Developing approaches to outdoor education that promote sustainability education

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Abstract

Social, economic, and environmental issues facing 21st century societies compel a transformative shift towards sustainability in all spheres of life, including education. The challenges this holds for outdoor education programs and practices is significant. If outdoor education theory and practice is to make a greater contribution to sustainability education it must explore both alternatives and alterations to approaches based on adventure pursuit activities and personal development doctrines. For over a decade there have been calls from across the world to include greater emphasis on human/nature relationships, place, social justice, and ecological perspectives in outdoor education. This article adds to those calls through advocating for a pedagogical approach to outdoor education that promotes sustainability education. Drawing from recent doctoral research this article introduces a model which describes a change process towards sustainability focused pedagogy. The model suggests change can take place in three areas for educators: first, in philosophy, values, and understandings, second, in infrastructure, resource use, and programming, and third, in teaching and learning strategies. It is at the nexus of these three areas that the most effective pedagogical change can be found.

Keywords: Outdoor and sustainability education, action research, sustainability, teacher professional learning.

Introduction

As societies across the world face the stark reality of growing social inequality, economic uncertainty, and environmental degradation, it is increasingly evident that we are sustaining the unsustainable. Consequently, the need for a transformative shift towards sustainability in all spheres of life, including education, is escalating. For the better part of two decades there have been calls from within the outdoor and adventure education field to pay heed to sustainability issues. Despite these calls, many dominant conceptions of outdoor education in Western countries, such as Aotearoa New Zealand[1], still cling to twentieth century models based primarily around adventure pursuit activities and personal development doctrines. In many ways these dominant conceptions have emerged to be largely separate from the aims of education for sustainability or environmental education. It must be acknowledged this is not the case in all contexts, for example, Victoria, Australia has a rich heritage of environmental and community oriented school based outdoor education curriculum (Gough, 2007; Martin, 2008a). Moreover, a significant body of literature in the last decade has critiqued dominant adventure based conceptions of outdoor education and advocated for more meaningful and critical engagement with human/nature relationships, place, culture, and ecology. Consequently, the contested space of outdoor education continues to wrestle with issues of identity, philosophy, theory, curriculum, and pedagogy (Brown, 2009; Wattchow & Brown, 2011; Zink 2010). Whilst this introspection, characterised by criticality and debate may be necessary and even healthy, I argue that any re-envisioning of outdoor education must be framed by 21st century issues and contexts. To this end, this article advocates for an approach to outdoor education which, among other things, seeks to address and incorporate sustainability issues and principles. Specifically this article draws on recent doctoral research (Hill, 2011) to present a change model for facilitating approaches to outdoor education which promote the goals of sustainability education. This model suggests that change can take place at three levels for teachers and educators: first, in philosophy, values, and understandings, second, in infrastructure, resource use, and programming, and third, in teaching and learning strategies.

Multiple claims have been made about the impact of outdoor education over the years, including: personal and social development, leadership, group bonding, acquiring adventure skills, and aspects of environmental care. Of course a case can be made that outdoor educators should remain faithful to goals such as personal development through adventure and challenge, or the acquisition of adventure recreation skills. These types of arguments inevitably lead to the philosophical question; what are we educating for? As I have suggested elsewhere (Hill, 2009, 2011, 2012), and maintain in this article, the global social, economic, and environmental issues facing 21st century societies are too significant and pressing to ignore. Moreover, these issues compel a response from all aspects of society including education. As Orr (2004) notes, "all education is environmental education – by what is included or excluded, students are taught that they are part of or apart from the natural world" (p. 12). As outdoor education is so intricately tied to learning experiences in the natural world, it is imperative that outdoor educators consider how they might

contribute to addressing sustainability issues in their pedagogy and programs. This may be a gradual and sometimes difficult process, comprising both the critical examination of underlying assumptions and the re-envisioning of theory and practice to promote new or alternative approaches. It is to these ends that this article seeks to make a contribution.

The doctoral research which informs this paper worked with eight educators in Aotearoa New Zealand to critically examine and re-envision school-based outdoor education through sustainability perspectives. The aims of the study were two-fold. First, to engage teachers in a process of critique whereby their dominant conceptions of outdoor education where challenged. Second, to enable teachers to incorporate sustainability concepts and principles into their existing outdoor education programs and practices. Further details of this research approach will be covered in the next section of this article. The following three sections provide some brief contextual background to global sustainability issues, sustainability education, and the contested landscape of contemporary outdoor education. Finally, a change model will be presented which describes a process for incorporating sustainability education into outdoor education programs, practices and pedagogies.

