by taking personal and collective responsibility for the public good and to improve community, foster environmental stewardship and ensure a sustainable world with a hopeful future' (Alberta Education, 2016, p. 3). A review of education for sustainable development in four provinces/territories – Manitoba, Nunavut, Newfoundland and Labrador and Ontario – revealed differing priorities for sustainability (Nazir,

Pedretti, Wallace, Montemurro, & Inwood, 2011). Environmental stewardship is embedded in a socio-cultural concept of sustainability in Nunavut and Ontario. In Newfoundland and Labrador, the emphasis is on climate change education (CCE) through education for sustainable development in a cross-curricula approach. In Manitoba, there is a paradox between government planning and policy for education for sustainable development and a lack of consistent classroom practice (Nazir et al., 2011). Despite the uptake of education for sustainable development across Canada there are tensions around curriculum fit, the transition of education for sustainable development to environmental education emphasising development over environment, and gaps in policy, research and practice (Nazir et al., 2011). Overall, there are programs that promote environmental stewardship in environmental studies across Canada, despite a reversion to a more traditional educational ideology with scripted instruction, crowded curriculum and time constraints for teachers (Breunig, Murtell, Russell, & Howard, 2014; Cirkony, 2015; Upitis, Hughes, & Peterson, 2013).

New Zealand.

New Zealand, like Canada and Australia, has experienced changing priorities and funding for environmental and sustainability education due to changing governments, different political ideologies and policies. Even though there is a national curriculum for New Zealand, the implementation of EE/EfS/ESD varies considerably across primary, secondary and tertiary education institutions (Williams, 2012). Environmental stewardship principles emerge in the Enviroschools program established in 1993 by a regional city council in response to Agenda 21 from the Earth Summit in Rio de Janeiro (Williams, 2012). The aim of Enviroschools is to foster a generation of people who instinctively think and act sustainably, where people connect to each other, connect to their cultural identity and to their land, and where people care for each other and the environment (Enviroschools, n.d.). The Enviroschools' program is based on learner centred pedagogies, a whole school approach, and interaction with the wider community, and there are 1,026 participant schools and early learning centres across New Zealand (Enviroschools, n.d.). There are approximately 7,000 schools in New Zealand (https://www.educationcounts.govt.nz/data-services/directories/list-of-nz-schools) and

4,500 early childhood centres (https://www.educationcounts.govt.nz/data-services/directories/early-childhood-services). This equates to just under one-tenth of students in formal education receiving education for environmental stewardship principles through Enviroschools programs. It was outside the parameters of this research to consider what learning for environmental stewardship was occurring in the majority remaining schools.

Scotland.

Scotland is a world leader in environmental education and for the advocacy of environmental stewardship principles and behaviour. Strong leadership was provided over many decades by Professor John Smyth, who has made many contributions to the national and international acceptance of environmental education, including co-authorship of Chapter 36 in Agenda 21 for the UNCED (Smyth, 1995; The Herald Scotland, 2005). In 1990, a cross-sectorial working group was commissioned to write a national strategy for environmental education and training for Scotland. The report states:

> Environmental education is thus concerned with the whole environment, spatial, social and temporal, built and unbuilt, political, economic and cultural, and not just with some green abstraction from it. Education is a way of informing and guiding the development of behaviour towards a more caring approach. The Group was influenced by the 'Principles for Sustainable Living' which form the framework of IUCN's *Caring for the Earth* (1991). It saw the need to ensure that people have the chance to develop enough knowledge and understanding, skills and commitment to allow them to guide their own behaviour towards the environment in the responsible way required by these principles (Smyth, 1996, p. 29).

Scotland's (long term) holistic caring approach was critical to key change events between 1996 and 2013, and a catalyst for advancing legislation that learning for sustainability and outdoor learning is the legal entitlement of every student. Instrumental to the passage of legislation were outcomes from the *Natural Change Project,* designed to innovate sustainability leadership founded on caring values. The *Natural Change Project*, developed in conjunction with the *World Wide Fund for Nature Scotland* (WWF), emerged from eco-psychology theory recognising that 'to achieve long-term, deep-seated change, facilitators need to work with personal and cultural psychology' (Key, cited in Harrison, 2009, p. 15). Key research outcomes had revealed that WWF public education campaigns were counter-

productive and did not necessarily facilitate behaviour change because they reinforced consumerist (and other) values (Harrison, 2009). Coordinators of the *Natural Change Project* recognised that changes in values and attitudes were necessary, and so, organised workshop activities to explore new actions, values and identities, time for reflection on how ideas of self and the world had changed, and understanding of the wider changes occurring across Scottish society. The *Natural Change Project* coordinators invited participants influential in Scottish business, charitable, arts, public, health and education sectors, to attend workshops between autumn 2008 and spring 2009 (Harrison, 2009).

The *Natural Change Project* works on three interconnected levels – personal, cultural and structural. At the personal level, the Project offers participants experiences that generate new perspectives of self and the world. At the cultural level, the Project presents exercises that question the cultural norms that reinforce an ecologically unsustainable society. On the structural level, the Project provides motivation to create policies that benefit a sustainable human society and the natural world (Kerr & Key, 2013). Outcomes from the report titled *Natural Change – Psychology and Sustainability* (Harrison, 2009) include: 'participants developed a conceptual understanding of ecological and social systems which helped them grasp the interconnection of current global challenges' (p. 28) and, participants 'acknowledge the importance of time spent in natural surroundings' (p. 29) and, 'the Project was extremely successful in causing a group of 'light green' individuals to think deeply about sustainability and to communicate their thoughts widely through their social and professional networks....in a way that more traditional environmental 'campaigns' have not (p. 27).

As a consequence of these experiences of connecting and reflecting, workshop participants have been successful in instigating changes in legislation, local sustainability initiatives and education, including learning for sustainability in the primary, secondary, tertiary and adult education sectors (Kerr & Key, 2013). The *One Planet Schools* working group was established in November 2011 by the Scottish Government Minister for Learning, Science and Scotland's Languages, to make recommendations on how learning for sustainability could be embedded in the curriculum, campus, culture and community

of every Scottish school. *The Learning for Sustainability Report 2012* produced by the *One Planet Schools* working group, recommended that Learning for Sustainability and outdoor learning should be a legal entitlement of every student. During 2012, the General Teaching Council Scotland (GTCS) began revising the Professional Standards for teachers 'to put sustainability at the heart [of the Standards], not as a subject but as a way of being' (Murray, cited in Kerr & Key, 2013, p. 7). Murray has also instigated a *Common Cause* values workshop for the entire workforce of GTCS to 'shift culture' at the professional level for teachers. Essentially, these multiple cross–sectorial changes occurred because of a program that focused on building affinity and connection with the natural environment and developing caring values and attitudes.

Environmental Stewardship and Australian Teachers

There is no (known) literature addressing teaching for environmental stewardship in Australia. Sustainability education in Australia may be a conduit for education for environmental stewardship principles, but teaching about and for sustainability in Australia is constrained by many things. Barriers include a lack of pre- and in-service teacher training, preparedness and confidence to engage with the Sustainability Cross Curriculum Priority in the Australia Curriculum, and time constraints imposed by a content heavy curriculum utilising evidence based testing to achieve statistical outcomes – particularly for numeracy and literacy (AESA, 2014). In the Australian Education for Sustainability Alliance independent report, only two percent of teachers were engaged in educating for sustainability in their classrooms and 80% of teachers were either unaware of sustainability education or did not understand what it is. This lack of awareness may be related to dominant anthropocentric worldviews held by teachers (Quinn, Castéra, & Clément, 2016) or, as indicated in a study with pre-service teachers, unfamiliarity with the concept of educating for sustainability as professional practice (Hickey, Whitehouse, & Evans, 2010). Despite the guidance provided by well-developed policy frameworks for implementing education for sustainability, what 'teachers know, think and believe directly affects classroom content and pedagogy' (Evans, Whitehouse, & Hickey, 2012, p. 3). Preparing sustainability literate teachers is seen as crucial to remedying this situation (Ferreira, Ryan, Davis,

Cavanagh, & Thomas, 2009; Nolet, 2009). Importantly, across Australia there are many individual efforts from committed teachers and schools engaged in education for sustainability (Evans, Whitehouse, & Gooch, 2012; Green & Somerville, 2015). No (known) research exists about whether these individual efforts to teach sustainability include environmental stewardship.

Ideologies and Adolescent Identity in the Anthropocene – Gen Z Today

In a culture dominated by neoliberalism, the grand narrative can be summed as 'people are competitive beings focused on their own profit….which benefits society as a whole' growing a 'single, free market unhampered by government intervention' in which 'everyone is responsible for their own success or failure' (Verhaeghe, 2014, p. 112). Verhaeghe, a Belgian Professor of Psychoanalysis, argues that the globalised economy is no longer embedded in religious, ethical and social structures and those structures have become subservient to the marketplace. The consequences are a neoliberal meritocracy where people are privileged by (inherited) capital and qualifications that are financially expensive and often physically difficult to obtain. Health care and education have become the prerogative of those who can pay creating a new 'static' society where the middle class is disappearing making way for a small group at the top and a huge underclass (Verhaeghe, 2014). Neoliberalism promotes inequality, a lack of opportunity, a decline in motivation to work and mistrust, which is a momentous waste of talent (Stiglitz 2013; Stiglitz & Bilmes, 2012). In nations that aggressively espouse neoliberal values of hierarchy and mastery, children's well-being is lower than in nations that promote values of egalitarianism and harmony (Kasser, 2011). What does this mean for Gen Z, the 15 year olds in this study? Not only will they inherit a world disrupted by rapid environmental change but they will also inherit a society that prioritises a wealthy minority at the expense of the majority, as capital is transferred away from social infrastructure in a cultural climate not conducive to promoting well-being (Pett, 2016). This is contrary to the basic premise of environmental stewardship, posited here as necessary to shape the identities of the first adults of the Anthropocene, as they live with unknown and unexpected perturbations in the Earth System.

A neoliberal culture is structured around the entrepreneurship of individual citizens who must strategize for their well-being in every aspect of life and take responsibility for the consequences of their actions (Dimick, 2015; Hursh et al., 2015). This worldview is in direct opposition to individuals identifying as citizens of a global community working in unison for a common cause (Dimick, 2015). Dimick contends that a neoliberal ideology seeks to untether the state from its responsibility to regulate and protect the common good and to privatise responsibility for the environmental commons through the lifestyle choices that individual citizens make (2015). Neoliberalism consistently fails to properly regulate and protect the commons (including the biodiversity and climate commons) resulting in a 'variability in individuals' environmentally sustainable activities [which] creates a vacuum of responsibility for the environmental commons' (Dimick, 2015, p. 395). An 'individual view' of the world may explain the disconnect and hopelessness that young people can experience with respect to environmental responsibility and action (Wilks & Harris, 2016). One answer to this is teaching youth to become 'solutionaries' in a neoliberal climate (Smith, 2015). Another, is to develop understanding about the interconnected role that each person plays in the built and natural environment (Davis et al., 2009).

The "I" culture – narcissism and celebrity obsession.

Environmental stewardship is probably more difficult for Gen Z in a neoliberal culture. The dominant ideology of individualism and competitiveness works against the philosophy underpinning environmental stewardship – collaboration for collective good through care for the natural environment. Verhaeghe (2014) argues identity <u>is</u> ideology and adolescent identity has been 'incorporated' by the global market economy into consumer culture, and one of the consequences of the commercialisation of adolescence is narcissism. As Wearing, McDonald and Wearing state:

> The producer society and the demise of its associated institutions (e.g. family, community, religious observances, job security, trade unions, etc.) has been replaced by a consumer society that has altered the experience of self-identity, so that life choices, images, symbols and lifestyles are filtered through abstract systems and commodification. This allows the market, through highly targeted forms of marketing, media and advertising, to create a desire for expressive

> individualism, norm violations, rebelliousness, celebrity, wealth and beauty. The result is a narcissistic self-identity, constructed via the manipulation of the signs and symbols of consumer culture, which is offered as a form of self-actualisation and a defence against the ontological insecurity characteristic of post-traditional society (2013, p. 368).

In *Celebrity and Entertainment Obsession: Understanding Our Addiction,* Michael Levy describes western culture as being 'hijacked' by the celebrity and entertainment industry (2015). In a 2006 survey, 51% of 18-25 year olds listed fame as an important goal (Manne, 2014). A 2012 study finds fame the number one value in 10-12 year olds (Uhls & Greenfield, 2012). The culture of narcissism is implicit in celebrity obsession, and individuals become less empathetic, more ruthless, less kind and more competitive (Manne, 2014). To quote, 'narcissism provide[s] a benefit to the self but at a long-term cost to other individuals and to the commons' (Campbell, Bush, Brunell, & Shelton, 2005, p. 1358) and leads to a worsening of environmental attitudes (Manne, 2014).

A narrow and self-focusing narcissistic identity can be considered as oppositional to an identity embracing environmental stewardship. If an ecological identity is a sense of self in relation to the natural environment (Thomashow, 1996) then developing environmental stewardship principles in a market driven culture becomes problematic. How will or does Gen Z have the opportunity to form an ecological identity when neoliberal worldviews are widespread across all tiers of society (Crompton & Kasser, 2009)? In the *World Wide Fund for Nature* publication *Meeting environmental challenges: The role of human identity*, Crompton and Kasser outline how campaigns to create pro-environmental behaviour must address 'environmentally problematic aspects of identity' (2009). Communication strategies are failing to create the level of change needed to address the 'epochal scale of today's environmental challenges' (Crompton & Kasser, 2009). The environment movement is complicit in deploying discourses of neoliberalism, evident in phrases such as 'the business case for sustainable development' and 'payment for environmental services' which reinforce materialist values (Crompton & Kasser, 2009; Noddings, 2010b). This WWF publication proposes that environmental organisations promote 'identity campaigning' and take responsibility for how they model materialistic values, particularly in sales and marketing promotions. Compton and Kasser argue for strategies to help

people cope with the insecurity that leads to materialism and they suggest that programs promote intrinsic, self-transcendent values for personal growth and pro-environmental behaviour (2009).

Invisible nature.

People living the western lifestyle are encouraged to be perceptually disassociated from the natural environment because life is lived and shared through 'radically elongated material and informational networks' (Worthy, 2013, p. 33). Clean water arrives at the turn of a tap after travelling through many kilometres of pipeline, food is transported across continents and flown across oceans and delivered to the local community, sewerage waste disappears through kilometres of pipelines to treatment facilities, e-waste disappears to developing countries for recycling and landfill, information arrives via satellites to internet connected devices, products are delivered to the door after being ordered on-line and the power to control home and work place climates, arrives from long range gas and electrical networks (Worthy, 2013). A lifestyle of convenience means individuals have little need to understand how the natural environment works or what basic materials are used to manufacture the multiple products they use. 'Nature' becomes invisible, with the exception of the weather (Worthy, 2013). This 'invisibility' of nature likely contributes to ecophobia and post-ecolgoism, though this area needs further research.

Ecophobia, post-ecologism and climate anxiety.

Ecophobia is 'the fear of ecological problems and the natural world' and it occurs when society asks children to prematurely respond to ecological problems which are beyond their understanding and control (Sobel, 1996, p. 5). Studies show learning about environmental devastation can create ecophobia and non-connectedness in children (Sobel, 2005; Strife, 2010, 2012). Sobel wrote in 1996 that he feared that education about environmental problems would not necessarily lead to environmental awareness and action, and that such knowledge can engender a subtle form of dissociation not too dissimilar to strategies employed for distancing oneself from pain, an example being, learnt strategies to disconnect from the pain from physical or sexual abuse. In an uncanny way, Sobel's fear of 'a subtle form of dissociation' in 1996 pre-empted Zeyer and Kelsey's 2013 research

outcomes that identified an apathetic dissociation from the natural environment in adolescents, which they named the post-ecologism life-world culture of western youth.

Post-ecologism is a term applied to individuals who understand on face value, that the status quo is unsustainable but put forward many reservations and doubts that sustainable change will occur (Zeyer & Kelsey, 2013). In a life-world culture of post-ecologism an individual displays apathy about their ability to influence environmental conditions, they offer a rhetoric of othering – 'the others' lacked care for environmental issues, they believe that technology will fix environmental problems, they are committed to consumerism and dislike nongovernmental actors and green politics (Zeyer & Kelsey, 2013). This study found that students' post-ecologism views clashed with the school culture of environmental education offered in Swiss high schools. Zeyer and Kelsey's response was to embed new value orientations and for teachers to become 'cultural-brokers' to effect change by 'bridging, enlinking, or mediating' between students' post-ecolgoism and the dominant school culture of environmental education (2013, p. 211). The suggestions that Zeyer and Kelsey make for teachers to develop sophisticated communication and negotiation skills are relevant, however, it is argued that the profile of post-ecologism describes a very narrow range of care – for consumer products and self.

Contemporary discourse on climate catastrophe and uncertainty taps into climate anxiety and deeper human anxieties about the future (Asah, Bengston, & Westphal, 2012). Throughout the ages humanity has engaged in a discourse of fear about the climate. Hulme (2008) has divided this discourse into three main trends: climate as judgement - the wrath or favour of the Gods; climate as pathology – unknown places and unknown climates, for example, the newness of tropical climates encountered by Victorian scientists; and, in the modern context – climate as catastrophe, fear of an unknown future. Overcoming climate fears requires education to develop understanding about what role human intervention and technology can play for mitigation and adaption (Hulme, 2008).

Humanity has no history on how to navigate the Anthropocene. Never before has humanity disrupted the climate system, never before has there been such large scale global environmental injustice, and

as a consequence of these disruptions, humanity faces a possible global economic system crash (Gilding, 2011; Tedeschi et al., 2013). All of the eight millennium development goals are threatened by climate change (Tedeschi et al., 2013). Gilding writes, 'we are heading for a social and economic hurricane that will cause great damage, sweep away much of our current economy and our assumptions about the future, and cause a great crisis that will impact the whole world' (2011, p. 5). Do we dismiss these authors as doomsayers? Or, do we listen and plan for contingencies?

Sobel argues, 'We can cure the malaise of ecophobia with ecophilia [biophilia] – supporting children's biological tendency to bond with the natural world' (1996, p. 6). He emphatically states 'What's important is that children have an opportunity to bond with the natural world, to learn to love it, before being asked to heal its wounds' (1996, p. 9).

Hope.

Optimism and hope are foundational to a positive future outlook (Morton, Rabinovich, Marshall, & Bretschneider, 2011; Ojala, 2012a, 2012b, 2015; Wilks & Harris, 2016). Hopelessness about the future of the natural world is rife. Scientists, academics, educators and students respond to the severity of environmental degradation with terms like 'environmental grief', 'solastalgia' – homesickness felt for an environmentally damaged planet, 'culture of hopelessness' and 'ecophobia' (Kelsey & Armstrong, 2012).

Environmental stewardship education seeks to develop hope. Purposely engendering constructive hope about environmental challenges in teaching and learning is paramount. In formal education this can occur through avoidance of 'doom and gloom' narratives, listening to students express their feelings, encouraging creative and reflective responses, encouraging critical thinking, and spending time outdoors in the natural environment to foster wonder and appreciation (Kelsey & Armstrong, 2012). It is important to frame environmental issues in positive language to build response efficacy for adaptive action (Morton et al., 2011). Fostering a sense of hope does encourage pro-environmental

behaviour and restores faith in collective action (Ojala, 2012a; Wilks & Harris, 2016). Building constructive hope based on agency and trust in other actors and avoiding negativity when seeking solutions to global environmental problems, are key to engaging youth in hopeful, pro-environmental behaviour (Ojala, 2012a, 2013, 2015).

Conclusion

This chapter reviewed literature to build a meta-narrative to provide the context for this research. It began by defining the terms used in multiple disciplines that indicate environmental stewardship principles and behaviour and the expression of these in environmental education, education for sustainability and education for sustainable development. Then, research and theories that incorporate environmental stewardship principles in biophilia, ecological identity, well-being and eco-wellness were discussed followed by an examination of some of the frameworks and pedagogies supportive of environmental stewardship. Explored next were environmental values, attitudes and ethics and their role in promoting pro-environmental behaviour, and the difference between pro-environmental behaviour and environmental stewardship behaviour. How environmental stewardship principles are expressed in education in Australia, Canada, New Zealand and Scotland, was explored briefly, as was the role Australian teachers play in developing environmental stewardship principles. Lastly, the neoliberal culture of self-focus, narcissism and celebrity obsession and the impact on identity formation in Gen Z, the obscuration of the natural environment by modern lifestyle, and the subsequent disassociation with the natural environment were examined. The chapter concluded with the importance of developing hope.

Chapter Three – Research Methodology

Preface

This chapter begins with an explanation of the philosophical worldview which informs the structure, approach and design of this research. Then, an overview of the research methodology and a description of the research sites, participants, recruitment procedures and ethics approvals are provided. The three phases of data collection are outlined next, followed by the five stages of analysis. Lastly, the procedures for data validation and triangulation are described.

Research Approach and Design

An important first step is to reflect upon, acknowledge and state the standpoint or perspective adopted within this research paradigm from an ontological and epistemological perspective (Clark, 2011). However, it is difficult to articulate this standpoint as it is based on feelings of connection and embodiment with the natural world, akin to 'a constant communion between ourselves and the living world that encompasses us' (Abram, 1985, p. 4). One way to describe this communion is as a 'knowingness', foundational to a deep appreciation and respect for the provision of earthly life in all its variety and magnificence. I describe this 'knowingness' as being cultivated by life's formal and informal learning experiences, leading to the establishment of an appreciative bond with the natural world. Key to development of an affinity with the more-than-human world for me was a childhood replete with parental mentoring on respect and appreciation, whilst enjoying direct experiences in a variety of natural environments, from remote western desserts to dry and lush coastal settings. The effect, framed in the terms of this research, has been opportunities to develop innate biophilic values (Kellert, 2012a), development of an eco-identity (Thomashow, 1996) and environmental stewardship action.

At the core of this research is a constructivist philosophy. Constructivism acknowledges that meaning is shaped by individual and group perspectives and analysed to form broad patterns and understandings or theories in answer to research question/s (Creswell & Plano Clark, 2007). The premise of this study is to understand phenomena about the educational constructs of environmental

stewardship to formulate meaning and understanding about formal state school education and the preparation of future citizens in far northern Queensland. Analysed data, together with understandings gleaned from current research and theories presented in the literature, construct a 'picture' of how appropriately (or not) education policy and practice respond to contemporary needs.

Education research uses data gathered through quantitative and qualitative inquiry to produce new knowledge about teaching and learning and the human and social phenomena of schooling. This study uses a mixed methods analysis where both quantitative and qualitative data were collected to 'construct a data set that more completely answers the research question' (Drew, Hardman, & Hosp, 2008, p. 21). Quantitative research methods collect data that is readily measurable in the form of numbers in either experimental conditions in an introduced or managed environment, or in nonexperimental conditions where data collection occurs within a familiar setting (Drew et al., 2008). Qualitative data collection involves observing, collecting, interpreting and describing, and usually occurs in the natural setting being studied (Drew et al., 2008). This study uses quantitative methods in a nonexperimental setting and qualitative methods in natural settings to explore and understand the expression of environmental stewardship capacity and action in federal and state government education policy documents, in current curricula, and in Year 10 students and teachers in five state schools in the Wet Tropics region of north eastern Australia.

This research follows an explanatory, sequential research design and uses a mixed methods approach (Creswell, 2012). In an explanatory, sequential research design, data gathered at each phase informs the development of subsequent data collection phases (Creswell, 2012). Generally, this occurs by firstly collecting quantitative data to explain the research problem in broad terms, then using qualitative data to refine, deepen, and if necessary, refocus the research question. As such, the research design 'unfolds' as collected data contributes to new understandings and affects how the topic is subsequently explored. An explanatory, sequential research design is well suited to examination of multilevel complex topics (Tashakkori & Teddie, 1998, cited in Creswell, 2012). The

'unfolding' nature of this research design enables a rich exploration of the complexities of environmental stewardship expression in teaching and learning. The design complemented the multilevel analysis processes undertaken to explore participants' stewardship values, attitudes, knowledge and action. There were three data collection phases interspersed with five data analysis stages. Table 4 presents an overview of the research design. The arrows indicate where data from one or more phases informed subsequent phases of data collection and analysis. In addition, the theoretical constructs informing each phase are listed. Directly following is a rationale for the research design and a brief synopsis of each of the three data collection methods and the five analysis processes.

Table 4: Environmental Stewardship Explanatory Sequential Research Design

Data Collection	Method	Data Analysis	Data Analysis Process	Theoretical Construct for analysis
Phase 1	Document collection	Stage 1	Quantitative	Bowen, 2009; Merriam, 2014 Krippendorff, 2013
Phase 2	Teacher and student on-line surveys	Stage 2	Quantitative and Qualitative	Schwartz, 2012 Milfont & Duckitt, 2010
Phase 3	Teacher and student interviews	Stage 3	Qualitative	Braun & Clark, 2006, 2012 Thomas, 2006
		Stage 4	Whole Data Set Inductive Comparative Analysis Mixed Method Analysis	Onwuegbuzie et al, 2007 Onwuegbuzie & Teddlie, 2010
		Stage 5	Whole Data Set Deductive Analysis Mixed Method Analysis	Onwuegbuzie et al, 2007 Onwuegbuzie & Teddlie, 2010

Data Collection and Analysis Overview

Federal and state government frameworks that frame or guide teaching and learning for sustainability were collected and quantitatively analysed to understand the historical context for environmental stewardship. These document studies informed the second phase of data collection, the online surveys, as indicated by the top curved arrow in Table 4. Next, data from online surveys with teachers and students were quantitatively and qualitatively analysed to inform the third phase of data collection, conversational interviews, as indicated by the bottom curved arrow. Then, interview data

– collected one-on-one with teachers and in small student groups – was analysed following a qualitative inductive analysis process. Finally, data collected from all three phases became the basis for the final two stages of analysis of the whole data set following mixed method analysis, indicated by the long arrow in Table 4. The three data collection phases and the first three stages of analysis are explained more fully in the following paragraphs, followed by an overview of the theoretical constructs informing the five stages of analysis. The last two stages of data analyses focus on analysis of the whole data set and are explained towards the end of this chapter.

Phase one of data collection involved gathering fourteen seminal Australian Government education policy documents in the form of frameworks and reports published between 1999 and 2012 (see Tables 7 and 8 located on subsequent pages), five Year 10 curricula documents in the Australian Curriculum (AC), the Sustainability Cross Curriculum Priority (SCCP) and the State of Queensland curriculum called Curriculum into the Classroom (C2C). In this chapter, the acronym SCCP is used for the Sustainability Cross Curriculum Priority and C2C is used for Curriculum into the Classroom. The policy documents (note, policy here is defined as *'a principle proposed by an organisation'* from http://www.oxforddictionaries.com/) were analysed to understand the level of priority given to environmental stewardship by both federal and state governments at the policy level. The object of analysing Year 10 curricula and the SCCP was to determine the level of environmental stewardship content included in current curriculum documents. The intent of the government documents and the expression of environmental stewardship in curricula were analysed for relationship linkages. Understandings from the document analysis informed the development of online survey instruments for Year 10 teachers and students, which marked the second phase of data collection.

The online surveys were designed to investigate several self-expressed variables: values, attitudes, knowledge, stewardship behaviour and motivation for pro-environmental behaviour and their relationship with environmental stewardship capacity and action. Quantitative analysis of the first section of the surveys provided data about basic values and value orientations related to pro-

environmental behaviour (Karp, 1996; Schwartz, 2012). Quantitative analysis of environmental attitudes depicted orientations to preservation or utilisation of the natural environment (Milfont & Duckitt, 2010). Quantitative analysis of environmental knowledge, capacity and action for environmental stewardship was gleaned through exploring relationships between values, attitudes and actions, and allowed comparisons between city suburban and rural schools and males and females in a formal teaching and learning context. The objectivity, generalisability and reliability of the data obtained from participants from Year 10 students in five schools and the statistical data analysis of relationships between variables, informed development of the next data collection instruments – the interview questions for Year 10 teachers and students.

The last phase of data collection was conversational interviews with Year 10 teachers and in-depth conversations with small groups of Year 10 students. These conversations explored participant values, beliefs, attitudes, feelings, knowledge and actions germane to environmental stewardship. The qualitative research methods of interview and discussion explored the subjective aspects of environmental stewardship and provided greater insight and depth into the human factors contributing to environmental stewardship capacity and action. Details of every phase of data collection are provided in subsequent sections of this chapter.

Analysis took place in five stages and followed nine theoretical constructs. Firstly, quantitative analysis of documents followed the methodologies of Bowen (2009), Merriam (2009) and Krippendorff (2013). Next, quantitative analysis of online surveys used statistical analysis in Excel and SPSS to understand values (Schwartz (2012), environmental attitudes (Milfont & Duckitt, 2010), and environmental stewardship knowledge and behaviour. In the third stage, qualitative inductive analysis of conversational interview transcripts followed Braun and Clarke (2006, 2014) and Thomas (2006). The final two stages of analysis were of the whole data set and followed mixed method analysis (MMA) or mixed analysis, a formal technique used when analysing both quantitative and qualitative data within the same framework, and followed Onwuegbuzie, Slate, Leech, and Collins (2007) and Tashakkori and

Teddlie (2010). Inductive comparative analysis of the whole data set was followed by deductive analysis to respond to research objectives and questions. Details of each stage of analysis are provided later in this chapter.

Research Sites, Participants, Procedures and Ethics

Research sites.

Schools were recruited following processes outlined by the Queensland Department of Education and Training (DET). Principals were contacted by letter first, followed by an email to invite their school to participate and to request an appointment to explain the research. At the meeting with each principal/deputy principal and any teachers they had invited, the project and data collection methods were explained, research information sheets were provided and agreement to participate was secured. Next, a time to meet students was organised via email with each teacher. At these meetings the research project, the online survey and the format of the small group conversations were explained to each class. Teachers were present at these meetings and given the appropriate documents so they could organise student volunteers and obtain written permission for the interview conversations from parents or caregivers. At this time, a day and time was also agreed upon for the class to complete the online survey. Dates and times for interviews were organised with teachers via email after the online surveys were completed.

Five state high schools participated in this research including three suburban schools from Cairns, a school from a small semi-rural town 25 kilometres south of Cairns and one from a small rural town 50 kilometres west of Cairns. The study region is shown on the map below (see Figure 8). Schools have been given a pseudonym to maintain confidentiality and named City Suburban School A, B and C, and Rural School A and B. The three Cairns' schools are situated in very different locations and have unique foci and student cohorts. Both rural schools are located in unique agricultural communities. The profile, unique character of each school and the demographics of the feeder suburbs and regions are discussed below (Qpzm, 2016). School catchment maps were identified on the EdMap site hosted by the Department of Education and Training (Queensland Government, 2016a). Values from the Index

of Community Socio-Educational Advantage (ICSEA) are included in school profiles. ICSEA is a benchmark value system created by The Australian Curriculum, Assessment and Reporting Authority (ACARA) to indicate the 'average level of educational advantage of the school's student population' (ACARA, 2014). Values are determined by parent occupation and education, the school's geographical location and the proportion of Indigenous students attending the school (ACARA, 2014). The benchmark is set at an average of 1000 with values below 1000 indicating a lower level of educational advantage and those above 1000 indicating educational advantage (ACARA, 2011). ICSEA values for all schools were retrieved from http://www.ksouhouse.com/topschool.php?type=3&sta=qld.

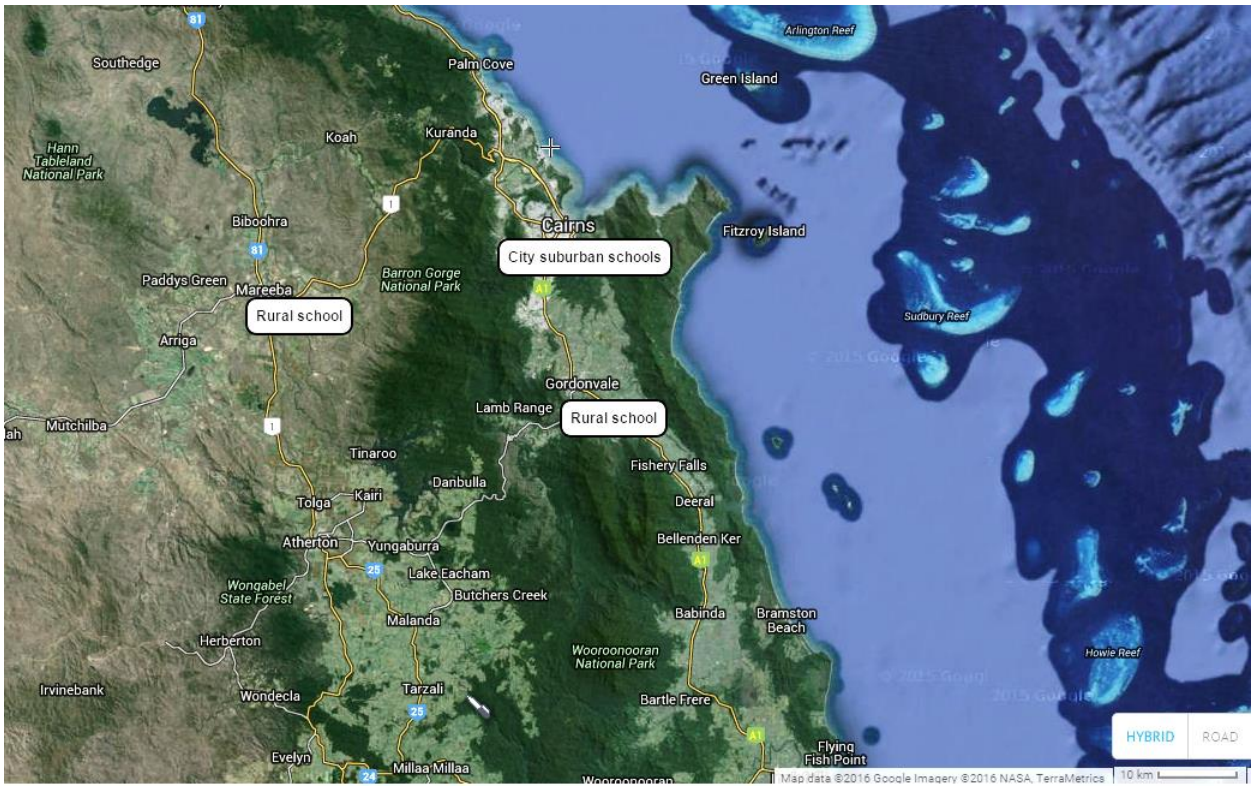


Figure 8: Research sites in the Wet Tropics Australia

Source: https://www.scribblemaps.com/create/#lat=-16.834775542011233&lng=145.7501220703125&z=10&t=hybrid

City Suburban School A has an ICSEA value of 1018 and is a P-12 school with more than 1700 students enrolled over two campuses. The junior school (P-6) was established in 1932 and the secondary campus (7-12) was added in 2007. The school sits in picturesque mountainous surroundings adjacent to a national park some 10 kilometres from the city of Cairns. The school supports various

sustainability actions including school gardens and a sustainability 'officer' who regularly addresses primary school parades and rewards students for good recycling habits. The research presented in this thesis was undertaken in the secondary campus. The school serves a moderate to high socio-economic demographic. This is indicated in the feeder suburbs where approximately 25% of homes are fully owned, 45% are in the process of being purchased through home loan mortgages and 28% are rented. Over 62% of workers are engaged in full-time work, 28% in part-time work and four percent are unemployed with the remaining percentage not indicating work status. Over 20% of wage earners are professionals and approximately 15% are administrators. The main employing industry is health care.

City Suburban School B has an ICSEA value of 983, was established in 1983 and has 850 students enrolled in Years 7-12. This school is an Independent Public School which affords greater autonomy and empowerment in decision making compared to 'ordinary' state high schools (Queensland Government, 2016b). The school is 17 kilometres from the city of Cairns and services residents from the northern beaches suburbs. This school has a focus on smooth transitions across primary school, secondary school and university via partnerships with a local primary school and university. The school serves a moderate socio-economic demographic. This is indicated in the feeder suburbs where approximately 23% of homes are fully owned, 34% are in the process of being purchased through home loan mortgages and 41% are rented. Over 58% of workers are engaged in full-time work, 28% in part-time work and six percent are unemployed with the remaining percentage not indicating work status. Just under 20% of wage earners are professionals and approximately 15% are technicians or work in a trade. There are three industries providing an equivalent percentage of employment – health care, retail trade and accommodation and food services.

City Suburban School C has an ICSEA value of 914. This inner suburban high school was established in 1960 and has a current population of 1650 students of whom 20% self-identify as Indigenous, mostly Torres Strait Islander (as recorded on the school's website). A significant number of these students board in Cairns away from home in order to attend a high school located in the regional capital. The

school is less than three kilometres from the city of Cairns and services residents of inner suburbs. This school has four distinct Schools of Excellence in Science, Artistic Development, Athletic Academy and Visual Arts Industries. The school serves a low to moderate socio-economic demographic. This is indicated in the feeder suburbs where approximately 27% of homes are fully owned, 19% are in the process of being purchased through home loan mortgages and 47% are rented. Over 61% of workers are engaged in full-time work, 23% in part-time work and nine percent are unemployed with the remaining percentage not indicating work status. Just over 18% of wage earners are technicians or work in a trade. The main employing industry is public administration and safety.

Rural School A has an ICSEA value of 885. This school was established in 1965 and has 860 students enrolled in Years 7-12. It is located in a small regional town 23 kilometres from the centre of Cairns, with a population of 6,214 (The University of Queensland, 2015). The area around the town supports a sugar cane farming community and a commuter workforce that services Cairns city. This school is proud of its educational opportunities across academic, vocational, agricultural and sporting arenas. The school serves a low to moderate socio-economic demographic. This is indicated in information about the town and feeder localities where approximately 32% of homes are fully owned, 46% are in the process of being purchased through home loan mortgages and 18% are rented. Over 61% of workers are engaged in full-time work, 28% in part-time work and four percent are unemployed with the remaining percentage not indicating work status. Just over 18% of wage earners are technicians or work in a trade, just over 15% are professionals and 14% are managers. Employment is spread across many industries, primarily in health care, construction and retail trade and to a lesser extent in accommodation and food services, agriculture, forestry and fishing.

Rural School B has an ICSEA value of 923. This school was established in 1960 and has 700 students enrolled in Years 7-12. The school is located in a small rural town 64.5 kilometres from the city of Cairns and has a population of 10,180 (The University of Queensland, 2015). The town supports a diversity of agricultural endeavours including cattle farming, tropical fruit farms and coffee

plantations. This school website lists foci of instrumental music, a gifted and talented program, arts excellence, sporting excellence, student leadership, agribusiness and engineering. The school serves a low to moderate socio-economic demographic. This is indicated in information about the town and feeder localities where approximately 40% of homes are fully owned, 27% are in the process of being purchased through home loan mortgages and 28% are rented. Over 63% of workers are engaged in full-time work, 24% in part-time work and five percent are unemployed with the remaining percentage not indicating work status. Over 26% of wage earners are managers, most likely farm managers and 14% are technicians or work in a trade and 14% are labourers. Employment is primarily found in agriculture, forestry and fishing (Qpzm, 2016).

Participants.

Teachers.

Five teachers, four female and one male – all interested in sustainability and new to the concept of environmental stewardship – volunteered to participate in this study. Only five schools participated in this study and in following the study design; only one teacher and one class per school were required, except for City Suburban School B where two classes taught by the same teacher completed the online survey at the teacher's initiative. Here, the teacher wanted both classes to complete the online survey as a catalyst for class discussion. Outlined in Table 5 are profiles of each teacher. Pseudonyms are used. The left-hand column summarises subjects taught to student participants and years teaching. None of the teachers had received any formal training to teach sustainability. Only one teacher was committed to teaching sustainability and had just completed building a fully sustainable house. The remaining teachers were personally interested in sustainability but found it difficult to incorporate sustainability professionally into teaching practice for a number of reasons (including curriculum design). Teachers' ages ranged between the late twenties and late thirties and teaching experience between four and fifteen years.

Table 5: Teacher Participants

Teacher Pseudonym Gender, Age School Subject Taught Years Teaching	Comments about: 1 Sustainability in teaching practices 2 Including sustainability pedagogy 3 Environmental challenges facing humanity
Candice F, 30-35 City Suburban School A Geography 5-10	1 Incorporates sustainable practices professionally. 2 Not trained to teach geography and not confident to include sustainability in teaching content. Curriculum rigid. 3 Very concerned about food security, urban sprawl diminishing habitat, erosion in Cairns from cyclones, resource depletion.
Faye F, 30-35 City Suburban School B Philosophy & Reason 5-10	1 Follows sustainable teaching practices by avoiding printing teaching materials and using PowerPoint. 2 Unable to include sustainability principles in this subject. 3 Need global community to work together. Not sure what the long-term results will be.
Natalie F, 30-35 City Suburban School C Health & Physical Education 5-10	1 Doesn't consciously try to implement sustainability principles in teaching practice. 2 Not possible to include sustainability in this subject, although stewardship values could be included in a self-care unit. 3 Fighting over limited natural resource shortages at local and global levels. Countries will hoard food supplies.
Amy F, 25-30 Rural School A Science 0-5	1 Concerned about being sustainable with teaching practices, particularly photocopying of worksheets, retypes C2C worksheets to reduce printing. 2 Sustainability not presented in curriculum and difficult to include sustainability in teaching current in this subject for Year 10. 3 Cost of living will become expensive, increased sickness from pollution, biodiversity loss worrying and gloomy for future generations.
Kevin M, 35-40 Rural School B Geography 10-15	1 Includes sustainability principles in teaching, students designing a sustainable house. 2 Social Science subjects dropped from 3.5 hours per week to 2, therefore difficult to cultivate any topic depth. 3 Huge impact local lifestyles and income in agricultural area, concerned about level of ignorance about global environmental issues.

Students.

There were 126 online survey participants of whom 58% were female (*n* = 73) and 42% male (*n* = 53). Of these, 76% were city suburban students (*n* = 96) and 24% were from rural areas (*n* = 30). Student ages ranged from 14 to 18 years of age: 14 years (*n* = 15), 15 years (*n* =89), 16 years (*n* =17), 17 years (*n* =2) and 18 years (*n* =1) [two students did not answer this question]. Five students were interviewed at each of the three city suburban schools and four students at each rural school. Table 6 outlines the number of students who participated in the online surveys and interviews at each school.

Table 6: Student participants

School	Survey participants n = 126	Survey Gender m = 53, f = 73	Interview participants n = 23	Interview Gender m = 9, f = 14
City Suburban School A	16 (13%)	m = 8, f = 8	5	m = 3, f = 2
City Suburban School B	58 (46%)	m = 16, f = 42	5	m = 1, f = 4
City Suburban School C	22 (17%)	m = 15, f = 7	5	m = 2, f = 3
Rural School A	20 (16%)	m = 12, f = 8	4	m = 2, f = 2
Rural School B	10 (8%)	m = 2, f = 8	4	m = 1, f = 3

Procedures.

Finding co-operative teachers was integral to the success of this research. The process for identifying potential teacher participants and obtaining formal written approval varied for each of the schools. In City Suburban School B and Rural School A, the Principal (or their liaison person) suggested a teacher and emails were sent and meeting times were arranged to present the research and gain written consent. In City Suburban School A, the Principal delegated the matter to a Deputy Principal, who invited an interested teacher to attend the initial presentation of the research. At this meeting, formal written approval from the Deputy Principal and the teacher was obtained. In Rural School B, the email to invite the school to participate was circulated by the school to interested teachers and one teacher volunteered to participate by return email direct to me. For this school, separate meetings on different days were organised to meet with the Principal and the teacher to explain the research fully and obtain written approval. Last, in City Suburban School C, written permission was collected from an administration officer without meeting the Principal or any school officer. At this school, a teacher colleague of mine had volunteered to participate and times and dates were organised to obtain written permission.

All five teachers contributed to this research through direct participation and administration of student participation. Direct participation entailed completing an online survey and a face-to-face interview. The URL for the online survey was provided by email and teachers completed the online

survey independently in non-contact time. Teacher interviews were scheduled before school commenced or between classes in non-contact time via email communication. Time constraints were ever present as there were high demands on teachers' time in all schools, consequently, some interview times were short. Interview times were measured in minutes and times varied between 17 and 31 minutes. Administration of student participation involved hosting the Year 10 online survey in class teaching time and organising distribution and collection of permission slips for the student interviews.

The procedures for conducting student surveys and interviews were similar in all five schools. Suitable times and dates for school visits were negotiated with teachers via email to fit with the demands of class timetables. All five teachers invited me into their classrooms at a mutually convenient time to introduce and explain the research and then assist with hosting the online survey. This provided an opportunity for a personal thankyou to the students for their valuable contribution and time to explain the online survey and interview purpose and protocol.

Students copied the survey URL from the whiteboard onto their computers and completed the survey whilst the teacher and I attended to student enquiries. Teachers were the best judge of class literacy levels and to anticipate how their students were able to respond to the online survey and whether explanations about words or concepts were required. In three schools, students naturally fell into quiet discussion with their neighbours and directed queries about word meanings or concepts to the teacher and myself. In the other two schools, the students completed the survey in relative silence except for a couple of questions directed to the teacher or myself about word meanings or concepts. It is estimated that one-fifth of questions required some assistance by one-fifth of each class.

Following completion of the surveys, teachers at each school asked the class for volunteers to participate in small group conversations with me. From a list of volunteers, teachers chose those students who were best able to articulate their opinions about the environment to ensure successful interview conversations. On the scheduled interview days, the interviews were conducted directly

outside the classroom in City Suburban Schools A and C and Rural School A, in a vacant classroom in Rural School B and in a library meeting room in City Suburban School B. Students were keen to contribute. After introductions and the invitation to call me by my first name, free standing name tags for each of the students were written on cards and placed in front of students. Usage of first names was a convenient way to invite quieter students to participate, especially if there were more dominant personalities in the group.