Research Approach

The change model discussed in this article is drawn from recent doctoral research (Hill, 2011). As this research employed a critical qualitative approach where context is highly important, it is useful to briefly consider some of the methods and procedures used in the research design. The research project worked with eight educators in Aotearoa New Zealand, six from secondary schools and two from tertiary pre-service teacher education, to critically examine and re-envision school-based outdoor education through sustainability perspectives. To achieve these aims, a research approach was employed which wove together critical ethnography and participatory action research (see Carspecken, 1996; Creswell, 2002; Denzin & Lincoln, 2005; Kemmis & McTaggart, 2005; Kincheloe & McLaren, 2005).

Pragmatically this approach resulted in a three phase research process which took place over a thirteen month period from November 2008 until December 2009. Phase one was concerned with ascertaining and critiquing teachers' outdoor education programs and practices through critical ethnographic methods. Research information was collected using semi-structured interviews, and analysis of curriculum material such as course/program plans and statements. This data was analysed thematically for emergent themes relating to teachers' perceptions and conceptualisations of outdoor education and sustainability education, and the current state of social, economic, and ecological issues in society. Phase two focused on facilitating pedagogical change through professional development and participatory action research. Specifically this involved teachers taking part in professional reading, professional learning and development workshops, and implementing individual action plans through which teachers incorporated various aspects of sustainability into their outdoor education programs and pedagogy. Phase three involved reflection and evaluation of the action plans, research process, and potential for outdoor education to educate for a sustainable future. Data from phase three was collected using a final workshop which included a written qualitative evaluation, and semi-structured interviews. Research information from all of these phases was then organised by two themes and five case studies. The case studies were a holistic and contextual way of presenting findings, consistent with the key tenets of critical qualitative research (Cohen, Manion, & Morrison, 2011; Kincheloe & McLaren, 2005; Patton, 2002). The change model for sustainable outdoor education presented and discussed in this paper emerged from each of the research stages and consequent case study narratives.

Sustainability Issues in Local Contexts

We live in uncertain times, characterised by significant global environmental threats, social issues, and economic instability. These are exemplified in many ways including: the well documented 2008 global financial crisis, climate change concerns, threats to biodiversity, and increasing income inequality in many nations. The literature base related to these issues in both academic and popular media is vast and it is unlikely that readers of this article need convincing of the seriousness of sustainability issues. My intent in this section, therefore, is to provide a brief snapshot of sustainability issues, focusing on Aotearoa New Zealand and Australian contexts. This will be followed by a discussion of discourses around sustainability education.

Evidence across the world which points to general environmental degradation, biodiversity loss, human induced (anthropogenic) climate change, and increasing pressure on ecosystems is significant (see Australian Bureau of Statistics, 2010a; Flannery, 2005; Hamilton, 2010; IPCC, 2008; Millennium Ecosystem Assessment, 2005; Monbiot, 2007; Statistics New Zealand, 2009; United Nations Environment Programme, 2007). At times global sustainability issues can seem removed from people's everyday lives, particularly in resource rich nations like Aotearoa New Zealand and Australia. It is therefore useful to place sustainability issues into a local context. Statistics New Zealand's (2009) publication, *Measuring New Zealand's Progress Using a Sustainable Development Approach: 2008* indicates that New Zealand's greenhouse gas emissions have grown since

1990 (by 20% according to United Nations Framework Convention on Climate Change (UNFCCC, 2011), that native species biodiversity continues to decline and that pollution of rivers and streams has increased. These findings challenge the taken-for-granted notion that Aotearoa New Zealand is a clean, green country. The Australian context is not dissimilar. Australia's net greenhouse gas emissions continue to climb and have increased by a little over 30% since 1990 (UNFCCC, 2011). A recently released report on the state of Australia's climate (CSIRO & Australian Bureau of Meteorology, 2012), notes that the warming trends of Australia's land and oceans matches or exceeds that of global averages and that sea-level rise is greater than or equal to the global average. Loss of biodiversity is also an issue for Australia. Despite an increase in terrestrial protected areas such as conservation parks, from 2000 to 2009 the number of threatened fauna species in Australia increased by 35%. Threatened flora species increased by 15% in the same time (Australian Bureau of Statistics, 2010a).

Social inequality is also prevalent in both Aotearoa New Zealand and Australia. Data from Wilkinson and Pickett (2009) indicates that Aotearoa New Zealand has the fifth highest and Australia the fourth highest levels of income inequality among "developed" nations. Furthermore, Wilkinson and Pickett argue that as inequality increases so to do health and social problems in societies. In Aotearoa New Zealand, since 1988, income inequality has widened and the proportion of the population with low incomes has increased (Statistics New Zealand, 2009). Similarly the Australian Bureau of Statistics (2010b) reveals that while per capita household net worth has increased by 6.4% per year since 1999, this has largely benefited the wealthiest 20% of Australian households who account for 62% of total household net worth. Meanwhile the poorest 20% of Australian households account for only 1% of total household net worth (Australian Bureau of Statistics, 2011).

From a sustainability perspective, it is important to view this brief synopsis of social and environmental issues together. Wilkinson and Pickett (2009) recognise the links between social inequality and issues such as global climate change, suggesting that these issues need to be addressed in tandem. Authors such as Plumwood (2002) and Shiva (2008) lay the blame for the current "ecological crisis" at the feet of the unsustainable social fabric of capitalist Western society and accompanying consumer-oriented and individualised lifestyles. These perspectives relate to concepts of sustainability and sustainability education and it is useful to briefly explore these discourses and how they link to this article.

Sustainability and Sustainability Education

Sustainability or sustainable development, as it known in many areas of the world, is a contested concept with many competing and sometimes contradictory definitions (Jacobs, 1999; Rathzel & Uzzell, 2009; Williams & Millington, 2004). The most commonly used definition for sustainable development was that offered by the Brundtland Report (World Commission on Environment and Development, 1987), which defines sustainability as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (p. 8). Whilst this definition has acceptance at a general level there is less agreement about what this means at more specific levels. For instance, how might one define "need" or "development" and what exactly is to be sustained? Entering into this conceptual debate surrounding sustainability and sustainable development is beyond the scope of this article. Rather, it is useful to consider some core aspects of these concepts. Theories of sustainability, both weak and strong, (Neumayer, 2003; Rathzel & Uzzell, 2009; Sustainable Aotearoa New Zealand Incorporated, 2009) often contain the intersection or nestedness of three spheres; social-cultural, economic, and environmental. These three spheres are supported by understadings of sustainability as both normative and descriptive; that is, criteria for sustainability must be translated into practice which in turn supports an active response to sustainability (Christen & Schmidt, 2011). Therefore, sustainability is largely a holistic concept wherby social-cultural, economic, and environmental areas must be considered in any movements or solutions which seek to be sustainable.

Education has an important role in meeting the goals of sustainability. The New Zealand Parliamentary Commissioner for the Environment (PCE) (2004) quotes from Agenda 21 of the 1992 United Nations Conference on Environment and Development (UNCED), stating education is "critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision making" (p. 37). This statement, however, must be considered with some caution. Although education is an important part of building a sustainable future, it cannot do the job of politics, and to expect education to be a panacea for current un-sustainability is "both horribly naive and utterly unfair on the younger generation" (Jucker, 2002, p. 9).

Sustainability education is open to contestation and multiple interpretations just as the broader concepts of sustainability or sustainable development are. I use the term sustainability education deliberately in this paper as a catch-all for environmental

education, education for sustainability, and education for sustainable development (Sterling, 2010). In Aotearoa New Zealand, sustainability education can be viewed as "an emerging concept that encompasses a new vision of education that seeks to empower people of all ages to assume responsibility for creating a sustainable future" (Parliamentary Commissioner for the Environment, 2004, p. 36). Conceptually, sustainability education is probably best understood in the Aotearoa New Zealand context through Law's (2006) education for sustainability Koru Model (cited in Hill, 2011). This model is based on a vision that promotes "attitudes and values that lead to create a nation of innovative and motivated people who think and act sustainably" (p.44). Conceptually it weaves together three key aspects of sustainability; economic, environmental, and socio-cultural-political, in a holistic model.