The format for the interview was explained carefully. The researcher ensured that all individuals in each group understood their right to not answer any question or to terminate the interview at any time. Acknowledgement of understanding was achieved by looking at each person after reading that section of the introduction and hearing a 'yes' response from each student or seeing a nod of the head that indicated consent. It was important that each participant felt like an individual with a valued opinion. Interview times varied between 26 and 36 minutes.

Ethics and research approvals.

This research complied with the necessary ethical responsibilities and permission requirements in accordance with the James Cook University Code for the Responsible Conduct of Research outlined at https://www.jcu.edu.au/research-services/ethics-and-integrity/research-code-of-conduct. It was also in accordance with the code adopted by all Australian Universities outlined at https://www.nhmrc.gov.au/guidelines-publications/r39. Approval to conduct research was granted by the James Cook University Human Research Ethics Committee – approval number H5403. Written permission to conduct research in sites administered by the Queensland Department of Employment, Education and Training was received from the Regional Director, Far Northern Region of Education Queensland, Cairns, before the project began.

Data Collection – Documents, Online Surveys and Interviews

Document compilation.

The education policy of the Australian Federal Government and Queensland State Government is reflected in frameworks, reports and curricula. Documents were sourced from both tiers of government for this research and are referred to generically as government education policy documents or documents. See Tables 7 and 8 for a list of the documents. Documents that focused on environmental and sustainability education were gathered and subjected to systematic inquiry. The purpose of analysing each document was to determine if and how environmental stewardship was promoted and the context of that promotion. This was largely determined by the document's purpose. For example, the document *Today Shapes Tomorrow – Environmental Education for a Sustainable Future – A Discussion Paper* (1999) sought to engage conversation about environmental education and therefore, any mention of environmental stewardship would be within that context. Whereas, the *National Report on Schooling in Australia - 2012* reports on education delivery in Australian schools and reflects a very different context for environmental stewardship, if mentioned at all. To understand how environmental stewardship was communicated in current curricula, specific documents were gathered and subjected to a similar inquiry process. An explanation of these documents occurs in the following sections. Overall, the gathered documents included a combination of hard and electronic copies sourced from the James Cook University library, lecturers at the College of Arts, Society and Education, James Cook University, Cairns, from Australian Government and National Library archive websites and the Australian Curriculum website. An explanation of the relevance of these documents follows.

Australian Government frameworks.

Government frameworks directly express the Australian Government education initiatives and policy directives for Australia. To set the context for this research the prioritising of environmental stewardship was mapped in eight Australian Government frameworks that present a national government perspective on sustainability and environmental education, as historically, in the

Australian context, environmental stewardship has been positioned within environmental and/or sustainability education. The documents are listed in Table 7.

Table 7: Australian Government National Frameworks

Year	Framework
1999	Today Shapes Tomorrow – Environmental Education for a Sustainable Future – A Discussion Paper
2000	Environmental Education for a Sustainable Future National Action Plan
2004	The National Framework for Values Education in Australian Schools (NFVE)
2005	Education for a Sustainable Future - a national statement on Environmental Education
2007	Caring for our Future. The Australian Government Strategy for the UNDESD, 2005-2014
2007	Caring for our Country – Environmental Stewardship Strategic Framework
2009	The Second National Action Plan – Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability
2010	The Sustainability Curriculum Framework, A Guide for Curriculum Developers and Policy Makers

Australian Government reports.

Between 1999 and 2012 the Australian Government commissioned various meetings and reviews to consider and report on education direction and practice. The resulting reports that summarised these events were analysed to understand environmental stewardship and sustainability content and context. These reports are listed in date order in Table 8. Of particular relevance to this research are the Education Ministerial meetings in 1999 and 2008 – the *Adelaide Declaration* and the *Melbourne Declaration*. These meetings were convened to discuss national education priorities for Australia. Also relevant to this research are the outcomes of a symposium to implement the UNDESD in Australia (2005) and a speech to UNESCO about education for sustainable development research in Australia (2006). Included for analysis are reports detailing two reviews on schooling in Australia, one report focused on environmental education and its contribution to sustainability education in schools (2005) and a national report on schooling in Australia in 2012.

Table 8: Australian Government Reports

Year	Document Title	Author
1999	Adelaide Declaration	Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA)
2005	A National Review of Environmental Education and its Contribution to Sustainability in Australia: School Education	Australian Government Department of Environment and Heritage and ARIES Australian Research Institute in Education for Sustainability
2005	Initiating the UNDSED in Australia. Report on a National Symposium	Australian National Commission for UNESCO
2006	Speech to UNESCO Workshop on ESD Research: Setting the stage for a strategic research agenda for the UNDESD	Australian Government
2008	Melbourne Declaration on Educational Goals for Young Australians	The Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEECDYA)
2012	National Report on Schooling in Australia- 2012	Australian Curriculum, Assessment and Reporting Authority (ACARA)

Curricula.

The term curriculum, as used in the context of this research, refers to the statute national curriculum called the Australian Curriculum which guides teaching and learning content, from which each Australian state and territory develops 'state specific' classroom ready curriculum. The term curriculum also refers to a subsection of the Australian Curriculum – the Sustainability Cross Curriculum Priority or SCCP – which outlines how sustainability can be included in Australian Curriculum subject material. The term curriculum also refers to Curriculum into the Classroom or C2C, the curriculum developed for use in Queensland state schools by the Queensland Department of Education and Training. Following is a synopsis of each.

Australian Government curriculum.

Australian Curriculum.

The Australian Curriculum (AC) is produced by The Australian Curriculum, Assessment and Reporting Authority (ACARA), the independent statutory authority responsible for curriculum development, assessment and reporting nationwide (http://www.acara.edu.au/). Following Australian Government directive, ACARA developed the Australian Curriculum to standardise education Australia-wide with the aim 'to develop successful learners, confident and creative individuals, and active and informed citizens' (ACARA, 2013a). Core subjects of English, Mathematics, Science and History were endorsed

for Australia wide usage in December 2010 (ACARA, 2012). Geography followed in May 2013. Other humanities and social sciences subjects, technologies subjects, health and physical education and languages are in various stages of development, consultation and endorsement with full implementation expected by the end of 2016 (http://www.australiancurriculum.edu.au). All subject curriculum documents are available for free download on the ACARA website. For this research, five Year 10 subjects from the Australian Curriculum that represent the core of academic learning – English, Maths, History, Geography and Science – were downloaded and analysed from the ACARA website: Version 3.0 (dated January 2012) in July 2013, Version 7.2 in August 2014, Version 7.5 in June 2015 and Version 8.2 in October 2016. In March 2017, both Version 7.5 and Version 8.3 were available on the Australian Curriculum website (http://www.australiancurriculum.edu.au/).

Sustainability Cross Curriculum Priority.

The Australian Curriculum has three cross-curriculum priorities (CCPs) - Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia, and Sustainability (SCCP). These priorities were identified by the *Melbourne Declaration* as key areas for development within formal schooling and are to be taught across all learning areas (disciplines), with their degree of presence depending on topic relevance. The priorities are not mandatory teaching content.

The Sustainability Cross Curriculum Priority has nine Organising Ideas reflecting the essential knowledge, understandings and skills for the priority. How the Sustainability Cross Curriculum Priority fits with each subject in the Australian Curriculum is defined in concept statements on the ACARA website. The Sustainability concept statements for each of the core subjects were downloaded on the 06 May 2015 from the ACARA website for analysis of their role in informing curricula.

Queensland Government Curriculum.

Curriculum into the Classroom.

To implement the Australian Curriculum in Queensland schools, the State Schools Division of Education in the Queensland Department of Education and Training has developed the Curriculum into the Classroom resource called C2C. C2C is an online, comprehensive set of whole-school

classroom planning materials covering all subjects and years and includes lesson plans, resource lists and assessment criteria. Teaching from C2C is mandatory in Queensland state schools unless a school based curriculum has been developed to complement or replace C2C. Implementation of the Australian Curriculum and the SCCP into Queensland schools via C2C is an ongoing process (http://education.qld.gov.au/curriculum/). Five Year 10 subjects – English, Maths, History, Geography and Science from Version (3.0) were downloaded in September 2014 for analysis.

Online survey structure.

Investigating the linkages between values and attitudes and their influence on behaviour, motivation and expression was key to answering the questions guiding this research. Accordingly, the objective of the online survey was to investigate what values, attitudes, environmental stewardship knowledge and behaviour were expressed by Year 10 students and their teachers, and to explore linkages between these and participants' environmental stewardship capacity, action and inclination for pro-environmental behaviour. As discussed in Chapter 2, pro-environmental behaviour is behaviour that benefits the environment or harms it as little as possible. Although a distinction is made between pro-environmental behaviour and environmental stewardship behaviour in Chapter 2, the term pro-environmental behaviour is used here because it is accepted across many disciplines, appearing as a goal in many environmental education and eco psychology programs, and as a metric for self-reported behaviour.

Two 25 minute online survey instruments were developed and hosted on Survey Monkey – one for Year 10 teachers and one for Year 10 students. The surveys had a trifold design and data from each section were analysed independently, comparatively and relationally. Section I of the survey investigated values from Schwartz's *Portrait Values Questionnaire* (2012) to gain understanding of the motivational role that values play in pro-environmental behaviour for participants. Section II used a modified version of Milfont and Duckitt's (2010) *Environmental Attitudes Inventory* to explore the prioritising of participant environmental attitudes. Section III, called Stewardship Knowledge and

Behaviour was designed by the researcher to investigate in greater detail teaching and learning for environmental stewardship, levels of ecophobia and eco-wellness, sources of environmental information, pro-environment actions and anti-environment school culture.

The teacher and student surveys replicated each other until the final part of Section III where different questions were posed. Additional to the teacher survey were questions about environmental stewardship and sustainability teaching and learning: the need for and preparedness of schools to participate, the degree and availability of administrative support and professional development, and the need for environmental values education. Additional to the student survey were questions about the perceived benefits of environmental stewardship and sustainability education from a learner's perspective and if peers displayed environmental stewardship and sustainability behaviours.

Survey length was designed to fit with school timetabling requirements, to engage participant interest, and to avoid fatigue and non-genuine engagement. The surveys were anonymous, recording only gender, age and school location. Teacher online survey data were collected between 01 September 2014 and 03 November 2014 and directly imported from Survey Monkey to an Excel spreadsheet for analysis. Student online survey data were collected between 01 September 2014 and 17 November 2014 and directly imported from Survey Monkey to SPSS for analysis. A complete copy of each survey can be found in Appendix E – Teachers and Appendix F – Students.

Portrait Values Questionnaire.

Section I of the on-line survey addressed values and was based on the internationally established *Schwartz Value Theory* which recognises universal values common to all cultures (Schwartz, 2012). The *Schwartz Value Theory* measures 10 distinct value orientations that motivate behaviour namely: self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence and universalism. The *Schwartz Value Survey* (SVS) was the first instrument developed to measure the theory in the 1990s. The *Portrait Values Questionnaire* (PVQ) was developed later for 11 to 14 year olds and 'for people not educated in Western schools that emphasize abstract, context-free thinking' (Schwartz, 2012, p. 11). The PVQ works equally well with adults as it 'captures a person's

values without explicitly identifying values as the topic of investigation' (Schwartz, 2012, p. 11). The SVS and PVQ have been widely used internationally in over 82 countries with results from highly diverse groups being universally similar. The PVQ comprises an important part of the *European Social Survey* (Davidov, Schmidt, & Schwartz, 2008). For standardisation and continuity, the 'gender specific' 21 item version of the PVQ was used for both teachers and students. Participants nominated their gender at the beginning of the online survey. Each statement in the PVQ describes a personal goal or aspiration, uses the personal pronoun he or she, and asks for a response to how much that person is like them. Participants chose one of six graduating options on a 6 point Likert scale that best describes how similar they are to the person the statement describes. Options ranged from 1 = 'Very much like me', to, 6 = 'Not like me at all'. The 10 basic values and example statements for each as they appear in the PVQ are listed in Table 9.

Table 9: Ten Basic Values from the Schwartz Value Theory
Source: Schwartz, 2012

	Value	Definition *Example statement*
1	Self-Direction	Independent thought and action, choosing, creating, exploring *It is important to her to make her own decisions about what she does. She likes to be free to plan and not depend on others.*
2	Stimulation	Excitement, novelty and challenge in life *She looks for adventures and likes to take risks. She wants to have an exciting life.*
3	Hedonism	Pleasure and sensuous gratification for oneself *Having a good time is important to her. She likes to "spoil" herself.*
4	Achievement	Personal success, demonstrating competence to meet social standards *It's important to her to show her abilities. She wants people to admire what she does.*
5	Power	Social status, prestige, control/dominance over people and resources *It is important to her to be rich. She wants to have a lot of money and expensive things.*
6	Security	Safety, harmony, stability of society, relationships and self *It is important to her to live in secure surroundings. She avoids anything that might endanger her safety.*
7	Conformity	Restraint of actions that harm, upset or violate social expectations *She believes that people should do what they're told. She thinks people should follow rules at all times, even when no-one is watching.*
8	Tradition	Respect, commitment and acceptance of traditional customs and ideas *Tradition is very important to her. She tries to follow the customs handed down by her religion or her family.*
9	Benevolence	Preserve and enhance the welfare of personal contact group *It's very important to her to help the people around her. She wants to care for their well-being.*
10	Universalism	Understanding, appreciation, tolerance: welfare of people and nature *She strongly believes that people should care for nature. Looking after the environment is important to her.*

The PVQ measures value priorities as behaviour is usually affected by a compromise of relevant values, not the importance of any one value over another (Schwartz, 2012). Schwartz argues that values act as guiding principles in people's lives with the crucial aspect being the motivational goal individuals attach to each value and how those values are prioritised and/or compromised, which, in turn, becomes the basis for expression of a value/s (Schwartz, 2006, 2009). According to Schwartz, actions in pursuit of a value/s have psychological, practical and social consequences that may conflict or be congruent with other values. This is an important aspect of adolescent and adult value prioritisation, as the motivational construct of these distinct basic values creates a structural dynamic relationship through the interplay of congruence and conflict. This relationship is realised when responses from the PVQ are plotted on a circumplex (see Figure 9) showing value orientation and how values are prioritised. In Figure 9, the ten values are found in the inner circle of the circumplex where values are plotted from survey results, which then indicate one or more of the four behaviour tendencies shown in the outer circle – self-transcendence, self-enhancement, openness to change and conservatism. To explain, the values of universalism and benevolence are related to biospheric and altruistic values and therefore favour self-transcendence and behaviour that transcends self-oriented outcomes. This is in direct opposition to the values of self-enhancement which include hedonism (partially), achievement and power. Similarly, openness to change – expressing values of independence of thought and action, is in direct opposition to conservatism – values that emphasize order, self-restriction, preservation of the past and resistance to change. The values of tradition and conformity share the same wedge because they share the same broad motivational goal as conservatism.

As explained in Chapter 2, and in following Karp (1995), analysis of different value orientations indicate four possible levels of pro-environmental behaviour (PEB): engaging in PEB because of an altruistic value orientation, engaging in PEB if it is the accepted norm, engaging in PEB if there is a distinct benefit and no likelihood of engaging in PEB. Value orientation and priorities plotted on the circumplex, particularly for the student group, along with data from Section II and III of the online

survey, are valuable contributions to constructing an overall profile for participants to gain understanding about environmental stewardship capacity and action.

Figure 9: The Schwartz Value Circumplex

Source: http://valuesandframes.org/handbook/2-how-values-work/

Environmental Attitudes Index.

Environmental attitudes are psychological inclinations with evaluative tendencies (Milfont & Duckitt, 2010). Environmental attitudes inform an individual's view of the natural environment – with a degree of favour or disfavour and attitudes inform beliefs, affect and behaviour, and in turn, are influenced by them (Milfont & Duckitt, 2010). The *Environmental Attitudes Index* (EAI) was developed by Milfont and Duckitt to understand the 'multidimensional and hierarchical' nature of environmental attitudes (2010). The Index adopts a systematic horizontal and vertical construct that indicates whether a

participant's environmental attitude is one of preservation or utilisation of the natural environment. According to Milfont & Duckitt, an individual with a preservation worldview is inclined to endorse sustainability, whereas an individual with an utilisation worldview is more inclined to a social dominance orientation and right wing authoritarianism (2010). In terms of this research, environmental attitudes that indicate preservation of the environment are more likely to inform pro-environmental behaviour. In this research, knowledge of participants' attitudes about preservation or utilisation of the environment contributes to understanding environmental stewardship capacity and action. The EAI was tested on New Zealand and Brazilian university students aged 16-51.

The EAI is structured around measuring 12 primary perspectives or beliefs (scales) regarding the natural environment and factors that affect the quality of the natural environment. In each of the 12 scales there are 10 statements with five positive and five negative perspectives for 'balance' and 'acquiescence' (Milfont & Duckitt, 2010). These 120 statements form the horizontal construct of environmental attitudes. Each question is scored on a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Analysis of the priority given to each of the 12 scales defines the vertical construct of the EAI and whether an individual's environmental attitudes are more inclined to a preservation or utilisation worldview. Table 10 outlines the 12 scales, their defining construct and priority structure.

Table 10: The 12 Scales from the Environmental Attitudes Index

Scale	Scale Label	Defining Construct	Priority Structure
1	Enjoyment of nature	Belief that spending time in nature is pleasant and preferable to spending time in urban areas	Preservation
2	Support for interventionist conservation policies	Support for conservation policies regulating industry and the use of raw materials	Preservation
3	Environmental movement activism	Personal readiness to actively support or get involved in organised action for environmental protection	Preservation
4	Conservation motivated by anthropocentric concern	Support for conservation policies motivated by anthropocentric concern for human welfare and gratification	Utilisation
5	Confidence in science and technology	Belief that human ingenuity can and will solve all environmental problems	Utilisation
6	Environmental fragility	Belief that the environment is fragile and easily damaged by human activity with catastrophic consequences	Preservation

7	Altering nature	Humans have the right to alter nature to satisfy human goals and objectives	Utilisation
8	Personal conservation behaviour	Taking care to conserve resources and protect the environment in personal everyday behaviour	Preservation
9	Human dominance over nature	Nature exists primary for human use	Utilisation
10	Human utilization of nature	Economic growth and development should have priority rather than environmental protection	Utilisation
11	Ecocentric concern	A nostalgic concern and sense of emotional loss over environmental damage	Preservation
12	Support for population growth policies	Support for policies regulating population growth and concern about overpopulation	Preservation

For the Year 10 secondary school participants in this research project, the EAI in its entirety was deemed too long and the language somewhat confusing. Therefore, language and content in the EAI were modified and the 120 statements were reduced to 46. Most negative statements within each section were discarded due to double negative wording. Items that appeared repetitive or irrelevant to Year 10 students were excluded, for example: 'It is wrong for governments to try and compel business and industry to put conservation before producing goods in the most efficient and cost-effective manner'. Modifications to language were also necessary, for example, Australian Year 10 students in Far North Queensland are not necessarily familiar with the term 'wilderness', so in brackets following, 'out in the bush' was inserted. Also 'shopping mall' was changed to 'shopping centre' to fit Australian idiom. For the statement: 'The idea that the balance of nature is terribly delicate and easily upset is much too pessimistic', 'negative' was inserted in brackets after pessimistic in case students were not familiar with the word pessimistic.

In the standard EAI of 120 items, 50 represent utilisation ideals (41%) and 70 preservation ideals (59%). Of the 46 items in the modified version of the EAI, 17 represent utilisation ideals (36%) and 29 preservation ideals (63%). The abbreviated EAI was considered more practical for this research. The ratio of utilisation ideals to preservation ideals was close to the original Index and the discarded statements were cognitively unsuitable for the student survey age group. The EAI makes an important contribution to the online survey because analysis of preservation and utilisation worldviews in conjunction with the value orientations provided by Section I of the survey, offers insight into how

environmental attitudes are constructed. In addition, analysis of EAI data offers insights to analysis of the third section of the online survey, the expression of Stewardship Knowledge and Behaviour.

Stewardship Knowledge and Behaviour.

The purpose of the online survey was to directly investigate environmental stewardship attitudes and self-reported behaviours. Sections I and II of the survey assessed values and environmental attitudes. Neither of these assessed stewardship knowledge and behaviour directly. This absence was compensated for in the design of Section III which investigated in greater depth teachers' and students' environmental stewardship values, attitudes, knowledge and action. This original section of the survey asked participants about their feelings and opinions in relation to environmental stewardship capacity, indications of ecophobia, post-ecologism and/or connectedness to place, levels of environmental knowledge and pro-environmental actions.

Section III of the teachers' survey had 39 statements and there were 34 statements in the students' survey. There were five replicate subsections: i) connection to the earth and the natural environment; ii) concern for the natural world; iii) concern for the future; iv) importance of sustainability and stewardship; and, v) sources and trustworthiness of environmental information. In addition, the teacher's survey had the following subsections: Tvi) the importance of and preparedness for teaching about stewardship and sustainability; Tvii) preparedness to teach values; Tviii) stewardship values and student well-being; and, Tix) evidence of an 'anti-environment' school culture. Additional sections in the student survey were: Svi) the need to learn about sustainability; Svii) questions about the stewardship values of peers; and, Sviii) evidence of an 'anti-environment' school culture. An anti-environment school culture espouses negative attitudes towards the natural environment. The perspectives of teachers and students about an 'anti-environment' culture at school is directly related to cultural capacity for environmental stewardship. Table 11 provides sample questions from each subsection of the survey. Responses to survey statements were scored on a Likert scale ranging from 1 = strongly disagree to 7 = strongly agree.

Table 11: A Summary of Student and Teacher Survey Questions from Section III

Student and teacher survey subsections	Q Nos	Sample questions/statements
i) connection to the earth and the natural environment	Q1-8	I feel relaxed and calm when I'm in the natural world. I respect what nature provides. I feel connected to the natural world.
ii) concern for the natural world	Q9 matrix	Global environmental issues make me worried. Biodiversity loss (lots of plants and animal species dying) is happening at an alarming rate. Consumerism is wasting earth's resources.
iii) concern for the future	SQ10-17 TQ10-15	Changes to the natural world make me concerned for the future. I have faith that the future will be positive. The thought of solving environmental problems in the future makes me deeply worried.
iv) importance of sustainability and stewardship	SQ18-24 TQ16-22	Living sustainably is important (actions today so future generations have enough for their needs). It is important to me that I act in environmentally friendly ways. I am happy with how humanity is looking after the natural world.
v) sources and trustworthiness of environmental information	SQ25 SQ26 TQ 23 TQ24	Most of my information about the environment comes from: (student survey) movies (not documentaries), documentaries, websites, teachers, school work (teachers survey) Professional Development – seminars, conferences, reading, friends, social media
Additional to the teacher survey:		
Tvi) the importance of and preparedness for teaching about stewardship and sustainability	TQ25-32	I am ready and able to teach sustainability. There is professional support for teaching sustainability. Experiential learning or learning by doing is an important aspect of sustainability education.
Tvii) preparedness to teach values	TQ33-34	Values education (ie learning to value the environment) IS incorporated in sustainability education. Values education (ie learning to value the environment) SHOULD be incorporated in sustainability education.
Tviii) stewardship values and student well-being	TQ35-37	Developing stewardship (an ethic of care for the natural world) would assist students' well-being. I am happy with the level of stewardship education in this school (stewardship education develops an ethic of care for the natural world in students).
Tix) evidence of an anti-environment school culture	TQ38-39	There is evidence of an anti-environment culture in school staff. There is evidence of an anti-environment culture in school students.
Additional to the student survey:		
Svi) the need to learn about sustainability	SQ27-32	There is a need for sustainability education in schools. Participating in sustainability activities at school benefits students. Learning to value the environment is an important part of learning about sustainability.
Svii) peer stewardship values	SQ33	My fellow students generally display stewardship values and actions.
Sviii) evidence of an anti-environmental school culture	SQ34	There is evidence of an anti-environment culture at school.

Note: Q = question, TQ = teacher question, and SQ = student question.

Careful attention was given to the structural design of this section of the survey. As it was the third section, it was important to consider participant fatigue, possible levels of impatience reducing authentic engagement, and that the survey itself may/would have been a learning experience about the very things it was measuring. This later realisation informed the order of subsections as shown in Table 11. Initially, questions were randomly listed, however, after reflecting on the flow of the topics, natural groupings for the questions emerged. Topics were introduced in a certain order to cultivate thinking and assist with the formalising of opinions about the natural environment, environmental stewardship and sustainability. Subsections began with an inwards focus on feelings about connection to the natural environment and then outwards to opinions about the natural environment, the future, how important sustainability and stewardship were, where environmental information was sourced and whether those sources were deemed trustworthy. The final subsections were about environmental stewardship and sustainability teaching and learning in schools.

Other measures were taken to reduce participant fatigue and impatience. A matrix was created for question nine on concerns for the natural world. A comment box was also added after question nine for further response. The questions about the various ways participants received environmental information (SQ25 and TQ23) were also made into a matrix. Subsequent questions to these (SQ26 and TQ24) asked participants how they felt about the trustworthiness of their sources of environmental information and a comment box was provided for further details.

Survey Pilot.

The online survey was pilot tested for content validity with three colleagues, two of whom are teachers and one PhD student. Feedback confirmed that language use, concepts raised and organisation of material was appropriate. The three participants said that content was relevant to the survey focus.

Interview structure.

Interviews are (desirably) a productive interaction between an interviewer and a participant around a theme or topic (Yin, 2011). Interviews can follow a structured, semi-structured or un-structured design

(Lankshear & Knobel, 2005; Lichtman, 2013). Interviews that are structured and semi-structured are planned, usually pre-arranged and heavily scripted, whereas, un-structured interviews are more like themed conversations (Greig, Taylor, & MacKay, 2007; Lankshear & Knobel, 2005). Structured interviews engage a distinctive set of procedures, for example, using closed ended questions where respondents are limited to pre-defined responses and where the interviewer adopts a formal role and maintains a consistent behaviour for all interviews (Yin, 2011). Closed questions lead to more accurate data and more definite analysis, because choosing a pre-defined response leads to quantitative measurement of data (Yin, 2011). By contrast, in an un-structured interview, the interviewer takes on the role of an informed prompter to allow topics to arise without controlling the way the interview develops (Greig et al., 2007). A qualitative interview style following a semi-structured approach was appropriate to this research in order to explore dimensions of environmental stewardship – not easily understood by a series of ticked boxes or pre-defined responses or necessarily through open flow conversation.

The purpose of the interviews was to further investigate environmental stewardship and matters identified after analysis of the online surveys. Two semi-structured interview schedules were developed – one for students and one for teachers. The interview script for the teacher interview had 19 questions and the script for students had 17 questions. Copies of both interviews are in Appendices G and H respectively. Interviews with teachers were conducted between 12 September 2014 and 7 November 2014. Student interviews were held between 17 September 2014 and 12 November 2014. All interviews were audio recorded on three devices, a smart phone, laptop and a dictaphone. The audio files were then transcribed for analysis.

Teacher interviews.

Interviews were conducted one-on-one in a quiet location – in an empty classroom, staff room or meeting room. The purpose of the interviews was to explore teachers' thoughts about environmental stewardship teaching and learning, and how environmental stewardship is expressed in their school

context. Each teacher interview began by asking what subject they taught the student participants and whether the students had provided any feedback about the survey.

The first interview topic was the Sustainability Cross Curriculum Priority. Teachers were asked about the importance of teaching and learning for sustainability, if sustainability was taught across the discipline curriculum, and if teachers were able to incorporate sustainability in their teaching. Teachers were asked if it was easy to implement sustainability, as presented in the Australian Curriculum, if they used any online resources when teaching for sustainability, and if they saw evidence of colleagues teaching for sustainability. Questions were also asked about the level of professional development (PD) available for sustainability teaching and learning, and if there was a school wide culture of implementing sustainability principles.

The second interview topic was stewardship, and this was explained as developing an ethic of care for the environment in the Wet Tropics. Teachers were asked if they saw developing environmental stewardship as important to contemporary education and if stewardship education contributed to sustainability education. They were asked how stewardship education could be or would be implemented in schools, what they thought about teaching environmental values with young people in relation to stewardship values, and if they thought this should be the role of the classroom teacher.

The third interview topic was that of the environmental challenges facing societies in the Anthropocene. Resource depletion, climate uncertainty, ecosystem disruption, biodiversity loss and increasing pollution were offered as examples. Teachers were asked how they saw climate change impacting the world and humanity. Teachers were asked if and/or how these events were impacting students they taught – in relation to students' outlook for the future, and in particular if they saw any evidence of ecophobia (explained as a fear of the natural environment). Teachers were asked if students expressed a pessimistic outlook for the future and if they saw evidence of post-ecologism. Post-ecologism was explained as a term describing attitudes and behaviour when environmental challenges were too hard to face, caused by others (usually older people) and therefore dismissed

(Zeyer & Kelsey, 2013; Zeyer & Roth, 2013). Finally, teachers were asked how they found the survey, how questions were framed, if any questions were left out, and if the responses offered were adequate. Teachers were invited to further comment before the interview ended.

Student interviews.

Student interviews were conducted in small groups with four and/or five participants for time efficiency. Questions to promote discussion on stewardship and sustainability were chosen to encourage in-depth conversation. After the prepared introduction where the interview format was explained, the interview began by asking students to comment on how they found the survey and whether they discussed it with their friends.

The first student interview topic was the natural environment in Far North Queensland which includes two World Heritage areas. Ten questions prompted discussion about the natural environment and these included the importance of caring for the natural environment and the importance of learning how to care for the natural environment and where this learning should occur. Suggested examples of ways of caring for the natural environment relevant to adolescents were discussed and included: picking up litter, recycling, reusing household items and clothing. Students were asked in three separate questions to comment on whether they felt they cared for the natural environment, if they felt their family did, and if a school culture of caring was evident. Students were asked if anyone had shown them how to care, whether they were concerned about pollution, climate uncertainty, animals and plants becoming extinct, and how this made them feel, and if this impacted on how they viewed their future. Students were asked directly if they saw climate change impacting their world, whether they had friends concerned about the challenges facing the natural environment and whether it was common for people their age to care for the environment.

The next interview topic was introduced with 'Let's talk about you and young people today'. Students were asked direct questions about what was important to them and their friends, and what worries they have and what worries they discuss with friends. Students were asked what could be done to

assist young people feel more confident about who they are, more confident about the environment, and more confident about their future.

For the final interview topic, I stated, 'For my university studies, I'm looking at stewardship and developing caring for the environment and part of stewardship is developing a nurturing connection with nature'. Students were asked if they felt it was possible to teach someone how to care for the natural environment and how they thought this could happen. Discussion was invited about learning to care for a pet, as an example of learning to care. Students were asked if they felt they had been taught to care, firstly for themselves and then for an animal, plant or garden and, if so, how this had occurred. To finish, students were asked if there was anything else they would like to add to the conversation.

Five Stages of Data Analysis

This research employed five stages of data analysis of: i) Australian and Queensland Government documents framing education; ii) teacher and student on-line surveys; iii) teacher and student conversational interviews; then, iv) inductive comparative analysis of the whole data set; and, v) deductive analysis of the whole data set seeking answers to research questions. The theoretical foundations and analysis processes for each stage are discussed in the following sections.

Analysis stage I – documents – four steps.

Document analysis follows a systematic procedure for reviewing and interpreting meaning and can also be called content analysis (Bowen, 2009; Krippendorff, 2013; Merriam, 2009). By coding and cataloguing key terms, document contents can be mapped for: i) descriptive information; ii) research context and historical understanding; iii) changes and developments; iv) advancement and verification of emerging hypotheses; and, v) data triangulation (Bowen, 2009; Merriam, 2009). Content analysis is inclusive of text, pictures, videos, and conversations and may involve inferential conclusions – deductive, inductive and, particularly in the case of multiple media content analysis, abductive inferences (Krippendorff, 2013). The purpose of my analysis of multiple documents was to research

how environmental stewardship, as a matter for formal education, was present or absent in government education policy documents over time, meeting criteria two above – *documents can be mapped for research context and historical understanding* (Bowen, 2009; Merriam, 2009). Analysis of the situational context and depth of meaning attributed to environmental stewardship in each document is known as context density in this research and is closely aligned with White and Marsh's units of analysis and procedures for analysing coded data (2006). A summary of the context density analysis of each text indicated if, and/or how a document promoted environmental stewardship. Procedures for the document analysis were founded first on a theoretical construct, then as formal educative purpose, and finally through quantitative analysis, to investigate the context density of environmental stewardship in each document. Each is explained in the following paragraph.

The theoretical construct for document analysis followed Krippendorff's comparing similar phenomena inferred from different bodies of texts (2013). Using this construct means the same analysis procedures are applied to multiple texts. The analysis process must pattern the intended use of the studied texts and accord with each document's function, audience demographics, sequence, time scale, purpose and ontological context (Krippendorff, 2013). All documents analysed in this research were Australian and Queensland State Government policy documents that framed education in a formal and directive manner, and were written in different formats by a variety of authors to serve different purposes to create different outcomes. For example, some reports aimed to generate conversation, others to report on education initiatives, and in the case of curricula, to advise content for teaching and learning. The same analysis procedures were followed for all documents, however, reporting formats varied to match document purpose, structure, language and content. The analytical approach followed Krippendorff's statistical association approach (2013). The frequency and function (or context) of words were assessed to understand the context density of the expressed principles and purpose of environmental stewardship and sustainability. Document content (as data) can be analysed quantitatively and/or qualitatively. Quantitative content analysis uses a positivist, deductive approach with analytical constructs or rules to analyse the text in response to research questions (Marsh &

White, 2006). Qualitative content analysis relies largely on the authority of the researcher's interpretation and conclusions and uses an inductive, iterative approach to understand concepts and themes (Marsh & White, 2006). A quantitative methodology using deductive analysis was adopted for all documents in this study, as this approach was determined to be the most revealing.

The document analysis proceeded in four steps: Step 1, counting the frequency of use of certain terms; Step 2, analysis of how those terms were used; Step 3, analysis of how those terms were used in relation to the purpose of the document; and Step 4, analysis of the outcomes implicit in each of the two document groups, the frameworks and reports, and the curricula. Analysis steps are explained further in the following subsections (see Table 12).

Table 12: Document Analysis Steps

Document Analysis Steps		
Context Density Analysis	Step 1	Determine stewardship frequency - coding
	Step 2	Stewardship use within the document
	Step 3	Stewardship use relational to document purpose
Summary	Step 4	**1. Frameworks and reports**: timeline - stewardship focus and development **2. Curriculum documents:** AC & SCCP: develop action competence C2C: develop action competence, estimate annual stewardship teaching and learning time

Step 1: analysis of all documents.

The first step of context density analysis determines the frequency of usage of key words within each document. White and Marsh (2006) call this coding. Key word searches were conducted for stewardship, sustainable and sustainability, and for phrases that depict an inference to stewardship: ethic of care, environmental care, environmental responsibility, nature care and nature responsibility. The number of times the word or phrase appeared in the text was manually counted and recorded (see Table 13). The same procedures for analysis were followed in Steps 2, 3 and 4, but reporting varied because of the different structure and language used in: i) the frameworks and reports; ii) the Australian Curriculum (AC) and the Sustainability Cross Curriculum Priority (SCCP); and, iii) in Curriculum into the Classroom (C2C). The processes for each are outlined in the following paragraphs.

Steps 2, 3 and 4: analysis of Australian Government frameworks and reports.

In the framework and report documents, context density analysis focused on analysing where key words appeared in the text and how they were used, that is, ascertaining the contextual meaning/s ascribed to them. To begin the second step of analysis, three levels of meaning were identified and coded. For example, if stewardship was referenced in the document in a heading – it was coded 'Heading'; if it was referenced as a stated outcome – it was coded 'Outcome'; if it appeared within the document as part of the content – it was coded 'Text'. In the third step of analysis, to continue the example, if stewardship was referenced in all three – Heading, Outcome and Text, or only in Outcome, is was deemed that the document promoted stewardship and the column in Table 13 titled Step 3 Promotion was marked 'Direct'. If stewardship was referenced as a Heading or Text, the column was coded 'Indirect'. If there was no reference to stewardship, the column was marked 'None' (see Table 13).

Table 13: Analysis of Stewardship in the Frameworks and Reports

Analysis of Stewardship in the Frameworks and Reports					
Document	Year	Step 1	Step 2	Step 3	Step 4
		Context density			Timeline
		Reference count	How referenced	Promotion	Notes
		Number of references	Heading Outcome Text	Direct Indirect None	

To complete Step 4, findings from the frameworks and reports were collated and analysed to develop an overall understanding of the temporal developments and prioritisation of stewardship in an Australian education context between 1999 and 2012. These data are represented as a timeline mapping the explicit and implicit development of stewardship education over a discrete period in the twenty-first century.

Steps 2, 3 and 4: analysis of Australian Government curricula.

Australian Curriculum and Sustainability Cross Curriculum Priority.

The Australian Curriculum guides (to standardise) teaching content for all subjects from the Preparatory Year of schooling to the final year – Year 12. It is used by government education

departments in all Australian States and Territories as a guide to prepare classroom ready curriculum in the form of lesson plans, resources and assessment tasks. This research examined Year 10 English, Maths, Science, Geography and History where teaching content is outlined in sections called Content Descriptions, and the knowledge and skills to be developed are described in sections called Elaborations. Elaborations are marked with icons to show linkages to one or more of the seven general capabilities that the Australian Curriculum seeks to develop in students (literacy, numeracy, ICT capability, critical and creative thinking, personal and social capability, ethical understanding and intellectual understanding) and, to cross curriculum priorities. A leaf icon indicates an explicit link to the Sustainability Cross Curriculum Priority (SCCP).

Step 2 of the context density analysis meant counting the number of times key words were referenced in: i) Content Descriptions; ii) Elaborations; and, iii) the number of leaf icons depicting linkages to the SCCP. Step 3 determined whether stewardship was promoted (or not) in a Learning Area by counting where and how often the key words appeared. If, for example, sustainability was referenced in a Content Descriptions and developed further in an Elaboration and had linkages to the Sustainability Cross Curriculum Priority, the subject promoted sustainability (see Table 14).

Step 4 of the context density analysis in the Elaborations of the Learning Areas that promoted stewardship and/or sustainability were analysed for development of action competence (Jensen & Schnack, 1997). Recall from Chapter 2 that action competence seeks to develop in students: i) knowledge about the environment; ii) commitment to act for change; iii) development of a vision for the student's future; and, iv) action experiences to connect emotions, values, knowledge and action (Jensen & Schnack, 1997). Word usage in the Elaborations was analysed using key words from the four points above, namely knowledge, change, vision and experiences. Results were summarised for each subject and recorded in the notes column in Table 14.

Table 14: Analysis of Stewardship in the Australian Curriculum and Sustainability Cross Curriculum Priority

Analysis of Stewardship in the AC						
AC Subject	Step 1	Step 2			Step 3	Step 4
	Context density					Develop action competence
	Reference count	How referenced			Promote	Notes
	Number of references	Content Descrip Ref count.Total	Elaborations Ref count.Total	SCCP Linkages	Yes/No	

Steps 2, 3 and 4: analysis of Queensland Government curriculum.

Curriculum into the Classroom.

Steps 2 and 3 of analysis of Curriculum into the Classroom (C2C) followed a similar procedure to analysis of the Australian Curriculum. C2C develops Content Descriptions and Elaborations from the Australian Curriculum into units of work, lesson plans, teaching resources and assessment tasks, so, different organisational language is used. Relevant to this research are the terms: i) Overview – the description of the unit plan to be studied; ii) Lessons – a number of lessons to teach content; and, iii) Resources – a list of resources to support teaching and learning in each lesson. References to the key words were counted in the Overview, Lesson Plans and Resources in each unit of work in the five Year 10 subjects and recorded in Table 15. These key words were then analysed for development of action competence (Jensen & Schnack, 1997). Also in Step 4, the annual lesson time allocated to teaching and learning for stewardship and sustainability was calculated as a percentage of the annual teaching and learning time for the five Year 10 subjects in this study.

Table 15: Analysis of Stewardship in Curriculum into the Classroom

Analysis of Stewardship in the C2C						
C2C Subject	Step 1	Step 2			Step 3	Step 4
	Context density					Develop action competence Time learning
	Reference count	How referenced			Promote	Notes
	Number of references	Overview	Lessons, number of references	Resources	Yes/No	

In summary, document analysis was undertaken to identity where opportunities are in Australian and Queensland Government policy for environmental stewardship and sustainability, to understand if and how this was related to the inclusion of environmental stewardship and sustainability in the curriculum, as well as to understand what role these opportunities play in developing environmental stewardship teaching and learning in the formal curriculum. Understanding the existence of environmental stewardship curriculum content was necessary for relational analysis of participant values, environmental attitudes and environmental stewardship actions inherent in the data collected from the on-line surveys and interviews in the next two phases of research.

Analysis stage 2 – online surveys.

Portrait Values Questionnaire.

Value statements in the *Portrait Values Questionnaire* are not grouped by value but mixed throughout the survey. Each statement is positive, so, no recoding of negatives was required. Data from the teachers' questionnaires were downloaded from Survey Monkey to an Excel spreadsheet and value statements were grouped. Mean, median and standard deviations were calculated for each value group and for the value priority ranking. Student data were downloaded from Survey Monkey to an SPSS database, value statements were grouped and the mean, median and standard deviation for each variable were calculated. Both teachers' and students' value rankings were graphed on separate circumplex templates (see Figure 10) to determine how participant values were organised into the two second order values – self-transcendence in opposition to self-enhancement and openness to change in opposition to conservation of the status quo. These placings were analysed according to Karps' four hypotheses (as discussed in Chapter 2).

Independent *t*-tests were performed to analyse relationships between gender, school geographic location, values and priority rankings. Results were then compared with the value priorities of German adolescents from research conducted by Musiol and Boehnke in 2013. The German study used the *Portrait Values Questionnaire* as one tool when analysing 'the relationship of person-environment value congruence and individual satisfaction with life' in an individualist society (Musiol & Boehnke,

2013, p. 57). Adolescent value rankings from the Wet Tropics and Germany were compared on the circumplex template similar to the one used by Musiol and Boehnke shown in Figure 10. This comparison framed the value priorities of adolescents in the Wet Tropics (with two adjacent World Heritage sites) with adolescents in an 'individualist' Western society.

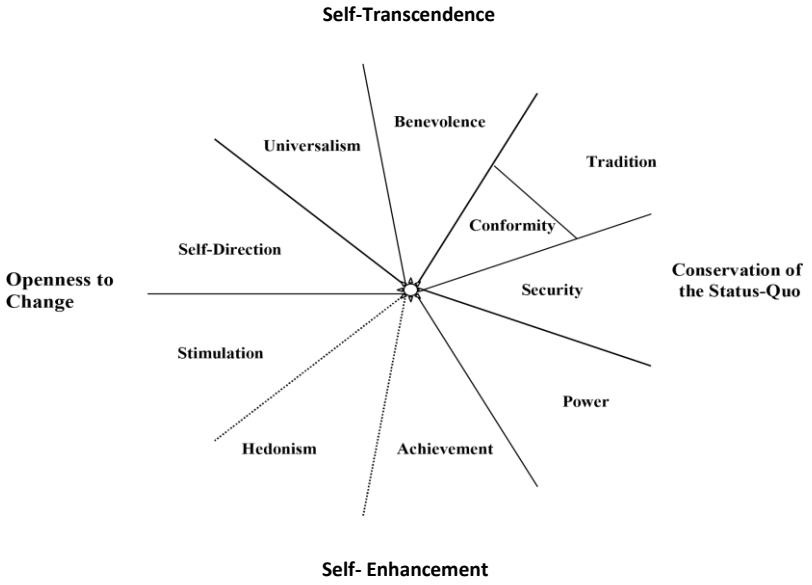


Figure 10: Schwartz's Circumplex of Human Values used by Musiol & Boehnke, 2013

Environmental Attitudes Index.

Teacher data were analysed in Excel. Negative statements were reverse coded and all responses were coded numerically. A mean subscale score was computed for the utilisation and preservation items. Student data were analysed using SPSS. Negative statements were reverse coded and mean subscale scores were computed for the 10 subscales. The mean and standard deviation was calculated for the utilisation and preservation scales. Independent sample *t*-tests were performed to compare responses by gender and geographic location of schools. Alpha of < 0.05 was considered statistically significant. Results from this study were compared with the New Zealand university students in Milfont & Duckitt's (2010) study to investigate the congruence (or otherwise) of environmental attitudes expressed by individuals from a similar national culture.

Stewardship Knowledge and Behaviour.

Teacher data were analysed using Excel as the participant numbers were small. Negative statements were reverse coded and all responses were coded numerically. Responses were grouped into six

subscales: i) connected to the earth and the natural environment; ii) concern for the natural world; iii) concern for the future; iv) importance of action for stewardship and sustainability; v) school learning about the environment and sustainability; and, vi) school learning about stewardship. Mean and standard deviation were calculated for each subscale and tables and graphs were constructed from the raw data in Excel to explore and construct meanings, relationships and themes. In addition, teachers were asked to nominate where they obtained information about the environment and whether they trusted that information. A mean was calculated for each response.

Student data were analysed using SPSS, a program designed for statistical analysis of larger data sets. Negative statements in the student data were reverse coded. Responses were grouped into five subscales. The five sub-scales were: i) connected to the earth and the natural environment; ii) concern for the natural world; iii) concern for the future; iv) importance of action for stewardship and sustainability; and, iv) school learning about the environment, stewardship and sustainability. Mean and standard deviation were calculated for each subscale. Each question was analysed for agreement, indecision and disagreement. The number and percentage of students in agreement, undecided or disagreement were calculated. Students were also asked to nominate where they obtained information about the environment and whether they trusted that information. Responses were ranked according to preference and sources were listed in order of frequency from highest to lowest. The percentage of students who trust the environmental information they receive was calculated. *T*-tests were performed to compare levels of trust about sources of environmental information between males and females and between the geographic locations of schools.

Analysis stage 3 – interviews.