In the Australian context, education for sustainability is conceptualised at a federal/national level through *Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability* (Department of the Environment Water Heritage and the Arts, 2009). This document suggests education for sustainability is based on principles of; "transformation and change, education for all and lifelong learning, systems thinking, envisioning a better future, critical thinking and reflection, participation, partnerships for change" (p. 9). Both the Aotearoa New Zealand and Australian perspectives presented here operate at a pragmatic level, which in some ways skirts around the deeper theoretical debates surrounding the conceptualisation of sustainability and sustainability education. Nevertheless, these perspectives provide a useful basis for understanding the changes teachers in this research were making as they incoporated sustainability principals and ideas into their outdoor education programs and practices. Before presenting the change model which describes this process, it is useful to briefly consider contemporary outdoor education trends, particularly as they relate to sustainability education.

The Contested Landscape of Contemporary Outdoor Education

Precise conceptualisations and/or definitions of outdoor education can be difficult and even problematic. As Nicol (2002) suggests, "outdoor education defies definition in terms of being a fixed entity of common consent, homogeneous over time and space" (p. 32). It is therefore with some caution that I seek to provide a contextual background for outdoor education theory and practice which highlights its often uneasy relationship with environmental or sustainability education. It must be recognised that calls for transformative approaches to outdoor education which embrace human/nature relationships, concepts of sustainability, and critical perspectives on gender and class issues, have appeared in the literature since the 1990s (see Bell, 1996; Brookes, 1994; Cooper, 1994; Haluza-Delay, 1999; Higgins, 1996; Loynes, 1998; Lugg, 1999; Martin, 1999; Warren, 1998). This tradition of criticality in outdoor education has continued into the 21st century with increasing calls for incorporation of sustainability, socio-ecological, and place-responsive approaches into outdoor education thinking and practice (see Brookes, 2003a, 2003b; Brown, 2008, 2009; Brown & Fraser, 2009; Higgins, 2009; Hill, 2010a, 2012; Irwin, 2008, 2010; Lugg, 2007; Martin, 2008b; Nicol, 2003; O'Connell, Potter, Curthoys, Dyment, & Cuthbertson, 2005; Payne, 2002; Payne & Wattchow, 2008; Stewart, 2004; Wattchow, 2008; Wattchow & Brown, 2011; Zink, 2003, 2010). Notwithstanding this large body of work, which has attempted to position outdoor education pedagogy as relevant to 21st century issues, I would argue that outdoor education at an international level is still a contested concept. Though a reading of the literature might suggest that outdoor education has the ability to cure many of the ills of contemporary society, I would contend that outdoor education remains a fledgling and theoretically underdeveloped field which is yet to come to grips with issues of identity, philosophy, epistemology, methodology, pedagogy, and content.

My view of outdoor education is shaped not only by my reading of the literature but also through my experience as a teacher and researcher in Aotearoa New Zealand and more recently Tasmania. Dominant conceptions of outdoor education in Aotearoa New Zealand still largely revolve around adventure activities and personal development doctrines with only cursory attention paid to environmental or sustainability goals (Cosgriff, 2008). Certainly many of the programs I had knowledge of were based firmly on adventure activities. The group of eight teachers involved in my PhD research (which I discuss in more detail in the next section) also came from backgrounds and programs which largely embraced adventure pursuit activities as the primary basis for their programs. Although all teachers in this research group expressed a desire to integrate sustainability education into their programs and practices, there remained considerable tension as to what sustainability meant for them and their programs. There was also frustration for some with an apparent disjuncture between the perceived goals of outdoor education and those of sustainability education. These views resonate with those of Boyes (2012) who suggests that in Aotearoa New Zealand there has been a key struggle between conceptualisations of *outdoor-education-as-adventure* and *outdoor-education-as-outdoor-learning* which might include environmental or sustainability education. It is Boyes' view that the outdoor-education-as adventure discourse has been totally embraced in New Zealand although he notes there has been a gradual "greening" of practice in recent years.

The Tasmanian context is not dissimilar. With a few notable exceptions it is my impression that many of the outdoor education programs in the state are firmly entrenched in adventure education models underpinned by pursuit activities, personal development, and leadership. This is evidenced in the tone and content of the Year 11 and 12 Tasmanian Qualifications Authority (TQA) outdoor education courses which focus on outdoor experiences, expeditions, adventure recreation and outdoor leadership (Tasmanian Qualifications Authority, 2012). It is of interest that the outdoor education courses sit, perhaps uncomfortably, within the *Food, Hospitality & Personal Services* sector of the TQA structure. Again this may demonstrate the identity struggle which remains for outdoor education, in Tasmania at least.