Qualitative analysis of student and teacher interviews combined Thomas' general inductive approach (2006) and an essentialist/realist method of thematic analysis (Braun & Clarke, 2006, 2014). A general inductive approach is used to condense and summarise the raw data, establish relationships with the research objectives and questions, and create a framework of the experiences and any relationships

presented by the data (Thomas, 2006). Thematic analysis 'is a method for identifying, analysing and reporting patterns (themes) within data' (Braun & Clarke, 2006, p. 79). An essentialist/realist method of thematic analysis adopts a 'bottom up' inductive approach to data coding, and is experiential in its orientation and realistic in its theoretical framework as it 'gives voice' to experiences and meanings reported in the data (Braun & Clarke, 2014). Analysis occurs at a semantic level with description of the explicit meanings inherent in data text. Interpretation of meanings occurs through organisation of data into patterns and analysis of the significance of the patterns and their broader implications, often in relation to previous literature (Braun & Clarke, 2006). In this study, a ten step process resulted for this essentialist, thematic analysis. The manual process for interview data analysis was:

i) listening – twice to audio files of interviews;
ii) data cleaning – preparation of files into common format;
iii) professional transcription – check for accuracy;
iv) data organisation – for ease of coding;
v) close reading – of text several times;
vi) mark text – identify commonalities;
vii) analyse marked text – for emergent themes;
viii) categorise and describe themes – in each question;
ix) revise and refine themes, collapse themes into parent themes – for all questions; and,
x) collate themes separately from each of the student and teacher surveys to create a diagrammatic representation of outcomes using mind maps and tables.

Each step is discussed more fully in the following paragraphs.

Teacher and student interviews were analysed separately and followed the same procedures. Following each interview when driving away from the school, the smart phone audio files of the interview were listened to through the car stereo, and then again within two weeks of the interview, for familiarity with content. Data files from each device were screened and cleaned. The smart phone files provided the best quality and were saved as MPEG-4 Audio (.m4a) files. These were professionally transcribed. Each participant transcript was identified by a code: two letters from the school name and two numerals, making it easy to identify the responses from each of the five participant schools and each individual participant. Transcripts were saved as an MS Word file for each interview and

printed and bound into student and teacher volumes. Transcripts were read with audio files to check for the accuracy of the transcript and to gain greater familiarity with content.

Digital transcript files were organised for ease of coding. Responses to each question were amalgamated. For example, responses to question one from all student interviews were cut and pasted from their different files into one MS Word file and saved. This was repeated for every question in both interviews. Each question – with all responses – was then printed with wide margins for hand written notes. One question at a time, the transcripts were read and reread as part of the inductive analysis seeking expressed values, attitudes, knowledge and actions. Commonalities were highlighted and coded in corresponding colours and notes made in the margins. All codes were assessed for thoroughness in description and inclusivity and were grouped according to their inherent meanings. Emergent themes were identified, revised and refined, and where possible, collapsed into parent themes and a description was written for each theme on a blank sheet of paper. A mind map summary of the emergent themes was then created for each question analysed.

The mind map summaries from each question – 19 from the teacher interview and 17 from the student interview – were placed side by side on a large table for the task of further composing of themes into parent and sub-themes. Similar themes resulted across questions, for example, students commented in many questions about the level of difference in sustainability teaching and learning between high school and primary school. The result of this iterative process is that major themes were identified from the student and teacher interviews and then analysed through a knowledge and action capacity lens in order to understand student capacity for environmental stewardship in relation to post-ecologism. Outcomes were diagrammatically represented in tables and figures.

Analysis stages 4 and 5 – inductive and deductive analysis of whole data set.

Rationale.

This section explains the theoretical foundation and data analyses of the whole data set to meet the research objectives and answer the research question and sub-questions. Analysis of the whole data set was necessary to fulfil the objectives of this research:

i) understand the temporal development of stewardship from 1999 to 2012;
ii) gain an understanding of the actual expression of stewardship in teaching and learning in a sample of state high schools in the Wet Tropics in Australia in 2014;
iii) analysis of relationships between the intended, planned, enacted and lived curriculums as expressed in this research sample – the linkages between Australian and State Government policy (intended), and curriculum (planned), lesson plans and teaching (enacted) and student expression of stewardship (lived curriculum); and,
iv) development of a learning for stewardship conceptual framework.

Achieving these objectives means investigating what priority stewardship was given in both government frameworks and curriculum content (if any), understanding teacher capacity and agency for developing stewardship among the study participants, identifying and describing the teaching and learning context for stewardship in the Wet Tropics, and reaching an understanding of student capacity and agency for stewardship. Data collection and data analyses were designed to explore: What is the relationship between environmental stewardship, Year 10 students and their teachers, and the Australian Curriculum's sustainability cross-curriculum priority within the Wet Tropics region of Australia, and to be able to answer the following sub-questions:

i) To what extent and how is environmental stewardship represented in the Australian Curriculum's Sustainability Cross-Curriculum Priority?
ii) How is environmental stewardship, as represented in the Australian Curriculum's Sustainability Cross-Curriculum Priority, enacted in the school context?
iii) What environmental stewardship aspirations, values, knowledge, beliefs and action capacities do Year 10 students and their teachers have?
iv) How are the environmental stewardship aspirations, values, knowledge, beliefs and action capacities of the Year 10 students and teachers realised or how do they play out in reality?

Theoretical foundation.

Analyses of the whole data set followed mixed method analysis (MMA), a formal technique used when analysing both quantitative and qualitative data collected for the same research project (Onwuegbuzie

et al., 2007). Both quantitative and qualitative analytical techniques are 'utilised either concurrently or sequentially sometime after the data collection process, from which interpretations are made either in a parallel, integrated, or a sequential manner' (Tashakkori & Teddlie, 2003 cited in Onwuegbuzie et al., 2007, p. 5). Parallel analysis means treating the quantitative and qualitative data first as separate and then combined for further interpretation. Sequential analysis means one analysis phase informs subsequent phases. Parallel, integrated and sequential interpretations were used and are described in the following section.

Mixed method analysis process.

Tashakkori and Teddlie (2010) outline seven processes of mixed method analysis: data reduction, data display and transformation, data correlation, consolidation and comparison and data integration. The processes require inductive, comparative and deductive analysis mechanisms to answer research objectives and questions. In this research, the first two processes of data reduction and display overlapped in time with the first three stages of data analysis of documents, online surveys and interviews, as described earlier. Parallel and sequential interpretation mechanisms were applied here as shown in Table 16. The final five processes – data transformation, correlation, consolidation, comparison and integration – were deployed in order to conduct analysis of the whole data set invoking the mixed method analysis fundamental mechanism of integration (Tashakkori & Teddlie, 2010). Table 16 presents the data analysis stages, the mixed method analysis processes and the relevant research questions answered. These five mixed method analysis processes are explained in the following paragraphs.

Table 16: Data Analysis Stages and Mixed Method Analysis Processes

Data Analysis Stages	Data Type & Analysis	Mixed Method Analysis – 7 Processes	Fundamental Principle of MMA	Research question & sub-questions
Document analysis	Quantitative		Parallel	a)
On-line surveys	Quantitative and Qualitative	1 Data reduction	Parallel & sequential	b), c), d)
Interviews	Qualitative – inductive for emergent themes	2 Data display	Parallel	b), c), d)
Whole data set	Mixed method analysis – inductive & comparative	3 Data transformation 4 Data correlation	Integrated	Research question
Whole data set	Mixed method analysis – deductive	5 Data consolidation 6 Data comparison 7 Data integration	Integrated	

Data transformation meant qualitising the quantitative data by writing a narrative description of the statistical data, that is, statistics were described verbally to enable coding for themes. For example, the number of times stewardship was referenced in each document was a quantitative measure. Descriptive statistics were then summarised with a descriptive narrative to depict the relative importance given to stewardship in the Australian Government documents, for example, 'a receding emphasis given to the expression of stewardship from 1999 to 2010'. Data correlation meant a comparative analysis was conducted on the narratives from the quantitative data with the themes from the qualitative data to investigate potential interrelating themes. Data consolidation occurred when the quantitative and qualitative data sets were combined and new consolidated themes resulted. Data comparison of the two data sets occurred when existing themes were compared and a search for additional emerging relationships and themes was conducted. In the final process of data integration, the two data sets were combined into one, generating an in-depth and a more holistic understanding of the expression of environmental stewardship.

Data Validation and Triangulation

Measuring the quality and validity of mixed methods research data is always a matter to be addressed (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2010). O'Cathain has analysed and synthesised methodological data analysis procedures used by a number of eminent researchers and devised an

eight stage quality framework for mixed methods research (QFfMMR) (cited in Tashakkori & Teddlie, 2010). Relevant to this research are the three domains of quality. Items in each of the three domains are listed and defined in Table 17 along with how they were addressed in this research.

Table 17: Abbreviated Quality Framework for MMR as followed in this Research
Source: Adapted from O'Cathain, 2010 in Tashakkori & Teddlie, 2010

Domain of Quality	Items within domain	Definition of item	Research application
Data Quality	Data transparency	Each method described in detail and role in study	Described in 3.2 Research Design Overview
	Design fidelity	Extent to which methods are implemented with rigor	Methods subject to university ethics protocols
	Adequacy of sampling	Sampling technique and size for each method adequate to the design context	Research design approved by Graduate Research School
	Analytic adequacy	Data analysis appropriate for research question and undertaken properly	Research design approved by Graduate Research School
	Analytic integration rigor	Analysis of integrated data is robust and data transformations are defensible	Data analysis techniques and outcomes widely discussed with supervisors and colleagues
Interpretative Rigor	Interpretative transparency	Clear which findings have resulted from which methods	Described in Chapter 4 of this thesis
	Interpretative consistency	Inferences are consistent with the findings on which based	Data analysis techniques and outcomes widely discussed with supervisors and colleagues
	Theoretical consistency	Inferences are consistent with current knowledge or theory	Discussed in Chapter 2 of this thesis
	Interpretative agreement	Others are likely to reach the same conclusions	Discussed in Chapters 2, 4, 5 and 6 of this thesis
	Interpretative distinctiveness	Conclusions drawn are more credible than any other conclusions	Data analysis techniques and outcomes widely discussed with supervisors and colleagues
	Interpretative efficacy	Meta-inferences from whole study adequately incorporate inferences from qualitative and quantitative findings and inferences	Data analysis techniques and outcomes widely discussed with supervisors and colleagues
	Interpretative bias reduction	Explanations are given for inconsistences between findings and inferences	Described in Chapter 5 of this thesis
	Interpretative correspondence	Inferences correspond to the purpose of the study	Described in Chapters 4, 5 and 6 of this thesis
Inference Transferability	Ecological transferability	To other contexts and settings	Described in Chapters 4, 5 and 6 of this thesis
	Population transferability	To other groups and individuals	Described in Chapters 4, 5 and 6 of this thesis
	Temporal transferability	To the future	Described in Chapters 4, 5 and 6 of this thesis
	Theoretical transferability	To other methods of measuring behaviour	Described in Chapters 4, 5 and 6 of this thesis

Research design and analysis in this project was complex. As outlined in the preceding sections, analysis involved quantitative analysis of document contents and values, attitudes, knowledge and actions from online surveys, and then qualitising the quantitative results. The interview data underwent qualitative analysis for emergent themes, comparison and integration of the multiple data sets and inductive and deductive analysis of the whole data set. Therefore, it is of great value to use the QFfMMR to enhance data quality and validity. Three of the eight domains of the framework – data quality, interpretive rigor and inference transferability – provided a well-structured mechanism for research design and conduct and acted as a checklist on completion to make certain every rigour was in place to ensure the trustworthiness of the findings.

Conclusion

This chapter has described the research design, methodology, and methods employed to understand the expression of environmental stewardship in government policy and a sample of Year 10 teachers and students in the Wet Tropics region of Australia. An explanatory, sequential research design, with three phases of data collection interspersed with five stages of analysis was developed to explore Australian Government and Queensland State Government education policy documents, teacher and student values, environmental attitudes, stewardship capacity, knowledge and behaviour, and teaching and learning for environmental stewardship in a formal context in Year 10 in five state high schools.

Chapter Four – Research Findings

The most fundamental transition is the transition in culture and consciousness.
The change that is needed can be best put as follows:
in the twentieth century we were from Mars
but in the twenty-first century
we must be from Venus – caring, nurturing, and sustaining
Speth, 2004, p. 191

Preface

Teaching and learning for environmental stewardship in formal schooling is comprised of many facets including guidance from education policy, curriculum content, school culture, and teacher and student capacity to engage. As discussed in Chapter 1, environmental stewardship education is associated with environmental and sustainability education in Australia. Findings from the document analysis are presented at the beginning of this chapter. Findings from teacher and student data collected from on-line surveys are presented next and findings from interviews follow. To conclude this chapter, outcomes from a thematic analysis of the whole data set are presented and analysed in answer to research objectives and questions.

Government Documents

Results of the analysis of Australian and Queensland State Government policy documents including the Australian Curriculum, Curriculum into the Classroom and the Sustainability Cross Curriculum Priority followed the process as explained in Chapter 3. For ease of reading in this chapter, the acronym C2C is used for Curriculum into the Classroom and the acronym SCCP is used for the Sustainability Cross Curriculum Priority.

Frameworks and reports.

Results of the frameworks and reports analysis are presented in chronological order in Table 18 with environmental stewardship data represented in blue (top line) and sustainability in black (bottom

line). The terms sustainable and sustainability have been grouped together as sustainability. The key word searches showed several references to stewardship, sustainable and sustainability, but no results for inferences to stewardship. Inference to stewardship in the documents was determined by searching for references to: ethic of care, environmental care, environmental responsibility, nature care and nature responsibility. In Table 18, the number of references to stewardship and sustainability are shown in the column Ref Counts. How concepts of stewardship and sustainability appeared in each document is mapped under Context Density, and the columns are titled Heading, Goal, and Text and are marked with a 'Yes' or a 'No' to indicate how the terms were used. The column Promotion indicates whether each document promoted stewardship and/or sustainability and is categorised as 'Direct', 'Indirect' or 'No'.

Direct promotion means the document showed high context density for stewardship and/or sustainability when key words were referenced in heading/s, goal/s and in general text, or when key words were referenced as a goal/s. Indirect promotion means the document mentions stewardship and/or sustainability in a positive tone, indicated by key words being used in a heading or in general text. The word 'No' in the Promotion column means that any in text references to stewardship and/or sustainability were without advocacy and the document did not promote stewardship or sustainability.

Stewardship was mentioned in six of the fourteen documents, with two documents directly promoting stewardship, two indirectly promoting stewardship and two with no promotion, but with a mention.

Sustainability was mentioned in all documents, with direct promotion of sustainability evident in ten documents, indirect promotion in one, and no promotion in three documents.

Table 18: Government Document Analysis

Document – Year – Author	STEWARDSHIP top row (blue) SUSTAINABILITY bottom row (black) Ref Count	Context Density Heading Yes/No	Goal Yes/No	Text Yes/No	**Promotion** **Direct** **Indirect** **No**
Today Shapes Tomorrow – Environmental Education for a Sustainable Future – A Discussion Paper – 1999 – Australian Government Environment Australia	0 **61**	No **Yes**	No **Yes**	No **Yes**	No **Direct**
The Adelaide Declaration on the Goals for Schooling in the Twenty-first Century – 1999 – Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA)	1 **1**	No **No**	Yes **Yes**	No **No**	Direct **Direct**
Environmental Education for a Sustainable Future National Action Plan – 2000 – Australian Government Environment Australia	3 **2**	No **Yes**	No **Yes**	Yes **Yes**	Indirect **Direct**
Educating for a Sustainable Future – A National Environmental Education Statement for Australian Schools – 2005 – Australian Government Department of Environment and Heritage	9 **148**	No **Yes**	Yes **Yes**	No **Yes**	Indirect **Direct**
The National Framework for Values Education in Australian Schools (NFVE) – 2005 – Australian Government Department of Education, Science and Training	0 **1**	No **No**	No **No**	No **Yes**	No **No**
A National Review of Environmental Education and its Contribution to Sustainability in Australia: School Education – 2005 – Australian Government Department of Environment and Heritage and ARIES	4 **>350**	No **Yes**	No **Yes**	Yes **Yes**	No **Direct**
Initiating the UNDSED in Australia Report on a National Symposium – 2005 – Australian National Commission for UNESCO	1 **190**	No **Yes**	No **Yes**	Yes **Yes**	No **Direct**
Speech to UNESCO Workshop on ESD Research: Setting the stage for a strategic research agenda for the UNDESD – 2006 – Australian Government	0 **108**	No **No**	No **Yes**	No **Yes**	No **Direct**
Caring for our Future. The Australian Government Strategy for the UNDESD, 2005-2014 – 2007 – Australian Government Department of Environment and Heritage	0 **94**	No **Yes**	No **Yes**	No **Yes**	No **Direct**
Caring for our Country. Environmental Stewardship Strategic Framework – 2007 – Australian Government Department of Environment, Water, Heritage and the Arts; Department of Agriculture, Fisheries and Forestry	108 **2**	Yes **No**	Yes **No**	Yes **Yes**	Direct **Indirect**
Melbourne Declaration on Educational Goals for Young Australians – 2008 – The Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEETYA)	0 **1**	No **No**	No **No**	No **Yes**	No **No**
Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability **The Second National Action Plan** – 2009 – Australian Department of the Environment, Water, Heritage and the Arts	0 **255**	No **Yes**	No **Yes**	No **Yes**	No **Direct**
The Sustainability Curriculum Framework, A Guide for Curriculum Developers and Policy Makers – 2010 – Australian Department of the Environment, Water, Heritage and the Arts	0 **105**	No **Yes**	No **Yes**	No **Yes**	No **Direct**
2012 National Report on Schooling in Australia – 2012 – ACARA	0 **1**	No **No**	No **No**	No **Yes**	No **No**

Government documents – stewardship.

Of the six government documents that reference stewardship, the first is the *Adelaide Declaration* (1999) with direct promotion of stewardship through Goal 1.7 which states, 'When students leave school, they should have an understanding of, and concern for, stewardship of the natural environment, and the knowledge to contribute to ecologically sustainable development' (Australian Education Council, 1999, p. 229). Two subsequent documents refer to Goal 1.7, *Environmental Education for a Sustainable Future* (2000) and *Educating for a Sustainable Future* (2005) and indirectly promote stewardship. The fourth document that references stewardship is *Caring for our Country* (2007) with 108 references to stewardship in headings, goals and within the text. Stewardship is promoted within a land care asset management context, not as an education priority, marking a strategic change in government focus with responsibility for stewardship transferred to a new government department, the then Department of Agriculture, Fisheries and Forestry, which is now the Department of Agriculture and Water Resources. There are four references to stewardship in *A National Review of Environmental Education and its Contribution to Sustainability* (2005) and one reference in *Initiating the UNDESD* (2006). Figure 11 maps promotion of stewardship from 1999 to 2012. Zero indicates no promotion of stewardship, one is indirect promotion, and two is direct promotion. The peak in 1999 marks Goal 1.7 in the *Adelaide Declaration* and in 2007, the shift to land asset management in *Caring for our Country*.

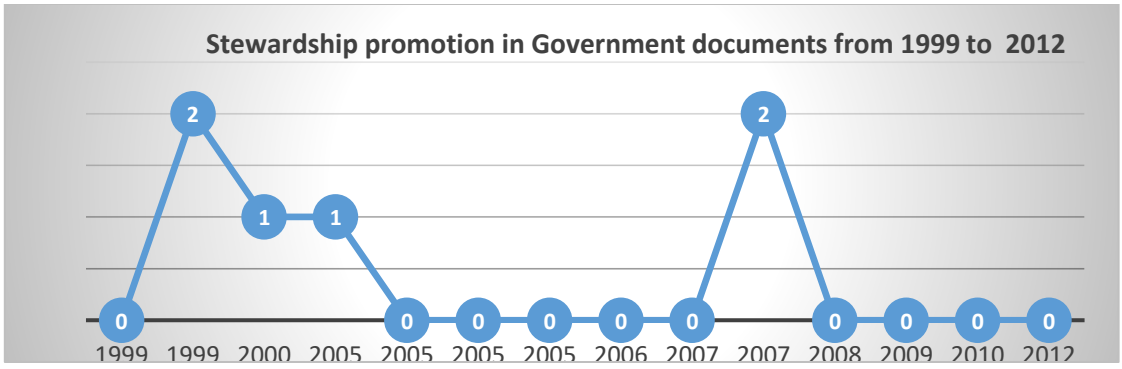


Figure 11: Stewardship Promotion in Government Documents

Government documents – sustainability.

Direct promotion of sustainability occurs in ten documents: *Today Shapes Tomorrow* (1999), the *Adelaide Declaration* (1999), *Environmental Education for a Sustainable Future* (2000), *Educating for a Sustainable Future* (2005), *A National Review of Environmental Education and its Contribution to Sustainability* (2005), *Initiating the UNDESD* (2006), the *Speech to UNESCCO Workshop on ESD Research* (2006), *Caring for our Future* (2007), *Living Sustainably* (2009), and the *Sustainability Curriculum Framework* (2012). Indirect promotion of sustainability occurs in one document: *Caring for our Country* (2007). There is no promotion of sustainability in three documents: the *National Framework for Values Education* (2005), the *Melbourne Declaration* (2008), and the *2012 National Report on Schooling in Australia*.

The following graph in Figure 12 maps how government documents promoted sustainability from 1999 to 2012. Zero indicates no promotion of sustainability, one is indirect promotion, and two is direct promotion. No promotion of sustainability in 2005 is due to the absence of sustainability in the *Values Framework* (2005). In the 2008 *Melbourne Declaration*, there is no mention of sustainability and in the *2012 National Report on Schooling*, there is no comment on sustainability teaching and learning.

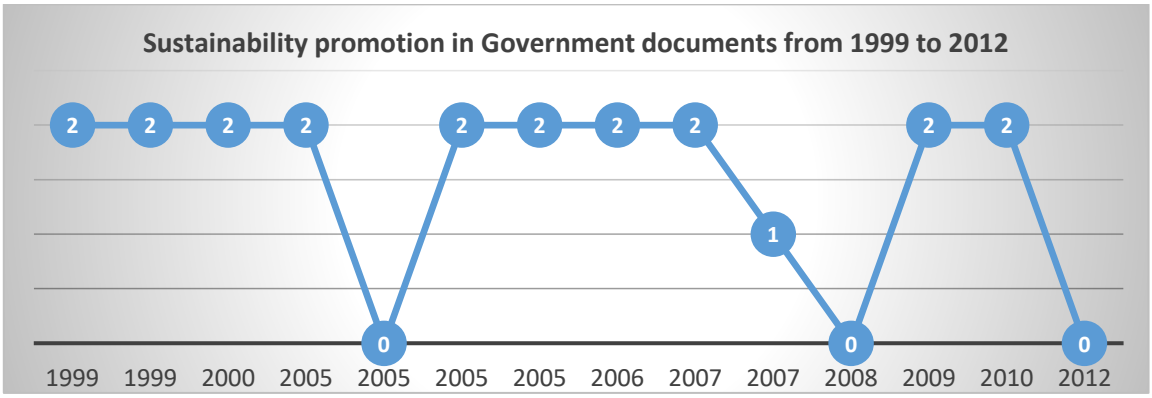


Figure 12: Sustainability Promotion in Government Documents

Stewardship timeline.

The timeline in Figure 13 summaries document analysis findings. The timeline maps the representation of stewardship, and its framing within sustainability, in the chosen fourteen Australian Government reports and frameworks from 1999 to 2012. Document titles have been abbreviated for ease of reading, EE denotes environmental education and ESD is education for sustainable development.

Year	Stewardship Focus	Document	Purpose, Analysis Outcomes, Stewardship and Sustainability linkages
1999	no Stewardship	Today Shapes Tomorrow	…to promote EE discussion
1999	**Stewardship**	Adelaide Declaration	…Education Ministers combine ESD & Stewardship
2000	**Stewardship**	National Action Plan	…Stewardship necessary for Sustainable Development
2005	**Stewardship**	Educating for a Sustainable Future	…Stewardship linked to Sustainable Development
2005	no Stewardship	Values Education	…no Stewardship, no Sustainability
2005	no Stewardship	Review of EE and Sustainability	…no Stewardship, some Sustainability
2005	no Stewardship	UNDESD in Australia	…no Stewardship, focus on Sustainability
2006	no Stewardship	Report to UNESCO	…Sustainability all education sectors, no Stewardship
2007	no Stewardship	Australia education plan for UNDESD	…no Stewardship, ESD
2007	**Stewardship**	Caring for our Future	…Stewardship **no longer education goal now land care**
2008	no Stewardship	Melbourne Declaration	…Education Ministers want ESD, but no Stewardship
2009	no Stewardship	Second National Plan	…ESD, no Stewardship
2010	no Stewardship	Sustainability Curriculum Framework	…no Stewardship
2012	no Stewardship	ACARA School Report	…no Stewardship, no Sustainability

Figure 13: Government Documents – Stewardship Timeline

Between 1999 and 2005 stewardship and sustainability goals were congruent and stewardship was either directly or indirectly promoted in the education narrative alongside sustainability due to references to Goal 1.7 from the *Adelaide Declaration* (1999) in both the *Environmental Education for a Sustainable Future National Action Plan* (2000), and *Educating for a Sustainable Future - A National Environmental Education Statement for Australian Schools* (2005). None of these documents have been updated since. The *National Action Plan* (2000) proposes establishment of a federally funded Australian Environmental Education Foundation with one of many aims being to: 'ensure sustainable

stewardship of the Australian environment' (p. 7). In *Educating for a Sustainable Future (*2005): 'Sustainability also seeks to promote stewardship of the environment, encouraging everyone to assume the responsibility of being a caretaker or custodian for the environment' (p. 4). Also in this document, stewardship is strong in goal five which states, 'develop an ethic of personal responsibility and stewardship towards all aspects of the environment' (p. 8).

From 2006 the education narrative separated stewardship and sustainability, and subsequent education frameworks and reports do not mention stewardship (see Figure 13). Sustainability is directly promoted without any mention of stewardship in: the 2006 *Speech to UNESCO,* the 2007 *Australian Government Strategy for the UNDESD,* the 2009 *National Action Plan for Education for Sustainability* and the 2010 *Sustainability Curriculum Framework*. The ACARA *2012 National Report on Schooling in Australia* does not mention stewardship and only makes one reference to the SCCP in 101 pages. This document does not report on sustainability teaching and learning.

Curricula.

To understand if and how they promote environmental stewardship and sustainability, five core Year 10 subjects in the Australia Curriculum and C2C - English, Maths, Science, History and Geography, and the subject skill sets for sustainability in the SCCP were analysed. Three stages of analysis were followed: i) counting the in text references to key words and in the Australia Curriculum counting the leaf icons that indicate linkages to the SCCP; ii) analysing the context density; and, iii) determining which curricula promote environmental stewardship and sustainability. Considered next, was how each outcome promoted development of three of the four criteria for action competence (Jensen & Schnack, 1997). It was outside the scope of this research to analyse curricula for commitment to act for change, the second criteria for action competence. Key word searches revealed direct references to sustainable and sustainability but no direct references to stewardship or inferences to stewardship. As there was no reference to stewardship in any of the three curricula there was no promotion of stewardship. Findings for each curriculum are explained in the following sections.

Australian Curriculum.

The Australian Curriculum sets national standards for learning outcomes for all subjects and year levels. Version 3.0 of the Year 10 Australia Curriculum and the Scope and Sequence statements for the five Year 10 subjects (English, Maths, Science, History and Geography) were downloaded from the Australian Curriculum website and analysed through a stewardship and sustainability lens in July 2013 and then, Version 7.2 in August 2014. In June 2015, Version 7.5 of the Australia Curriculum replaced Version 7.2 and so the same five subjects in the new version were downloaded and re-analysed. In November 2016, Versions 7.5 and 8.2 were released. Upon inspection, it was found that the Scope and Sequence statements were the same but had been renamed Topics. Subject Linkages to the SCCP in English, Maths, Science, History and Geography were again downloaded and re-analysed. There were no changes to links between the SCCP and subjects.

Findings for the Australian Curriculum are presented in Table 19. Topics are the pedagogical content of the subject and Elaborations are suggestions for developing pedagogy. Linkages to the SCCP are represented by a leaf icon. Numbers in the Ref Count column depict the number of direct references to sustainability. In the Topics and Elaborations columns, the first numbers are the number of references to sustainability and the second number is the total number of Topics and Elaborations for that subject. Numbers in the SCCP column are a count of leaf icons depicting linkages to the SCCP. Together the information in the Topic, Elaborations and SCCP columns demonstrate the context density for sustainability. Promotion of sustainability in a subject depended on sustainability being referenced in a Topic, developed further in an Elaboration, and with linkages to the SCCP. A 'Yes' or 'No' in the Promote column indicates whether or not the subject promotes sustainability. The following paragraphs describe how sustainability appears in each of the five subjects and whether the four criteria for action competence are met (Jensen & Schnack, 1997).

Table 19: Sustainability in Year 10 Subjects in the Australia Curriculum

Subjects	SUSTAINABILITY				
	Ref Count	Context Density			Promote Yes/No
		Topics Ref Count..Total	Elaborations Ref Count..Total	SCCP	
English	0	0…31	0…66	0	No
Maths	0	0…25	0…39	1	No
Science	1	0…21	1…90	15	No
Geography	8	1…21	7…54	25	Yes
History	4	2…33	2…52	9	No

There were no direct references to sustainability in Year 10 English or Maths. There was one link to the SCCP in a Maths Elaboration. In Year 10 Science there was one direct reference to sustainable transport in an Elaboration and 15 linkages to the SCCP, seven of which are in a Topic called: 'Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere'. The Science Elaborations with linkages to the SCCP use words like: 'investigate, examine, consider, describe' and 'evaluate' to enhance scientific knowledge. Science, as it is represented here in the Australian Curriculum, only responds to the first criteria of action competence – increasing knowledge.

In Year 10 Geography, there were eight direct references to sustainability, one in a Topic: 'The human-induced environmental changes that challenge sustainability', and seven in Elaborations. Of the 54 Geography Elaborations there were 25 with a link to the SCCP. The Geography curriculum uses similar words to Science to enhance knowledge for action competence but also uses language to promote a vision for the future and in these Elaborations words such as: 'discuss, propose, compare, explain, debate, analyse, synthesise' and 'reflect' are used. A third element of action competence is developed – action experiences, with the words: 'gather relevant data' used in the Elaboration. Geography, as it is represented here in the Australian Curriculum seeks to develop three of the four components of action competence.

In History, there were four direct references to sustainability in two Topics and two Elaborations. The first reference is the Topic: 'developments in technology, public health, longevity and standard of

living during the twentieth century, and concern for the environment and sustainability'. The second topic is an elective: 'the growth and influence of the environmental movement within Australia and overseas, and developments in ideas about the environment (notion of 'Gaia', 'limits to growth', concept of sustainability, concept of 'rights of nature')'. In Year 10 History, two Elaborations out of a total of 52 reference sustainability. There were nine links to the Sustainability CCP. Language use in the Topics and Elaborations reflects knowledge acquisition only, therefore, as it is represented here this subject only develops the first criteria of action competence – increasing knowledge.

Education Queensland Curriculum into the Classroom.

As mentioned before, C2C – Curriculum into the Classroom, is Education Queensland's interpretation of the Australian Curriculum made classroom ready – with fully developed lesson plans, student worksheets and resources. Subject content is organised into units of work summarised into the following sections: Unit Outlines, Topic Overview statements, Lesson plans and Resources lists. Version 3.0 for Year 10 was accessed for analysis in September 2014.

C2C analysis results are presented in Table 20. The Ref Count column depicts the number of times sustainability was referenced in the subject. The Context Density columns in Table 20 depict how sustainability is written about in the subject: Overview refers to the number of times key words were referenced in any Unit Outline and Topic Overview, the Lessons column provides the number of lessons focused on sustainability and the number of references made to sustainability in those lessons, and the Resources column refers to the number of sustainability references in the teaching resources list. A 'Yes' in the Promote column can be found when the subject referenced sustainability in the overview and resources and had lessons focused on sustainability.

Table 20: Sustainability in Year 10 Subjects in C2C

C2C Subjects	SUSTAINABILITY				
	Ref Count	Context Density			Promote Yes/No
		Overview	Lessons, number of references	Resources	
English	0	0	0	0	No
Maths	0	0	0	0	No
Science	1	0	0	1	No
Geography	15	3	3, 10 references	2	Yes
History	14	6	3, 4 references	4	Yes

There was no mention of sustainability in the Year 10 C2C English and Maths curricula, and only one reference in the Science curriculum to a resource in Lesson 12 in Unit 4, on page 8: a YouTube clip entitled *Sustainability explained through animation*. There is one Science lesson considering environmental ethics when making environmental decisions, but no reference to sustainability. The 15 references to sustainability in Geography and the 14 references in History are described in the following paragraphs.

In C2C Year 10 Geography there are two, 20 week units of study. Unit 1 focuses on: *'*Geographies of human wellbeing' and Unit 2 on 'Environmental change and management'. The Content Description for both units reference sustainability: *'*provides opportunities to develop the following concepts for geographical understandings: place, space, environment, interconnections, change, sustainability, and scale'. There is no further mention of sustainability in Unit 1. Content in Unit 2 provides opportunities to develop eight geographical concepts, one of which references sustainability: 'select and record relevant data and geographical information, using ethical protocols, from a range of appropriate primary and secondary sources to investigate how environmental functions support life and the major challenges to sustainability'. Lesson 1, lesson 3 and lesson 25 from the 25 lessons in Unit 2, reference sustainability and develop this concept. A précis of these lessons is outlined in Table 21.

Table 21: C2C Geography Unit 2 Lesson Plans with Sustainability

Lesson	Teaching and Learning Sequence	Resources
Lesson 1 Making Connections	**Lesson objectives** Students will: Understand the role of change, interconnection and sustainability in developing geographical understanding of the world **Evidence of learning** Can the student: Define the terms change, interconnection and sustainability? **Example learning sequence** Defining the terms change, interconnection and sustainability Understanding the role of change, interconnection and sustainability in geography	No reference to sustainability
Lesson 3 Human-induced change and sustainability	**Lesson objectives** Students will: Understand the impacts of human-induced change that challenge sustainability **Evidence of learning** Can the student: Identify, describe and explain the cause and effect of human-induced changes that challenge sustainability? **Example learning sequence** Responding to the effects of human-induced environmental change that challenge sustainability	**Example resources** -Hotlink to sheet – Human-induced change and sustainability -Hotlink to slideshow – The Aral Sea Human-induced change and sustainability **Helpful information** -Supporting learning resources – Hotlink to Human-induced change and sustainability/Answers
Lesson 25 Reflection	**Example learning sequence** Reflecting of the terms change, interconnection and sustainability	No reference to sustainability

Lessons 1 and 3 develop knowledge about sustainability: to understand the role of human-induced environmental change and invoke one criteria of action competence: to increase knowledge. The neutral language used in Lesson 25 may assist students to develop a vision for the future, but lesson content and context are determined by teacher priorities. In summary, the Geography curriculum has the capacity to develop action competence for sustainability in three lessons.

In C2C Year 10 History there are 3 units of 18, 16 and 14 weeks duration. Both Unit 1 on WWII and Unit 2 about Rights and Freedoms do not reference stewardship or sustainability. In Unit 3, teachers choose from one of three approaches: Approach A (V3.0) Migration Experiences, Approach B (V3.0) Popular Culture and Approach C (V3.0) the Environment Movement. In Approaches A and B there is one reference to sustainability in the Unit Outline: '….developments in technology, public health, longevity and standard of living during the 20th century and concern for the environment and

sustainability', and no further mention of sustainability. In Approach C, there is mention of sustainability in the Unit Outline:

> The post-1060s environmental movement reflects a significant change in global perspectives regarding the role of people on this planet. In the 19th century, a view of human dominance of nature held general sway, at least in the 'west' or industrialised societies. This gave way, as the 19th century proceeded, to late 19th century environmental notions of conservation and preservation, and scientific investigation of 'nature' in places such as national parks. This was, particularly after the 1960s, augmented and/or supplanted by the ideas of the rights of nature, of environmental sustainability and of sustainable development to ensure a future for people on earth.

Table 22 outlines all topics and lessons from Approach C. There are three lessons that directly reference sustainability – lessons 5, 6 and 7 – in the topic called Interpreting Change.

Table 22: C2C History Unit 3 Approach 3 Lesson Plans Focused on Sustainability

C2C History Unit 3 Year 10 The Environment Movement – Approach C (V3.0)			
Lessons per Topic	Topic	Lesson Title	Sustainability objectives or outcomes
1 Lesson	Overview	1 The changing world	None
3 lessons	Recording, evaluating change	2 The emergence of environmental awareness 3 & 4 Environmental impacts in the 20th century	None
3 lessons	Interpreting change	5 & 6 Environmental developments in Australia 7 Sustainability	Sustainability objectives
7 lessons	Responding to change	8 -14 History research processes and assessment task	No written sustainability objectives in C2C but content open to teacher and possibly student input

Lessons 5 and 6 focus on student understanding of how significant events and campaigns contributed to popular awareness of environmental issues in Australia. Lesson 7 objectives are to develop understanding about responses by Australian Governments to environmental threats including climate change. Learning sequences outline discussion about the different perspectives of sustainability, analysis of the significance of the concept of sustainability within the environment movement, population growth and resource use, and how different Australian Governments have responded to sustainable management of the natural environment. These are sequenced lessons, not extended inquiry learning that may be structured to develop deeper knowledge about sustainability.

They may incorporate learning activities with action experiences to assist students develop their vision for the future and they may facilitate development of three of the four criteria for action competence. The perspective adopted in the classroom is dependent on teacher capacities, subjectivities and school and system limitations.

Sustainability Cross Curriculum Priority.

The SCCP seeks to assist students to develop the knowledge, skills, values and world views necessary to contribute to more sustainable ways of living. The SCCP presents a skill set relevant to each Learning Area. A précis of these skills include:

English:	skills necessary to investigate, analyse and communicate ideas and information related to sustainability, and to advocate, generate and evaluate actions for sustainable futures
Maths:	develop the proficiencies of problem solving and reasoning essential for the exploration of sustainability issues and their solutions
Science:	investigating the relationships between systems and system components and how systems respond to change, students develop an appreciation for the interconnectedness of Earth's biosphere, geosphere, hydrosphere and atmosphere
Geography:	develop a holistic understanding of human dependence on the environment; opportunities for students to integrate their study of biophysical processes with investigations of the attitudinal, demographic, social, economic and political influences on human use and management of the environment
History:	development of students' world views, particularly in relation to judgments about past social and economic systems, and access to and use of the Earth's resources

All subjects list increased knowledge for sustainability as a desirable outcome. Only Geography seeks to develop other aspects of action competency with the development of: 'holistic understanding of human dependence on the environment'. The role of the SCCP is to inform curriculum. It was outside the scope of this research to investigate how the priority directly informed C2C.

Curricula lesson plans and focus.

In summary, in the Australian Curriculum, C2C and the SCCP there is no reference or inference to environmental stewardship. It was important to map how sustainability is promoted in curricula because developing environmental stewardship principles are important outcomes for education for sustainability. There were limited references to sustainability in the Australian Curriculum and in C2C.

The SCCP lists subject relevant sustainability skills, which may best be used as a reference tool when writing curriculum and/or planning lessons. However, teachers in the study sample reported not using the tool as curricula is provided by Education Queensland through C2C.

In V7.5 of the Australian Curriculum, there was limited or no reference to sustainability in English, Maths and Science. In Geography, there was limited reference to sustainability in one topic out of 21 and in seven elaborations out of 54. There was limited reference to sustainability in History with four references, in two topics out of 33 and in two elaborations out of 52. In the Australian Curriculum, only Geography promoted sustainability action competency.

In C2C (V3.0), two of the five subjects have limited promotion of sustainability. There is no reference to sustainability in English and Maths. In Science, there is only one reference to sustainability as a teaching resource in one lesson. In Geography, sustainability is referenced in Units 1 and 2 in the Content Description. In Unit 2, three lessons focus on how to develop the environmental functions to support life and to address the major challenges to sustainability. In History, sustainability is outlined in three lessons in an elective unit about the environment movement in Australia, with the focus being to understand government responses to environmental threats. This indicated limited development and promotion of sustainability action competency.

To conclude, C2C is the curriculum that guides Year 10 teaching content for the Wet Tropics in Far North Queensland state schools. Throughout Year 10 there are six planned lessons (of which three are an elective) directly related to sustainability and one lesson about environmental ethics. These lessons are spread across three subjects – History, Geography and Science. In terms of classroom teaching and learning time, seven lessons with an average lesson time of 50 minutes equates to 350 minutes of lessons directly focused on sustainability, less than 6 hours out of the (approximately) 390 hours of teaching time allocated to the five core subjects across the school year. Although the three subjects with sustainability content – History, Geography and Science – are considered core subjects, not all

Year 10 students undertake these studies. Figure 14 graphs sustainability lessons as less than two per cent of the total lessons for Year 10 English, Maths, Science, Geography and History.

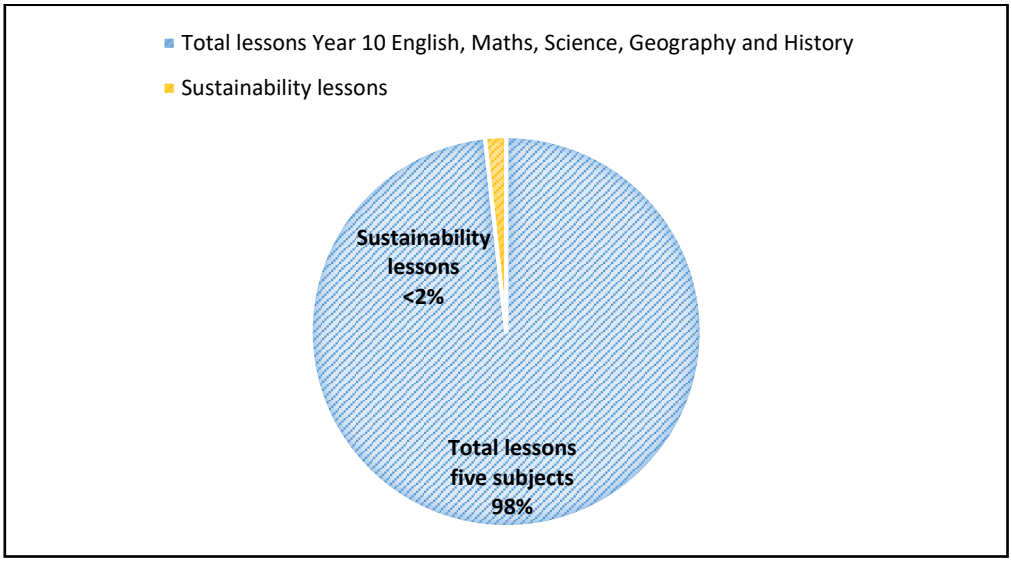


Figure 14: Sustainability Lessons Proportional to Total Lessons in Year 10 English, Maths, Science, Geography and History

In addition to the five core subjects analysed in this research, Year 10 students undertake one to three elective subjects. These may include Health and Physical Education, subjects from these groups – Languages, Technology, The Arts (dance, drama, music, media arts and visual arts) and other elective subjects specific to schools. Typically, these subjects do not have a sustainability focus. Therefore, in terms of the total number of lessons across all subjects in Year 10, teaching and learning for sustainability accounts for less than one percent of planned curriculum content in C2C.

Online Surveys

As discussed in Chapter 3, the online survey consisted of three parts: Section 1 used the Portrait Values Questionnaire – PVQ (Schwartz, 2012) to understand value prioritisation, Section 2 used a modified version of the Environmental Attitudes Index – EAI (Milfont & Duckitt, 2010) to explore environmental attitudes, and Section 3 was designed by the researcher to explore stewardship capacity, knowledge and action. The teacher and student surveys were identical apart from some amendments to Section 3 in both surveys. Teachers were asked about the need for environmental stewardship and sustainability teaching and learning, their level of preparedness and levels of professional and

administrative support, and about the need for environmental values education. Students were asked if there were learner benefits from stewardship and sustainability education and if peers displayed stewardship and sustainability behaviours.

Teacher online survey results.

Responses were imported from Survey Monkey into a Microsoft (MS) Excel spreadsheet and data were descriptively analysed. Analysis results are presented in the following sections.

Section 1 – Teacher Values.

As stated earlier, the PVQ identifies ten basic values important to individuals across cultures: universalism, benevolence, tradition, conformity, security, power, achievement, hedonism, stimulation and self-direction. Analysis of data reveals how participants' rate and rank their value prioritisations. As represented in Figure 15, **t**eachers rated all values highly (blue or bottom line in the graph) between 1.7 and 2.7 on a Lickert scale which ranged from one – very much like me, to seven – not like me at all. Teachers ranked benevolence first, universalism second, self-direction third and conformity as the least important value (depicted by the red or top line in Figure 15).

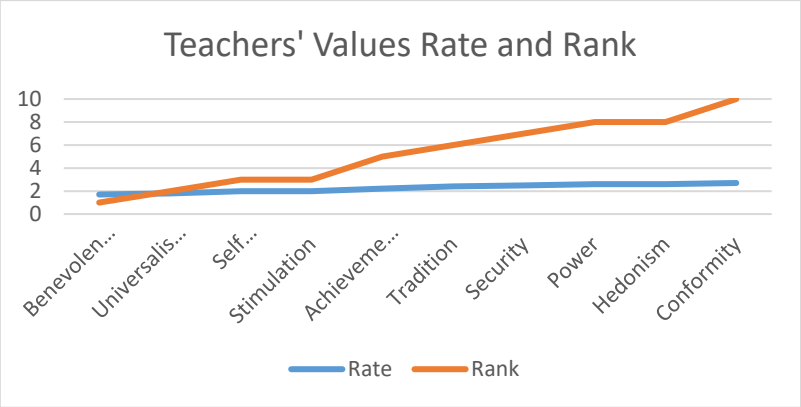


Figure 15: Teachers' Values Rate and Rank

On the Schwartz circumplex, the ten values organise into two second order values with opposing dimensions – self-transcendence in opposition to self-enhancement and openness to change in opposition to conservation of the status quo. Teacher responses placed on the circumplex reveal a prioritisation of values in the self-transcendence and openness to change quadrant. See Figure 16.

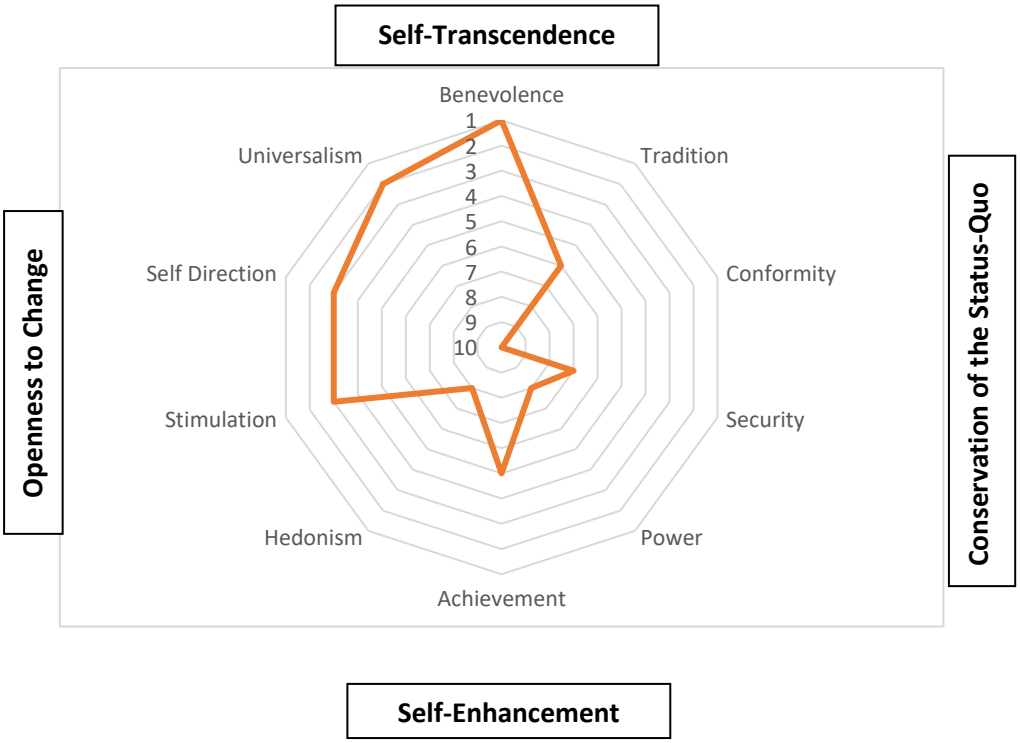


Figure 16: Teachers Value Rankings

Key: 1 most important value, 10 least important

As discussed in Chapter 1, the four hypotheses of pro-environmental behaviour (PEB) postulated by Karp (1996) can be mapped in relation to Schwartz's value circumplex. Briefly, H_1 denotes individuals whose value rankings lie in the self-transcendence and openness to change quadrants as engaging in PEB. H_2 depicts individuals whose value rankings lie in the self-transcendence and conservation of the status quo quadrants, as engaging in PEB when it is the norm. H_3 depicts individuals whose values align with self-enhancement and openness to change, as engaging in PEB when there is a clear link between PEB and self-interest. H_4 depicts individuals whose values strongly align with self-enhancement and conservatism as being the least likely to be pro-environmental.

From these data, teacher value preferences are in alignment with H_1, indicating they engage in pro-environmental behaviour. A pictorial representation of Karp's hypotheses is presented in Figure 17.

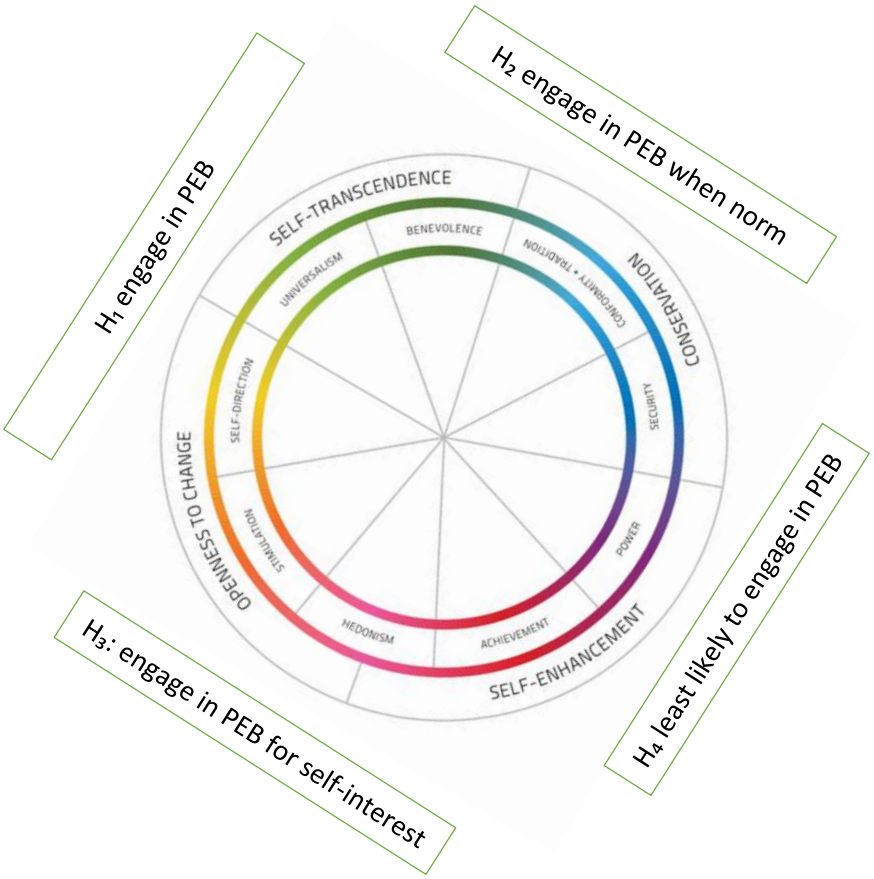


Figure 17: Schwartz Value Circumplex Overlaid with Karp Hypotheses

Section 2 – Teacher Environmental Attitudes.

As discussed in Chapter 3, the Environmental Attitudes Index (EAI) assesses environmental attitudes using 12 different scales, which then define a two dimensional higher order structure of preservation and utilisation of the environment. The combined mean score for the preservation scale for teachers was 5.66 and utilisation was 5.54, indicating that teachers' environmental attitudes are pragmatically distributed between preservation and utilisation of the natural environment. This suggests that whilst teachers are inclined to care for the natural environment, the natural environment is positioned as a resource and is there to be used.

Section 3 – Teacher Stewardship Knowledge and Behaviour.

On a scale of one to seven, with one strongly disagree, seven strongly agree and four undecided, teachers indicated responses to the Stewardship Knowledge and Behaviour Scales, as presented in Table 23. A high mean score was recorded for concern for the natural world – 6.64, the need for sustainability education in schools – 6.40, education to value the environment *should be* included – 6.20 and developing stewardship would assist students' well-being – 6.00. Teachers were neutral

about the ease and level of school support for teaching sustainability. Teachers further indicated that students generally do not display stewardship values and actions and that they were unhappy with the level of stewardship education in their school. However, teachers noted that there was no evidence of an anti-environment culture in staff and students (see Whitehouse, 2001; Whitehouse & Evans, 2010).

Table 23: Teachers Responses to Stewardship Knowledge and Behaviour Scales

Stewardship Knowledge and Behaviour Scales - Teachers	M (SD) N = 5
Connected to the Earth and the Natural Environment	5.87 (.91)
Concern for the Natural World	6.64 (.48)
Concern for the Future	5.53 (1.36)
Importance of Action for Stewardship and Sustainability	5.77 (1.24)
School Learning about the Environment and Sustainability	
Need for sustainability education in schools	6.40 (.49)
Ready and able to teach sustainability	5.52 (1.17)
Support for and ease of teaching sustainability	4.14 (1.09)
Need for conceptual and experiential learning for sustainability	6.00 (0.66)
Evidence of anti-environment culture in staff and students	3.80 (1.32)
School Learning about Stewardship	
Education to value the environment IS included	4.80 (.99)
Education to value the environment SHOULD BE included	6.20 (.45)
Students generally display stewardship values and actions	3.20 (1.6)
Happy with the level of stewardship education in their school	3.40 (1.02)
Developing stewardship would assist students' well-being	6.00 (.63)

In response to questions about sources of environmental information, teachers indicated that they obtain most of their information about the environment from the media, followed by colleagues. In equal third place were documentaries, websites and family members, followed by social media, then professional development – which included seminars, conferences and reading. Teachers reported movies as the sixth source from which they obtained environmental information. Three teachers agreed they trusted their information sources, one sort of agreed and one was undecided. This comment was added to the undecided response: 'There is a lot of conflicting information out there and it takes time to analyse and develop a strong, personal opinion based on the facts provided'.

Student online survey outcomes.

Across five schools, 126 Year 10 students began the survey and 109 students – 47 males and 62 females – completed the survey. The average age of students was 15 with 2 students identifying they were 11 years old, 15 students were 14 years, 89 were 15 years, 17 were 16 years, 2 were 17 years, and 1 was 18 years old. Results are presented below.

Section 1 – Student Values.

The *Portrait Values Questionnaire* (PVQ) identifies ten basic values important to individuals across cultures enabling participants' value prioritisation and congruence to be mapped. Participants ranked on a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) how they identified with the values expressed in each statement or item in the questionnaire. For analysis in SPSS, items were summed to create value mean scores. Values were then ranked from one to ten based on mean scores to show value priorities. Figure 18 shows male and female scores for each of the basic values (bar graph) and value priorities (line graph). Both males and females ranked benevolence first, stimulation second, and universalism third. Males ranked hedonism fourth and self-direction fifth and females the opposite. Rankings were the same for the remaining values.

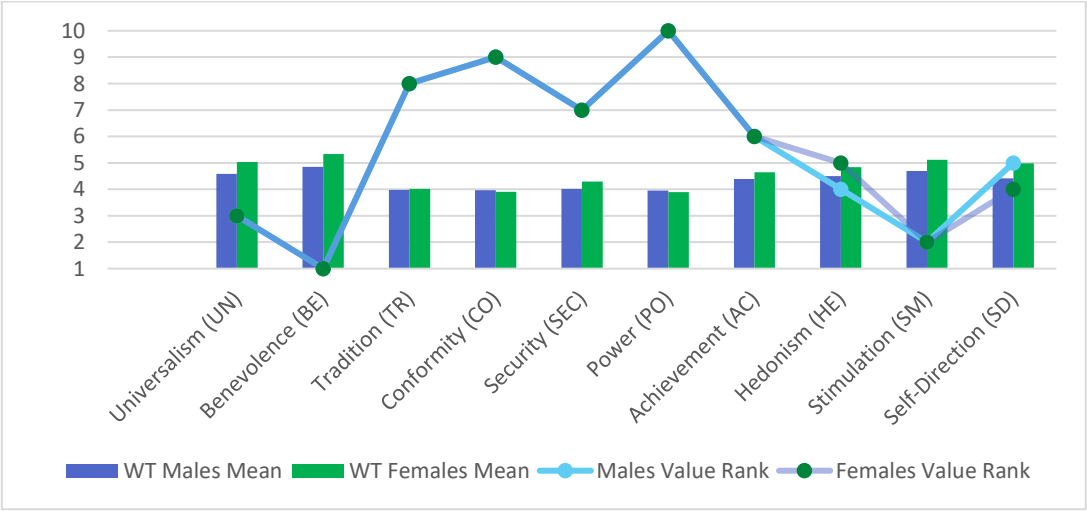


Figure 18: Wet Tropics Male and Female Values – Mean (bars) and Rank (line)

Female students reported significantly higher value priorities than male students for self-direction, the expressive-communal values of universalism, benevolence and stimulation. See Table 24.

Table 24: Comparison of Female and Male Student Values in the Wet Tropics

Values	Female *N* = 62 *M* (*SD*)	Male *N* = 47 *M* (*SD*)	P value
Self-Direction	4.98 (0.73)	4.42 (0.81)	< 0.001
Universalism	5.36 (0.65)	4.73 (0.94)	< 0.001
Benevolence	5.33 (0.65)	4.85 (0.88)	0.002
Tradition	4.02 (1.09)	3.99 (0.90)	0.860
Conformity	3.91 (1.15)	3.98 (1.21)	0.768
Security	4.29 (1.05)	4.02 (1.18)	0.211
Power	3.89 (1.21)	3.97 (1.01)	0.739
Achievement	4.65 (1.13)	4.39 (1.06)	0.226
Hedonism	4.85 (1.05)	4.50 (1.08)	0.094
Stimulation	5.12 (0.87)	4.69 (0.95)	0.016

City suburban and rural students differed significantly in two of the ten values. See Table 25. City suburban students reported higher mean scores for the expressive-communal values of universalism and benevolence compared with rural students.

Table 25: Comparison of City Suburban and Rural Student Values

Values	City suburban WT students *N* = 83 *M* (*SD*)	Rural WT students *N* = 26 *M* (*SD*)	P value
Self-Direction	4.79 (0.79)	4.58 (0.86)	0.232
Universalism	5.19 (0.77)	4.77 (0.99)	0.025
Benevolence	5.21 (0.72)	4.85 (0.93)	0.040
Tradition	4.03 (1.04)	3.94 (0.95)	0.702
Conformity	3.96 (1.19)	3.86 (1.13)	0.711
Security	4.23 (1.13)	4.00 (1.05)	0.361
Power	3.94 (1.11)	3.88 (1.20)	0.829
Achievement	4.59 (1.09)	4.36 (1.15)	0.355
Hedonism	4.72 (1.14)	4.63 (0.82)	0.734
Stimulation	5.00 (0.94)	4.73 (0.87)	0.197

Responses placed on the Schwartz circumplex reveal a prioritisation of student values in the self-transcendence and openness to change quadrant. See Figure 19. Discussion in relation to Karp's hypotheses follows later.

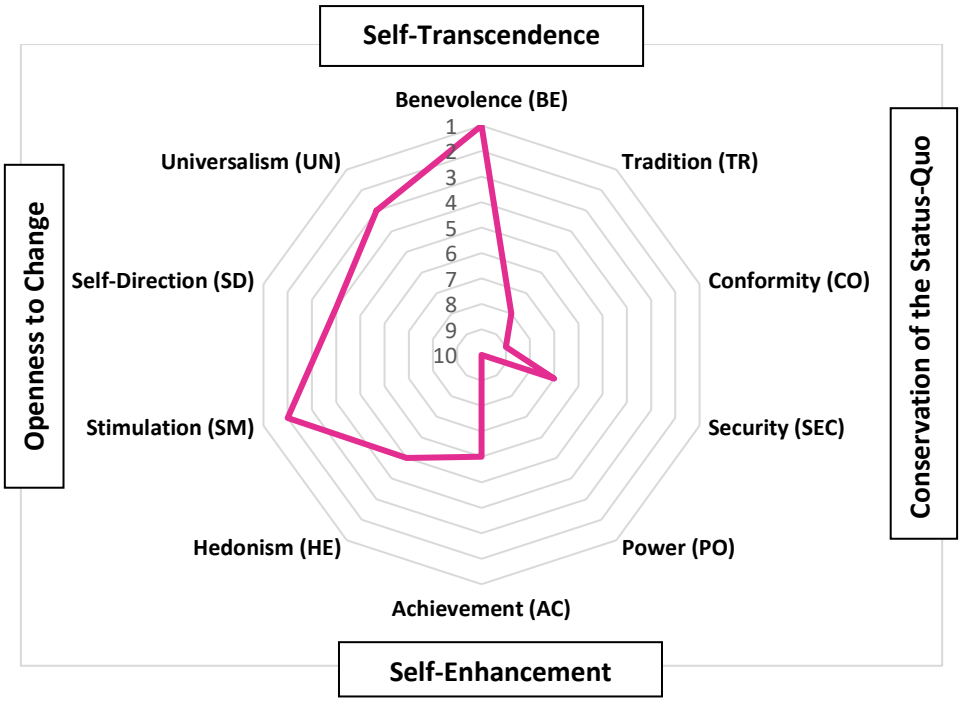


Figure 19: Value Rankings Wet Tropics Students

Key: 1 most important value, 10 least important

A one sample *t*-test was conducted to compare the student value ranking results from this study with a study of German adolescents of similar age conducted by Musiol and Boehnke (2013). The German adolescents ranked the ten values accordingly: hedonism first, benevolence second, followed by self-direction, universalism, stimulation, achievement, security, conformity, power and lastly tradition.

The two groups comparative sample reliabilities for the value types were satisfactory. Listed are Cronbach's alpha values for the Wet Tropics followed by reliability values from the German study (WT/German): universalism .63/.61, benevolence .60/.68, tradition .20/.35, conformity .72/.65, security .55/.60, power .56/.54, achievement .64/.79, hedonism .73/.66, stimulation .60/.56 and self-direction .43/.52. Wet Tropics students reported significantly higher value priorities for the expressive-communal values of universalism and benevolence, for tradition, conformity, the agentic-instrumental values of power and achievement and for stimulation compared with German students (see Table 26 and Figures 20 and 21.) German students reported a higher value priority for hedonism compared with Wet Tropics students. Students did not differ significantly for the values of self-direction or security.

Table 26: Comparison of Wet Tropics and German Student Values

Values	Wet Tropics students *N* = 109 *M* (*SD*)	German students *N* = 426 *M* (*SD*)	P value
Self-Direction	4.74 (0.81)	4.71 (0.75)	0.670
Universalism	5.09 (0.89)	4.53 (0.95)	< 0.001
Benevolence	5.12 (0.79)	4.89 (0.76)	0.003
Tradition	4.01 (1.01)	3.48 (1.12)	< 0.001
Conformity	3.94 (1.17)	3.69 (1.03)	0.028
Security	4.17 (1.11)	4.20 (1.18)	0.809
Power	3.93 (1.12)	3.59 (1.21)	0.002
Achievement	4.54 (1.11)	4.24 (1.06)	0.005
Hedonism	4.69 (1.07)	4.96 (0.92)	0.012
Stimulation	4.93 (0.92)	4.44 (1.04)	< 0.001

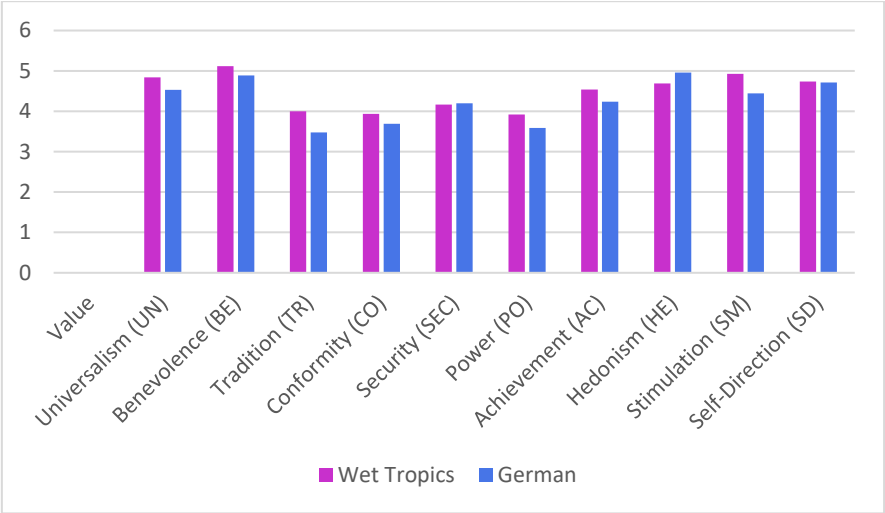


Figure 20: Comparison of Value Means between Wet Tropics and German Adolescents

The comparative value rankings for Wet Tropics and German adolescents are presented in the cirumplex in Figure 21. The pink line indicates participants from the Wet Tropics study prioritising values in the self-transcendence and openness to change quadrant indicating that students engage in pro-environmental behaviour (PEB). In contrast, the German adolescents from the Musiol and Boehnke (2013) study indicate values in alignment with Karp's H_3 where PEB is linked with self-interest.

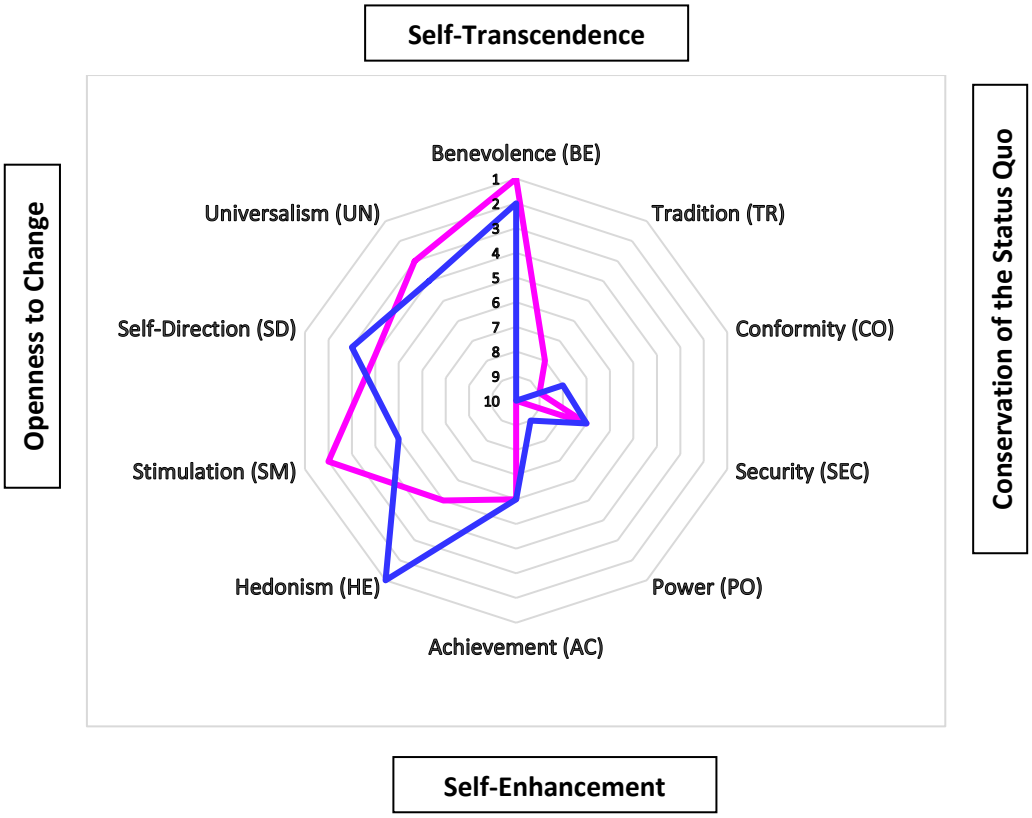


Figure 21: Wet Tropics and German Adolescent Value Rankings

Wet Tropics German Key: 1 most important value, 10 least important

Section 2 – Student Environmental Attitudes.

The *Environmental Attitudes Index* (EAI) is based on 12 scales oriented to either preservation or utilisation of the environment. Students in this study scored a mean of 4.461 for the preservation scales and 3.416 for the utilisation scales, indicating that adolescents in the Wet Tropics feel more inclined to preserve the natural environment. Table 27 compares Wet Tropics responses with New Zealand university students aged between 16 and 51 (Milfont & Duckitt, 2010). In the New Zealand study, participants scored a mean of 4.83 for preservation scales and 3.64 for the utilisation scales. Participants from the Wet Tropics generally disagreed with statements in scales 4, 5, 7, 8, 9, 10 and 12 and similar negative responses were present in the New Zealand study in scales 4, 5, 9, 10 and 12. Overall, there were no significant differences in the responses of the Year 10 students in the Wet Tropics in this study and the New Zealand university students in the 2010 study.

Table 27: Comparison of EAI Scales between Wet Tropics and New Zealand Students

Scale	Type	Name	Wet Tropics α Mean (SD) N = 100	New Zealand α Mean (SD) N = 314
1	P	Enjoyment of nature	.58 4.55 (1.10)	.87 4.88 (1.01)
2	P	Support for interventionist conservation policies	.49 5.00 (0.92)	.87 5.39 (.89)
3	P	Environmental movement activism	.72 4.18 (1.17)	.89 4.56 (1.06)
4	U	Conservation motivated by anthropocentric concern	.14 3.39 (1.57)	.74 3.81 (.82)
5	U	Confidence in science and technology	.78 3.97 (1.30)	.84 3.73 (.83)
6	P	Environmental fragility	.09 4.56 (.63)	.87 5.05 (.89)
7	U	Altering nature	.42 3.48 (1.34)	.72 4.10 (.77)
8	P	Personal conservation behaviour	.55 3.95 (1.19)	.80 4.67 (.91)
9	U	Human dominance over nature	.57 2.89 (1.00)	.87 3.13 (1.04)
10	U	Human utilisation of nature	.68 3.36 (1.08)	.86 3.44 (.80)
11	P	Ecocentric concern	.80 5.26 (1.11)	.88 5.40 (.88)
12	P	Support for population growth policies	.76 3.74 (1.18)	.85 3.87 (1.00)

Table 28 presents gender and school comparisons within the Wet Tropics study group. Females scored a higher mean on seven of the 12 scales, six of which were preservation scales highlighted yellow in Table 28. Males scored higher on scales measuring confidence in science and technology, altering, using or dominating nature, and support for population growth policies highlighted green in Table 28.

Table 28: Male/Female and City/Regional School Comparisons

Scale	Name	Wet Tropics Mean (SD)			
		Males N = 45	Females N = 55	City Schools N = 75	Regional Schools N = 25
1-P	Enjoyment of nature	4.51 (1.08)	4.60 (1.13)	4.57 (1.17)	4.51 (.91)
2-P	Support for interventionist conservation policies	4.85 (0.83)	5.14 (.99)	5.08 (.85)	4.77 (1.10)
3-P	Environmental movement activism	3.90 (1.17)	4.41 (1.12)	4.28 (1.15)	3.90(1.21)
4-U	Conservation motivated by anthropocentric concern	3.59 (1.10)	3.23 (1.18)	3.22 (1.16)	3.92 (.95) *
5-U	Confidence in science and technology	4.18 (1.10)	3.80 (1.44)	3.88 (1.24)	4.25 (1.50)
6-P	Environmental fragility	4.43 (.69)	4.80 (.65)	4.67 (.63)	4.56 (.85)
7-U	Altering nature	3.64 (1.08)	3.35 (1.51) *	3.43 (1.44)	3.64 (.96) *
8-P	Personal conservation behaviour	3.72 (.90)	4.15 (1.36) *	3.97 (1.22)	3.92 (1.11)
9-U	Human dominance over nature	3.17 (.94)	2.65 (1.00)	2.71 (.96)	3.40 (.96)
10-U	Human utilisation of nature	3.62 (.94)	3.14 (1.15) *	3.20 (1.07)	3.85 (.96)
11-P	Ecocentric concern	4.85 (.98)	5.59 (1.10)	5.41 (.97)	4.80 (1.36) *
12-P	Support for population growth policies	3.99 (1.08)	3.54 (1.23)	3.60 (1.18)	4.15 (1.12)

Students from city schools scored a higher mean on the same seven scales as the general female responses highlighted purple in Table 28. Participants at rural schools shared the same responses to

nature as the males, highlighted blue in Table 28. An independent sample *t*-test was performed to compare male and female responses. Males and females showed significant variances (p values between .005 and .001) in scales 7, 8 and 10. Males were more likely to endorse statements about altering and utilising nature, whereas females were more likely to endorse statements about personal conservatism behaviour. The same test comparing city and regional schools showed significant variances (p values between .005 and .001) in scales 4, 7 and 11. The scales are marked in Table 28 with an asterisk (*). City students were less likely than regional students to agree that protection of the environment was motivated by anthropocentric concern and more likely to report an ecocentric concern over environmental damage. Regional students were more likely to endorse statements about humans having the right to alter nature.

Section 3 – Student Stewardship Knowledge and Behaviour.

This section of the questionnaire was purposely designed to gather information about perspectives on a number of environmental topics. Responses were rated on a seven point Likert scale ranging from strongly disagree 1, to strongly agree 7, with a medium point of 4 = undecided. Statements in this section were grouped into the five scales shown in Table 29 with a mean range from 4.75 to 5.45, indicating that participants felt connected to and were concerned for the natural environment, were concerned for the future and rated that action for and school learning about the environment through stewardship and sustainability were important.

Table 29: Student Stewardship Knowledge and Behaviour Scales

Student Stewardship Knowledge and Behaviour Scales	M (SD) N = 95
Connected to the Earth and the Natural Environment	5.03 (1.01)
Concern for the Natural World	5.45 (1.04)
Concern for the Future	4.89 (.80)
Importance of Action for Stewardship and Sustainability	4.75 (.84)
School Learning about the Environment, Stewardship and Sustainability	4.96 (1.00)

Individual responses to the scale concern for the natural world are listed in Table 30. An average of all responses indicate that 73 participants were concerned for the natural world, 7 were not, and 15 participants were undecided. Eighty-four percent of participants indicated that nature is being

destroyed by humans all around the globe, 83% indicated the Wet Tropics is an important environmental area, and 80% indicated that clean air and water supplies are threatened by global pollution. Only 58% of participants indicated that consumerism is wasting earth's resources.

Table 30: Responses to Statements in Concern for the Natural World Scale

Concern for the Natural World Scale	Agree	Percentage Participants
Global environmental issues make me worried.	69	73%
The future supply of clean air and water is threatened by global pollution.	76	80%
Climate change is a problem that affects the whole world.	74	78%
Biodiversity loss (lots of animal and plant species dying) is happening at an alarming rate.	74	78%
Consumerism is wasting earth's resources.	55	58%
In lots of places around the world, nature is being destroyed by humans.	80	84%
The natural environment needs protection - today more than ever before.	74	78%
The Wet Tropics, where I live, is important environmentally.	79	83%
There are many threatened - either polluted or damaged, natural areas in the Wet Tropics.	73	77%

In the concern for the future scale, responses to two statements indicate student concern. The first: 'My generation will be left a world full of environmental problems', show 63 (66%) of the 95 participants agree, 19 were undecided and 13 disagreed. For the second statement: 'The thought of solving environmental problems in the future makes me deeply worried', 44 (46%) participants agreed, 19 were undecided and 32 disagreed. Two-thirds of the students responded they will inherit a world full of problems and just less than half are deeply worried by this prospect.

Individual responses to school learning about the environment, stewardship and sustainability are shown in Table 31. An average of all responses indicate that 65% of participants were in favour of learning about the environment, stewardship and sustainability in school, 22% were undecided and 13% were not in favour. The last two statements in Table 31 indicate a high level of indecision. Approximately one third of students were undecided about whether fellow students display stewardship values and actions and students were divided about whether there was evidence of an anti-environment culture at school.

Table 31: Responses to School Learning about the Environment, Stewardship and Sustainability

School Learning about the Environment, Stewardship and Sustainability Statements	Agree	Percentage Participants
There is a need for sustainability education in schools	71	75%
Students benefit from learning about sustainability at school	69	73%
Learning about the theory of sustainability is an important aspect of sustainability education	66	69%
Participating in sustainability activities at school benefits students	69	73%
Learning to value the environment is an important part of learning about sustainability	73	77%
I value learning about the environment	71	75%
My fellow students generally display stewardship values and actions	36	38%
There is evidence of an anti-environment culture at school	42	44%

Female students expressed a greater concern for the natural world compared with male students (p = 0.001). See Table 32.

Table 32: Comparison of Gender and Student Stewardship Knowledge and Action

Stewardship Knowledge and Action Items	Female *N* = 54 *M* (*SD*)	Male *N* = 41 *M* (*SD*)	P value
Connected to the Earth and the Natural Environment	5.16 (0.95)	4.86 (1.08)	0.167
Concern for the Natural World	5.76 (0.92)	5.05 (1.07)	0.001
Concern for the Future	5.02 (0.83)	4.72 (0.74)	0.071
Importance of Action for Stewardship and Sustainability	4.87 (0.85)	4.61 (0.81)	0.138
School Learning about the Environment, Stewardship and Sustainability	5.05 (1.03)	4.84 (0.86)	0.315

There were no significant differences between city suburban and rural students' expressed stewardship knowledge and action. See Table 33.

Table 33: Comparison of Geographic Location and Student Stewardship Knowledge and Action

Stewardship Knowledge and Action Items	City suburban *N* = 72 *M* (*SD*)	Rural *N* = 23 *M* (*SD*)	P value
Connected to the Earth and the Natural Environment	5.10 (0.96)	4.79 (1.16)	0.209
Concern for the Natural World	5.48 (1.01)	5.38 (1.17)	0.692
Concern for the Future	4.90 (0.72)	4.86 (1.04)	0.845
Importance of Action for Stewardship and Sustainability	4.74 (0.74)	4.82 (1.09)	0.735
School Learning about the Environment, Stewardship and Sustainability	4.99 (0.97)	4.84 (1.10)	0.519

Participants (n=95) rated documentaries as their main source of information, with 80 (84%) receiving 'a little to most' of their environmental information from documentary media. The next most common sources were teachers and school work – 77 participants (81%), websites – 76 participants (80%),

followed by traditional media (TV, newspapers and magazines) – 65 participants (68%), family members – 56 participants (59%), movies – 41 participants (43%), social media – 39 participants (41%) and lastly, friends – 31 participants (33%). Sixty-three participants (66%) trust the environmental information they receive, 19 are undecided and 13 do not trust the information. Table 34 outlines trust levels for environmental information between males and females in the Wet Tropics, and between city and regional schools. Female students were more inclined to trust the environmental information they received compared with male students, and students in regional schools were less likely than students in city schools.

Table 34: Trust of Environmental Information

Trust environmental information					
Wet Tropics Mean (SD)		City Schools Mean (SD)		Regional Schools Mean (SD)	
M	N = 41	M	N = 31	M	N = 10
4.70	(1.27)	4.84	(1.18)	4.30	(1.49)
F	N = 54	F	N = 41	F	N = 13
4.96	(1.29)	5.02	(1.19)	4.77	(1.59)

Gender and location comparisons.

There was little difference in value rankings between male and female participants and between city suburban and regional students. Cross cultural differences were evident however. Adolescents in the Wet Tropics were more inclined to pro-environmental behaviour (PEB) compared to German adolescents in the Musiol and Boehnke study (2013) whose values indicated PEB was linked with self-interest. Adolescents in the Wet Tropics may conceptually identify with the area and accord a higher value to the natural environment and be more inclined to PEB without the need to attach self-interest outcomes because of the natural beauty of the area and the international profile of the two World Heritage Areas. Whereas, Musiol and Boehnke define their research as occurring in an 'individualistic' cultural context. The environmental attitudes of females in the Wet Tropics were more inclined to preserve the environment than males and regional adolescents were more likely to utilise and care for the natural environment than city suburban students, similar to the Milfont and Duckitt (2010) study and to students in a UK study (Hinds & Sparks, 2008). Female Wet Tropics students expressed a

greater concern for the natural world than male students. Students in regional schools were less likely to trust the environmental information they received than students in city schools. Perhaps this resulted from regional students being able to gain knowledge through direct experience (see Hinds & Sparks, 2008).

Interviews

Teacher interview results.

Interview data were analysed using an inductive approach by making 'detailed readings of raw data to derive concepts, themes or a model through interpretations made from the raw data' (Thomas, 2006, p. 238). After inductive analysis and interpretation, the interview data logically fell into two overarching themes. These are:

1. Current practice of stewardship and sustainability teaching and learning
2. Considerations for stewardship and sustainability teaching and learning

The first overarching theme is a summary of teachers' perspectives of/on current practice about stewardship and sustainability teaching and learning and is represented in Figure 22. The second overarching theme is a summary of teachers' perspectives and considerations for stewardship and sustainability teaching and learning and is represented in Figure 23. In the following discussions individual teacher responses are nominated by a code – TH1, TH2, TH3, TH4 and TH5.

Overarching theme one: Current practice of stewardship and sustainability teaching and learning.

Stewardship and sustainability were discussed separately in the interviews. Teacher reflections on each are themed in the circles in Figure 22 with subthemes, Stewardship Important and Sustainability Important. Each subtheme is discussed in the following paragraphs.

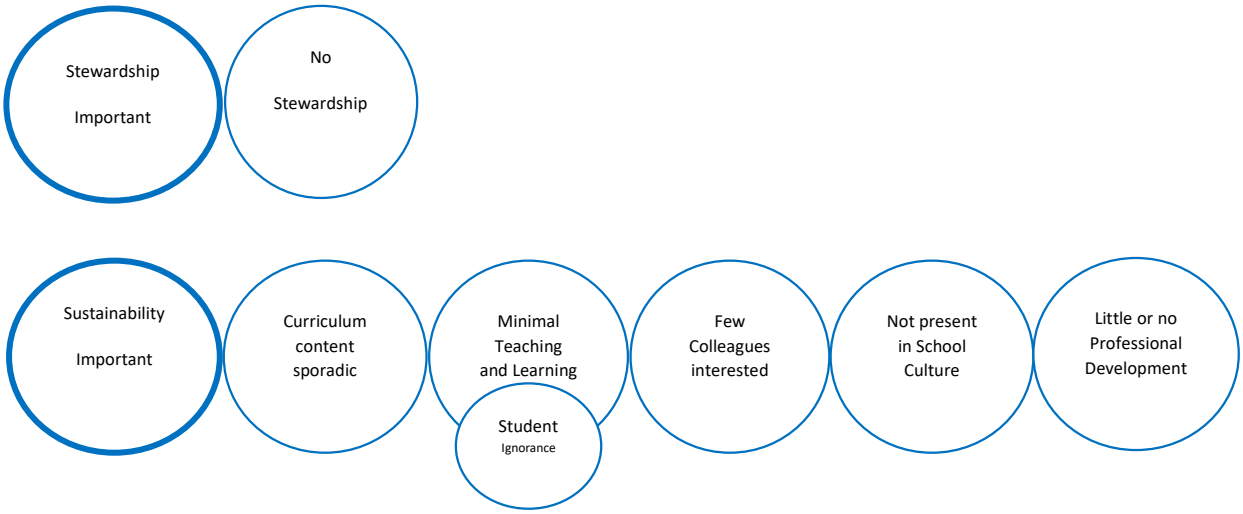


Figure 22: Current Practice of Stewardship and Sustainability Teaching and Learning

Subtheme one: Stewardship important.

Stewardship was considered an important component of contemporary education with indicative statements such as: 'Oh, yes, yes, I do think it's important and if they want to be able to build a sustainable society than stewardship has to be linked into that' (TH2); 'kids need to learn how to not only look after themselves, but to give back to environment and look after the environment too, and care. They need to learn to care' (TH5) and 'I think in order to understand and practise sustainability you need to have that care factor' (TH3). However, teachers reported that no direct stewardship teaching and learning was occurring in their classes. One teacher said, 'I don't think there's enough stewardship' (TH2) and another said, 'I think it's lacking in our students' (TH4).

Subtheme two: Sustainability important.

Sustainability was seen as important. Teachers said, 'It has to be important because it's kind of, our future depends on it' (TH1); 'I definitely think we need to be talking about sustainability now' (TH2); 'Oh, one hundred percent' (TH3); 'Oh, yes, definitely' (TH4); and 'There are so many things important in education…..it's definitely up there' (TH5). However, immediately after saying how important sustainability teaching and learning was, TH1 commented that sustainability was undervalued and said, 'I don't think there's a great deal of importance [given to sustainability] in subjects'.

Curriculum content sporadic.

Sustainability had different levels of presence in the curriculum for participant teachers. Three teachers said sustainability was explicit across a broad spectrum of the curriculum and two teachers said it was represented well through Geography and Study of Society or SOSE. Only one teacher commented that it was easy to translate sustainability from the curriculum into the classroom.

Minimal teaching and learning for sustainability.

There was little evidence of explicit teaching and learning for sustainability in the participant research group. Only one teacher was teaching sustainability to their Year 10 Geography class. However, in their school, time allocation for Social Sciences had been dropped from 3.5 hours per week to 2 hours per week in favour of increased literacy and numeracy instruction. This teacher said that the time reduction 'does make it difficult to really branch out too much' (TH2) to develop learning depth. Teachers said that their students were generally ignorant about environmental challenges and sustainability. TH2 said, 'I find that not a lot of students know much about it' and TH1 said interest 'depends on how much they know about it and that would be limited by the fact that we don't teach it'. Teachers noted that sustainability was not a priority in their school despite being a cross curriculum priority in the Australian Curriculum and that their school was 'focused on things like explicit teaching… focused on numeracy and literacy at the moment and just trying to get kids up to the same level' (TH4). TH3 said, 'The curriculum's very rigid. It's hard enough to get through the specified lessons in order to get the assessment. I think they'd [the school] have to rejig in order to incorporate sustainability values more'.

Few colleagues interested.

Teachers said that some colleagues were interested in sustainability as measured by casual conversations in the staff room which occurred 'from time to time' (TH4) in one school, but 'on the whole, no' (TH3) was the comment about experiences in another school. Teachers said that conversations about sustainability tended to occur between teachers of these specific subjects – Outdoor Recreation, Geography, some Humanities strands, Marine and Agriculture Studies. Two teachers summed up the little or no response, 'There are a few people who are really for sustainability

and are really, you know, taking a lot of ownership' (TH2), and 'I haven't been able to see too much exposure to sustainability' (TH3).

Not present in school culture.

There was no evidence of a school wide culture for sustainability at any of the five schools, according to the teachers interviewed. Comments were: 'probably not' (TH1); 'I would say no' (TH2); 'Definitely on the primary side, yes; I'm not seeing it come through on a senior side' (TH3); and 'I hope so!....but as a whole school, I think we're focused on things like explicit teaching' (TH4), and 'No' (TH5). This remark from TH2 sums up teachers' general comments about a sustainability school culture:

> in terms of anything happening outside the classroom, I don't think there's a great deal happening. There might be you know, the occasional mention of recycling or you know, not using air conditioning when you don't have to and things like that, but it's not really something that has been emphasized in the school.

Little or no professional development.

Only one teacher had any form of professional development (PD) and that came through their Head of Department (HoD) and through membership in a State wide professional Geography teachers group. TH2 said:

> In terms of support [unclear] my HoD is always, you know, on the lookout for different magazine articles, newspaper clippings, all that kind of stuff so he'll often leave stuff on my desk which can be quite handy especially from local issues, and that again helps the kids to relate to it. There's a, you know, a Geography almost e-mail group that you know, is a good link to have so you can send an e-mail out and get feedback from other people about different sources that they've used or different information.

The remaining teachers said they had not been involved in any PD for sustainability teaching and learning and were not aware of any being offered.

Overarching theme two: Considerations for stewardship and sustainability teaching and learning.

The second overarching theme, considerations for stewardship and sustainability teaching and learning, resulted logically from the remaining subthemes in the collated data. See Figure 23. The five subthemes: environmental change, impacts on students, profile of students, the need to learn to care,

and stewardship and sustainability teaching and learning; summarise what teachers felt was missing and/or important to stewardship and sustainability teaching and learning.

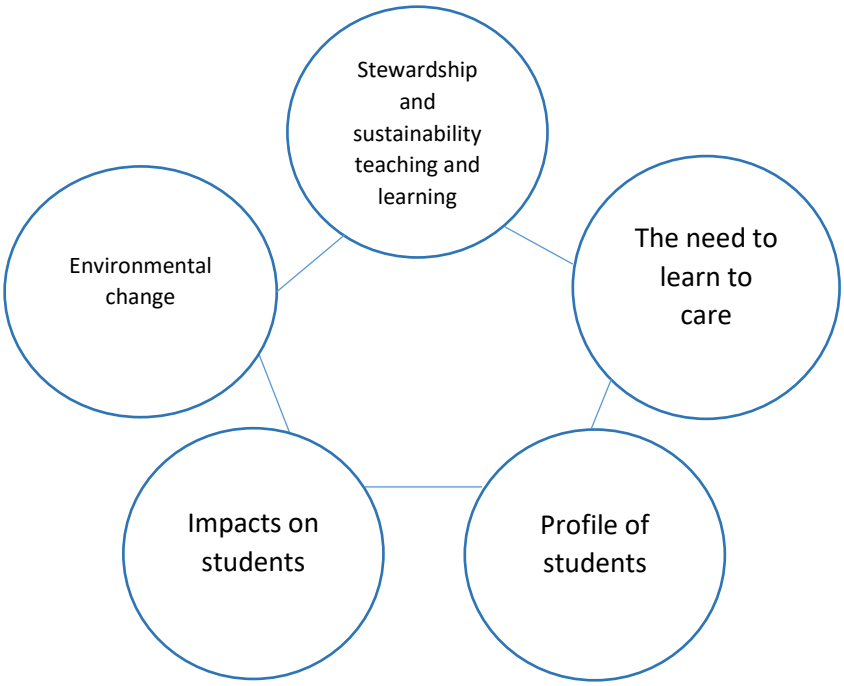


Figure 23: Considerations for Stewardship and Sustainability Teaching and Learning

Environmental change.

Teachers cited impending issues such as food and water shortages, resource wars, loss of habitat and species extinction, sickness caused by pollution and urban sprawling. Two teachers said they did not know enough about climate change. When asked about climate change and how it would impact the world, teachers replied, 'Badly' (TH1), and 'that if we don't do something about it now that it will be a big issue in the future' (TH2), and 'we're seeing damage now' (TH3), and 'I know it's having a negative impact' and also 'I suppose I don't know what the long term results will be, if I think about it' (TH4). And TH5 said,

> I know that it is impacting the world, I know that it's changing faster than it should, but I haven't looked into it enough to have, to know what to believe, because I find that the media really throws things at you. And to get a better idea, I'd have to go and research and do my own stuff.

Impacts on students.

All teachers said their students were worried about rapid environmental change, 'they're kind of a little bit shocked and overwhelmed by what's happening' (TH2). Asked whether students were worried about iconic species, like polar bears and habitat loss, TH3 said, 'In the younger grades, yes, but I think in the upper grades they're really looking at things like food, shelter, just basic necessities and resources, they're really worried about that running out'. When asked if there was evidence of ecophobia, TH3 said, 'Yes, definitely, when they are talking about water and things like that'.