It is into this contested landscape of outdoor education that this article seeks to contribute. The need for an educational response to growing social, economic, and ecological issues in 21st century societies is without question. Although traditional models of outdoor education which focus primarily on adventure can have worthwhile outcomes, they may be insufficient to meet the aims of educating for a sustainable future. What is required, therefore, is a critical re-appraisal of the purpose and goals of outdoor education programs. In re-considering *what outdoor education is for*, transformative educational objectives which contribute towards a sustainable future appear more desirable and appropriate. This does not mean that outdoor education must "dismiss the pedagogic potential of outdoor journeys that rely upon particular outdoor activities and technologies" (Payne & Wattchow, 2008, p. 36). However, I would argue that significant change needs to occur in many existing outdoor education programs, thinking, and practices to align the objectives of such programs with those of sustainability education. This change might take place in two ways. First, through critical examination into the appropriateness of outdoor adventure activities to help educate for a sustainable future and investigating ways sustainability education can be woven into such activities. Second, through exploring new, innovative, or alternative outdoor learning experiences which more specifically incorporate the goals of sustainability education. Change in both these areas occurred for teachers in this research. The following section presents a model which describes this change process and offers insight into ways that future pedagogical change might be informed, framed, and enabled by sustainability education.

A Change Model for Sustainable Outdoor Education

As this research project progressed I became aware of change that was taking place in a variety of different ways for teachers in the research group. Some were wrestling with philosophical and identity issues, some were expanding knowledge and improving understanding, some were making changes to their teaching programs, others were implementing innovative teaching and learning strategies and of course many were engaged in more than one of these areas. As I considered these changes I realised that many were interrelated. This model is an attempt to capture the interrelated and complex nature of pedagogical change. I am aware that sometimes models, such as the one presented on the following page, can be reductionist and over simplify complex processes. I am cognisant that pedagogical change for teachers through professional learning and development is multifaceted and complex, as outlined by Timperley, Wilson, Barrar, and Fung (2007). Notwithstanding these cautions, I believe the model presented here effectively captures and illustrates a process by which teachers in this research developed more sustainable approaches to their outdoor education programs and pedagogy. From the findings and literature presented in this research, I maintain that effective change towards more sustainable approaches to outdoor education involves the interaction of all three aspects of change and a number of underlying key principles. Evidence which supports this model comes from teachers' experiences summarised in the following subsections. Pseudonyms have been used to protect the teacher's identities.

Change in philosophy, values and understandings

The findings detailed in the case study narratives from this research project revealed multiple ways that the research process affected teachers' philosophy, values, and understandings related to sustainability. These findings were significant in that they demonstrated how, for teachers in this research, change towards more sustainable outdoor education pedagogies was strongly interrelated with shifts or developments in their philosophy, values, and understandings. I believe these shifts were important in two ways. First, I contend that a key part of incorporating sustainability principles and issues into their programs and pedagogy involved teachers developing, increasing, and wrestling with their philosophical and conceptual understandings of sustainability and how these might influence their outdoor education practice. There were a number of examples of this. Sophie concentrated on developing a departmental philosophy statement which would underpin all of her outdoor education programs. The process of developing this statement involved significant gains in her sustainability knowledge and