Student concern is to be viewed through a larger lens. Complexities arise as student concern about present and future worries engender feelings of despondence, being overwhelmed, impotence and apathy. Teachers said that students typically saw environmental issues as 'too hard', 'too big', and 'it's not my problem because adults stuffed it up' (TH3), and 'they [students] have no idea how they can make a difference or they feel like they're too small to make a difference' (TH4).

Profile of students.

Teachers noted that the students they work with each day embody a complex profile of competing ideologies and dichotomies. In particular, teachers said that students were concerned about the future of the environment and job availability upon leaving school, but these concerns were underwritten by ignorance about world affairs, despondency and apathy about the role they could play and adolescent self-interest. Table 35 summaries the complex profile that teachers reported.

Table 35: Teachers Understanding of the Complexity Inherent in Student Worldviews

Concern about environmental issues and the future of the environment, coupled with feelings of despondency and overwhelm, yet ignorant about the intensity of environmental challenges and the role they could play
In the upper grades they're really looking at thing like food, shelter, just basic necessities and resources, they're really worried about that running out (TH3)
I do find it a little bit shocking myself that they [students], the level of absolute ignorance surrounding what's actually going on around the world (TH2)
they [the students] have no idea how they can make a difference (TH4)
They're not even being exposed to it….they don't watch the news and it wouldn't be on their Facebooks or anything, so they just have no exposure to it at all (TH1)
Just so that we can actually make a change in the future; they…these guys are our future, but they don't…either don't care or don't know enough about what's going on (TH4)
Concern about individual futures in regard to jobs and lifestyle, but, relatively happy with life though self-centred and have a self-centred future vision
they're freaking out, and, that fact that there's no welfare support for when they get into that age bracket (TH3)

doesn't occur to them that in the future, it's their future (TH1)
They want to have money and cars and everything – it's me, me, me. They have this big dream of making it and getting out (TH3)
Students are apathetic about anything that doesn't immediately and directly impact them
they get the information, but they don't really register until it becomes important (TH5)
they don't think about the problems occurring in it [the environment] (TH2)
Doesn't affect them. So, it's just of little concern to them (TH1)

TH4 commented that students feel depressed about their future but s/he was uncertain if one or multiple causative factors were responsible, and said,

> Yes, feeling depressed about their futures; I mean, there's so many emotions for them, and there's age, and I don't know how much of that is caused by what you said [post-ecologism], but….[I'm not sure] how much of it is caused by what's going on in their friendship groups and at home and things like that.

Student ignorance about environmental challenges 'would be limited by the fact that we don't teach it [about the environment, stewardship and sustainability]' (TH1).

The need to learn to care.

There was general agreement that fostering care, an aspect of environmental stewardship, is foundational to developing higher motivation for sustainability practices. Teachers' comments are presented in Table 36.

Table 36: Importance of Learning to Care – Teachers

Importance of Learning to Care – Teachers
yes, I think they go together perfectly (TH1)
[when the students] feel like they're a part of it [the environment] then they would really appreciate the sustainability conversations a little bit more (TH2)
in order to understand and practise sustainability you need to have that care factor (TH3)
if you can get someone to care about something and want to make a change, then it's obviously going to help with the cause (TH4)
Yes, definitely. Kids need to learn how to not only look after themselves, but to give back to environment and look after the environment too, and care. They need to learn to care. (TH5)

Stewardship and sustainability teaching and learning.

Teachers suggested various strategies for teaching and learning for environmental stewardship and sustainability: experiential learning and direct experiences; teaching and learning values including

caring for the environment and values important for life, including conflict resolution and responsibility; understanding of local and global environmental issues and exploring solutions to issues; greater curriculum flexibility; and, personalising the learning experience. Teachers said school activities could include an environment club, school audits to monitor resource use, promoting stewardship and sustainability through the student council, reminders at assembly, gardening at school and promoting recycling. Teachers' suggestions are summarised in Table 37 following the subthemes identified in each blue box.

Table 37: Teachers Suggestions for Stewardship and Sustainability Teaching and Learning

Experiential learning and direct experiences
Physically going out and spending time in nature and learning about, you know, the environment in the environment, *linking excursions into the program* (TH2)
Make the assessment more practical and authentic (TH3)
More hands on (TH5)
Give them firsthand experience in environment and see what can actually happen to an environment if we're not implementing sustainable practices, [otherwise] I don't think they fully get it (TH2)
Teaching and learning values including caring for the environment and values important for life, including conflict resolution and responsibility
Yes, I think that should be the role of a classroom teacher, yes, and that's you know, sort of [how you] explain the importance of having those thoughts now to implement into the future (TH2)
I think it should be the role of everyone, from family to admin developing policies….all teachers and all staff should be on-board (TH3)
Yes, I mean, just teaching the values, I think is the most important. And I guess that can lead to teaching about actions (TH4)
Understanding of local and global environmental issues and exploring solutions to issues
Well, in the end, you know, education is number one I think. Knowing about the issue, understanding what the actual issue is and why it's being caused, then coming up with solutions for the problem even if it's just, you know, starting from small scale solutions that they find quite manageable and they say okay, that's something that I can do on an individual level (TH2)
Get out and do a wellbeing project about the environment (TH3)
Greater curriculum flexibility
At the moment with C2C there's not much room to budge. I'm finding that's very difficult; the curriculum's very rigid. It's hard enough to get through the specified lessons in order to get the assessment (TH3)
Personalising the learning experience
Building a classroom environment where students feel safe and happy to learn and share…a lot of kids need to know that someone's either proud of them or supporting them in some way (TH4)

Getting kids to actually feel something and make them see that what's happening…is the fastest way to get to the point. But also making it, making them feel as though they can do something about it, because if they think...just decide, oh, that's too hard, or that's never going to change, then they'll just put it to the side and not worry about it (TH4)

[They've] crammed so much in, and you don't have time to actually get to what is…what are you [the students] thinking and feeling about whatever subject that we're discussing school learning is geared towards that uni style of writing, where you've got to research information, apply it to whatever the question is and then evaluate whether ……There's not that personal, you know, how does it affect me [aspect] (TH5)

Student interview results.

The five student interviews were conducted in small groups of four and five and each interview followed a semi-structured qualitative method (Yin, 2011). For some students, responding to questions was the first time they had verbalised thought on the topic of environmental stewardship. Students admitted they hadn't thought about this matter before and some sentences trailed off without being finished and students were over talked by other participant/s. An inductive analysis of the interviews revealed 14 major themes which were collapsed into 3 overarching themes called components. These will be discussed in the following paragraphs.

Major themes.

The 14 major themes identified in the student interviews are presented in Table 38 with supporting quotes from student interviews. Each are elaborated in following paragraphs.

Table 38: Major Themes from Student Interviews

	Themes *Supporting quotes from interviews – individual's responses separated by a hyphen*
1	**Feel worried about environmental issues** *feel scared ..about the environment, and that we might not have anywhere to live – I feel concerned and also concerned for future generations – really actually worried – my children or their children won't really understand what it was like back when there were lots of rain forest and lots of clean water – feel disappointed in everyone – feel angry*
2	**Importance of environment** *what keeps us alive - only home we've got - extremely important - take it for granted - no Planet B – [go to nature to] escape from things – if we don't look after the Earth we won't have it to live on*
3	**Importance of an environmental care ethic or stewardship** *majority of us use more than we give back – if we don't do something now we'll really pressure the future – people need to be informed…have knowledge on how to do it [care for environment] – educating young people so that in the future, like, you know, like people don't go out and destroy it [the natural environment]*
4	**Feel unaware of degree of environmental challenges, lack of knowledge, disempowerment**

	we don't really know - I know we're killing it [the Earth] but that's all I know – I think it [climate change] has the potential to be a big threat but some people still don't even believe in it, is that right? – we're not even aware of half the stuff that goes on
5	**Impotence and apathy for environmental care ethic or stewardship** *most people don't realise – don't take notice or don't care – whatever you do actually won't make a difference – we've done so much damage that it's irreversible – not going to take it serious when there's nothing you can do – most people just like blank it out and go on with their lives*
6	**Responsibility and burden of environmental challenges** *so it's kind of all up to us – if more people cared about the environment then it may build up your confidence to also join in – up to yourself and you need personally to want to do something – keep it [concern about the environment] to themselves – like I wouldn't go around talking about the environment, you know – I had to educate my friends [about drought affecting Australian farmers]*
7	**Lack of confidence in peers to care for the environment, peer pressure to not discuss the environment** *focus on own personal stuff – sit in their room all day in a little cave on their phones – as a generalisation most teenagers now don't care – more care about their popularity – don't have any idea [about the environment] – ask someone [peer] if they cared [about the environment] I can guarantee you the answer would be no – probably one out of ten [care about the environment] – they pretty much care about themselves – no one shows it [concern for environment] because they just block it out – I wouldn't go around talking about the environment – most of my friends really don't care – if something comes up on the news……they become worried and they'll voice it more. But not like, in everyday conversation*
8	**Need to learn how to care for the environment** *people don't know how to do it [look after the planet], none of us get taught how to do it – all take no give – uneducated – just using it [the environment] – the only thing we're really encouraged to do is recycle and don't use electricity – taken away from technology, like, go camping*
9	**Various environmental care pedagogies** *enforced from all perspectives – big garden experience – sustainability subject…kids turn their nose up at that, sort of….go outside and just go into nature…would be fun to learn about – interactive activities – fund raising activities – make it fun – documentaries*
10	**Best to learn to care at a young age** *really young ages, when your brain's actually setting everything in stone - you can't teach an old dog new tricks – little kids are a lot more interested in the environment – learn about it from a young age - compulsory*
11	**High school vs Primary school learning to care for the environment** *Primary school..a lot stronger – Year 7 and primary we did a lot of that [learning about the environment] – taught well enough at the primary school and then they come here [high school] there's nothing – primary school taught me that [to care] when I was, like, really young – Primary school did little things to keep your mind on track [including] days when not allowed to bring any plastic to school*
12	**Learning by doing** *more hands on things than sitting in class writing about it – helping them open their eyes [when outside and] how do you feel – need to have more like big celebrations like Australia Day as well, like big earth days – planting tree days – going out and just enjoying like, a naturous place, if that's a word – get people more involved – experience of being outside - excursions*
13	**The teacher's role in learning to care for the environment** *some teachers talk about it like it's so serious that, like, we can't do anything about it – [have] teachers that do care about the environment*
14	**The impacts of learning to care for the environment on intergenerational learning** *you'd have to start with school to get it into families – they [students] go and tell their families..their families get involved, and it goes on and when they grow old they can pass it on to their kids*

The 14 themes were collapsed into three overarching components: Component 1 – Personal perspectives about the environment from themes two, three and five; Component 2 – Concern for

environmental challenges from themes one, four, six and seven; and Component 3 – Development of stewardship from themes eight to fourteen. The components are presented in Figure 24.

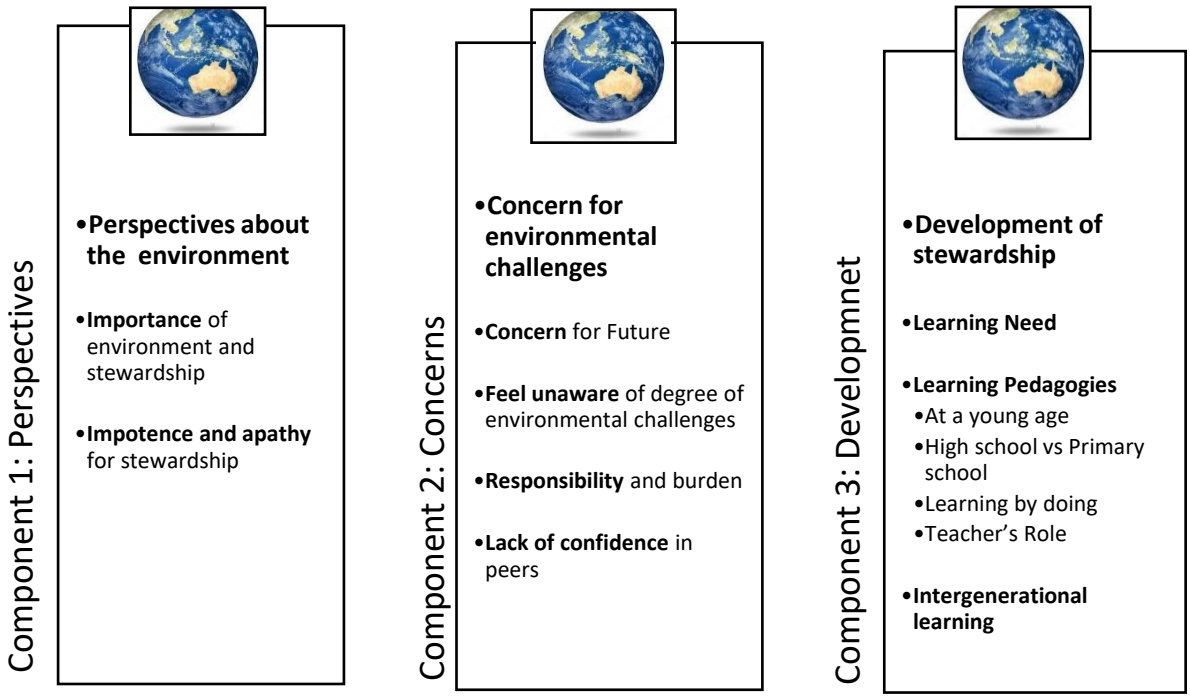


Figure 24: Student Interview Themes

Image: www.shutterstock.com

Student responses were given a four part code. The first two letters and number indicate the school, for example, Sc3 is school number three. The second two letters and number indicate the student at that school, St5 is student five. Therefore, Sc3,St5 is school three and student number five.

Themes: Component 1 – Perspectives about the environment.

In the Perspectives component, two key subthemes resulted: the importance of the environment and the need to care for it and a collective feeling of impotence and apathy for restorative environmental action. In Table 39 each subtheme is supported with quotes from the student interviews.

Table 39: Component 1 – Student Perspectives about the Environment

Theme one – the importance of the environment and the need to care for it
what keeps us alive (Sc1,St4)
only home we've got (Sc1,St3)
if we don't do something now we'll really pressure the future (Sc1,St2)
if there's no environment, then there's no us in the future (Sc3,St1)
It's pretty important. I want my children and my children's children to see, like, the Great Barrier Reef and the mountains and all that (Sc5,St1)
Theme two – feelings of impotence and apathy for restorative environmental action
whatever you do actually won't make a difference (Sc4,St2)
Most people just go, ah, forget it. It doesn't matter anymore. So they just kind of blank it out and then go on with their lives (Sc4,St4)
we've done so much damage that it's irreversible (Sc4,St2)
Like, if I'm scared of something, I'm going to want to avoid it at all costs (Sc4,St5)
Some people don't really realise how important it is. Like, I feel so oblivious to it (Sc5,St4)
Like, I'd like to think that I care about it [the environment] a lot more, but I don't really do a lot to show. I don't go out of my way (Sc5,St5)

Themes: Component 2 – Concern for environmental challenges.

In the Concerns component, student voices naturally collapsed into four themes: concern for the future, concern about their lack of awareness about environmental challenges, feelings of responsibility and burden and a lack of confidence in peers to make a difference. Students acknowledged a disempowering lack of awareness about the intensity of the environmental challenges facing humankind. In Table 40 each subtheme is supported with interview quotes.

Table 40: Component 2 – Student Concern for Environmental Challenges

Theme one – concern for the future
I feel concerned and also concerned for future generations (Sc2,St1)
Today's society focuses so much on our own personal dilemmas and stuff that we kind of don't consider the welfare of the earth for future generations (Sc4,St3)
Theme two – concern about lack of awareness about environmental challenges
I know we're killing it [the Earth] but that's all I know (Sc4,St2)
Like, just day to day things, just simple things we do we don't understand how much it's affecting our environment (Sc2,St1)
We, sort of just keep doing wrong (Sc1,St4)
Like I said if we don't do something now we'll really pressure the future (Sc1,St2)
Theme three – feelings of responsibility and burden
so it's kind of all up to us (Sc3,St5)
Theme one – lack of confidence in peers
as a generalisation most teenagers now don't care [about the environment] (Sc3,St2)
they pretty much care about themselves (Sc2,St1)
more care about their popularity (Sc5,St2)

Themes: Component 3 – Development of stewardship

The three key subthemes in Component 3 showed considered thinking by students about teaching and learning to develop environmental stewardship. Students highlighted the need for learning to

care and suggested optimum ages and different pedagogies that may afford environmental stewardship outcomes, for example, learning at a young age and learning by doing. Students also commented on the role of the teacher and were cognisant of the importance and flow-on effects of intergenerational learning for environmental stewardship. In Table 41 each subtheme is supported with quotes from student interviews.

Table 41: Component 3 – Development of Stewardship

Theme one – need for learning to care
People don't know how to do it [look after the planet]…. people need to be informed… like, you know, have knowledge on how to do it. Because people don't know how to do it. They just... they don't. None of us get taught how to do it (Sc2,St1)
Theme two – various learning pedagogies: at a young age, high school versus primary school, learning by doing and the teacher's role
[best to learn how to care for the environment at] really young ages, when your brain's actually setting everything in stone (Sc4,St4) *You can't teach an old dog new tricks* (Sc4,St5) *more hands on things than sitting in class writing about it* (Sc2,St4) *some teachers talk about it like it's so serious that, like, we can't do anything about it* (Sc4,St2) *we're not going to take it serious when she's [the teacher says] like, ah, yes, there's nothing you can do* (Sc4,St5) *[have] teachers that do care about the environment* (Sc3,St2)
Theme three – intergenerational learning
You'd have to start with school to get it into families. And they go and tell their families with it and their families get involved, and it goes on and when they grow old they can pass it on to their kids (Sc3,St5) *[About learning to care for the environment at a young age] Because their mindsets will change, and it will be just, like subconsciously enforced and continue on for generations* (Sc4,St5)

Whole Data Set Analysis Summary

Results are summarised under the headings Government Documents, Teachers and Students.

Government documents.

Neither the Australian Curriculum nor C2C mention stewardship. Although sustainability is a priority across the curriculum and designed to inform curriculum content, the number of Year 10 lesson plans focused on sustainability teaching and learning equate to less than two percent of lessons in the five core subjects of English, Maths, Science, Geography and History. When the full complement of Year 10 subjects is considered and includes core and elective subjects, this drops to less than one percent of Year 10 teaching and learning time.

Teachers.

Teachers' values lie in the self-transcendence and openness to change sectors and they engage in pro-environmental behaviour. Teachers' environmental attitudes are pragmatically distributed between preservation and utilisation of the environment. Teachers expressed a high level of concern for the natural world, and the need for education to value the environment and that developing environmental stewardship would assist students' well-being. Teachers expressed concerns that there is little education for stewardship, that sustainability education is sporadic, students are ignorant and apathetic about environmental issues and are self-centred. Teachers said that learning by doing outside is important and that the curriculum is rigid and teaching time is pressed.

Students.

Students' values also lay in the self-transcendence and openness to change sectors indicating that they engage in pro-environmental behaviour. Students' environmental attitudes were more inclined to preserve the environment than use it. Students expressed concern for the natural world and worry that their generation will be left a world full of environmental problems. Half were "deeply" worried by this thought. Sixty-five percent of the students said that learning about the environment, stewardship and sustainability should occur at school through learning by doing. Students expressed a lack of confidence in their peers' ability to take care of the environment and cited self-interest, ignorance and apathy as key aspects.

Meeting Research Objectives and Research Questions

Research objectives have been fulfilled as outlined in Table 42. The environmental stewardship timeline presented earlier in this chapter (Figure 13) outlines the environmental stewardship focus expressed by the Australian government between 1999 and 2012 and answers Research Objective 1. Analysis of the whole data set responds to Research Objective 2 and 3. Discussion about the relationships between policy and the various curricula is presented in Chapter 5 and responds further to Research Objective 3. Last, a conceptual framework for learning for environmental stewardship is presented in Chapter 6 fulfilling Research Objective 4.

Table 42: Meeting Research Objectives

Research Objectives	Met by:
i) understand the temporal development of stewardship from 1999 to 2012	Environmental Stewardship Timeline
ii) understand the actual expression of stewardship in teaching and learning in a sample of state high schools in the Wet Tropics in Australia in 2014	Whole Data Set analysis Chapter 4
iii) analysis of relationships between the intended, planned, enacted and lived curriculums as expressed in this research sample – the linkages between Government policy (intended), and curriculum (planned), lesson plans and teaching (enacted) and student expression of stewardship (lived curriculum)	Whole Data Set analysis Chapter 5
iv) development of a Stewardship Conceptual Framework	Chapter 6

Deductive thematic analysis of the whole data set to answer the research question and sub questions is presented in Table 43. There is very little to no stewardship present in the formal curriculum. Value orientations, attitudes and self-reported pro-environmental behaviour indicate that environmental stewardship aspirations exist in both teachers and Year 10 students. Research findings indicate environmental stewardship aspirations are not being met in formal schooling in Year 10 in the Wet Tropics.

Table 43: Whole Data Set Thematic Analysis in Response to Research Questions

Research Question and Sub questions	Answering themes
What is the relationship between environmental stewardship, Year 10 students and their teachers, and the Australian Curriculum's sustainability cross-curriculum priority within the Wet Tropics region of Australia?	Complex, undeveloped relationship. Both Year 10 students and teachers concerned about the challenges facing the natural world, the lack of teaching and learning for stewardship and students' ability to respond now and in the future as prepared citizens.
a) To what extent and how is environmental stewardship represented in the Australian Curriculum's sustainability cross-curriculum priority?	No stewardship in the Australian Curriculum's sustainability cross-curriculum priority.
b) How is environmental stewardship, as represented in the Australian Curriculum's sustainability cross-curriculum priority, enacted in the school context?	Little to no stewardship enacted in the formal schooling context.
c) What environmental stewardship aspirations, values, knowledge, beliefs and action capacities do Year 10 students and their teachers have?	Both Year 10 students and teachers value the importance of teaching and learning for stewardship. They value the need to learn to care to develop stewardship, through 'doing learning' and exposure to the natural environment.
d) How are the environmental stewardship aspirations, values, knowledge, beliefs and action capacities of the Year 10 students and teachers realised or how do they play out in reality?	No time for expression of stewardship aspirations, values, knowledge, beliefs and action capacities, as curriculum too rigid.

Conclusion

Presented in this chapter are the findings from the document analysis, teacher and student online surveys and interviews, as well as a summary of the whole data set analysis and findings in relation to research objections and research questions. Findings indicate very little to no environmental stewardship in formal schooling in Year 10 in the Wet Tropics and a very limited expression of teaching and learning for sustainability in the research cohort. Teachers' value orientations indicated pro-environmental behaviour. Teachers' environmental attitudes sit pragmatically between preservation and utilisation of the natural environment. Teachers were unhappy with the level of environmental stewardship and sustainability education in schools and were concerned about students' environmental ignorance and apathy. Teachers expressed that developing environmental stewardship would assist student well-being. Students' value orientations indicated pro-environmental behaviour. In following Karp's hypothesis (1996), students in the Wet Tropics were more inclined to pro-environmental behaviour for altruistic orientations than German adolescents whose results indicated pro-environmental behaviour was linked to self-interest outcomes (Musiol & Boehnke, 2013). The environmental attitudes of the student group overall, and the city school students in particular, indicated they were inclined to preserve the natural environment, similar to New Zealand university student environmental attitudes (Milfont & Duckitt, 2010). However, regional school students in the study group were more inclined to utilise the natural environment than city students. Female students were more inclined to preserve the natural environment than males. Students indicated they were concerned for the natural environment, that there was a need for environmental stewardship and sustainability education and that it was important to learn to value the natural environment. Two-thirds of students indicated that their peers did not display environmental stewardship values and actions. Students expressed that their age group was ignorant and apathetic about the natural environment. Students were concerned for the future and expressed that development of environmental stewardship through school learning was important.

Chapter Five – Education Policy in the Anthropocene

We often fail to connect
the imbalances that exist in the world
with the systems of education
that foster the thinking and values
that shape the systems
that create these imbalances
Peter Senge, 2016

Like, today's society focuses so much
on our own personal dilemmas and stuff,
that we kind of don't consider
the welfare of the earth
for future generations
(Sc4,St3), Gen Z student participant, 2015

Preface

These two opening quotes describe the compounding dilemma that motivates this research: the lack of educational focus on the development of thinking and values to create a sustainable and equitable future for all. In the first quote, Senge calls attention to a failure to connect the thinking and values that education fosters with the systems that shape the imbalances that exist in the world and the Gen Z quote typifies this failure. After 10 years of schooling this student poignantly acknowledges that today's culture prioritises a focus on 'personal dilemmas and stuff' and is too pre-occupied to consider the welfare of the earth and future generations. How do we correct the imbalances in the systems that shape our world if education fosters thinking and values that encourage imbalance? Gen Z will

shape, and be shaped by, the coming decades. It is important to consider how formal education prepares Gen Z for their adult lives.

Research Précis

Following a mixed methods, explanatory, sequential research design, (as per Creswell, 2012) data were collected and analysed to answer the research question: What is the relationship between environmental stewardship, Year 10 students and their teachers, and the Australian Curriculum's sustainability cross-curriculum priority within the Wet Tropics region of Australia? Government policy and curriculum documents were collected and analysed for promotion of environmental stewardship and sustainability, the latter being the traditional conduit for teaching and learning for environmental stewardship. Teachers and students in five high schools completed on-line surveys and interviews. Data were analysed to understand value orientations for pro-environmental behaviour, whether environmental attitudes indicate preservation or utilisation of the natural environmental, stewardship knowledge, and what participants thought about teaching and learning for environmental stewardship and sustainability. There was little to no promotion of environmental stewardship within sustainability curricula and in teaching and learning in the participating schools.

Adequate Preparation for the Future?

Analysis of findings indicate that Gen Z in Far North Queensland may not be receiving the very best preparation for their adult lives. The formal education system may be doing Gen Z a disservice. Education policy (including curricula) does not prioritise learning about, and for, anthropogenic change. In the study sample, education policy and praxis mirror the apathy of mainstream indifference to environmental degradation and change posed by the Anthropocene (see Adel, 2013). Is it reasonable to conclude then, that the formal education system has deferred to environmental apathy? Or truth avoidance? In July 2012, the conservative Liberal National Party, the then ruling Queensland government, voted to remove 'environmental propaganda' on climate change from Queensland schools calling it 'post-normal' science (Barrett, 2012). Scientific measurements tell us

that the planet is in crisis. Climate models predict outcomes that range from discomfort to disaster (Flato et al., 2013). Where is the leadership from policy and curriculum to guide teachers on how to develop capacity in students to mitigate and adapt to the unprecedented environmental changes Gen Z students know exist 'out there' and must face as adults? Students stated they felt 'let down'. Hopelessness results from a lack of: i) knowledge of environmental issues; ii) a lack of agency for environmental responsibility; iii) a lack of desire; and, iv) a lack of capacity for pro-environmental behaviour (Wilks & Harris, 2016). All these traits were evident in the study data.

Gaps and focus myopia in curricula.

Through an environmental stewardship lens in the Anthropocene, I identify gaps in the Australian Curriculum and in the Queensland Curriculum into the Classroom teaching material. Firstly, there is a lack of pedagogy founded on research that links development of biophilic needs with positive mental and scholastic outcomes. Secondly, care pedagogy and learning how to care for self, others and the natural environment is excluded. In addition, I propose these curricula display (what I call) focus myopia with the prioritisation of numeracy and literacy over other curricula at the expense of educating the whole person. One example provided by the study group is the halving of weekly time spent on geography instruction in the only participant school that taught sustainability, in favour of teaching to the test. I propose that these curricula gaps and focus myopia may have contributed to student and teacher stress, feelings of compromise because of an over-crowded curriculum and the struggle to meet performance demands. This, in turn, may have contributed to stagnate NAPLAN scores over the past eight years (ACARA, 2016; Rice, 2016). In the study sample, Gen Z students are apathetic towards the natural environment and lack confidence in the future quality of the natural environment, and they mistrust their peers' ability to manage the natural environment into the future. Are these data also evidence of curricula gaps and focus myopia?

Education policy guides curriculum, teaching and learning. The remaining sections in this chapter present an overview of the cultural influences guiding policy and the impact of these policies on teachers and students as depicted in research findings.

Education Policy in Australia

Document analysis findings from this study reveal that policy changes in Australia, in tandem with global policy changes (for example the implementation of the UNDESD), resulted in a shift in focus away from environmental education and the development of environmental stewardship principles. Education policy in Australia is now strongly influenced by globalisation and neoliberalism (Smith & Stevenson, 2017) and follows a global education agenda that serves the neoliberal marketplace over and above the needs of individuals, the needs of communities, and the needs of the natural environment (Bottery, 2001; Jickling & Wals, 2012; Lingard, 2011). In keeping with a 'global education policy' agenda, regulatory testing regimes are now central to Australian education policy and praxis (Smith & Stevenson, 2017). Over the last decade, both the Federal and Queensland Governments in Australia have enacted a series of education policies based on neoliberal ideologies that directly impact research participants. These directives constrain opportunities to promote learning for environmental stewardship.

In response to Australia's poor test performance in the 2006 *Programme for International Student Assessment* (PISA), an 'education revolution' became Federal Government policy in 2007 (Lingard, 2011; McGaw, 2011). Included in the 'revolution' was the development of a national curriculum, standardised numeracy and literacy testing (NAPLAN), the *My School* website to showcase comparisons of school performance in NAPLAN tests, and a $16 billion investment in school infrastructure across Australia (Lingard, 2011). At a state level, Queensland education policy became sharply focused on improved literacy, numeracy and science scores following revelations in the Masters Report (2009) that students were below national and international averages. In 2017, a key focus for all Queensland schools is to improve NAPLAN scores which translates as an overcrowded

curriculum aimed at learning for the 'test'. However, despite all these efforts, NAPLAN scores are stagnant since the inception of the tests (Rice, 2016).

Study Participants, Policy and Teaching and Learning

Education policy and teacher tensions.

Tensions exist for teachers as a direct result of education settings that ignore stewardship learning in the Wet Tropics. Teachers in this study were aware of their students' need for knowledge about the challenges facing their local environment and were unable to fill this gap, and mused that students may seem ignorant and uncaring because 'we don't teach it' (TH1). Teachers in this study appreciate that education for action to mitigate environmental catastrophe is a reasonable expectation of formal learning and that climate disruption is unprecedented and unknown (as per Hughes, Linares, Dakos, van de Leemput, & van Nes, 2013). However, teachers said they could not address these concerns because the curriculum was too rigid (as per O'Connor, 2008; Pearson & Moomaw, 2005) and teaching to meet assessment criteria tended to colonise lesson time. Consequently, the teachers said they felt unable to meet all their ethical and moral obligations to students. The teachers in this study expressed disappointment about the lack of professional development and administrative support for teaching and learning for environmental stewardship. These findings have additional resonance when the location of this research is considered: ancient rainforests and coral reefs, of value to the whole world, form the 'natural environments' of this study.

Education policy and Gen Z.

Education policy that voids learning to care for (and about) the natural environment diminishes student knowledge and capacity to manage their future. Given the complex nature of globalisation and the uncertainties of the Anthropocene, students reported floundering in complex worldviews replete with competing ideologies. They also described ecophobia and post-ecologism behaviours, and as a direct result of a lack of environmental stewardship focus in education policy, students revealed how their capacities for stewardship went undeveloped and lapsed into apathy. Each are discussed here.

Complex worldviews with competing ideologies.

Students in this study held a set of complex and conflicting views. Many said they worried about the future of the Wet Tropics and the environment generally, although students said they were largely ignorant about the type and scale of environmental change that was occurring and imminent. Students stated they felt impotent and apathetic about acting to address their worries, but, on the other hand, they advocated learning to care as 'important', 'beneficial' and 'valuable'.

Ecophobia and post-ecologism.

The complexities inherent in the Gen Z worldview contribute to ecophobia: a fear of the natural world including ecological problems (Sobel, 1996) and post-ecologism: a 'whatever – who cares' response to ecological problems (Zeyer & Kelsey, 2013). Students described post-ecologism and ecophobic positions in themselves and their peers: 'Like, if I'm scared of something, I'm going to want to avoid it at all costs' (Sc4,St5) and 'Kind of blank it out and go on with their lives' (Sc4,St4). Students associated the natural environment with worry, responsibility, burden and problems that were seemingly impossible to solve.

Another consequence of post-ecologism is consumerism. Forty-two percent of participating students did not deem consumerism as wasteful. But do such beliefs prepare young people for a resource depleted and polluted world? These complex worldviews possibly emanate from the natural environment being largely hidden in their modern western lifestyle, as students live in a 'built' environment with a digital fixation, particularly with social media (Bekoff, 2013; McCrindle Research, 2013; Worthy, 2013). The Wet Tropics appear to be outside their field of view.

Undeveloped capacities for environmental stewardship.

Findings from this study show that the capacity for environmental stewardship is not being developed in formal schooling in the Wet Tropics. In Figure 25, themes from student interview data map how pro-environmental values and attitudes lapsed into post-ecologism and apathy. Students' pro-environmental values and attitudes from online survey data are placed in the top of the funnel in Figure 25 and titled *Capacity*. Other themes from interview data that express student overwhelm are

positioned in the cone of the funnel. These themes have been labelled *Lack of information and a pro-active skill set*. Students stated they do not know the extent of anthropogenic challenges, what mitigation is occurring, what adaption needs to occur and what role they can play. The vertex of the funnel represents student lapse into post-ecologism and apathy.

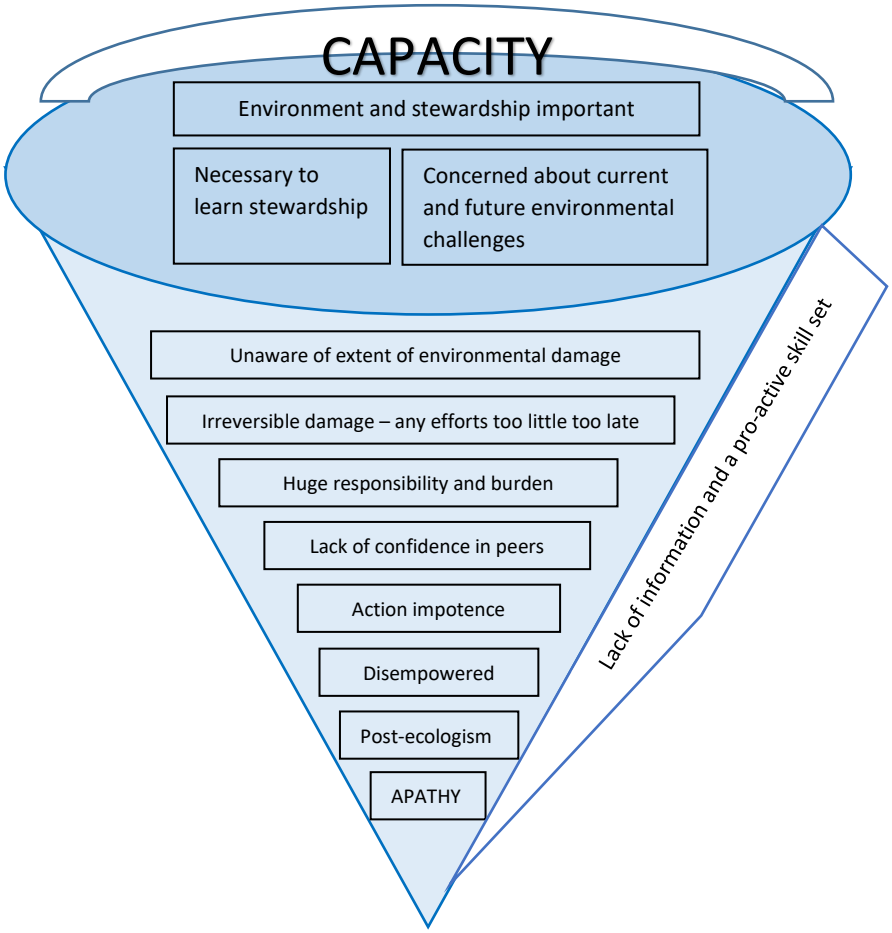


Figure 25: Student Environmental Stewardship Capacity to Apathy Funnel

The Changing Role of Education Policy

Education policy and formal curriculum is designed to accommodate change and to steer understanding and action to create change, either desired or imagined (Stevenson, 2013). Education policy must ethically and dutifully lead and respond to the needs of individuals and institutions that it directs and serves and to the needs presented in broader contexts like society, culture, the economy,

the natural environment and the future. To achieve this, education policy makers must be cognisant of current times and pre-emptive of future possibilities. Education policy must both lead and follow.

Historically, education policy has responded to need. Globally, during the 1970s, education policy responded to growing awareness about environmental devastation and provided leadership. Environmental education was formalised. Unprecedented resource and asset development in the 1980s and development of a globalised marketplace saw the emergence over subsequent decades of various policy iterations for education for sustainable development and education for sustainability. These policies gained traction with implementation of the *United Nations Decade of Education for Sustainable Development* (UNDESD) and the current United Nations lead education publication, the *Roadmap* (UNESCO, 2014). Education for (sustainable) development occurs in tandem with adoption of a neoliberal infused education policy bringing shifts in social structure and power which destabilises social equity (Jickling & Wals, 2008; Pett, 2016; Stiglitz, 2013). Education for the environment has been pushed to the margins of school practice. It is time again, for education policy to lead the way and to build capacity for social-ecological resilience, where serving the needs of the marketplace is a subset of serving the needs of the planet and her people.

Conclusion

The chapter began with a précis of this study and asked if we are adequately preparing Gen Z for their adult lives. Education policy guides teaching and learning. Gaps and a focus myopia were identified in Australian education policy. Teacher tensions and Gen Z complexities and some of the lived outcomes of current education policy, were discussed in relation to the study sample. The chapter concluded with a call for education policy that builds capacity for social-ecological resilience.

Chapter Six – Education Policy for the Anthropocene: The Imperative for Change

The skills, aptitudes and attitudes necessary to industrialise the earth …..
are not necessarily the same as those that will be needed to heal the earth
or to build durable economics and good communities'

David Orr, 2004, p. 27

Preface

This chapter presents the implications, major outcome and recommendations arising from this study. The main implication demonstrated by this study is that environmental stewardship education promotes well-being, improves capacity for higher order thinking and environmental stewardship behaviour. Argued throughout this thesis is the need for better preparation of adolescents through formal schooling for their adult lives in a changing world. This imperative has been framed as environmental stewardship education and is discussed here (and in Chapter 7) in the context of developing adaptive capacity for social-ecological resilience to change. Next, environmental stewardship education is conceptualised from isolated fragments in the research literature. A search in Google Scholar in August 2016 revealed there are writings about environmental stewardship but no (known) literature that links environmental stewardship and education in one term. The major outcome of this research is a *learning for environmental stewardship conceptual framework,* developed from a synthesis of the literature supportive of environmental stewardship. To conclude this chapter, recommendations are made to education policy makers in Queensland (state level) and Australia (national curriculum) to adopt environmental stewardship education.

The Imperative for Environmental Stewardship Education

New ideas and values are needed in and for the Anthropocene (Jamieson, 2014). Study findings reveal that current Australian and Queensland education policy and practice do not reflect the new ideas and values that are needed. The intent of environmental stewardship education is to enable students

to meet their current needs and provide a foundation for meeting needs into the decades beyond 2020. Education is a powerful means for developing adaptive capacity for social-ecological resilience to change (Ardoin, Clark, & Kelsey, 2013; Krasny & Roth, 2010; Tauritz, 2012).

Conceptualising Environmental Stewardship Education

To develop adaptive capacity for social-ecological resilience, I have conceived environmental stewardship education as development of an ethic of care through direct relationship-based experiences to meet biophillic needs to foster an ecological identity and eco-wellness. In conjunction with learning about intrinsic and extrinsic goals, goal validation and the prioritising of intrinsic goals, well-being is developed which promotes capacity for higher order thinking, problem solving and improved scholarship. In conceptualising environmental stewardship education, I have drawn from a range of concepts. (See Table 2 in Chapter 2 and discussion on page 176.) Foundational concepts include biophilia and care pedagogy. This research extends Noddings' care pedagogy (1988, 1992, 2005, 2010a, 2011, 2013) to develop an ethic of care encompassing a love of self, community and the natural environment, a sense of wonder for the natural world and the development of hope. To biophilia and care pedagogy, I add Ewert, Milton and Overholt's suggestions: i) a sense of place – through place-based education; ii) critical thinking skills – to analyse and evaluate information from a variety of sources; and, iii) ecoliteracy skills – knowing the principles of ecology and conservation biology and action capacity to create change if required (Ewert et al., 2014; Litz & Mitten, 2013). I also draw upon research about the importance of direct relationship-based experiences in the natural environment, development of an ecological identity, values learning to foster well-being, and the development of a systems thinking worldview.

My conceptualisation of environmental stewardship education is presented here, firstly, as a flow diagram that indicates linkages to improved scholarship (see Figure 26). Then, a learning for environmental stewardship conceptual framework (see Figure 27) outlines a conceptual pathway that I have identified to develop environmental stewardship behaviour and build capacity for social-

ecological resilience. Next, Table 44 outlines the function of each step in the framework. Lastly, the expanded framework in Figure 28 summarises each concept and provides a basic structure to guide pedagogy.

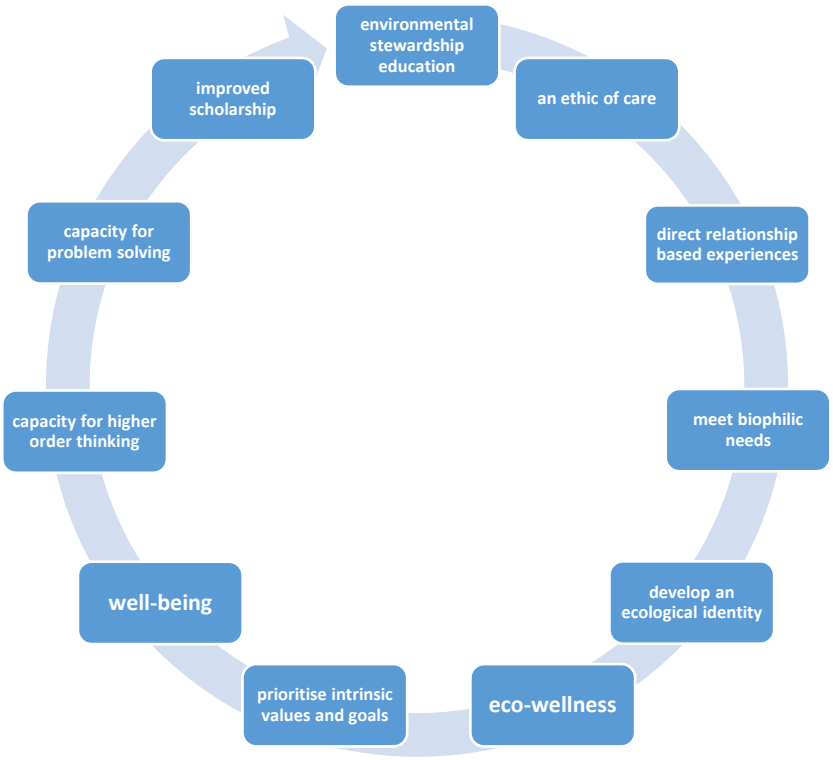


Figure 26: Links between Environmental Stewardship Education and Improved Scholarship

Environmental stewardship education incorporates principles of environmental education, education for sustainability, education for sustainable development and place-based education, or, it can be added to each of these education programs. However, I assert that the findings from this study, together with supporting research, conceptualise and establish environmental stewardship education as a viable education approach. It is my considered response to the urgent call for planetary stewardship from eminent scientists.

Learning for Environmental Stewardship Conceptual Framework

The premise of the framework is that environmental stewardship education responds to biophilic needs to develop a nurturing connection with the natural environment to cultivate an ecological identity and eco-wellness. Important next, is the development of skills to promote intrinsic values to

cultivate well-being, higher order thinking and problem solving, and a sense of self in relation to the ecological and human created systems that we all inhabit. The overall aim is to cultivate and promote improved scholastic performance and environmental stewardship behaviour to build capacity for social-ecological resilience. Care pedagogy is integral throughout the framework.

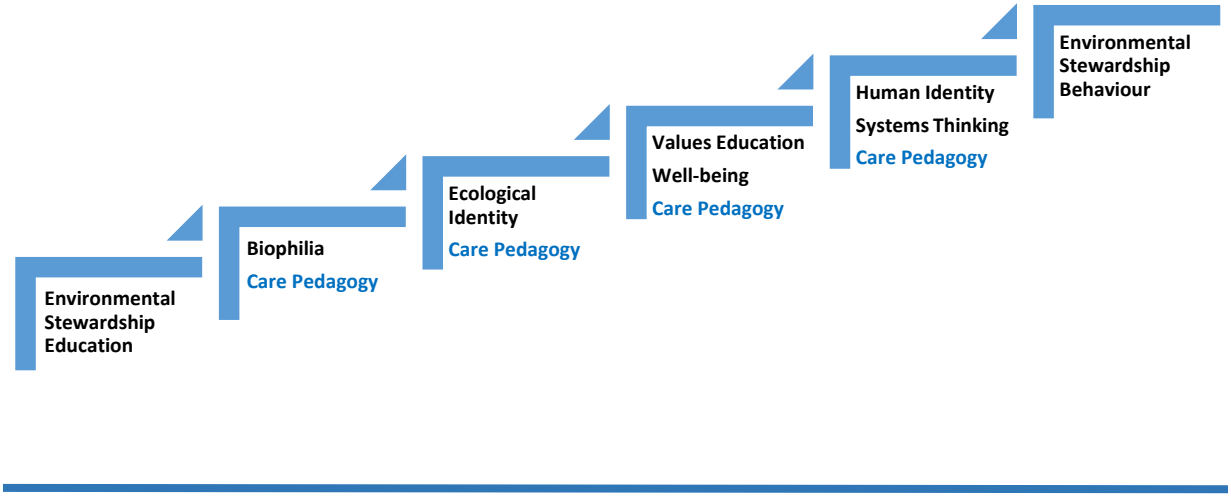


Figure 27: Learning for Environmental Stewardship Conceptual Framework

Table 44 outlines the function of each step in the framework. The column titled framework function depicts the overarching role played by that step.

Table 44: The Functions of the Framework

Step	Framework Function	Description
Environmental Stewardship Education	Architecture	learning to connect and affiliate with the natural world, develop environmental stewardship principles and a relational, systems thinking worldview. Incorporates principles of EE, EfS, ESD and place-based education
Care Pedagogy	Action	learning how to care generally and for the natural world specifically
Biophila	Foundation	innate human need to connect and affiliate with the natural world
Ecological Identity	Intent	develop an ecological identity, a sense of self in relation to the natural world
Values Education Well-being	Goal	cultivate environmental values and attitudes, well-being and an intrinsic motivation reward cycle
Human Identity Systems Thinking	Overarching Outcome	Inclusive of an ecological identity and systems thinking, improving capacity for higher order thinking, problem solving and scholarship
Environmental Stewardship Behaviour	Lived curriculum	continuing outcome, 'lived' curriculum, encompasses pro-environmental behaviour, well-being and eco-wellness to achieve environmental stewardship, sustainability and sustainable development

Note: EE = environmental education, EfS = education for sustainability, ESD = education for sustainable development

Age appropriate learning experiences.

It is important to acknowledge that bonding and building affinity with the natural environment is fostered in different ways at different stages of life. Age appropriate learning experiences to cultivate environmental values, knowledge, and understanding for environmental stewardship are identified as: early childhood (ages 3 to 7) development of empathy and the cultivation of a relationship with the natural environment; the early and middle primary grades (ages 7 to 11) explore, experience and bond with the natural environment; and adolescence school years (ages 12 to 17) the (continued) development of self-identity and social action for preservation of the local and global natural environment (White & Stoecklin, 2008). These relationships can be developed through informal and formal learning environments. Outdoor experiences with significant others like parents, family and friends can also develop an innate relationship with the natural world and foster an ethic of care (Ewert et al., 2005; Kals et al., 1999).

A lack of learning to develop biophilic needs and a lack of environmental care lie at the core of the ecological crises of the Anthropocene (Clarke, 2017; Mortari, 2004). Learning to develop empathy with nature and to value nature, are key components to actively caring for the natural environment (Chawla, 1988, 2006, 2009; Chawla & Cushing, 2007). Human reliance on learning is foundational to 'reach[ing] beyond our biology, to change, create and progress' (Kellert, 2012a, p. xii). The focus of learning must be fundamental to improving the quality of life. Higher levels of awareness, thinking, and approaches to learning are required (Taylor, Taylor, & Luitel, 2012).

The expanded framework in Figure 28 collates the theories and concepts that have informed the development and definition of environmental stewardship education in this research.

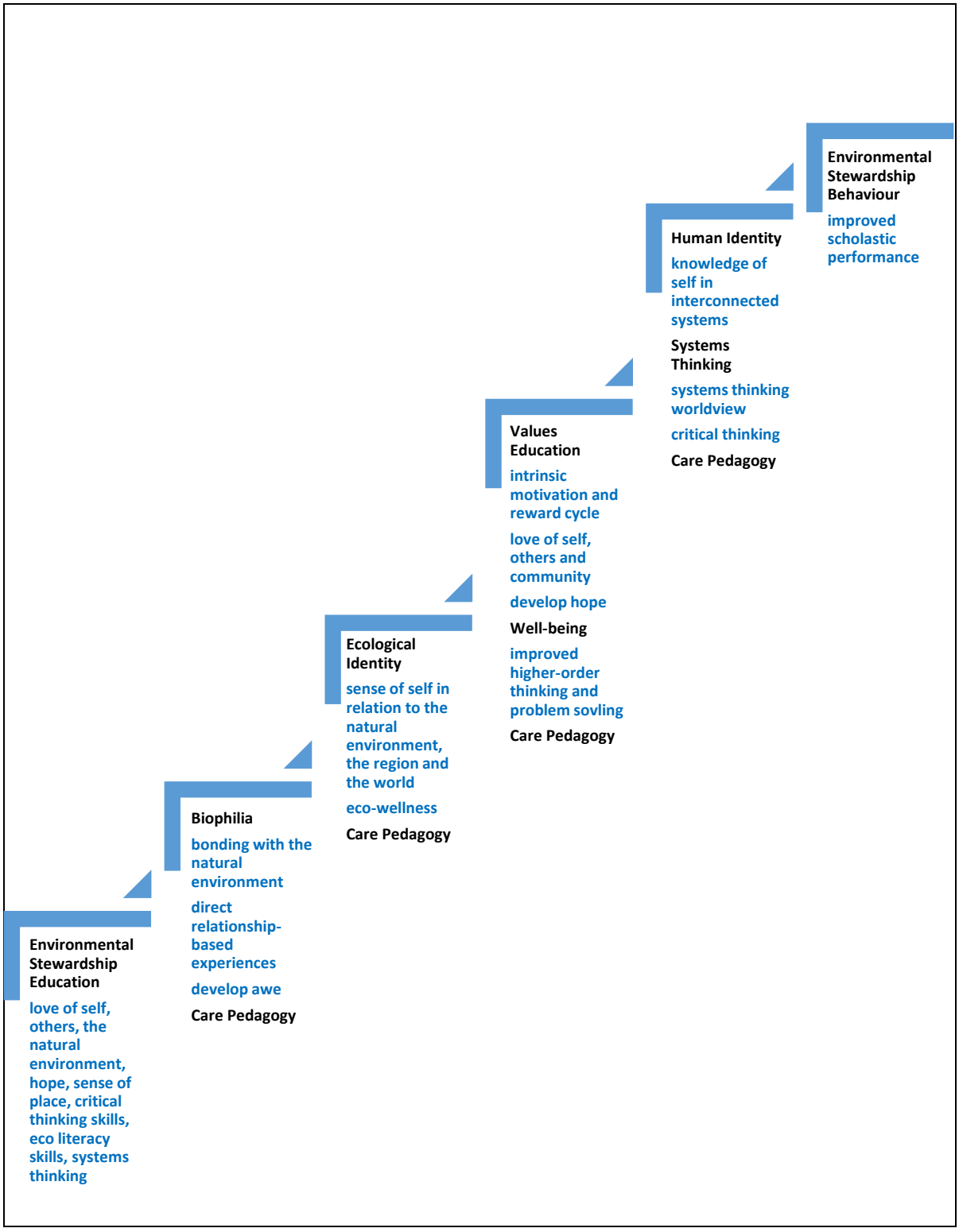


Figure 28. Expanded Framework – Informing Theories and Concepts

The framework is a work in progress and further research outcomes will, no doubt, augment theoretical and structural content.

Discussed next are the links between direct relationship-based experiences to meet biophilic needs, cultivation of an ecological identity and eco-wellness, and prioritisation of intrinsic values to advance well-being and capacity for higher order thinking, problem solving and improved scholarship.

Direct experience, direct relationship-based experiences and ecological identity.

Direct experiences in the natural environment are integral to environmental stewardship education. The benefits of knowing and experiencing the natural world can develop biophilic needs and lead to improved mental and physical health and generally make people happier (Cervinka et al., 2011; Kellert, 2012a; Russell et al., 2013; Stevens, 2010; Zelenski & Nisbet, 2014). Direct experiences build emotional affinity, construct environmental attitudes and values and provide the motivational basis for environmental protection and concern for environmental issues (Kals et al., 1999; Kellert, 2002; Schultz, 2002; Schultz et al., 2004). All direct experiences can be beneficial, whether they are short experiences in an urban garden or a lengthy solitary wilderness walk (Kellert, 2012b; Maller et al., 2006; Thompson & Aspinall, 2011).

More pertinent to environmental stewardship education are direct relationship-based experiences that focus on developing a sense of belonging and learning to care, awakening an environmental consciousness and the capacity for stewardship motivation and behaviour (Bramston et al., 2011; Kevany, 2007; Krogh & Jolly, 2012; Nazir & Pedretti, 2016). Purpose designed direct experiences build an individual's relationship with the natural environment, knowledge of interconnectedness and create a greater commitment to the environment, forming a 'psychological attachment to and long term orientation toward the natural world' (Davis et al., 2009, p. 174). This commitment to the natural world describes eco-wellness and an ecological identity: how a person extends their sense of self in relationship to 'nature' (Thomashow, 1996). Environmental stewardship education adopts Thomashow's four overriding questions to cultivate an ecological identity: i) where do the things I consume come from; ii) what do I know about the place where I live; iii) how am I connected to the

earth and other living beings; and, iv) what is my purpose and responsibility as a human being (1996, pp. 179-180). These knowledges and understandings overlap with place-based education.

The basic role played by values and an intrinsic motivation reward cycle.

Values are validated either through intrinsic self-acceptance and/or through extrinsic alignment with the mores of a chosen group (Kasser, 2014). Educating for understanding about the differences between intrinsic and extrinsic values and the goals they orientate towards; and developing self-questioning and reflection about value orientation, choice and balance; assists in the creation of an ethic of care for the natural environment (Kasser, 2014). In following Kasser, intrinsic goals of community feeling and self-acceptance fulfil universal psychological needs. In contrast, extrinsic goals of image, popularity, and financial success are usually pursued to achieve some other outcome like appearing attractive to someone. Prioritising of values and goals varies according to life needs. A life in pursuit of intrinsic goals and values is associated with higher well-being and lower distress, however, contemporary consumer culture largely celebrates and encourages the pursuit of extrinsic values and goals (Kasser, 2014). There is a significant body of research, notably through the work of Common Cause (Crompton, 2010), supporting the development of values to advance environmental stewardship behaviour and social-ecological resilience. Through learning how to care for the natural environment, environmental stewardship education seeks to: i) prioritise intrinsic values and goals to fulfil innate biophilic needs; ii) promote an intrinsic motivation and reward cycle (Holmes et al., 2011); iii) foster pro-environmental behaviour (Van der Werff, Steg, & Keizer, 2013); and, iv) cultivate greater resilience to meet Anthropogenic stressors (Kofinas & Chapin III, 2009).

Higher order thinking, problem solving.

Qualities of higher order thinking and their relative educational objectives are classified into a hierarchy with six levels of cognitive complexity called Blooms Taxonomy. See Figure 29. The bottom three of knowledge, comprehension and application are fundamental to life and describe the capacity to find, understand and use knowledge. The higher three levels of analysis, synthesis and evaluation

engage higher level thinking and are suggested here as necessary for response to unknown environmental change expected from further disruption to Planetary Boundaries (Steffen et al., 2015).

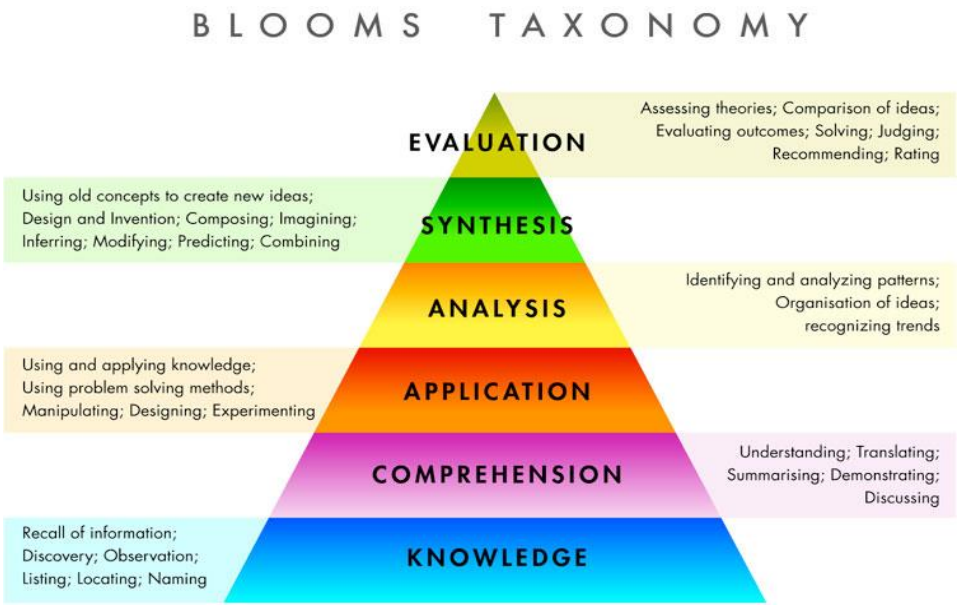


Figure 29: Blooms Taxonomy

Source: http://juliaec.wordpress.com/2011/03/23/blooms-taxonomy-encouraging-higher-cognitive-thinking-in-primary-school-classrooms/

The premise of environmental stewardship education is that learning and well-being are synergetic. In the fulfilment of biophilic needs and prioritising intrinsic values to promote well-being, self-efficacy for environmentally responsible behaviour is more achievable (Holmes et al., 2011; Kofinas & Chapin III, 2009; Tabernero & Hernández, 2011). Pedagogy that builds connection with the natural environment is effective in developing caring and environmental stewardship behaviour (Blanchet-Cohen, 2010; Eilam & Trop, 2012; Jickling, 2009). Research indicates that time spent in the natural environment enhances physical and mental well-being (Reese & Myers, 2012; Wood et al., 2013; Zotti & Branch, 2011) and improves directed attention, memory and cognitive functioning (Berman, Jonides, & Kaplan, 2008; Dadvand et al., 2015; Schutte, Torquati, & Beattie, 2015; A. F. Taylor & Kuo, 2009; Walsh, 2011). Academic study integrated with place-based environmental education develops well-being and capacity for higher order thinking to facilitate problem solving and improved academic achievement (Litz, 2010).

Research Implications and Recommendations

This study has focused on environmental stewardship education to develop environmental stewardship behaviour as one approach to building capacity for social-ecological resilience in Gen Z. Research outcomes indicate that development of an ecological identity, well-being and systems thinking will contribute to building capacity for social-ecological resilience in the face of extenuating and unprecedented Anthropogenic challenges and changes, and will balance the influence of the neoliberal, global marketplace on the identities of Gen Z.

Research Recommendations.

Two recommendations are made for environmental stewardship education to build capacity for social-ecological resilience:

R1. *Australian Federal and Queensland State Government education policy makers adopt environmental stewardship education and incorporate it throughout the P-12 curricula to develop*:

- R1a. biophilic values and an ethic of care encompassing a love of self, community and the natural environment
- R1b. an ecological identity inclusive of a sense of place: regionally and globally
- R1c. values education and skills to prioritise intrinsic values
- R1d. critical thinking, higher order thinking and a systems thinking worldview
- R1e. well-being

R2. *The Australian Federal and/or the Queensland State Government formally establish and finance a research agenda to investigate and develop environmental stewardship education.*

Proposals.

The following proposals outline how environmental education may be adopted by education policy makers and transitioned into school praxis.

P1. *Education policy goals explicitly develop environmental stewardship* in curricula and schools in P-12 year levels in an age appropriate manner

P2. *Initiate school pilot programs* to engage with environmental stewardship education to develop, explore and establish policy, curricula and praxis

P3. *Monitor well-being and scholarship in pilot programs*

P4. *Undertake professional development for teachers and school administrators* to educate about the principles of environmental stewardship and the need to develop well-being

and higher order thinking to build capacity for social-ecological resilience at an individual and professional level, and to develop capacity as an environmental stewardship educator and/or school administrator

P5. *Re-think the structure of the school day* so it is more integrated with the outdoors for both cognitive and affective learning

P6. *Continue to develop ideas and strategies for direct relationship-based experiences* in the natural environment through professional networks

P7. Through ongoing research and professional networks, maintain focus on the importance of developing and cultivating:

- P7a. values and learning about intrinsic and extrinsic values prioritisation
- P7b. problem solving
- P7c. a systems thinking worldview
- P7d. an ecological identity that encompasses knowledge and understanding about: i) where do the things I consume come from, ii) what do I know about the place I live, iii) how am I connected to the earth and other living beings, and iv) what is my purpose and responsibility as a human being (Thomashow, 1996, pp. 179-180)
- P7e. ecological literacy – the principles of ecology, conservation biology and action capacity (Ewert et al., 2014)

Conclusion

Environmental stewardship education is conceptualised here from a range of theories discussed throughout this thesis. It seeks to develop values and attitudes and an intrinsic motivation reward cycle to promote environmental stewardship behaviour and develop capacity for social-ecological resilience. The major outcome of this research – a learning for environmental stewardship conceptual framework was presented. Fundamental to environmental stewardship education are direct relationship-based experiences to cultivate an ecological identity and to promote higher order thinking and problem solving. The chapter concluded with two recommendations: that education policy makers in Federal and Queensland State Governments in Australia adopt environmental stewardship education and that they finance further research. Some proposals were offered to assist uptake of environmental stewardship education in schools.

Chapter Seven – Concluding Remarks

All education is environmental education….
by what is included or excluded we teach the young
that they are part of
or apart from
the natural world
David Orr, 2004, p. 12

Preface

This research project was designed to answer the questions: What is the relationship between environmental stewardship, Year 10 students and their teachers, and the Australian Curriculum's Sustainability Cross-Curriculum Priority within the Wet Tropics region of Australia; and to what extent is this relationship working to foster environmental stewardship?

Doctoral research is a reflective, multiyear journey. Across the years, I have specifically reflected on the cumulative effects of three things: Anthropogenic stressors jeopardizing the future reliability of the life providing functions of the Earth System, the impacts of a neoliberal, market-based, global culture on the identity of Gen Z, together with what I perceive as, a limited/limiting education policy in Australia. This has led to the conceptualisation of environmental stewardship education. Beginning this chapter is a personal reflection that maps my path to this research. Then, the uncertainties of the 21st century and the great theft of the Anthropocene are discussed. Next, questions are raised: are Gen Z needs (largely) neglected in education and, does this implicate education policy in the broader issue of youth suicide? Next, the socio-ecological contribution that environmental stewardship education can make to intergenerational equity and social justice and the rights of nature are briefly explored. Recounted by way of vignette, is the centuries old time tested schooling of Indigenous Australian children for environmental stewardship in remote, arid, western Queensland. Recorded by

white grazers to the region in the early 1900s, this education practice accentuates the intergenerational learning necessary for survival and conservation of a fragile environment and provides the precise knowledge that each child needed to have. This learning sits in stark contrast to the focus we place on educating our young to successfully navigate and contribute to their world. This thesis concludes with suggestions for continuing environmental stewardship education research.

A Personal Reflection: Arriving at this Research Topic

My upbringing was replete with experiences of natural environments. We visited (and played) in a variety of natural terrains from dessert, to forest, to sea country. Whilst my father was principal of Quilpie State School in south western Queensland, our family became intimate with the surrounding district, visiting vast sheep and cattle stations and befriending the 'cockys' – the station owners or managers and their families and staff. It was through these friendships that my parents were invited to supply 12 photographs of the region for the second edition of *Where Strange Paths Go Down* by Alice Duncan-Kemp (1964). This book is an account of the lives of Aboriginal people in the sand hill country and on the cattle runs to the west of Quilpie close to the South Australian border, after the arrival of European, Chinese and Afghan settlers. In her book, Duncan-Kemp explains Aboriginal teaching and learning for environmental stewardship. Aboriginal children weren't learning <u>about the environment</u> as something separate, but learning their place in the 'lifescape', my word for: the whole environment that encompasses each individual, their role, the cycles of provision, the metaphysical world and complex Aboriginal kinship patterns; to ensure survival and to provide for the future. Enacting care occurred in a multi-generational (continuous) timeline.

Handed to me from childhood were basic Christian values but not Christian beliefs. Values were an unwritten code to guide the living space and they were basic – do good and tell the truth. Accompanying the value set was a worldview that everybody is/should be aiming for (and achieving) the same values. However, tensions existed for me as I reached adolescence and witnessed a lack of social and environmental justice and the unfairness that seemed to underpin the lives of so many of my fellow humans. As a young adult, I was left to decide for myself what my belief structure was to

be. I wasn't taught to believe in anything: God, or goodness, or tomorrow for that matter. Social mores, represented in a few old sayings like: when every door closes a new one opens and treat others as you would like to be treated, were inadvertently added to the construct of my worldview. Beliefs were an unknown quantity. Even today, beliefs remain enigmatic for me. What does it mean to believe? How do you decide if you believe in something? What do beliefs cost emotionally? Does an investment in a belief close a mind? Should it justify domination of others? Would adopting a universal code that promotes equality, like the Earth Charter, serve to moderate extreme beliefs?

By the time I had reached tertiary education at a 'college of advanced education' to study teaching in the early 1970s, the injustice I witnessed inspired me to be a better person. I adopted the women's cause as my own and became what I called a 'red hot' feminist in a small regional city in North Queensland – Townsville. *Dammed Whores and God's Police* by Anne Summers (1976) was my new best read, a narrative about the colonisation of women in Australian culture. Learning to be a teacher at this institution of 'advanced education' was not particularly intellectually engaging (the fault was most likely mine), and although I was on a scholarship to support my everyday living needs, I worked up to three jobs concurrently and saved to travel at every opportunity. I played sport at a high level and competed in the Under 18 Australian basketball championships in Melbourne representing Queensland and I toured the South Island of New Zealand with an Under 20 North Queensland basketball team. I ventured on excursions to central western Queensland to see almost complete dinosaur skeletons on the surface of the ground, partook in intercollegiate sporting excursions to Sydney, attended Australian Union of Student conferences in Melbourne and rode buses through Indonesia and trains in Malaysia. In the first year post study, I had moved to Perth in Western Australia to work and save for two months, to then ride buses and trains throughout India for nine months. Returning to Townsville in 1979, I married my partner of five years at a park on the banks of Ross River. These experiences of life, love and learning (and reading) saw me, in my mind at least, graduate to a humanist worldview embracing these causes: feminism, environmental justice and Indigenous rights. As for so many others around the planet, the 1970s proved a transformative decade.

In the 1980s, esoteric studies at *Beshara*, a school near Findhorn in Scotland, saw me question the nature of existence with fresh eyes. Love, and becoming a mother, had expanded my vision. Through esoteric study I came to understand (or resonate with the notion) that the world is a single, indivisible entity, and that the corporeal world has multi-dimensional, intangible aspects which are largely unrecognized and ignored by western culture. Within the study group at *Beshara*, I read and discussed the *Fusis al-Hikam* (the Bezels of Wisdom) written in the 1300s by a Sufi mystic, ibn Arabi (formally published in english in 1986) which recounts the wisdoms of the 'prophets' of the Abrahamic religions in 26 chapters: from Adam in the first chapter to Jesus in the second last chapter and Mohammed in the last chapter. Here, we also read and discussed eastern philosophy and religion, reading the *Tao Te Ching* and parts of the *Bhagavad-gita* and practiced prayer, meditation and the expression of our contemplations through our daily chores when caring for children, gardening and preparing food. The messages of the religions of the world merged into one. I came to understand (not believe) that Life is one single expression: human, animal, plant along with those entities not deemed to have consciousness: the soil, rocks, water and rivers. The metaphor of the earth as a polished jewel with each bezel representing a unique expression of the life essence was an image I created in my mind's eye, and this image continues to engender in me a deep respect and love for our shared world. Today, I (rightly or wrongly) consider this view to be analogous to Indigenous understandings of Life, the Earth Mother and the Oneness of Existence. It is my understanding that a similar view is articulated as natureculture by Hilary Whitehouse (2011). Other academics describe this worldview as 'embedment in the environment' (Stevens, 2010).

What is Next?

In hindsight, I can see how a strong and simple value structure has guided me through life. Learning about values and to value self, family and friends, community, and the natural environment is integral to learning to take care. It became important to me to understand if the Gen Z students in the Wet Tropics were learning about values; learning to value themselves and their world and if they were learning to care. I am concerned for the future of this unique, dual World Heritage region. I am

concerned for my home. Environmental degradation results from a lack of care, a lack of connection and a lack of understanding and respect. Learning for environmental stewardship is absent from education policy in Australia. Findings from this study show Gen Z participants had learnt to value the natural environment and were inclined to pro-environmental behaviour (in following Karp, 1996), but lacked learning to take care and were unable to conceptualize their caring role.

An Uncertain 21st Century and the Interconnectedness of Life

We are hurtling into the unknown. Anthropogenic stressors are jeopardizing the future reliability of the life providing functions of the Earth System and this demands dramatic changes in our relationship with the earth. Scientists monitoring the Earth System through the Planetary Boundaries (PBs) framework warn of dangerous perturbations to four of the nine key cycles: biochemical flows, biosphere integrity, climate change and land system use (Steffen et al., 2015). Critically, proactive environmental stewardship measures must assess and reduce vulnerability to the Earth System and the many ecosystem stressors and, 'ecosystem stewardship requires actions that recognize social–ecological interdependencies of human activities and ecosystem services' (Chapin III, Kofinas, & Folke, 2009, p. 247). Active environmental stewardship of life-support systems should be a central focus of management and governance (Folke, 2010). At a governance level, agreement was reached within the international community to retain global warming below two degrees Celsius ($2^{o}C$) at the Paris Climate Change Conference in November 2015. This may be a turning point to achieve greater care of one vital aspect of the natural environment, carbon emissions monitoring and reduction, but how this initiative plays out and if it will translate into education policy remains to be seen.

The Theft of the Anthropocene

Gen Z and the Alphas will come of age and live their adult lives on an environmentally damaged planet, a 'reduced' planet with a stressed Earth System (Dunlap & Cohen, 2016). Leaving the next generation with less is intergenerational theft. We will leave the next generation a world with diminished capacity to support the quality of life evidenced by: less biodiversity, more carbon pollution in the atmosphere

directly affecting global warming, climate uncertainty and unknown outcomes in the coming decades. We are leaving them depleted and polluted oceans. The possibility of no coral reefs and no Great Barrier Reef is a real threat (Hughes et al., 2017; Poloczanska et al., 2016). We have 'stolen' from future generations. Intergenerational theft has also been described in terms of a lessening in opportunity and civil rights (Rayner, 2016) and as poor economic management creating dis-advantage for Gen Z, the Alphas and the generations to come (Grattan, November 27, 2016).

Gen Z neglected?

The identities and values of Gen Z are constructed by the neoliberal ideologies that underpin the global marketplace, orienting Western adolescents toward a highly competitive, individualistic, me-centred, consumerist ideology and lifestyle (Manne, 2014; Verhaeghe, 2014). Combine this with a formal education bias on numeracy and literacy performance – not development of the whole individual – and education policy makers may inadvertently be complicit in disastrous outcomes. Where is the learning to value and take care of: self, family, friends, the community and the natural environment? Australian trends for adolescent health show (and possibly foretell increasing) alienation from the natural environment (Clarke, 2017) and depression (ARACY, 2013). Youth suicide rates in Australia are the highest they have been in a decade and account for a third of deaths in the 15-24 age group (Robinson & Hetrick, 2016). Could education policy and praxis be more pro-active and responsive to mental ill health through the development of environmental stewardship?

Social-ecological Resilience

Intergenerational equity and social justice.

Throughout my doctoral work, my conceptualisation of environmental stewardship education promotes learning that restores and upholds principles of intergenerational equity and social justice. Environmental stewardship education responds to broader human, social and environmental constructs through development of intrinsic values to create well-being and a systems thinking worldview and seeks to improve the quality of life for all. At the heart of intergenerational equity and

social justice is a safe world for future generations with access to unpolluted ecosystems (UNESCO, 2016).

Caring values.

Environmental stewardship education cultivates an ethic of care which is integral to acknowledging the inextricable links between the rights of nature, ecological justice and human rights (Sachs, 1996) and seeks to further the cause to establish the rights of nature. Care theory and the principles of ecological justice are complementary even though they are essentially different ethics:

> An ethic of justice focuses on questions of fairness, equality, individual rights, abstract principles, and the consistent application of them. An ethic of care focuses on attentiveness, trust, responsiveness to need, narrative nuance, and cultivating caring relations. Whereas, an ethic of justice seeks a fair solution between competing individual interests and rights, an ethic of care sees the interests of carers and cared-for as importantly intertwined rather than as simply competing. Whereas justice protects equality and freedom, care fosters social bonds and cooperation (Held, 2006, p. 15).

Care provides the wider and deeper ethic within which justice should be sought (Held, 2006). Care provides the foundation for justice. Care must become the foundation for education.

The rights of nature.

To achieve new paradigms and worldviews for better environmental management in times of accelerating change, meta-concepts like universal rights, responsibilities and ethics need to be at the very core of human focus (Leach et al., 2012; Robinson, 2012; Roeder, 2010; Steffen et al., 2015). The World Conservation Union (IUCN) is debating whether to adopt a Declaration of the Rights of Nature (Global Alliance for the Rights of Nature, 2016). However, not all who contribute to the debate agree with the notion of the rights of nature, epitomised in comments like '[this is] political grandstanding – an attempt to blame environmental degradation and climate change on capitalism' and 'we should focus on tackling important sustainable development issues through existing channels and processes' (IUCN, 2011, para. 4 & para. 5). Many would argue that existing channels and processes have failed to tackle environmental issues as they continue to compound (Steffen et al., 2015). Foundational to

positive change are paradigms and worldviews that understand the interdependence of humanity and the natural environment and are inclusive of the rights of nature and ecological justice (Kopnina, 2014).

An Example of Learning for Environmental Stewardship in a Fragile Landscape

Learning in preparation for an adult life is cornerstone to education in all cultures. Aboriginal Australians skilfully taught their young how to 'read and know' the natural environment. Related here, is an ethnographical account of environmental stewardship and place-based education of Indigenous Australian children in remote Western Queensland. This account was recorded in the early 1900s after European, Chinese and Afghan settlers had arrived.

> The trackless sand hills and stony wastes presented no terrors for even the five-year-old piccaninny. The roughest country slowed his pace and even obscured his vision, but never for a moment did it occur to him that he could lose himself in it. This, though he is unable to explain why, is due primarily to the aboriginal method of sand maps, huge drawings covering an acre or more, which the women and old men drew on cleared sand patches outside the gunyahs for the instruction of the children.
>
> On these *murras* (literally 'the hand that guides') sand hills and general characteristic of tribal territory, his own and his messmates, were shown accurately, along with the game and everything edible or poisonous that was to be found in its many divisions. Trees inhabited by dogs, birds, possums, or reptiles were sketched in their direction to the winds. Waterholes (whether deep or shallow, permanent or of poor holding capacity) water-bearing plants and roots and food areas, were drawn in their relative positions in the several surrounding towris.
>
> When the children reach the age of eight or nine years they have to draw all these maps without any help from the adults. Is it any wonder that when they reach man's estate the book of nature holds no surprises for them?
>
> The great network of roads that made up the native commerce road, an inter-tribal highway which once encircled Australia, was also sketched and its use and pitfalls explained to the young mind, which absorbed all this learning as a blotting paper absorbs ink (Duncan-Kemp, 1964, pp. 27-28).

After taking such great care of the natural environment for approximately 60,000 years, Indigenous Australians could not foresee and contend with the tsunami of colonialization. We, on the other hand, as citizens of the modern world, can measure and monitor Earth System disruption. Science can model climate uncertainty and model tipping point scenarios like the heat jump in the arctic caused, in part,

by methane release from the melting tundra. When will these scientific measurements and models be able to inform education policy?

Further Research, Implications and Future Directions

This study is novel in its construct methodology and takes a causative approach by situating outcomes within a local and global context to understand trends, patterns and gaps in the education of Gen Z in these extenuating times. No known study has canvased values, environmental attitudes, environmental knowledge, education policy and curricula to ascertain if and/or how environmental stewardship capacities are being fostered. This is a somewhat perilous task. At several points in this multiyear journey I have asked myself, what is the point of this research? Why spend years trying to understand if there are gaps in modern Western education focus, planning, policy and praxis? Why learn to care? Why is it an imperative for me? Is my study large enough and will the data be generalisable and transferable and will it make a difference? Will anyone listen, let alone create change in education systems?

In explanation: this data is from a small sample of participants who work in and study at regional state high schools in Australia. It is not a representative sample of the general population of Gen Z across Australia or in the developed Western world. Extrapolation of results to a wider Gen Z population should be undertaken with care. Correlations were undertaken with studies with a similar focus to aspects of this study: a German study about adolescent values (Musiol & Boehnke, 2013) and a study with New Zealand university students about environmental attitudes (Milfont & Duckitt, 2010). Participant data was analysed in relation to historical and current education policy to ascertain what leadership for environmental stewardship and sustainability was offered and enacted in a formal education context. However, extrapolation of these Gen Z research outcomes to a global context may provide a cognitive overview that encourages further research about the nature and role of environmental stewardship in education planning, policy and praxis.

There is much talk about the negative impacts of continuing unsustainable business as usual (BAU) models for economic activity (Mathews & Tan, 2014). What are the implications of continuing unsustainable BAU education models that do not answer biophilic needs or develop affinity with and care of the natural environment? What harm is created as a result of policies that ignore educating students about the environmental challenges facing the planet? As David Orr states at the beginning of this chapter, education that excludes the environment teaches the young that they are not a part of the natural world. In following Orr, the lack of 'environment content' in the study sample encourages separation from the natural world. The study group live in a dual World Heritage region and the natural environment sits outside the Gen Z students' realm of active importance.

To advance environmental stewardship education, additional research could seek to study the links between meeting biophilic needs, well-being, problem solving and improved scholarship. Further research could focus on how care pedagogy might develop affinity with, and respect and awe for, the natural environment. Research projects could also study the relationship between developing self-care and an intrinsic motivation and reward cycle, and could focus on the benefits of developing interactive caring between schools and the community. In Australia, education research could focus on place-based pedagogy and environmental stewardship in the context of the 56 natural resource management regions, in conjunction with the organisations that oversee each region and the local government authorities. A project of this nature could explore how environmental stewardship and a regional identity based on social, ecological and economic knowledge, could build identity and stewardship pertinent to each locality (see http://nrmregionsaustralia.com.au/ and http://www.dilgp.qld.gov.au/local-government-directory/). Research could also explore how the Earth Charter may be used as a framework to guide development of curriculum.

Conclusion

To conclude this thesis, I reflected on my journey to this research topic. The uncertainties of the 21st century, the great theft of the Anthropocene and the needs of Gen Z were discussed. How

environmental stewardship builds capacity for social-ecological resilience through promoting intergenerational equity and social justice, caring values and the rights of nature were discussed next. A time-tested example of Indigenous learning for environmental stewardship was shared. Further research ideas to develop environmental stewardship education were discussed.

At the heart of this research are the Gen Z research participants and their formal schooling preparation for their adult lives on an environmentally damaged planet. Situated in adjacent World Heritage listed areas – the Australian Wet Tropics and the Great Barrier Reef – this study viewed education through an environmental stewardship lens. Findings reveal that education policy responds largely to the demands of neoliberalism. Instruction, testing, and global comparison of numeracy and literacy scores consume the focus of curricula and teachers. Pursuit of these goals means that the environmental care capacities and capabilities of Year 10 students lapse into apathy.

A Final Word, the Exegesis of this Thesis

The natural environment is in crisis.

The structure of society has changed.

Embedded philosophies and religions that have guided ethical and moral reasoning and decision making to uphold the quality of life, no longer sit at the core of society. They have become subservient to the marketplace.

Society is structured around the marketplace in a neoliberal culture where strategic entrepreneurship is the responsibility of all citizens and the dominant ideology is individualism and competitiveness.

Neoliberalism consistently fails to properly regulate and protect the commons (including the biodiversity and climate commons) and creates a vacuum of responsibility for the natural environment.

The quality of life will continue to deteriorate in the natural environment – and for humanity – unless core values evolve, and care for the quality of life becomes important and actioned.

What do we expect if caring is no longer a valued and learned core ethic?

Environmental stewardship education and behaviour is vital to secure quality of life.

References

Abram, D. (1985). The perceptual implications of Gaia. Retrieved from http://wildethics.org/essay/the-perceptual-implications-of-gaia/

ACARA. (2011). *Guide to understanding ICSEA*. Retrieved from http://www.acara.edu.au/_resources/Guide_to_understanding_ICSEA.pdf

ACARA. (2012). Curriculum development process Version 6. Retrieved from http://www.acara.edu.au/_resources/ACARA_Curriculum_Development_Process_Version_6.0_-_04_April_2012_-_FINAL_COPY.pdf

ACARA. (2013a). F-10 overview. Retrieved from http://www.australiancurriculum.edu.au/overview/structure

ACARA. (2013b). Sustainability. F-10 curriculum. Retrieved from http://www.australiancurriculum.edu.au/crosscurriculumpriorities/sustainability/overview

ACARA. (2014). Australian Curriculum F-10 overview version implementation advice. Retrieved from http://www.australiancurriculum.edu.au/curriculum/overview

ACARA. (2016). *National assessment program—Literacy and numeracy achievement in reading, writing, language conventions and numeracy: National report for 2016*. Retrieved from https://www.nap.edu.au/results-and-reports/national-reports

Adel, D. (2013). Mainstream media's environmental coverage: The sound of silence. *Earth Island Journal. News of the World Environment*. Retrieved from http://www.earthisland.org/journal/index.php/elist/eListRead/mainstream_environmental_coverage_the_sound_of_silence/

AESA. (2014). *Education for Sustainability and the Australian Curriculum Project Final Report For Research Phases 1 - 3*. Retrieved from http://www.educationforsustainability.com.au/efs-in-the-curriculum/aesa-final-report-now-available

Alberta Education. (2016). *The Guiding Framework.* Retrieved from https://education.alberta.ca/media/3273037/guiding-framework-oct-6-2016.pdf

Andrejewski, R. G. (2011). *Nature connection, outdoor play, and environmental stewardship in residential environmental education.* (Doctoral dissertation, Pennsylvania State University, Pennsylvania, USA). Retrieved from http://jcu.summon.serialssolutions.com/link/0/eLvHCXMwY2BQMEwzTDEyTbUAtlRBySfRwsQ42QSYUpJSLJMsU8AXwSB2xyGV5m6iDHJuriHOHrqwUjE-JScnHlgBmYJOYbMwNBRj4E0ELfzOKwFvEEvhO3R_ctv-9V4fe79L_lr-yWY_AGYsJaM

Apple, M. W. (2005). Education, markets, and an audit culture. *Critical Quarterly, 47*(1-2), 11-29.

Apple, M. W. (2011). Democratic education in neoliberal and neoconservative times. *International Studies in Sociology of Education, 21*(1), 21-31.

ARACY. (2013). Report card: the wellbeing of young Australians. Retrieved from http://www.aracy.org.au/projects/report-card-the-wellbeing-of-young-australians

Arango, J. D. (2009). Teaching environmental stewardship. *Children's Technology and Engineering 14*(2), 7.

Ardoin, N. M., Clark, C., & Kelsey, E. (2013). An exploration of future trends in environmental education research. *Environmental Education Research, 19*(4), 499-520. doi:10.1080/13504622.2012.709823

Asah, S., Bengston, D., & Westphal, L. (2012). The influence of childhood operational pathways to adulthood participation in nature-based activities. *Environment and Behavior, 44*(4), 545-569.

Attfield, R. (2006). Environmental sensitivity and critiques of stewardship. In R. J. Berry (Ed.), *Environmental Stewardship* (pp. 76-91). London, UK: T&T Clark.

Australian Academy of Science. (1970). *Education and the environmental crisis*. Retrieved from https://eric.ed.gov/?id=ED052019

Australian Education Council. (1999). *The Adelaide Declaration on national goals for schooling in the twenty–first century*. Retrieved from

http://www.scseec.edu.au/archive/Publications/Publications-archive/The-Adelaide-Declaration.aspx

Australian Government. (1999). *Today shapes tomorrow – Environmental education for a sustainable future – A discussion paper.* Retrieved from https://www.environment.gov.au/system/files/resources/c4a11a84-8d2b-4abe-983e-e337e9f870f4/files/nap.pdf

Australian National Commission for UNESCO. (2005). *Initiating the United Nations Decade of Education for Sustainable Development in Australia*. Report of a National Symposium, Melbourne, 7 July 2005. Retrieved from http://www.environment.gov.au/education/publications/pubs/undesd-report.pdf

Barr, C. (2016, December 10). Who are Generation Z? The latest data on today's teens. *The Guardian*. Retrieved from https://www.theguardian.com/lifeandstyle/2016/dec/10/generation-z-latest-data-teens?

Barrett, M. (2007). Homework and fieldwork: Investigations into the rhetoric–reality gap in environmental education research and pedagogy. *Environmental Education Research, 13*(2), 209-223.

Barrett, R. (2012, July 14). No climate change in school: LNP. *The Australian*. Retrieved from http://www.theaustralian.com.au/national-affairs/state-politics/no-climate-change-in-school-lnp/news-story/9b6439bf621c61d24cf9e3a46c9e5e52

Bekoff, M. (2013). *Ignoring nature no more: the case for compassionate conservation*. Chicago, lL: University of Chicago Press.

Bennett, D. C., Cornwell, G. H., Al-Lail, H. J., & Schenck, C. (2012). An education for the twenty-first century: Stewardship of the global commons. *Liberal Education, 98*(4), 34-41.

Berkowitz, A. R., Ford, M. E., & Brewer, C. A. (2005). A framework for integrating ecological literacy and environmental citizenship in environmental education. In E. A. Johnson & M. J. Mappin

(Eds.), *Environmental Education and Advocacy. Changing Perspectives of Ecology and Education*. Cambridge, UK: University Press.

Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science, 19*(12), 1207-1212.

Blanchard, P. B., & Buchanan, T. K. (2011). Environmental stewardship in early childhood. *Childhood Education, 87*(4), 232-238. doi:10.1080/00094056.2011.10523184

Blanchet-Cohen, N. (2010). Rainbow Warriors: The unfolding of agency in early adolescents' environmental involvement. In R. B. Stevenson & J. Dillon (Eds.), *Engaging Environmental Education: Learning, Culture and Agency*. Rotterdam, The Netherlands: Sense Publishers.

Blumstein, D. T., & Saylan, C. (2007). The failure of environmental education (and how we can fix it). *PLoS Biology, 5*(5), e120-977. doi:10.1371/journal.pbio.0050120

Bolderdijk, J. W., Gorsira, M., Keizer, K., & Steg, L. (2013). Values determine the (in) effectiveness of informational interventions in promoting pro-environmental behavior. Retrieved from http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0083911

Bottery, M. (2001). *Education, policy and ethics*. London, UK: Continuum.

Bowden, R. (2013). *Leading through values: Pilot project report May 2013.* Retrieved from www.learningthroughvalues.org

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27-40. doi:10.3316/QRJ0902027

Bramston, P., Pretty, G. H., & Zammit, C. (2011). Assessing environmental stewardship motivation. *Environment and Behavior, 43*(6), 776-788. doi:10.1177/0013916510382875

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2014). What can "thematic analysis" offer health and wellbeing researchers? *International Journal of Qualitative Studies on Health and Well-being, 9*, 1-2. doi:10.3402/qhw.v9.26152

Breunig, M., Murtell, J., Russell, C., & Howard, R. (2014). The impact of integrated environmental studies programs: are students motivated to act pro-environmentally? *Environmental Education Research, 20*(3), 372-386.

Brodie, J., Kroon, F., Schaffelke, B., Wolanski, E., Lewis, S., Devlin, M., . . . Davis, A. (2012). Terrestrial pollutant runoff to the Great Barrier Reef: an update of issues, priorities and management responses. *Marine Pollution Bulletin, 65*(4), 81-100.

Brown, K. W., & Kasser, T. (2005). Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle. *Social Indicators Research, 74*(2), 349-368.

Brundtland, G. H. (1985). World Commission on environment and development. *Environmental Policy and Law, 14*(1), 26-30.

Bruni, C. M., & Schultz, P. (2010). Implicit beliefs about self and nature: Evidence from an IAT game. *Journal of Environmental Psychology, 30*(1), 95-102.

Bruni, C. M., Winter, P. L., Schultz, P. W., Omoto, A. M., & Tabanico, J. J. (2015). Getting to know nature: evaluating the effects of the Get to Know Program on children's connectedness with nature. *Environmental Education Research*, *23*(1), 43-62.

Caldwell, C., Hayes, L. A., & Long, D. T. (2010). Leadership, trustworthiness, and ethical stewardship. *Journal of Business Ethics, 96*(4), 497-512. doi:10.1007/s10551-010-0489-y

Campbell, W. K., Bush, C. P., Brunell, A. B., & Shelton, J. (2005). Understanding the social costs of narcissism: The case of the tragedy of the commons. *Personality and Social Psychology Bulletin, 31*(10), 1358-1368.

Canadian Environmental Grantmakers' Network. (2006). *Environmental education in Canada: An overview for grantmakers*. Retrieved from http://www.cegn.org/wp-content/uploads/2013/10/EEBrief_Eng.pdf

Capra, F. (2005). Speaking nature's language: Principles of sustainability. In M. Stone & Z. Barlow (Eds.), *Ecolgocial literacy. Educating our children for a sustainable world*. San Franciso, CA: Sierra Club Books.

Cervinka, R., Röderer, K., & Hefler, E. (2011). Are nature lovers happy? On various indicators of well-being and connectedness with nature. *Journal of Health Psychology*, *17*(3), 379-388.

Chapin III, F. S., Kofinas, G. P., & Folke, C. (Eds.). (2009). *Principles of ecosystem stewardship: Resilience-based natural resource management in a changing world.* New York, NY: Springer.

Chapin III, F. S., Kofinas, G. P., Folke, C., Carpenter, S. R., Olsson, P., Abel, N., . . . Smith, D. M. S. (2009). Resilience-based stewardship: Strategies for navigating sustainable pathways in a changing world. In F. S. Chapin III, G. P. Kofinas, & C. Folke (Eds.), *Principles of ecosystem stewardship: Resilience-based natural resource management in a changing world* (pp. 319-337). New York, NY: Springer.