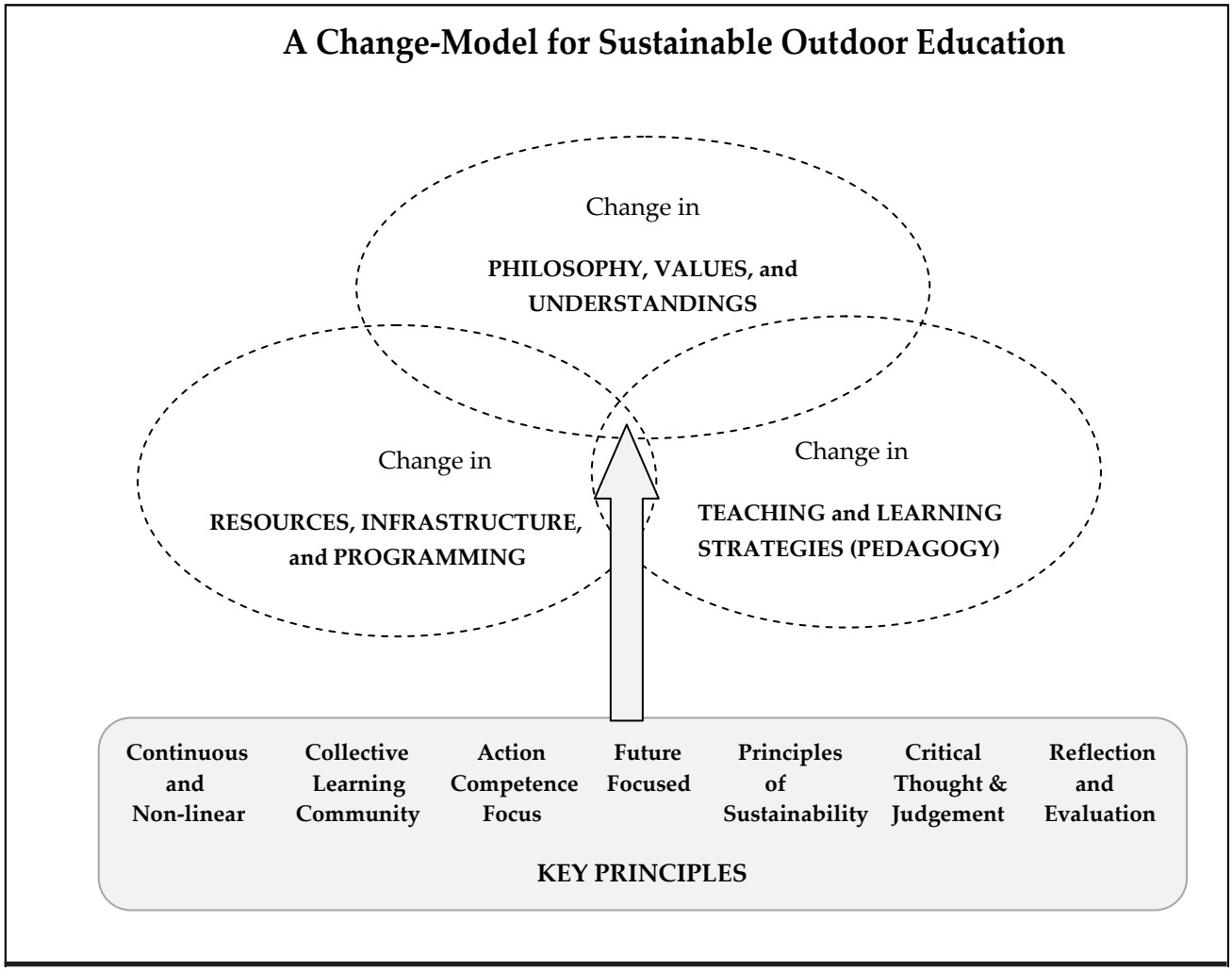

Figure 1. A change model for approaches to outdoor education which promote sustainability education

a realisation that her values were intricately tied to her understanding of sustainability. For Sophie the research also highlighted the importance of grappling with philosophy, understanding, and values before addressing more pragmatic or pedagogical concerns as revealed in the quote below.

> I didn't understand how much a part of it [sustainability] your beliefs, values and philosophy were until I stepped back. . . and then realising that I was a big picture person, I was like, ohh, of course that's where I have to start. I'm starting at the wrong point. I'm starting at the finish line, I need to back up the bus, and that's where I came to write that philosophy. (Sophie, Final Interview, Dec 09)

Josh's experience also revealed how the research process impacted on his philosophy, values, and understanding, and how he wrestled with a number of challenges and tensions as a result. He discussed how his core was rattled as he critically examined his existing understandings, and values, and engaged with new and sometimes difficult knowledge. Josh also revealed how the research helped him to process and strengthen his thinking, values, and philosophy relating to sustainability education in outdoor education. Another teacher, Mike, revealed how the research process helped him to further develop and synthesise deeper understandings of sustainability, as stated in the quote below.

> Starting with the conversation that we had last year through to now, I've seen the whole thing, the whole idea of, around sustainability and the kind of things you've been discussing sort of percolate to the top and it's, if there's anything that's happened for me in the last year, it's been like, umm, sort of a, a congealing a clarity of, about what it's all about and how it might work and that's, I guess, combined with a whole lot of other strands that are sort of coming together. (Mike, Final Interview – Part 1, Dec 2009)

In a similar way to Mike, Rachel revealed how the research process impacted positively on her understanding of sustainability and sustainability education. Whilst she described a perceived lack of knowledge about sustainability at the beginning of the research, labelling herself as a "novice", Rachel's knowledge and understanding improved through the research process. She subsequently indicated how improving her understandings had helped her to better incorporate sustainability education principles into her Year 12 outdoor education program. In all of the cases highlighted here, changes in philosophy and understandings had wider impacts on teachers' programs and pedagogy. Through increased understanding they were able to implement new initiatives, rethink existing teaching and learning activities, and to some extent, critically analyse their programs. The underlying role that increasing knowledge has in these shifts is supported by literature. In a foreword to Timperley et al.'s (2007) *Teacher Professional Learning and Development Best Evidence synthesis*, Earl (2007) suggests that in order to develop competence in any area of inquiry, teachers must have a deep factual knowledge.