Chapin III, F. S., Pickett, S. T. A., Power, M. E., Jackson, R. B., Carter, D. M., & Duke, C. (2011). Earth stewardship: a strategy for social–ecological transformation to reverse planetary degradation. *Journal of Environmental Studies and Sciences, 1*(1), 44-53.

Chapin III, F. S., Power, M. E., Pickett, S. T. A., Freitag, A., Reynolds, J. A., Jackson, R. B., . . . Power, A. G. (2011). Earth Stewardship: science for action to sustain the human-earth system. *Ecosphere, 2*(8), art89.

Chapin III, F. S., Young, O. R., Berkes, F., Biggs, R., Grove, J. M., Naylor, R. L., . . . Walker, B. (2010). Ecosystem stewardship: sustainability strategies for a rapidly changing planet. *Trends in Ecology & Evolution, 25*(4), 241-249. doi:10.1016/j.tree.2009.10.008

Chawla, L. (1988). Children's concern for the natural environment. *Children's Environments Quarterly*, 13-20.

Chawla, L. (2001). Significant life experiences revisited once again: Response to vol. 5(4) Five critical commentaries on significant life experience research in environmental education, *Environmental Education Research*, 7:4, 451-461. doi:10.1080/13504620120081313

Chawla, L. (2006). Learning to love the natural world enough to protect it. Retrieved from http://naturalplaygrounds.info/PDF/Chawla_LearningtoLove.pdf

Chawla, L. (2007). Childhood experiences associated with care for the natural world: A theoretical framework for empirical results. *Children Youth and Environments, 17*(4), 144-170.

Chawla, L. (2008). Participation and the ecology of environmental awareness and action. In A. Reid, B. B Jensen, J Njkel and V. Simovska (Eds.), *Participation and Learning. Perspectives on Education and the Environment, Health and Sustainability.* Retrieved from https://link-springer-com.elibrary.jcu.edu.au/book/10.1007%2F978-1-4020-6416-6

Chawla, L. (2009). Growing up green: Becoming an agent of care for the natural world. *The Journal of Developmental Processes, 4*(1), 6-23.

Chawla, L. (2015). Benefits of nature contact for children. *Journal of Planning Literature*. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/0885412215595441

Chawla, L., & Cushing, D. F. (2007). Education for strategic environmental behavior. *Environmental Education Research, 13*(4), 437-452.

Cheng, J. C.-H., & Monroe, M. C. (2012). Connection to nature children's affective attitude toward nature. *Environment and Behavior, 44*(1), 31-49.

Cirkony, C. (2015). Environmental learning: How BC teachers find and use resources. *Eco-thinking, 1*(1).

Clark, S. G. (2011). *The policy process. A practical guide for natural resource professionals*. New Haven, CT: Yale University Press.

Clarke, M. (2017). The ecological illiteracy crisis. Retrieved from http://www.latrobe.edu.au/big-fat-ideas/latest-episodes/ecological-illiteracy

Clayton, S. (2013). Nature and animals in human social interations. Fostering environmental identity. In M. Bekoff (Ed.), *Ignoring nature no more. The case for compassionate conservation*. Chicago, IL: University of Chicago Press.

Clayton, S., & Opotow, S. (Eds.). (2003). *Identity and the natural environment. The Psychological Significance of Nature*. Cambridge, MA: MIT Press.

Cobbold, T. (2016). *Australia's unfair school funding system must be overhauled*. Retrieved from http://www.adogs.info/statistics/trevor-cobbold-facts-and-figures-state-aid-private-schools-disastrous-public-policy

Collado, S., & Corraliza, J. A. (2013). Children's restorative experiences and self-reported environmental behaviors. *Environment and Behavior*, *47*(1), 38-56.

Commonwealth of Australia. (2000). *Environmental education for a sustainable future. National action plan*. Retrieved from https://www.environment.gov.au/resource/environmental-education-sustainable-future-national-action-plan-3

Commonwealth of Australia. (2005). *National framework for values education in Australian schools*. Retrieved from http://www.curriculum.edu.au/verve/_resources/Framework_PDF_version_for_the_web.pdf

Commonwealth of Australia. (2016). *Parlimentary debates. Senate (Hansard).* (Tuesday, 19 April 2016 ed., Vol. No. 6. 2016., pp. 2978).

Cooke, A. N., Fielding, K. S., & Louis, W. R. (2015). Environmentally active people: the role of autonomy, relatedness, competence and self-determined motivation. *Environmental Education Research*, 1-27.

Corcoran, P. B. (2004). What if? The educational possibilities of the Earth Charter. *Educational Studies, 36*(1). doi:10.1207/s15326993es3601_9

Corraliza, J. A., Collado, S., & Bethelmy, L. (2012). Nature as a moderator of stress in urban children. *Procedia-Social and Behavioral Sciences, 38*, 253-263.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston, MA: Pearson.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage Publications, Inc.

Crompton, T. (2010). *Common Cause. The case for working with our cultural values*. Retrieved from http://valuesandframes.org/downloads/

Crompton, T., & Kasser, T. (2009). *Meeting environmental challenges: The role of human identity* Retrieved from http://action-town.eu/wp-content/uploads/2010/02/meeting_environmental_challenges___the_role_of_human_identity.pdf

Dadvand, P., Nieuwenhuijsen, M. J., Esnaola, M., Forns, J., Basagaña, X., Alvarez-Pedrerol, M., . . . Su, J. (2015). Green spaces and cognitive development in primary schoolchildren. *Proceedings of the National Academy of Sciences, 112*(26), 7937-7942.

David Suzuki Foundation. (2015). *Will Generation Z give us superheroes for the planet*? Retrieved from http://www.davidsuzuki.org/blogs/science-matters/2015/09/will-generation-z-give-us-superheroes-for-the-planet/

Davidov, E., Schmidt, P., & Schwartz, S. H. (2008). Bringing values back in the adequacy of the European Social Survey to measure values in 20 countries. *Public Opinion Quarterly, 72*(3), 420-445.

Davidson, K. (2013, April 29). How privilege rules over school funding. *The Sydney Morning Herald*. Retrieved from http://www.smh.com.au/federal-politics/political-opinion/how-privilege-rules-over-school-funding-20130428-2imiu.html

Davis, J. L., Green, J. D., & Reed, A. (2009). Interdependence with the environment: Commitment, interconnectedness, and environmental behavior. *Journal of Environmental Psychology, 29*(2), 173-180.

Day, J. C. (2016, April 27). Great Barrier Reef bleaching stats are bad enough without media misreporting. *The Conversation*. Retrieved from http://theconversation.com/great-barrier-reef-bleaching-stats-are-bad-enough-without-media-misreporting-58283

De Groot, J. I., & Steg, L. (2010). Relationships between value orientations, self-determined motivational types and pro-environmental behavioural intentions. *Journal of Environmental Psychology, 30*(4), 368-378.

de Leo, J. (2012). *Quality education for sustainable development*. Adelaide, Australia: UNESCO APNIEVE.

Dimick, A. S. (2015). Supporting youth to develop environmental citizenship within/against a neoliberal context. *Environmental Education Research, 21*(3), 390-402.

DOGS. (2007). *Australian Council for the defence of government schools*. Retrieved from http://www.adogs.info/statistics/comparison-funding-government-and-non-government-schools

Dreezens, E., Martijn, C., Tenbült, P., Kok, G., & de Vries, N. K. (2008). The missing link: On strengthening the relationship between values and attitudes. *Basic and Applied Social Psychology, 30*(2), 142-152.

Drew, J. D., Hardman, M., & Hosp, J. L. (2008). *Designing and conducting research in education*. Thousand Oaks, CA: Sage Publications Inc.

Du Plessis, C. (2008). A conceptual framework for understanding social-ecological systems. *Exploring Sustainability Science: A Southern African Perspective*. Stellenbosch, South Africa: Sun Press.

Duerden, M. D., & Witt, P. A. (2010). The impact of direct and indirect experiences on the development of environmental knowledge, attitudes, and behavior. *Journal of Environmental Psychology, 30*(4), 379-392.

Duncan-Kemp, A. M. (1964). *Where strange paths go down* (2nd ed.). Brisbane, Australia: Smith & Paterson Pty Ltd.

Dunlap, J., & Cohen, S. A. (2016). *Coming of age at the end of nature: A generation faces living on a changed planet*. San Antonio, TX: Trinity University Press.

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56*(3), 425-442.

Dwyer, G. J., & Preston, J. A. (2015). Striving for best practice in environmental governance and justice: reporting on the inaugural environmental democracy index for Australia. *Environmental and Planning Law Journal, 32*(3), 202.

Eagles, P. F., & Demare, R. (1999). Factors influencing children's environmental attitudes. *The Journal of Environmental Education, 30*(4), 33-37.

Earth Charter Secretariat. (2000). *The Earth Charter*. Retrieved from http://www.earthcharterinaction.org/content/pages/Read-the-Charter.html

Eastep, B., Cachelin, A., & Sibthorp, J. (2011). Affinity for nature in outdoor programming: Theoretical foundations, scale development, and importance. *Journal of Outdoor Recreation, Education, and Leadership, 3*(3), 2.

Eilam, E., & Trop, T. (2012). Environmental attitudes and environmental behavior—Which Is the horse and which is the cart? *Sustainability, 4*(9), 2210-2246.

Enviroschools. (n.d.). *Enviroschools*. Retrieved from http://www.enviroschools.org.nz/

Evans, G. W., Brauchle, G., Haq, A., Stecker, R., Wong, K., & Shapiro, E. (2007). Young children's environmental attitudes and behaviors. *Environment and Behavior, 39*(5), 635-658.

Evans, L., Maio, G. R., Corner, A., Hodgetts, C. J., Ahmed, S., & Hahn, U. (2013). Self-interest and pro-environmental behaviour. *Nature Climate Change, 3*(2), 122-125.

Evans, N., Whitehouse, H., & Gooch, M. (2012). Barriers, successes and enabling practices of education for sustainability in Far North Queensland schools: A case study. *The Journal of Environmental Education, 43*(2), 121-138. doi:10.1080/00958964.2011.621995

Evans, N., Whitehouse, H., & Hickey, R. (2012). Pre-service teachers' conceptions of education for sustainability. *Australian Journal of Teacher Education, 37*(7), n7.

Ewert, A., Mitten, D., & Overholt, J. (2014). *Natural environments and human health*. Oxfordshire, UK: CAB Internatioal.

Ewert, A., Place, G., & Sibthorp, J. (2005). Early-life outdoor experiences and an individual's environmental attitudes. *Leisure Sciences, 27*(3), 225-239.

Ferreira, J.-A., Ryan, L., Davis, J., Cavanagh, M., & Thomas, J. (2009). Mainstreaming sustainability into pre-service teacher education in Australia. Retrieved from file:///C:/Users/jc196802/Downloads/Publisher%20version%20(open%20access).pdf

Fien, J. (2003). Learning to care: Education and compassion. Australian Journal of Environmental Education, 19, 1-13.

Fischer, K. A. (2011). *Cultivating environmental stewardship in middle school students.* (Masters Thesis, Portland State University, Portland, USA). Retrieved from http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1559&context=open_access_etds

Fishbein, G. W. (1969). The real meaning of environmental quality. *American Journal of Public Health and the Nations Health, 59*(12), 2130-2130.

Flato, G., Marotzke, J., Abiodun, B., Braconnot, P., Chou, S. C., Collins, W. J., . . . Eyring, V. (2013). Evaluation of climate models. In: climate change 2013: The physical science basis. Contribution of working group I to the fifth assessment report of the intergovernmental panel on climate change. *Climate Change 2013, 5*, 741-866.

Folke, C. (2010). How resilient are ecosystems to global environmental change? *Sustainability Science, 5*(2), 151-154. doi:10.1007/s11625-010-0109-x

Folke, C., Chapin III, F. S., & Olsson, P. (2009). Transformations in ecosystem stewardship. In F. S. Chapin III, G. P. Kofinas, & C. Folke (Eds.), *Principles of ecosystem stewardship. Resilience-based natural resource management in a changing world.* (pp. 103-125). New York, NY: Springer.

Folke, C., Jansson, Å., Rockström, J., Olsson, P., Carpenter, S. R., Chapin III, F. S., . . . Ebbesson, J. (2011). Reconnecting to the biosphere. *Ambio, 40*(7), 719-738.

Foster, J. (2005). Making sense of stewardship: Metaphorical thinking and the environment. *Environmental Education Research, 11*(1), 25-36.

Garnaut, R. (2012). Can humanity manage the Anthropocene?: The challenge of climate change. *'Anthropocene Humanities' 2012 Annual Meeting of the Consortium of Humanities Centers and Institutes*, Australian National University, Canberra. Retrieved from http://chcinetwork.org/programs-projects/annual-meetings/previous-annual-meetings/2012-annual-meeting

Gatersleben, B., White, E., Abrahamse, W., Jackson, T., & Uzzell, D. (2010). Values and sustainable lifestyles. *Architectural Science Review, 53*(1), 37-50.

Gilding, P. (2011). *The great disruption. How the climate crises will transform the global economy.* London, UK: Bloomsbury.

Gillett, D. P., Thomas, G. P., Skok, R. L., & McLaughlin, T. (1991). The effects of wilderness camping and hiking on the self-concept and the environmental attitudes and knowledge of twelfth graders. *The Journal of Environmental Education, 22*(3), 34-44.

Global Alliance for the Rights of Nature. (2016). *IUCN Adoption of a universal declaratino of the rights of nature*. Retrieved from http://therightsofnature.org/iucn-adoption-of-2020-universal-declaration-of-the-rights-of-nature/

Goleman, D., & Senge, P. (2015). *The triple focus: A new approach to education*. Florence, MA: More Than Sound.

Gough, A. G. (2004). Founders in environmental education. In W. Scott & S. Gough (Eds.), *Key issues in sustainable develoment and learning. A critical review*. London, UK: Routledge Falmer.

Gough, A. G. (2011). The Australian-ness of curriculum jigsaws: Where does environmental education fit? *Australian Journal of Environmental Education, 27*(1), 9-23.

Gough, A. G. (2013). The emergence of environmental education research. In R. B. Stevenson, A. Wals, J. Dillon, & M. Brody (Eds.), *International handbook of research on environmental education*. New York, NY: Routledge.

Grattan, M. (2016, November 27). Good riddance to innovation talk, in Abbott's view. Retrieved from https://theconversation.com/good-riddance-to-innovation-talk-in-abbotts-view-69459

Green, M., & Somerville, M. (2015). Sustainability education: researching practice in primary schools. *Environmental Education Research, 21*(6), 832-845.

Greig, A., Taylor, J., & MacKay, T. (2007). *Doing research with children*. London, UK: Sage.

Griswold, E. (2012, September 21). How 'Silent Spring' ignited the environment movement. *The New York Times Magazine*. Retrieved from http://www.nytimes.com/2012/09/23/magazine/how-silent-spring-ignited-the-environmental-movement.html?_r=0

Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology, 30*(4), 409-421.

Halstead, J. M., & Taylor, M. J. (2000). Learning and teaching about values: A review of recent research. *Cambridge Journal of Education, 30*(2), 169-202.

Hamilton, C. (2015). Getting the Anthropocene so wrong. *The Anthropocene Review, 2*(2), 102-107.

Hansen, J., & Van Den Berg, L. (2013). *Australia's second baby boom Generation Alpha smarter, richer, healthier.* Retrieved from http://www.news.com.au/lifestyle/parenting/australias-second-baby-boom-generation-alpha-smarter-richer-healthier/story-fnet08ui-1226655064591

Harrison, S. (2009). *Natural change - psychology and sustainability.* Retrieved from http://assets.wwf.org.uk/downloads/naturalchange_report_june09.pdf

Harvey, D. (2007). *A brief history of neoliberalism.* Oxford, UK: Oxford University Press.

Haynes, D., Müller, J., & Carter, S. (2000). Pesticide and herbicide residues in sediments and seagrasses from the Great Barrier Reef World Heritage Area and Queensland coast. *Marine Pollution Bulletin, 41*(7), 279-287.

Heberlein, T. A. (2012). *Navigating environmental attitudes*. New York, NY: Oxford University Press.

Held, V. (2006). *The ethics of care. Personal, political, and global*. New York, NY: Oxford University Press.

Hickey, R., Whitehouse, H., & Evans, N. (2010). Preservice teachers' perceptions of sustainability as professional practice. *AAEE National Conference.* Retrieved from http://researchonline.jcu.edu.au/16452/1/Preservice_teachers_Whitehouse_1-4-11.pdf

Hinds, J., & Sparks, P. (2008). Engaging with the natural environment: The role of affective connection and identity. *Journal of Environmental Psychology, 28*(2), 109-120.

Holmes, T., Blackmore, E., Hawkins, R., & Wakeford, T. (2011). *The common cause handbook* Retrieved from file:///C:/Users/jc196802/Downloads/Common%20Cause%20Handbook(2).pdf

Hoogenboom, M. (2016, May 31). How will the Barrier Reef recover from the death of one-third of its northern corals? *The Conversation*. Retrieved from http://theconversation.com/how-will-the-barrier-reef-recover-from-the-death-of-one-third-of-its-northern-corals-60186

Hopkins, C. (2014). Scope and impact of global actions under UNDESD. *Journal of Education for Sustainable Development, 8*(2), 113-119.

Howell, A. J., Dopko, R. L., Passmore, H.-A., & Buro, K. (2011). Nature connectedness: Associations with well-being and mindfulness. *Personality and Individual Differences, 51*(2), 166-171.

Hughes, T., Linares, C., Dakos, V., van de Leemput, I. A., & van Nes, E. H. (2013). Living dangerously on borrowed time during slow, unrecognized regime shifts. *Trends in Ecology & Evolution, 28*(3), 149-155. doi:http://dx.doi.org/10.1016/j.tree.2012.08.022

Hughes, T., Schaffelke, B., & Kerry, J. (2016, November 29). How much coral has died in the Great Barrier Reef's worst bleaching event? *The Conversation.* Retrieved from https://theconversation.com/how-much-coral-has-died-in-the-great-barrier-reefs-worst-bleaching-event-69494

Hughes, T. P., Kerry, J. T., Álvarez-Noriega, M., Álvarez-Romero, J. G., Anderson, K. D., Baird, A. H., . . . Berkelmans, R. (2017). Global warming and recurrent mass bleaching of corals. *Nature, 543*(7645), 373-377.

Hulme, M. (2008). The conquering of climate: discourses of fear and their dissolution. *The Geographical Journal, 174*(1), 5-16.

Hursh, D., Henderson, J., & Greenwood, D. (2015). Environmental education in a neoliberal climate. *Environmental Education Research, 21*(3), 299-318.

ibn 'Arabi, M. (1986). *Fusus al-Hikam* (I. H. Bursevi & B. Rauf, Trans.). Oxford, UK: Muhyiddin ibn 'Arabi Society.

IUCN. (2011). *UN prepares to debate whether 'Mother Earth' deserves human rights status.* Retrieved from https://www.iucn.org/content/un-prepares-debate-whether-mother-earth-deserves-human-rights-status

Jagers, S. C., & Matti, S. (2010). Ecological citizens: Identifying values and beliefs that support individual environmental responsibility among Swedes. *Sustainability, 2*(4), 1055-1079.

Jamieson, D. (2011). Energy, ethics, and the transformation of nature. In D. Arnold (Ed.), *The ethics of global climate change*. New York, NY: Cambridge University Press.

Jamieson, D. (2014). *Reason in a dark time. Why the struggle against climate change failed - and what it means for our future.* New York, NY: Oxford University Press.

Jensen, B. B., & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research, 3*(2), 163-178.

Jickling, B. (2009). Environmental education research: To what ends? *Environmental Education Research, 15*(2), 209-216.

Jickling, B., & Wals, A. (2008). Globalization and environmental education: Looking beyond sustainable development. *Journal of Curriculum Studies, 40*(1), 1-21.

Jickling, B., & Wals, A. (2012). Debating education for sustainable development 20 years after Rio. A conversation between Bob Jickling and Arjen Wals. *Journal of Education for Sustainable Development, 6*(1), 49-57.

Jickling, B., & Wals, A. (2013). Probing normative research in environmental education. Ideas about ethics and education. In R. B. Stevenson, A. Wals, J. Dillon, & M. Brody (Eds.), *International handbook of research on environmental education*. New York, NY: Routledge.

Jordan, K., & Kristjánsson, K. (2016). Sustainability, virtue ethics, and the virtue of harmony with nature. *Environmental Education Research*, 1-25.

Juujärvi, S., Myyry, L., & Pesso, K. (2012). Empathy and values as predictors of care development. *Scandinavian Journal of Psychology, 53*(5), 413-420.

Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences, 107*(38), 16489-16493.

Kals, E., Schumacher, D., & Montada, L. (1999). Emotional affinity toward nature as a motivational basis to protect nature. *Environment and Behavior, 31*(2), 178-202.

Kane, T. E. (2011). *Transforming the soul of education: Sustainability at the center of teaching and learning in secondary schools.* (Doctoral dissertation, Portland Univeristy, Portland, USA). Retrieved from http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1269&context=open_access_etds

Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, MA: Cambridge University Press.

Kaplan, R., & Kaplan, S. (2002). Adolescents and the natural environment: A time out? In P. Kahn & S. R. Kellert (Eds.), *Children and nature. Psychological, sociocultural and evolutionary investigations*. Cambridge, MA: MIT Press.

Karp, D. G. (1996). Values and their effect on pro-environmental behavior. *Environment and Behavior, 28*(1), 111-133.

Kasser, T. (2009). Values and ecological sustainability: Recent research and policy possibilities. In S. R. Kellert & J. G. Speth (Eds.), *The coming transformation: Values to sustain human and*

natural communities (pp. 180-204): Yale School of Forestry and Environmental Studies. Retrieved from http://environment.yale.edu/publication-series/5952.html

Kasser, T. (2011). Cultural values and the well-being of future generations: A cross-national study. *Journal of Cross-cultural Psychology, 42*(2), 206-215.

Kasser, T. (2014). Teaching about values and goals Applications of the circumplex model to motivation, well-being, and prosocial behavior. *Teaching of Psychology, 41*(4), 365-371.

Kearney, M. R., Wintle, B. A., & Porter, W. P. (2010). Correlative and mechanistic models of species distribution provide congruent forecasts under climate change. *Conservation Letters, 3*(3), 203-213.

Kellert, S. R. (2002). Experiencing nature: Affective, cognitive, and evaluative development in children. In P. Kahn & S. R. Kellert (Eds.), *Children and nature: psychological, sociocultural, and evolutionary investigations*. Cambridge, MA: MIT Presss.

Kellert, S. R. (2012a). *Birthright - people and nature in the modern world*. New Haven, CT: Yale University Press.

Kellert, S. R. (2012b). *Building for life: Designing and understanding the human-nature connection*. Washington, DC: Island Press.

Kelsey, E., & Armstrong, C. (2012). Finding hope in a world of environmental catastrophe. In A. J. Wals & P. B. Corcoran (Eds.), *Learning for sustainability in times of accelerating change*. Wageningen, The Netherlands: Wageningen Academic.

Kempton, W., & Holland, D. (2003). Identity and sustained environmental practice. In S. Clayton & S. Opotow (Eds.), *Identity and the natural environment. The psychological significance of nature* (pp. 317-341). Cambridge, MA: MIT Press.

Kerr, M., & Key, D. (2011). The ouroborous (Part I): Towards an ontology of connectedness in ecopsychology research. *European Journal of Ecopsychology, 2*(1), 48-60.

Kerr, M., & Key, D. (2013). *Evidence of natural change.* Case studies from the Scottich education sector. Retrieved from http://www.naturalchangefoundation.org/wp-content/uploads/2013/01/Evidence-of-Natural-Change-Case-Studies.pdf

Kevany, K. D. (2007). Building the requisite capacity for stewardship and sustainable development. *International Journal of Sustainability in Higher Education, 8*(2), 107-122.

Key, D., & Kerr, M. (2011). *The natural change project: Catalysing leadership for sustainability*. Retrieved from http://assets.wwf.org.uk/downloads/wwf_naturalchange2.pdf

Knapp, C. (1999). *In accord with nature: Helping students form an environmental ethic using outdoor education experience and reflection.* Retrieved from https://eric.ed.gov/?id=ED425897

Kofinas, G. P., & Chapin III, F. S. (2009). Sustaining livelihoods and human well-being during social–ecological change. *Principles of Ecosystem Stewardship*, 55-75. doi:10.1007/978-0-387-73033-2

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research, 8*(3), 239-260.

Kopnina, H. (2012). Education for sustainable development (ESD): the turn away from 'environment' in environmental education? *Environmental Education Research, 18*(5), 699-717. doi:10.1080/13504622.2012.658028

Kopnina, H. (2014). Debating ecological justice: implications for critical environmental education. *Chinese Journal of Population Resources and Environment, 12*(4), 290-300. doi:10.1080/10042857.2014.933498

Krasny, M. E., & Roth, W. M. (2010). Environmental education for social–ecological system resilience: a perspective from activity theory. *Environmental Education Research, 16*(5-6), 545-558. doi:10.1080/13504622.2010.505431

Krasny, M. E., & Tidball, K. G. (2012). Civic ecology: a pathway for earth stewardship in cities. *Frontiers in Ecology and the Environment, 10*(5), 267-273.

Krippendorff, K. (2013). *Content Analysis. An Introduction to Its Methodology* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Krogh, E., & Jolly, L. (2012). Relationship-based experiential learning in practical outdoor tasks. In A. E. J. Wals & P. B. Corcoran (Eds.), *Learning for sustainability in times of accelerating change* (pp. 213-224). Wageningen, The Netherlands: Wageningen Academic Publishers.

Kronlid, D. O., & Öhman, J. (2012). An environmental ethical conceptual framework for research on sustainability and environmental education. *Environmental Education Research, 19*(1), 21-44. doi:10.1080/13504622.2012.687043

Lankshear, C., & Knobel, M. (2005). *A handbook for teacher research*. Berkshire, UK: McGraw-Hill Education.

Larson, L. R., Green, G. T., & Castleberry, S. B. (2011). Construction and validation of an instrument to measure environmental orientations in a diverse group of children. *Environment and Behavior, 43*(1), 72-89.

Leach, M., Rokstrom, J., Raskin, P., Scoones, I. C., Stirling, A. C., Smith, A., . . . Arond, E. (2012). Transforming innovation for sustainability. *Ecology and Society, 17*(2), 11.

Leeming, F. C., Dwyer, W. O., & Bracken, B. A. (1995). Children's environmental attitude and knowledge scale: Construction and validation. *The Journal of Environmental Education, 26*(3), 22-31.

Lenton, T. M. (2013). Environmental tipping points. *Annual Review of Environment and Resources, 38*, 1-29.

Levy, M. S. (2015). *Celebrity and entertainment obsession: Understanding our addiction*. Lanham, MD: Rowman & Littlefield.

Lewis, S. E., Brodie, J. E., Bainbridge, Z. T., Rohde, K. W., Davis, A. M., Masters, B. L., . . . Schaffelke, B. (2009). Herbicides: a new threat to the Great Barrier Reef. *Environmental Pollution, 157*(8), 2470-2484.

Lichtman, M. (2013). *Qualitative research in education A user's guide* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Lingard, B. (2010). Policy borrowing, policy learning: Testing times in Australian schooling. *Critical Studies in Education, 51*(2), 129-147.

Lingard, B. (2011). Policy as numbers: ac/counting for educational research. *The Australian Educational Researcher, 38*(4), 355-382. doi:10.1007/s13384-011-0041-9

Litz, K. (2010). *Inspiring environmental stewardship: Developing a sense of place, critical thinking skills, and ecoliteracy to establish an environmental ethic of care.* (Masters thesis, Prescott College, Arizona, USA). Retrieved from http://pqdtopen.proquest.com/doc/365989663.html?FMT=ABS

Litz, K., & Mitten, D. (2013). Inspiring environmental stewardship: Developing a sense of place, critical thinking skills, and ecoliteracy to establish an environmental ethic of care. *Pathways. The Ontario Journal of Outdoor Education* (Winter 2013, 25 (2)).

Louv, R. (2005). The criminalization of natural play [Last child in the woods]. *Natural Life,* May/June 2005, 16.

Luke, T. W. (2001). Education, environment and sustainability: what are the issues, where to intervene, what must be done? *Educational Philosophy and Theory, 33*(2), 187-202. doi:10.1111/j.1469-5812.2001.tb00262.x

Maller, C., Townsend, M., Pryor, A., Brown, P., & St Leger, L. (2006). Healthy nature healthy people 'contact with nature'as an upstream health promotion intervention for populations. *Health Promotion International, 21*(1), 45-54.

Manne, A. (2014). *The life of I. The new culture of narcissism*. Carlton, Australia: Melbourne University Press.

Marcinkowski, T. J. (2010). Contemporary challenges and opportunities in environmental education: where are we headed and what deserves our attention? *Journal of Environmental Education, 41*(1), 34.

Marsh, E. E., & White, M. D. (2006). Content analysis: A flexible methodology. *Library Trends, 55*(1), 22-45.

Marshall, P., & Johnson, J. (2007). The Great Barrier Reef and climate change: Vulnerability and management implications. In J. Johnson & P. Marshall (Eds.), *Climate change and the Great Barrier Reef. A vulnerability assessment.* Townsville, Australia: GBRMPA.

Martin, P. (2007). Caring for the environment: Challenges from notions of caring. *Australian Journal of Environmental Education*, 23, 57-64.

Martin, E., & Beatley, T. (1993). Our relationship with the earth: Environmental ethics in planning education. *Journal of Planning Education and Research, 12*(2), 117-126.

Martin, M., Bright, A., Cafaro, P., Mittelstaedt, R., & Bruyere, B. (2009). Assessing the development of environmental virtue in 7th and 8th grade students in an expeditionary learning outward bound school. *Journal of Experiential Education, 31*(3), 341-358.

Masters, G. N. (2009). *A shared challenge: Improving literacy, numeracy and science learning in Queensland primary schools*. Retrieved from http://education.qld.gov.au/mastersreview/pdfs/final-report-masters.pdf

Mathews, J. A., & Tan, H. (2014). Manufacture renewables to build energy security. *Nature, 513*(11), 166-168.

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology, 24*(4), 503-515. doi:10.1016/j.jenvp.2004.10.001

McAlpine, C. A., Seabrook, L. M., Ryan, J. G., Feeney, B. J., Ripple, W. J., Ehrlich, A. H., & Ehrlich, P. R. (2015). Transformational change: creating a safe operating space for humanity. *Ecology and Society, 20*(1).

McCormick, J., & Ayres, P. L. (2009). Teacher self-efficacy and occupational stress: A major Australian curriculum reform revisited. *Journal of Educational Administration, 47*(4), 463-476.

McCrindle Research. (2013). *Generation Z defined*. Retrieved from http://mccrindle.com.au/free-mccrindle-research-resources

McCrindle Research. (2015, September 22). Generation alpha: Mark McCrindle Q&A with the New York Times [Blog Post]. Retrieved from http://mccrindle.com.au/the-mccrindle-blog/generation-alpha-mark-mccrindle-q-a-with-the-new-york-times

McGaw, B. (2011). Learning from others in reforming Australian school education. *Australian Centre for Educational Leadership: 10th Annual Conference, 25 February 2011.* Retrieved from http://www.uow.edu.au/content/groups/public/@web/@conf/documents/doc/uow097460.pdf

McGregor, H. E. (2012). Nunavut's education act: education, legislation and change in the Arctic. *Northern Review* (36), 27-52.

McShane, K. (2009). Environmental ethics: An overview. *Philosophy Compass, 4*(3), 407-420.

Merriam, S. B. (2009). *Qualitative research: a guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Milfont, T. L., & Duckitt, J. (2010). The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology, 30*(1), 80-94.

Millennium Ecosystem Assessment Board. (2005). *Ecosystems and human well-being* (Vol. 5). Washington, DC: Island Press

Monbiot, G. (2014, July 24). *Put a price on nature? We must stop this neoliberal road to ruin.* Paper presented at the SPERI Annual Lecture, University of Sheffield, UK. Retrieved from https://www.theguardian.com/environment/georgemonbiot/2014/jul/24/price-nature-neoliberal-capital-road-ruin

Mortari, L. (2004). Educating to care. *Canadian Journal of Environmental Education (CJEE), 9*(1), pp. 109-122.

Morton, T. A., Rabinovich, A., Marshall, D., & Bretschneider, P. (2011). The future that may (or may not) come: How framing changes responses to uncertainty in climate change communications. *Global Environmental Change, 21*(1), 103-109.

Musiol, A., & Boehnke, K. (2013). Person-environment value congruence and satisfaction with life. *International Journal of Humanities and Social Science, 3*(9).

Natural Capital Committee. (2014). *Second state of natural capital report*. Retrieved from http://www.naturalcapitalcommittee.org/state-of-natural-capital-reports.html

Nazir, J. (2014, June). *Applying an ethic of care to environmental education: Insight from a study of outdoor educators.* Paper presented at the 2014 Conference of the Canadian Society for the Study of Education. Retrieved from http://ocs.sfu.ca/csse/index.php/csse/csse2014/paper/view/19

Nazir, J., & Pedretti, E. (2016). Educators' perceptions of bringing students to environmental consciousness through engaging outdoor experiences. *Environmental Education Research, 22*(2), 288-304.

Nazir, J., Pedretti, E., Wallace, J., Montemurro, D., & Inwood, H. (2011). Reflections on the Canadian experience with education for climate change and sustainable development. *Canadian Journal of Science, Mathematics and Technology Education, 11*(4), 365-380.

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior, 41*(5), 715-740.

Noddings, N. (1988). An ethic of caring and its implications for instructional arrangements. *American Journal of Education*, 215-230.

Noddings, N. (1992). *The challenge to care in schools: An alternative approach to education. Advances in Contemporary Educational Thought, Volume 8*. New York, NY: Teachers College Press.

Noddings, N. (2005). *The challenge to care in schools: An alternative approach to education.* New York, NY: Teachers College Press.

Noddings, N. (2010a). Moral education and caring. *Theory and Research in Education, 8*(2), 145-151. doi:10.1177/1477878510368617

Noddings, N. (2010b). Moral education in an age of globalization. *Educational Philosophy and Theory, 42*(4), 390-396. doi:10.1111/j.1469-5812.2008.00487.x

Noddings, N. (2011). *Philosophy of Education*. Boulder, CO: Westview Press.

Noddings, N. (2012). The Language of Care Ethics. *Knowledge Quest, 40*(5), 52-56.

Noddings, N. (2013). *Caring: A relational approach to ethics and moral education*. Berkeley, CA: University of California Press.

Nolet, V. (2009). Preparing sustainability-literate teachers. *The Teachers College Record, 111*(2), 409-442.

NSW Government. (2012). *Who cares about the environment in 2012?* Retrieved from http://www.environment.nsw.gov.au/communities/who-cares.htm

O'Connor, K. E. (2008). "You choose to care": Teachers, emotions and professional identity. *Teaching and Teacher Education, 24*(1), 117-126.

Ogden, L., Heynen, N., Oslender, U., West, P., Kassam, K.-A., & Robbins, P. (2013). Global assemblages, resilience, and earth stewardship in the Anthropocene. *Frontiers in Ecology and the Environment, 11*(7), 341-347.

Ojala, M. (2012a). Hope and climate change: the importance of hope for environmental engagement among young people. *Environmental Education Research, 18*(5), 625-642. doi:10.1080/13504622.2011.637157

Ojala, M. (2012b). How do children cope with global climate change? Coping strategies, engagement, and well-being. *Journal of Environmental Psychology, 32*(3), 225-233.

Ojala, M. (2013). Coping with climate change among adolescents: Implications for subjective well-being and environmental engagement. *Sustainability, 5*(5), 2191-2209.

Ojala, M. (2015). Hope in the face of climate change: Associations with environmental engagement and student perceptions of teachers' emotion communication style and future orientation. *The Journal of Environmental Education, 46*(3), 133-148. doi:10.1080/00958964.2015.1021662

Olsson, D., & Gericke, N. (2016). The adolescent dip in students' sustainability consciousness—Implications for education for sustainable development. *The Journal of Environmental Education, 47*(1), 35-51.

Olvitt, L. (2013). Environmental ethics as processes of open-ended, pluralistic, deliberative enquiry. In R. B. Stevenson, M. Brody, J. Dillon, & A. E. J. Wals (Eds.), *International Handbook of Research on Environmental Education* (Vol. 2009, pp. 115). New York, NY: Routledge.

Ontario Ministry of Education. (2009). *Acting today, shapingtTomorrow*. Retrieved from http://www.edu.gov.on.ca/eng/teachers/enviroed/action.html

Onwuegbuzie, A. J., Slate, J. R., Leech, N. L., & Collins, K. M. T. (2007). Conducting mixed analyses: A general typology. *International Journal of Multiple Research Approaches, 1*(1), 4-17. doi:10.5172/mra.455.1.1.4

Oreg, S., & Katz-Gerro, T. (2006). Predicting proenvironmental behavior cross-nationally: Values, the theory of planned behavior, and value-belief-norm theory. *Environment and Behavior, 38*(4), 462-483.

Orr, D. W. (2004). *Earth in mind. On education, environment and the human prospect*. Washington, DC: First Island Press.

Oskamp, S. (2002). Environmentally responsible behavior: Teaching and promoting it effectively. *Analyses of Social Issues and Public Policy, 2*(1), 173-182.

Ozdemir, A., & Yilmaz, O. (2008). Assessment of outdoor school environments and physical activity in Ankara's primary schools. *Journal of Environmental Psychology, 28*(3), 287-300.

Palmer, C. (2006). Stewardship: A case study in environmental ethics. In R. J. Berry (Ed.), *Environmental Stewardship* (pp. 63-75). London, UK: T&T Clark.

Palmer, C. G., Biggs, R., & Cumming, G. S. (2015). Applied research for enhancing human well-being and environmental stewardship: Using complexity thinking in Southern Africa. *Ecology and Society, 20*(1), 53.

Pandolfi, J. M., Connolly, S. R., Marshall, D. J., & Cohen, A. L. (2011). Projecting coral reef futures under global warming and ocean acidification. *Science, 333*(6041), 418-422.

Pearson, L. C., & Moomaw, W. (2005). The relationship between teacher autonomy and stress, work satisfaction, empowerment, and professionalism. *Educational Research Quarterly, 29*(1), 38-54.

Peters, C. (2010). Experiencing oneness in Indigenous cultures. *Seventh Generation Fund for Indian Development.* Retrieved from http://videos.huffingtonpost.com/experiencing-oneness-in-indigenous-cultures-511835482

Pett, H. (2016, January 18). *Richest 62 people own as much as half the world's populationL: Oxfam* [Press release]. Retrieved from http://www.abc.net.au/news/2016-01-18/oxfam-uses-global-wealth-report-to-highlight-inequlity/7096688

Plastow, R. (2010). *Neoliberalism in environmental governance: a paradoxical double movement?* Retrieved from https://www.academia.edu/2703516/Neoliberalism_in_environmental_governance_a_paradoxical_double_movement

Poloczanska, E. S., Burrows, M. T., Brown, C. J., García Molinos, J., Halpern, B. S., Hoegh-Guldberg, O., . . . Schoeman, D. S. (2016). Responses of marine organisms to climate change across oceans. *Frontiers in Marine Science, 3*, 62.

Pooley, J. A., & O'Connor, M. (2000). Environmental education and attitudes emotions and beliefs are what is needed. *Environment and Behavior, 32*(5), 711-723.

Powell, R. B., Stern, M. J., Krohn, B. D., & Ardoin, N. (2011). Development and validation of scales to measure environmental responsibility, character development, and attitudes toward school. *Environmental Education Research, 17*(1), 91-111.

Pratchett, M., & Lough, J. (2016, April 7). Coral bleaching taskforce: more than 1000 km of the Great Barrier Reef has bleached. *The Conversation*. Retrieved from http://theconversation.com/coral-bleaching-taskforce-more-than-1-000-km-of-the-great-barrier-reef-has-bleached-57282

Pretty, J. (2011). Interdisciplinary progress in approaches to address social-ecological and ecocultural systems. *Environmental Conservation, 38*(2), 127-139. doi:10.1017/s0376892910000937

Pyle, R. M. (2002). Eden in a vacant lot: Special places, species, and kids in the neighbourhood of life. In P. H. Kahn & S. R. Kellert (Eds.), *Children and Nature. Psychological, Sociocultural, and Evolutionary Investigations*. Cambridge, MA: The MIT Press.

Qpzm. (2016). *LocalStats Australia*. Retrieved from http://localstats.com.au/localstats.cgi?search_suburb=4870&search_state=&type=search

Queensland Government. (2016a). EdMap Department of Education and Training. Retrieved from http://www.qgso.qld.gov.au/maps/edmap/

Queensland Government. (2016b). *Independent Public Schools.* Retrieved from http://education.qld.gov.au/schools/independent-public-schools/index.html

Quigley, C. F., & Lyons, R. (2017). The role of care in environmental education. In *Exploring emotions, aesthetics and wellbeing in science education research* (pp. 249-267). Retrieved from http://ebookcentral.proquest.com.elibrary.jcu.edu.au/lib/jcu/reader.action?docID=4721327&ppg=228

Quinn, F., Castéra, J., & Clément, P. (2016). Teachers' conceptions of the environment: anthropocentrism, non-anthropocentrism, anthropomorphism and the place of nature. *Environmental Education Research, 22*(6), 893-917. doi:10.1080/13504622.2015.1076767

Ramkissoon, H., Weiler, B., & Smith, L. D. G. (2012). Place attachment and pro-environmental behaviour in national parks: The development of a conceptual framework. *Journal of Sustainable Tourism, 20*(2), 257-276.

Rayner, J. (2016). *Generation Less: How Australia is Cheating the Young*. Carlton, Australia: Redback Quarterly.

Reese, R., & Myers, J. (2012). Eco-wellness: The missing factor in holistic wellness models. *Journal of Counseling & Development, 90*(4), 400-406.

Rice, S. (2016, December 13). NAPLAN results reveal little change in literacy and numeracy performance – here are some key takeaway findings. *The Conversation*. Retrieved from https://theconversation.com/naplan-results-reveal-little-change-in-literacy-and-numeracy-performance-here-are-some-key-takeaway-findings-70208

Robinson, J., & Hetrick, S. (2016). Suicide isn't just an older man's problem. *The Conversation*. Retrieved from https://theconversation.com/suicide-isnt-just-an-older-mans-problem-56069

Robinson, N. A. (2012). Beyond sustainability: environmental management for the Anthropocene epoch. *Journal of Public Affairs, 12*(3), 181-194. doi:10.1002/pa.1432

Rockström, J., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., . . . Folke, C. (2009). Planetary boundaries: Exploring the safe operating space for humanity. *Ecology and Society, 14*(2).

Roeder, M. (2010). *The big mo. Why momentum now rules our world.* Sydney, Australia: Harper Collins.

Russell, R., Guerry, A. D., Balvanera, P., Gould, R. K., Basurto, X., Chan, K. M., . . . Tam, J. (2013). Humans and nature: how knowing and experiencing nature affect well-being. *Annual Review of Environment and Resources, 38*, 473-502.

Sachs, A. (1996). Upholding human rights and environmental justice. *The Humanist, 56*(2), 5.

Saylan, C., & Blumstein, D. T. (2011). *The failure of environmental education (and how we can fix it)*. Berkeley, CA: University Of California Press.

Schrader, U., Fricke, V., Doyle, D., & Thoresen, V. (2013). *Enabling responsible living.* Retrieved from http://link.springer.com/book/10.1007/978-3-642-22048-7/page/1

Schultz, P. W. (2002). Empathizing with nature: The effects of perspective taking on concern for environmental issues-statis. *Journal of Social Issues, 56*(3), 391-406.

Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franěk, M. (2005). Values and their relationship to environmental concern and conservation behavior. *Journal of Cross-cultural Psychology, 36*(4), 457-475.

Schultz, P. W., Shriver, C., Tabanico, J., & Khazian, A. M. (2004). Implicit connections with nature. *Journal of Environmental Psychology, 24*(1), 31-42.

Schultz, P. W., & Tabanico, J. (2007). Self, identity, and the natural environment: Exploring implicit connections with nature. *Journal of Applied Social Psychology, 37*(6), 1219-1247.

Schultz, P. W., & Zelezny, L. (1998). Values and proenvironmental behavior. A five country survey. *Journal of Cross-cultural Psychology, 29*(4), 540-558.

Schultz, P. W., & Zelezny, L. (1999). Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of Environmental Psychology, 19*(3), 255-265.

Schutte, A. R., Torquati, J. C., & Beattie, H. L. (2015). Impact of urban nature on executive functioning in early and middle childhood. *Environment and Behavior*, 49(1), 3-30.

Schwartz, S. H. (2006). *Basic human values: an overview.* Retrieved from http://www. yourmorals. org/schwartz

Schwartz, S. H. (2009). Basic human values. *Sociologie, 42*, 249-288.

Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture, 2*(1), 11.

Senge, P. (2016). Reflections. *World Educaitonal Leadership Summit 2016.* Retrieved from http://www.intase.org/wels16/slides/PeterSenge/PeterSenge_WELS2016.pdf

Sipos, Y., Battisti, B., & Grimm, K. (2008). Achieving transformative sustainability learning: Engaging head, hands and heart. *International Journal of Sustainability in Higher Education, 9*(1), 68-86.

Slater, G. B., & Griggs, C. B. (2015). Standardization and subjection: An autonomist critique of neoliberal school reform. *Review of Education, Pedagogy, and Cultural Studies, 37*(5), 438-459.

Smith, G. A. (2002). Place-based education: Learning to be where we are. *The Phi Delta Kappan, 83*(8), 584-594.

Smith, G. A. (2007). Place-based education: Breaking through the constraining regularities of public school. *Environmental Education Research,* 13(2), 189-207.

Smith, G. A. (2015). Community organizing, schools, and the right to the city. *Environmental Education Research,* 21(3), 478-490.

Smith, G. A., & Sobel, D. (2010). *Place and community-based education in schools*. Hoboken, NJ: Taylor & Francis.

Smith, G. A., & Stevenson, R. B. (2017). Sustaining education for sustainability in turbulent times. *The Journal of Environmental Education, 48*(2), 79-95. doi:10.1080/00958964.2016.1264920

Smyth, J. C. (1995). Environment and education: a view of a changing scene. *Environmental Education Research, 1*(1), 3-120. doi:10.1080/1350462950010101

Smyth, J. C. (1996). A national strategy for environmental education: an approach to a sustainable future? *Environmentalist,* 16(1), 27-35.

Sobel, D. (1996) *Beyond ecophobia.* Great Barrington, MA: The Orion Society.

Sobel, D. (2005). *Place-based education. Connecting classrooms & communities.* Great Barrington, MA: The Orion Society.

Speth, J. G. (2004). *Red sky at morning*. New Haven, CT: Donnelley & Sons.

SSPP Blog. (2017). Book Review | Coming of age at the end of nature. Retrieved from http://ssppjournal.blogspot.com.au/2017/01/book-review-coming-of-age-at-end-of.html#!/2017/01/book-review-coming-of-age-at-end-of.html

Stapleton, S. R. (2015). Environmental identity development through social interactions, action, and recognition. *The Journal of Environmental Education, 46*(2), 94-113.

Starratt, R. J. (2003). *Centering education administration*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Steffen, W., Crutzen, P., & McNeill, J. (2007). The Anthropocene: are humans now overwhelming the great forces of nature. *Ambio: A Journal of the Human Environment,* 36(8), 614-621.

Steffen, W., Gordon, L., Molina, M., Ramanathan, V., Rockström, J., Scheffer, M., . . . Folke, C. (2011). The Anthropocene: from global change to planetary stewardship. *Ambio, 40*(7), 739-761. doi:10.1007/s13280-011-0185-x

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., . . . Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science, 347*(6223). doi:10.1126/science.1259855

Steffen, W., Sanderson, A., & Tyson, P. (2006). The Anthropocene era: How humans are changing the Earth System. *In Global Change and the Earth System - A Planet Under Pressure* (pp. 81-141). Würzburg, Germany: Springer.

Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental Psychology, 38*, 104-115.

Steg, L., Perlaviciute, G., van der Werff, E., & Lurvink, J. (2014). The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. *Environment and Behavior, 46*(2), 163-192. doi:10.1177/0013916512454730

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309-317.

Stern, M. J., Powell, R. B., & Ardoin, N. M. (2008). What difference does it make? Assessing outcomes from participation in a residential environmental education program. *The Journal of Environmental Education, 39*(4), 31-43.

Stevens, P. (2010). Embedment in the environment: a new paradigm for well-being? *Perspectives in Public Health,* 130(6), 265-269.

Stevenson, R. B. (1987). Schooling and environmental education: contradictions in purpose and practice. In I. Robottom (Ed.), *Environmental Education: Practice and Possibility.* Geelong, Australia: Deakin University Press.

Stevenson, R. B. (2007). Schooling and environmental education: contradictions in purpose and practice. *Environmental Education Research*, 13(2), 139-153. doi:10.1080/13504620701295726

Stevenson, R. B. (2011). Sense of place in Australian environmental education research: distinctive, missing or displaced? *Australian Journal of Environmental Education, 27*(01), 46-55.

Stevenson, R. B. (2013). Researching tensions and pretensions in environmental/sustainability education olicies. In R. B. Steveneon, M. Brody, J. Dillon, & A. E. J. Wals (Eds.), *International handbook of research on environmental education*. New York, NY: Routledge.

Stiglitz, J. E. & Bilmes, L. J. (2012). The 1 percent's problem. *Vanity Fair, 31*. Retrieved from https://www.vanityfair.com/news/2012/05/joseph-stiglitz-the-price-on-inequality

Stiglitz, J. E. (2013). *The price of inequality*. London, UK: Penguin.

Stone, M., & Barlow, Z. (Eds.). (2005). *Ecological literacy. Educating our children for a sustainable world*. San Francisco, CA: Sierra Club Books.

Strachan, G. (2009). Systems thinking. In A. Stibbe (Ed.), *The handbook of sustainability literacy. Skills for a changing world.* Devon, UK: Green Books Ltd.

Strife, S. (2010). Reflecting on environmental education: Where is our place in the green movement? *Journal of Environmental Education, 41*(3), 179-191. doi:10.1080/00958960903295233

Strife, S. (2012). Children's environmental concerns: Expressing ecophobia. *The Journal of Environmental Education, 43*(1), 37-54.

Summers, A. (1976). *Damned whores and God's police*. Ringwood, Australia: Penguin Books Australia Ltd.

Suzuki, D., Mason, A., & McConnell, A. (2007). *The sacred balance: Rediscovering our place in nature*. Vancouver, Canada: Greystone Books.

Tabernero, C., & Hernández, B. (2011). Self-efficacy and intrinsic motivation guiding environmental behavior. *Environment and Behavior, 43*(5), 658-675.

Tashakkori, A., & Teddlie, C. (2010). *Sage handbook of mixed methods in social & behavioral research*. Los Angeles, CA: Sage Publications.

Tauritz, R. L. (2012). How to handle knowledge uncertainty: Learning and teaching in timers of accelerating change In A. E. J. Wals & P. B. Corcoran (Eds.), *Learning for sustainability in times of accelerating change*. Wageningen, The Netherlands: Wageningen Academic.

Taylor, A. F., & Kuo, F. E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders, 12*(5), 402-409.

Taylor, P. C., Taylor, E. L., & Luitel, B. C. (2012). Multi-paradigmatic transformative research as/for teacher education: An integral perspective. *Second international handbook of science education* (pp. 373-387): New York, NY: Springer.

Tedeschi, P., Bexell, S. M., & NeSmith, J. (2013). Conservation social work. In M. Bekoff (Ed.), *Ignroing nature no more. The case for compassionate conservation.* Chicago, IL: University of Chicago Press.

The Herald Scotland. (2005). John Smyth A founding father of environmental education - Obituary. *The Herald Scotland*. Retrieved from http://www.heraldscotland.com/news/12394654.John_Smyth_A_founding_father_of_environmental_education/

The University of Queensland. (2015). *Welcome to Queensland places.* Retrieved from http://queenslandplaces.com.au/home

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation, 27*(2), 237-246. doi:10.1177/1098214005283748

Thomashow, M. (1996). *Ecoloical identity. Becoming a reflective environmentalist.* Cambridge, MA: MIT Press.

Thompson, C. W., & Aspinall, P. A. (2011). Natural environments and their impact on activity, health, and quality of life. *Applied Psychology: Health and Well-Being, 3*(3), 230-260.

Thoresen, V. W., Doyle, D., & Klein, J. (2015). *Responsible living concepts, education and future perspectives*. Switzerland: Springer International Publishing.

Tooth, R., & Renshaw, P. (2009). Reflections on pedagogy and place: A journey into learning for sustainability through environmental narrative and deep attentive reflection. *Australian Journal of Environmental Education, 25*, 95-104.

Turton, S. M. (2005). Managing environmental impacts of recreation and tourism in rainforests of the Wet Tropics of Queensland World Heritage Area. *Geographical Research, 43*(2), 140-151. doi:10.1111/j.1745-5871.2005.00309.x

Uhls, Y. T., & Greenfield, P. M. (2012). The value of fame: preadolescent perceptions of popular media and their relationship to future aspirations. *Developmental Psychology, 48*(2), 315.

Uljens, M. (2007). The hidden curriculum of PISA–The promotion of neo-liberal policy by educational assessment. Retrieved from https://www.researchgate.net/profile/Michael_Uljens/publication/242131197_The_hidden_curriculum_of_PISA_-_the_promotion_of_neo-liberal_policy_by_educational_assessment1/links/54c5e96c0cf219bbe4f60b02.pdf

UNESCO. (2014). *Roadmap for implementing the global action programme on education for sustainable development*. Retrieved from http://en.unesco.org/themes/education-sustainable-development

UNESCO. (2016). *Global education monitoring report.* Retrieved from http://unesdoc.unesco.org/images/0024/002457/245752e.pdf

United Nations. (2001). *Millenium ecosystem assessment*. Retrieved from http://www.millenniumassessment.org/en/index.html

UNWCED. (1987). *Our common future: Report of the World Commission on Environment and Development*. Retrieved from http://www.un-documents.net/our-common-future.pdf

Upitis, R., Hughes, S., & Peterson, A. (2013). Promoting environmental stewardship through gardens: A case study of children's views of an urban school garden. *Journal of the Canadian Association for Curriculum Studies, 11*(1), 92-135.

Valuing Nature. (2015). Valuing nature business impact school. Retrieved from http://valuing-nature.net/valuing-nature-business-impact-school

Van der Werff, E., Steg, L., & Keizer, K. (2013). It is a moral issue: The relationship between environmental self-identity, obligation-based intrinsic motivation and pro-environmental behaviour. *Global Environmental Change, 23*(5), 1258-1265.

Vane-Wright, R. I. (Ed.) (2009). *Planetary awareness, worldviews and the conservation of biodiversity*. New Haven, CT: Yale School of Forestry and Environmental Studies.

Verhaeghe, P. (2014). *What about me? The struggle for identity in a market-based society.* London, UK: Scribe Publications Pty Ltd.

Veron, J., Hoegh-Guldberg, O., Lenton, T., Lough, J., Obura, D., Pearce-Kelly, P., . . . Rogers, A. (2009). The coral reef crisis: The critical importance of < 350ppm CO 2. *Marine Pollution Bulletin, 58*(10), 1428-1436.

Vezeau, S. L., Powell, R. B., Stern, M. J., Moore, D. D., & Wright, B. A. (2015). Development and validation of two scales to measure elaboration and behaviors associated with stewardship in children. *Environmental Education Research*. doi:10.1080/13504622.2015.1121377

Walsh, R. (2011). Lifestyle and mental health. *American Psychologist, 66*(7), 579.

Waterhouse, J. (2011). Finding balance between human need and global stewardship. *Conservation Biology, 25*(6), 1087-1090. doi:10.1111/j.1523-1739.2011.01764.x

Wattchow, B., & Brown, M. (2011). *A pedagogy of place: Outdoor education for a changing world*. Melbourne, Australia: Monash University Publishing.

Wearing, S. L., McDonald, M., & Wearing, M. (2013). Consumer culture, the mobilisation of the narcissistic self and adolescent deviant leisure. *Leisure Studies, 32*(4), 367-381.

Webb, P. T., Gulson, K., & Pitton, V. (2014). The neo-liberal education policies of epimeleia heautou: Caring for the self in school markets. *Discourse: Studies in the Cultural Politics of Education, 35*(1), 31-44.

Wells, N. M., & Lekies, K. S. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children Youth and Environments, 16*(1), 1-24.

White, M. A. (2013). Sustainability: I know it when I see it. *Ecological Economics, 86*, 213-217.

White, R., & Stoecklin, V. L. (2008). Nurturing children's biophilia: Developmentally appropriate environmental education for young children. *Collage: Resources for Early Childhood Educators*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.453.5868&rep=rep1&type=pdf

Whitehouse, H. (2001). Not greenies' at school: Discourses of environmental activism in Australia. *Australian Journal of Environmental Education, 17*, 71-76.

Whitehouse, H. (2011). Talking up country: Language, natureculture and Interculture in Australian environmental education research. *Australian Journal of Environmental Education, 27*(1), 56-67.

Whitehouse, H., & Evans, N. (2010). " I am not a greenie, but": Negotiating a cultural discourse. *Australian Journal of Environmental Education, 26*, 19-31.

Wilks, L., & Harris, N. (2016). Examining the conflict and interconnectedness of young people's ideas about environmental issues, responsibility and action. *Environmental Education Research*, 1-14.

Williams, P. (2012). Educating for sustainability in New Zealand: Success through Enviroschools. In M. Robertson (Ed.), *Schooling for sustainable development. A focus on Australia, New Zealand, and the Oceanic region* (Vol. 3). Dordrecht, Netherlands: Springer.

Williams, S. E., Bolitho, E. E., & Fox, S. (2003). Climate change in Australian tropical rainforests: an impending environmental catastrophe. *Proceedings of the Royal Society of London B: Biological Sciences, 270*(1527), 1887-1892.

Wilson, E. O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.

Wood, C., Bragg, R., & Barton, J. (2013). *Natural choices for health and wellbeing*. Retrieved from http://www.greenexercise.org/pdf/Natural%20choices%20for%20health%20and%20well-being%20report%20Final%20Report%202.pdf

Worthy, K. (2013). *Invisible nature: Healing the destructive divide between people and the environment*. New York, NY: Prometheus Books.

Yin, R. K. (2011). *Qualitative research from start to finish*. New York, NY: Guilford Press.

Zavestoski, S. (2003). Constructing and maintaining ecologcial identities: the strategies of deep ecologists. In S. Clayton & S. Opotow (Eds.), *Identity and the natural environment. The psychological significance of nature* (pp. 297-315). Cambridge, MA: MIT Presss.

Zelenski, J. M., & Nisbet, E. K. (2014). Happiness and feeling connected. The distinct role of nature relatedness. *Environment and Behavior, 46*(1), 3-23.

Zeyer, A., & Kelsey, E. (2013). Environmental education in a cultural context. In R. B. Stevenson, M. Brody, J. Dillon, & A. E. J. Wals (Eds.), *International handbook of research on environmental education*. New York, NY: Routledge.

Zeyer, A., & Roth, W. M. (2013). Post-ecological discourse in the making. *Public Understanding of Science, 22*(1), 33-48.

Zotti, M., & Branch, N. C. (2011). Importance of nature to a child's health and wellbeing. *Public Health Bulletin SA*, 50.

Appendices

Appendix A: Scales Evaluating Environmental Attitudes and Nature Connection

Scales presented in chronological order

Scale	Designers (Year)
Children's Environmental Attitude and Knowledge Scale (CHEAKS)	Leeming, Dwyer, and Bracken (1995)
Factors Influencing Children's Environmental Attitudes	Eagles and Demare (1999)
Emotional Affinity toward Nature as a Motivational Basis to Protect Nature	Kals et al. (1999)
New Ecological Paradigm (1978 with subsequent revisions)	R. E. Dunlap, Van Liere, Mertig, and Jones (2000)
Inclusion of Nature in Self Scale	Schultz et al. (2004)
Implicit Connections with Nature	Schultz et al. (2004)
Connectedness to Nature Scale	Mayer and Frantz (2004)
Early-life Outdoor Experiences and an Individual's Environmental Attitudes	Ewert et al. (2005)
Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism	Wells and Lekies (2006)
Young Children's Environmental Attitudes and Behaviours	G. W. Evans et al. (2007)
Assessing Outcomes From Participation in a Residential Environmental Education Program	Stern et al. (2008)
Nature Relatedness Scale (NRS)	Nisbet, Zelenski, and Murphy (2009)
Children's Environmental Virtue Scale (CEVS)	M. Martin, Bright, Cafaro, Mittelstaedt, and Bruyere (2009)
Implicit Beliefs about Self and Nature: Evidence from an IAT game	Bruni and Schultz (2010)
Self-Efficacy and Intrinsic Motivation Guiding Environmental Behaviour	Tabernero and Hernández (2011)
Affinity for Nature Scale	Eastep, Cachelin, and Sibthorp (2011)
Children's Environmental Perceptions Scale (CEPS)	Larson, Green, and Castleberry (2011)
Environmental Responsibility, Character Development and Attitudes Towards School	Powell, Stern, Krohn and Ardoin (2011)
Connection to Nature	Cheng and Monroe (2012)
Development and validation of two scales to measure elaboration and behaviours associated with stewardship in children	Vezeau et al. (2015)
Getting to know nature: evaluating the effects of the Get to Know Program on children's connectedness with nature	Bruni, Winter, Schultz, Omoto, and Tabanico (2015)

Appendix B: Summary of Events Influencing Environmental Education in Australia

Year	Organisation / Conference / Government department	Document / Outcomes	Australian Initiative
1970	Australian Academy of Sciences conference - Education and the Environment Crises		National focus on environmental issues and need for environmental education
1972	Stockholm Conference on the Human Environment	Stockholm Declaration	
1975	Belgrade International Workshop on Environmental Education	Belgrade Charter	These goals became guiding principles for EE in Australia from 1977 (Gough, 2011)
1977	Tbilisi Environmental Education Conference	Tbilisi Declaration Agreed on three main goals for EE, 1/ fostering awareness of ecosystems interdependence, 2/creating opportunities for knowledge and values to protect and improve, and 3/ to create new behaviours	
1980	Australian Curriculum Development Centre	First national statement on EE for Australian schools (Greenall, 1980, cited in Gough, 2011)	Preliminary discourse for Australian Curriculum
1987	Brundtland World Commission on Environment and Development (WCED)	Our Common Futures	
1992	Rio de Janeiro Earth Summit United Nations Conference on Environment and Development (UNCED)	Agenda 21	Endorsed by Australia promoting an internationally agreed course of action to educate for sustainable development.
1999	Environment Australia, Department of the Environment and Heritage, Australian Government	Today Shapes Tomorrow Environmental Education for a Sustainable Future	A discussion paper to heighten national recognition of environmental education
1999	Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA)	Adelaide Declaration on National Goals for Schooling in the Twenty-first Century	Endorsed by all Australian education ministers
2000	Environment Australia, Department of the Environment and Heritage, Australian Government	Environmental Education for a Sustainable Future – First National Action Plan	To address the current needs of environmental education in Australia. The National Environmental Education Council (NEEC) established
2001	Environment Australia, Department of the Environment and Heritage, Australian Government		The National Environmental Education Network (NEEN) established
2002	Johannesburg UN Conference on Environment and Development World Summit on Sustainable Development		
2002	Earth Council, NGO based in Costa Rica	Earth Charter	
2002	United Nations Decade of Education for Sustainable Development (UNDESD) 2005 - 2014	Resolution 57/254	
2003	Australian Government	Independent of Australian Government support from 2009	Australian Research Institute in Education for Sustainability (ARIES)
2004	Australian Government Department of Education, Science and Training		National Framework for Values Education in Australian Schools (NFVE)
2004	Combined resources Australian, State and Territory Governments	Whole school approach to sustainability	Australian Sustainable Schools Initiative (AuSSI)
2005	Australian National Commission for UNESCO	Report on the National Symposium	National Symposium to initiate the UNDESD in Australia

Year	Organisation / Conference / Government department	Document / Outcomes	Australian Initiative
2005	Department of the Environment and Heritage, Australian Government	Educating for a Sustainable Future. Second national statement on EE for Australian schools	A National Environmental Education Statement for Australian Schools
2006	Department of the Environment and Heritage, Australian Government		Decade Implementation Plan UNDESD in Australia
2008	Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA)	Melbourne Declaration on Educational Goals for Young Australians	Guided development of a unified Australian Curriculum
2009	New South Wales Government Education and Training	Citizenship draft working paper, Earth Citizenship – A conceptual framework for learning for sustainability	State Government initiative
2009	Environment Australia, Department of the Environment , Water, Heritage and the Arts Australian Government	Second National Action Plan – Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability	Significant contributions stating Australia's participation in UNDESD (Gough, 2011)
2010	Department of the Environment, Water, Heritage and the Arts Australian Government	National Sustainability Curriculum Framework and A Guide for Curriculum Developers	
2010	Department of the Environment, Water, Heritage and the Arts Australian Government	Taking Action for the Future	Four case studies of sustainability in business and industry
2011	Australian Curriculum Assessment and Reporting Authority (ACARA)	Australian Curriculum	Partial roll out of Australian Curriculum across states
2012-2015	Australian Curriculum Assessment and Reporting Authority (ACARA)	Australian Curriculum	Roll out of Australian Curriculum continued and near completion, includes the Sustainability Cross Curriculum Priority

Appendix C: Values in the National Framework for Values Education (NFVE) for Australian Schools

Source: Commonwealth of Australia (2005)

Values in the National Framework for Values Education
Care and compassion – care for self and others
Doing your best – Seek to accomplish something worthy and admirable, try hard, pursue excellence
Fair go – Pursue and protect the common good where all people are treated fairly for a just society
Freedom – Enjoy all the rights and privileges of Australian citizenship free from unnecessary interference or control, and stand up for the rights of others
Honesty and trustworthiness – Be honest, sincere and seek the truth
Integrity – Act in accordance with principles of moral and ethical conduct, ensure consistency between words and deeds
Respect – Treat others with consideration and regard, respect another person's point of view
Responsibility – Be accountable for one's own actions, resolve differences in constructive, non-violent and peaceful ways, contribute to society and to civic life, **take care of the environment**
Understanding, tolerance and inclusion – Be aware of others and their cultures, accept diversity within a democratic society, being included and including others

Appendix D: Eleven Domains for Curricula Integration

Source: de Leo (2012)

Eleven domains for curricula integration
Interpersonal-relational
Socio-cultural
Political-civic
Religious-spiritual
Ethical-moral
Cognitive-intellectual
Technical-vocational
Economic
Educational
Physical-recreational
Aesthetic

Appendix E: Teacher Online Survey

NOTES in blue did not appear on the survey. For ease of reading, response options have been listed at the top of each of the three sections.

NOTE: After clicking Male or Female, a gender specific version of Section I of the survey was launched. Shown here is the female gendered version.

1. I am

- ○ Male
- ○ Female

This is part 1 of a 3 part survey.
Please tick the response that best describes how much you are like the person described.

NOTE: For each question response options ranged from:
Very much like me Quite like me Sort of like me A tiny bit like me Not like me Not like me at all

1. Thinking up new ideas and being creative is important to her. She likes to do things in her own original way.

2. It is important to her to be rich. She wants to have a lot of money and expensive things.

3. She thinks it is important that every person in the world be treated equally. She believes everyone should have equal opportunities in life.

4. It is important to her to show her abilities. She wants people to admire what she does.

5. It is important to her to live in secure surroundings. She avoids anything that might endanger her safety.

6. She likes surprises and is always looking for new things to do. She thinks it is important to do lots of different things in life.

7. She believes that people should do what they're told. She thinks people should follow rules at all times, even when no-one is watching.

8. It is important to her to listen to people who are different from her. Even when she disagrees with them, she still wants to understand them.

9. It is important to her to be humble and modest. She tries not to draw attention to herself.

10. Having a good time is important to her. She likes to "spoil" herself.

11. It is important to her to make her own decisions about what she does. She likes to be free to plan and not depend on others.

12. It's very important to her to help the people around her. She wants to care

for their well-being.

13. Being very successful is important to her. She hopes people will recognize her achievements.

14. It is important to her that the government insures her safety against all threats. She wants the state to be strong so it can defend **its'** citizens.

15. She looks for adventures and likes to take risks. She wants to have an exciting life.

16. It is important to her to always behave properly. She wants to avoid doing anything people would say is wrong.

17. It is important to her to get respect from others. She wants people to do what she says.

18. It is important to her to be loyal to her friends. She wants to devote herself to people close to her.

19. She strongly believes that people should care for nature. Looking after the environment is important to her.

20. Tradition is important to her. She tries to follow the customs handed down by her religion or her family.

21. She seeks every chance she can to have fun. It is important to her to do things that give her pleasure.

This is part 2 of a 3 part survey.
Please tick the response that best describes how you feel.

NOTE: For each question response options ranged from:
Strongly agree Disagree Sort of disagree Undecided Sort of agree Agree Strongly agree

1. I would rather spend my weekend in the city than in wilderness areas (out in the bush).

2. I enjoy spending time in natural settings just for the sake of being out in nature.

3. I have a sense of well-being in the silence of nature.

4. I find it more interesting in a shopping centre than out in the forest looking at trees and birds.

5. Government controls should be placed on industry to protect the environment from pollution, even if it means things will cost more.

6. People in developed societies are going to have to adopt a more

conserving life- style in the future.

7. The government should give generous financial support to develop alternative energy sources, such as solar and wind.

8. Industries should be able to use raw materials rather than recycled ones if this leads to lower prices and costs, even if it means the raw materials will eventually be used up.

9. If I ever get extra income I will donate some money to an environmental organisation.

10. I would like to join and actively participate in an environmental group.

11. I would NOT go out of my way to help recycling campaigns.

12. I often try to persuade others that the environment is important.

13. Nature is ONLY important because of what it can contribute to the pleasure and welfare of humans.

14. Conservation is important even if it lowers **peoples'** income and standard of living.

15. Most environmental problems can be solved by applying more and better technology.

16. Science and technology will eventually solve our problems with pollution, overpopulation, and reducing resources.

17. Humans will eventually learn how to solve all environmental problems.

18. Humans will eventually learn enough about how nature works to be able to control it.

19. If things continue on their present course, we will soon experience a major ecological catastrophe.

20. The earth is like a spaceship with very limited room and resources.

21. Humans are severely abusing the environment.

22. The idea that the balance of nature is terribly delicate and easily upset is much too pessimistic (negative).

23. The idea that we will experience a major ecological catastrophe if things continue on their present course is misguided nonsense.

24. People are wrong when they say that the unrelenting exploitation of nature has driven us to the brink of ecological collapse.

25. When nature is uncomfortable and inconvenient for humans we have every right to change and remake it to suit ourselves.

26. I oppose any removal of wilderness areas (wild bush with few or no humans), no matter how economically beneficial their development may be.

27. In my daily life **I'm** just not interested in trying to conserve water and/or power.

28. Whenever possible, I try to save natural resources.

29. Even if public transportation was more efficient than it is, I would prefer to drive or be driven.

30. Humans were meant to rule over the rest of nature.

31. Plants and animals have as much right as humans to exist.

32. Plants and animals exist primarily to be used by humans.

33. Humans are as much a part of the ecosystem as other animals.

34. Humans are no more important in nature than other living things.

35. Protecting peoples' jobs is more important than protecting the environment.

36. People have been paying far too little attention to how human progress has been damaging the environment.

37. The environment is secondary to economic growth.

38. The benefits of modern consumer products are more important than the pollution that results from their production and use.

39. Nature is valuable for its own sake.

40. I believe protecting the environment is an important issue.

41. Despite our special abilities humans are still subject to the laws of nature.

42. It makes me sad to see forests cleared for agriculture.

43. We should strive for the goal of **"zero** population **growth" –** no increase in population.

44. We should NEVER put limits on the number of children people can have.

45. People who say overpopulation is a problem are correct.

46. The world would be better off if the population stopped growing.

This is part 3 of a 3 part survey.
Please tick the response that best describes how you feel.

NOTE: For each question response options ranged from:
Strongly agree Disagree Sort of disagree Undecided Sort of agree Agree Strongly agree

1. I feel relaxed and calm when I'm in the natural world.

2. I feel scared when I am out in nature or in the bush.

3. I respect what nature provides.

4. I realise that the earth provides all the things that I need and use to live my life.

5. I feel connected to the earth.

6. It is important to me to feel connected to the earth.

7. I feel connected to the natural world.

8. It is important to me to feel connected to the natural world.

NOTE: Question 9 was a matrix with a comment box following.

9. Please click on one response for each row that most closely matches how you feel about the environment.

Global environmental issues make me worried.
The future supply of clean air and water is threatened by global pollution.
Climate change is a problem that affects the whole world.
Biodiversity loss (lots of animal and plant species dying) is happening at an alarming rate.
Consumerism is wasting earth's resources.
In lots of places around the world, nature is being destroyed by humans.
The natural environment needs protection - today more than ever before
The Wet Tropics, where I live, is important environmentally.
The Wet Tropics, where I live, is important environmentally.

10. Changes to the natural world make me concerned for the future.

11. Changes to climate make me concerned for the future.

12. It really concerns me that some people deny climate change is happening.

13. I have faith that the future will be positive.

14. I am hopeful that any problems in the natural world will be fixed in the coming years.

15. I feel confident about my future.

16. Living sustainably is important (actions today so future generations have enough for their needs).

17. Stewardship or looking after the natural world, is important.

18. It is important to me to tell others how I feel about looking after nature.

19. It is important to me that I act in environmentally friendly ways.

20. Whenever I can, I do things to protect the environment, like picking up rubbish, conserving water.

21. I am happy with the level of my actions to look after the natural world.

22. I am happy with how humanity is looking after the natural world.

NOTE: Question 23 was a matrix and response options ranged from:

No information Not much information A little information A lot of information Most of my information

23. Please click on the responses that most closely match where you receive information about the environment from

Most of my information about the environment comes from movies (not documentaries).
Most of my information about the environment comes from documentaries.
Most of my information about the environment comes from websites.
Most of my information about the environment comes from colleagues.
Most of my information about the environment comes from PD - seminars, conferences, reading, etc.
Most of my information about the environment comes from family members.
Most of my information about the environment comes from the media – TV, newspapers, magazines, etc.
Most of my information about the environment comes from social media – Facebook, Twitter, etc.

24. I trust the environmental information I receive.

NOTE: A comment box was added to Question 24.

25. There is a need for sustainability education in schools.

26. I am ready and able to teach sustainability.

27. There is across-school support, for sustainability to be taught in the current curriculum.

28. There is professional support for teaching about sustainability.

29. Professional support for teaching about sustainability is easy to access.

30. It is 'easy' to teach sustainability across a variety of subject areas.

31. Conceptual learning about sustainability theory is an important aspect of sustainability education.

32. Experiential learning or learning by doing is an important aspect of sustainability education.

33. Values education (ie learning to value the environment) IS incorporated in sustainability education.

34. Values education (ie learning to value the environment) SHOULD be incorporated in sustainability education.

NOTE: A comment box was added to Question 34.

35. Developing stewardship (an ethic of care for the natural world) would assist **students'** well-being.

36. Students generally display stewardship values and actions.

37. I am happy with the level of stewardship education in this school (stewardship education develops an ethic of care for the natural world in students).

38. There is evidence of an anti-environnment culture in school staff.

39. There is evidence of an anti-environment culture in school students.

Appendix F: Student Online Survey

NOTE: The structure of the student on-line survey is similar to the teacher on-line survey except for questions 15 to 34 in part 3. Comments in blue have been added to assist understand survey structure.

1. My age in years is

2. I attend

- **City Suburban School A**
- **City Suburban School B**
- **City Suburban School C**
- **Rural School A**
- **Rural School B**

NOTE: After clicking Male or Female, a gender specific version of Section I of the survey was launched. Shown here is the female gendered version.

3. I am

- Male
- Female

This is part 1 of a 3 part survey.
Please tick the response that best describes how much you are like the person described.

NOTE: For each question response options ranged from:
Very much like me Quite like me Sort of like me A tiny bit like me Not like me Not like me at all

1. Thinking up new ideas and being creative is important to her. She likes to do things in her own original way.

2. It is important to her to be rich. She wants to have a lot of money and expensive things.

3. She thinks it is important that every person in the world be treated equally. She believes everyone should have equal opportunities in life.

4. It is important to her to show her abilities. She wants people to admire what she does.

5. It is important to her to live in secure surroundings. She avoids anything that might endanger her safety.

6. She likes surprises and is always looking for new things to do. She thinks it is important to do lots of different things in life.

7. She believes that people should do what they're told. She thinks people should follow rules at all times, even when no-one is watching.

8. It is important to her to listen to people who are different from her. Even when she disagrees with them, she still wants to understand them.

9. It is important to her to be humble and modest. She tries not to draw attention to herself.

10. Having a good time is important to **her. She likes to "spoil" herself.**

11. It is important to her to make her own decisions about what she does. She likes to be free to plan and not depend on others.

12. It's very important to her to help the people around her. She wants to care for their well-being.

13. Being very successful is important to her. She hopes people will recognize her achievements.

14. It is important to her that the government insures her safety against all threats. She wants the state to be strong so it can defend **its'** citizens.

15. She looks for adventures and likes to take risks. She wants to have an exciting life.

16. It is important to her to always behave properly. She wants to avoid doing anything people would say is wrong.

17. It is important to her to get respect from others. She wants people to do what she says.

18. It is important to her to be loyal to her friends. She wants to devote herself to people close to her.

19. She strongly believes that people should care for nature. Looking after the environment is important to her.

20. Tradition is important to her. She tries to follow the customs handed down by her religion or her family.

21. She seeks every chance she can to have fun. It is important to her to do things that give her pleasure.

This is part 2 of a 3 part survey.
Please tick the response that best describes how you feel.

NOTE: For each question response options ranged from:
Strongly agree Disagree Sort of disagree Undecided Sort of agree Agree Strongly agree

1. I would rather spend my weekend in the city than in wilderness areas (out in the bush).

2. I enjoy spending time in natural settings just for the sake of being out in nature.

3. I have a sense of well-being in the silence of nature.

4. I find it more interesting in a shopping centre than out in the forest looking at trees and birds.

5. Government controls should be placed on industry to protect the environment from pollution, even if it means things will cost more.

6. People in developed societies are going to have to adopt a more conserving life- style in the future.

7. The government should give generous financial support to develop alternative energy sources, such as solar and wind.

8. Industries should be able to use raw materials rather than recycled ones if this leads to lower prices and costs, even if it means the raw materials will eventually be used up.

9. If I ever get extra income I will donate some money to an environmental organisation.

10. I would like to join and actively participate in an environmental group.

11. I would NOT go out of my way to help recycling campaigns.

12. I often try to persuade others that the environment is important.

13. Nature is ONLY important because of what it can contribute to the pleasure and welfare of humans.

14. Conservation is important even if it lowers **peoples'** income and standard of living.

15. Most environmental problems can be solved by applying more and better technology.

16. Science and technology will eventually solve our problems with pollution, overpopulation, and reducing resources.

17. Humans will eventually learn how to solve all environmental problems.

18. Humans will eventually learn enough about how nature works to be able to control it.

19. If things continue on their present course, we will soon experience

a major ecological catastrophe.

20. The earth is like a spaceship with very limited room and resources.

21. Humans are severely abusing the environment.

22. The idea that the balance of nature is terribly delicate and easily upset is much too pessimistic (negative).

23. The idea that we will experience a major ecological catastrophe if things continue on their present course is misguided nonsense.

24. People are wrong when they say that the unrelenting exploitation of nature has driven us to the brink of ecological collapse.

25. When nature is uncomfortable and inconvenient for humans we have every right to change and remake it to suit ourselves.

26. I oppose any removal of wilderness areas (wild bush with few or no humans), no matter how economically beneficial their development may be.

27. In my daily life **I'm** just not interested in trying to conserve water and/or power.

28. Whenever possible, I try to save natural resources.

29. Even if public transportation was more efficient than it is, I would prefer to drive or be driven.

30. Humans were meant to rule over the rest of nature.

31. Plants and animals have as much right as humans to exist.

32. Plants and animals exist primarily to be used by humans.

33. Humans are as much a part of the ecosystem as other animals.

34. Humans are no more important in nature than other living things.

35. Protecting peoples' jobs is more important than protecting the environment.

36. People have been paying far too little attention to how human progress has been damaging the environment.

37. The environment is secondary to economic growth.

38. The benefits of modern consumer products are more important than the pollution that results from their production and use.

39. Nature is valuable for its own sake.

40. I believe protecting the environment is an important issue.

41. Despite our special abilities humans are still subject to the laws of nature.

42. It makes me sad to see forests cleared for agriculture.

43. We should strive for the goal of **"zero** population **growth"** – no increase in population.

44. We should NEVER put limits on the number of children people can have.

45. People who say overpopulation is a problem are correct.

46. The world would be better off if the population stopped growing.

This is part 3 of a 3 part survey.
Please tick the response that best describes how you feel.

NOTE: For each question response options ranged from:
Strongly agree Disagree Sort of disagree Undecided Sort of agree Agree Strongly agree

1. I feel relaxed and calm when I'm in the natural world.

2. I feel scared when I am out in nature or in the bush.

3. I respect what nature provides.

4. I realise that the earth provides all the things that I need and use to live my life.

5. I feel connected to the earth.

6. It is important to me to feel connected to the earth.

7. I feel connected to the natural world.

8. It is important to me to feel connected to the natural world.

NOTE: Question 9 was a matrix with a comment box following.

9. Please click on one response for each row that most closely matches how you feel about the environment.

Global environmental issues make me worried.
The future supply of clean air and water is threatened by global pollution.
Climate change is a problem that affects the whole world.
Biodiversity loss (lots of animal and plant species dying) is happening at an alarming rate.
Consumerism is wasting earth's resources.
In lots of places around the world, nature is being destroyed by humans.
The natural environment needs protection - today more than ever before
The Wet Tropics, where I live, is important environmentally.
The Wet Tropics, where I live, is important environmentally.

10. Changes to the natural world make me concerned for the future.

11. Changes to climate make me concerned for the future.

12. It really concerns me that some people deny climate change is

happening.

13. I have faith that the future will be positive.

14. I am hopeful that any problems in the natural world will be fixed in the coming years.

15. My generation will be left a world full of environmental problems.

16. The thought of solving environmental problems in the future makes me deeply worried.

17. I feel confident about my future.

18. Living sustainably is important (actions today so future generations have enough for their needs).

19. Stewardship or looking after the natural world, is important.

20. It is important to me to tell others how I feel about looking after nature.

21. It is important to me that I act in environmentally friendly ways.

22. Whenever I can, I do things to protect the environment, like picking up rubbish, conserving water.

23. I am happy with the level of my actions to look after the natural

24. I am happy with how humanity is looking after the natural world.

NOTE: Question 23 was a matrix and response options ranged from:

No information Not much information A little information A lot of information Most of my information

25. Please click on the responses that most closely match where you receive information about the environment from

Most of my information about the environment comes from movies (not documentaries).
Most of my information about the environment comes from documentaries.
Most of my information about the environment comes from websites.
Most of my information about the environment comes from colleagues.
Most of my information about the environment comes from PD - seminars, conferences, reading, etc.
Most of my information about the environment comes from family members.
Most of my information about the environment comes from the media – TV, newspapers, magazines, etc.
Most of my information about the environment comes from social media – Facebook, Twitter, etc.

26. I trust the environmental information I receive.

NOTE: A comment box was added to Question 26.

27. There is a need for sustainability education in schools.

28. Students benefit from learning about sustainability at school.

29. Learning about the theory of sustainability is an important aspect of sustainability education.

30. Participating in sustainability activities at school benefits students.

31. Learning to value the environment is an important part of learning about sustainability.

32. I value learning about the environment.

33. My fellow students generally display stewardship values and actions.

34. There is evidence of an anti-environment culture at school.

Appendix G: Teacher Interview Script

Preamble

Stewardship in the context of my research is an ethic of care for the environment, an active valuing of the environment.

The purpose of this interview is to further understand what level of importance teachers and students attribute to sustainability and stewardship education. This will provide some feedback on the sustainability cross curriculum priority in the Australian Curriculum and C2C in Queensland. This interview also seeks to understand what environmental values are being developed in teaching and learning in state schools in the Wet Tropics.

This is a semi structured interview, with some guiding questions, and allowance for open ended responses. I value your time and the sharing of your feelings, ideas and beliefs.

This interview will be absolutely confidential, and you have the right to not answer any question and, to stop the interview at any time. Your comments will not be personally attributable as all data will be grouped and summarised for my thesis.

I'm asking your permission to record the interview, which will be transcribed into text. If you want, after transcription, I can guarantee the recording will be deleted to ensure your voice does not become pirated onto a clip somewhere on the internet.

FIRSTLY, A COUPLE OF Qs ABOUT THE STUDENTS WHO COMPLETED THE ON-LINE SURVEY

Q 1

What subject do you teach the class that completed the on-line survey?

Q 2

How did the students find the survey?

Any comments? Any feedback?

I'D LIKE TO DISCUSS THE SUSTAINABILITY CROSS CURRICULUM PRIORITY A LITTLE BIT

Q 3

Do you think developing teaching and learning for sustainability is important?

How important? How should this occur at school?

Q 4

Do you see sustainability being presented across a broad spectrum of the curriculum that your lesson plans originate from?

Where? In what way?

Q 5

Do you incorporate sustainability principles in your teaching?

How?

Q 6

Is it easy to translate sustainability as it is presented in the curriculum into your teaching?

Q 7

Do you use any on-line resources to assist you teach for sustainability? Like Scootle, the Learning Place, TES or others?

What are they?

Q 8

Do you incorporate any experiential sustainability learning activities for your students?

What does this involve?

Q 9

Do you see any evidence of your colleagues teaching for sustainability?

What does this involve?

Q 10

Can you comment on the level of PD or professional support provided in school for sustainability teaching and learning?

For example, is there a school wide culture of sustainability?

I'D LIKE TO DISCUSS STEWARDSHIP NOW

Q 11

In the context of my research, stewardship is developing an ethic of care for the environment, and part of that involves developing a nurturing connection with nature. Do you see developing stewardship as an important part of education today?

Why? Please explain further?

Q 12

Do you see stewardship education contributing to sustainability education?

In what way?

Q 13

How could stewardship education be implemented, do you think, in schools today, generally?

And in your field?

Q 14

How do you feel about teaching environmental values to today's youth? Should this be the role of the classroom teacher?

I'D LIKE TO DISCUSS THE ENVIRONMENTAL CHALLENGES THAT ARE FACING THE WORLD TODAY, LIKE RESOURCE DEPLETION, CLIMATE UNCERTAINTY AND CHANGE, ECOSYSTEM DISRUPTION, BIODIVERSITY LOSS AND POLLUTION, TO MENTION SOME.

Q 15

But firstly, how do you see climate change impacting the world?

Q 16

There are many global ecological challenges reported (and not reported) in the media. What future impacts do these present for humanity?

Q 17

Do you see any impact on students' outlook and attitude for the future, from the global ecological challenges presented through all the medias – including mainstream, social, digital.

Evidence of ecophobia?

Evidence of post-ecologism?

Depressive moods and/or behaviours that you would consider are linked to a pessimistic outlook for the environment in the future?

Q 18

What can be done to assist students feel more confident about who they are, more confident about the environment and more confident about their future?

Can this happen through school education?

AND FINALLY I'D LIKE TO DISCUSS HOW YOU FOUND THE SURVEY.

Q 19

Did you have any problems with the questions in the on-line survey? For example, the way questions were framed, or questions that were left out?

Q 20

Did the survey leave you thinking there were more or different responses you would like to have offered?

AND

Is there anything else you would like to add?

Appendix H: Student Interview Script

Preamble

Introduce myself and ask for the first names of students. Write on a small free standing card and put in front of them, so I can use their names.

When I talk about stewardship I am talking about an ethic of care for the environment, an active valuing of the environment. So thinking about and doing things that look after the environment. In comparison, sustainability is thinking and acting so there is enough for people now and enough for people in the future so they can have good lives. This means enough clean air, water, food, resources, all the things that we not only use but also appreciate, in our lives. For example we may not use a national park in the snow fields of southern Australia but it's great it is a national park and being protected.

The purpose of this interview is to help me understand how important teachers and students think sustainability and stewardship education is. I am hoping this will provide some feedback to the people who design what should be taught and learnt in schools.

This is a semi structured interview, which means I'll ask some questions, but I want to hear what you think. There are no right or wrong answers. Please be completely honest. I am not judging you and what you say. I want to understand how you feel about the natural environment, how important it is to you, how important it is to you to sustain and care for the environment and how you feel about learning about the natural environment. I value your time and the sharing of your feelings, ideas and beliefs.

This interview will be absolutely confidential, and you have the right to not answer any question and, to stop the interview at any time. Your comments will be grouped and summarised for my thesis, which is basically a book I'll write about what I've found by talking to teachers and students. This will not get on social media.

Any questions before we start?

FIRSTLY A COUPLE OF Qs ABOUT THE ON-LINE SURVEY

Q 1

How did you find the survey? Where you engaged by the Qs? Did the Qs make sense? Were they easy to answer? Were there any Qs you didn't understand?

How did it make you feel? Did it make you think about how you feel and act towards the natural environment?

Q 2

Did you discuss it with your friends after? If so, what did your friends say about it?

AND NOW I WANT TO DISCUSS THE NATURAL ENVIRONMENT

Q 3

How important do you think it is to look after the natural environment?

Q 4

Do you think learning how to look after the natural environment is important?

How important?

Should this occur at school or at home, or both, and in other ways?

Q 5

Do you think you look after the natural environment?

Some ways we can measure that are no littering, picking up other people's litter, careful with recycling, reusing things where you can, etc

Q 6

Do you think your family looks after the natural environment?

Q 7

Do you think there is a school wide culture of looking after the natural environment?

Q 8

Can you say if anyone (or lots of people) have showed you how to care for the natural environment?

Who was that? Where did that happen?

Q 9

Are you concerned about some of the challenges facing the natural environment, like pollution, climate uncertainty, animals and plants becoming extinct?

How does it make you feel?

Does this affect how you look at your future?

Q 10

How do you see climate change impacting the world? Will it become a big issue?

What makes you think like that?

Q 11

Do you have friends concerned about some of the challenges facing the natural environment?

If so, how do you think this concern affects them?

Does it show in their talk, moods, what they do, their vision for who they will become, what the world will be like for them, their job prospects?

Q 12

Do you think it is common for people your age to care for the environment?

If yes, why do you think so? If no, why do you think so?

LET'S TALK ABOUT YOU AND YOUNG PEOPLE TODAY.

Q 13

What is important to you and your friends?

Q 14

What worries, if any, do you and your friends have or talk about, generally?

If any, is it possible (and easy) to do something about them?

Q 15

What can be done to assist young people your age feel more confident about who they are, more confident about the environment and more confident about their future?

Can this happen through school education?

Would more exposure to the natural environment be of assistance?

FOR MY UNI STUDIES I'M LOOKING AT STEWARDSHIP AND DEVELOPING CARING FOR THE ENVIRONEMNT AND PART OF STEWARDSHIP IS DEVELOPIING A NURTURING CONNECTION WITH NATURE.

Q 16

Do you think it is possible to teach someone to care for the natural environment?

How do you think this should happen?

DOES ANYONE HAVE A PET? FOR ME HAVING A PET WHEN YOU'RE YOUNG IS ONE WAY A YOUNG PERSON CAN LEARN HOW TO CARE?

Q 17

Do you think you've been taught how to care? Let's break this up into parts. Firstly, do you think you have been taught how to care for your self – or are learning how to care for yourself?

Have you learnt how to care for someone or an animal, a plant, or a tree or a garden or some thing, other than simply caring about yourself?

If so, how and when did this happen?

AND

Is there anything else you would like to add?