The second reason I believe developing philosophy, values, and understandings is an important part of incorporating sustainability into outdoor education is related to consistency between teachers' values and actions and what they are trying to teach. In one case study narrative, Bryn highlighted the importance of teachers' role-modelling sustainability principles and practices in their pedagogy. Mike and Josh also spoke about role modelling and the need to avoid hypocrisy between words and actions. Meanwhile, Rachel talked about how she has become more sympathetic to sustainable practices and has tried to incorporate these into her own life. My argument here is that through improving understandings and examining philosophies and values related to sustainability, teachers may be more able to effectively role-model sustainable behaviours. This process is neither simple nor easy however. Several of the teachers in this research spoke of the tension they felt with the level of inconsistency between their sustainability values and reality of their lives. Josh articulated this well when he stated "So what that means is it's very difficult, I think there's potential for a perception of hypocrisy and actual hypocrisy as well" (Hill, 2011, p. 172). I acknowledge that attempting to practice and teach sustainability principles will inevitably be accompanied by tension, contradiction, and even hypocrisy. For teachers in this research, it appears that tensions related to sustainability issues and principles, and their values, beliefs, practices, and pedagogies was a very real part of their lived experience. In this social context it can be difficult to achieve consistency between teachers' beliefs and practices, as I have detailed elsewhere (Hill, 2010b). Notwithstanding the tensions revealed in this research, I contend that developing consistency between what teachers teach and practice through enhancing their philosophies, values, and understandings related to sustainability is an important part of working towards sustainable outdoor education pedagogy. These deep level shifts can, and perhaps should, lay the foundation for other shifts towards sustainability in outdoor education programs and pedagogy. The next subsections detail the two other areas where changes occurred for teachers in this research: resource use, infrastructure and programming, and teaching and learning strategies.

Change in resources, infrastructure, and programming

The second level of change towards more sustainable approaches in outdoor education involves change to resource use, infrastructure, and programming. These areas are pragmatic and might involve thinking critically about and/or making change to things such as: vehicle use, amount and type of equipment used, location of programs or activities, food planning, purchase and preparation, waste minimisation, reuse, recycling and disposal, activity and assessment of content of programs, and sustainable use of buildings and lodges. Scattered through the case study narratives were examples of teachers implementing changes in this area. A tramping/bushwalking trip that Sophie led became focused on more sustainable approaches to food consumption and waste minimisation. This involved students taking action to seek out more sustainable food options. Josh re-wrote course plans to incorporate more aspects of sustainability, which included a specific 16 hour block introducing and exploring sustainability education and how it relates to outdoor learning. Mike looked at how aspects of his program, particularly tramping/bushwalking, could be more sustainable through using a triple-bottom-line analysis. This included students looking at reducing vehicle use and impacts. Rachel introduced new teaching and assessment content into her program which looked critically at outdoor clothing and equipment from sustainability perspectives. This led to students taking action by buying locally made outdoor clothing.

All of the examples above involve taking action. Environmental educators, Jensen and Schnack (1997) and Eames, Barker, Wilson-Hill, and Law (2010) suggest that developing action competence to address environmental and social issues is a key part of educating for a sustainable future. Action competence refers to "the capacity to be able to act, now and in the future, and to be responsible for one's actions" (Jensen & Schnack, 1997, p. 175). Eames, et al. (2010) have conceptualised action competence in an Aotearoa New Zealand context as a "broad range of competencies to guide appropriate action, and the ability, attitudes and values, willingness and opportunity to act . . .

to achieve better outcomes for the environment and sustainability" (Appendix F). The development of action competence in outdoor education must include teachers, instructors, and outdoor education centres, as well as students. The changes made by teachers in this research illustrate the potential for an action focused emphasis on sustainability within outdoor education. I acknowledge that many of these changes may not have occurred if teachers had not increased their understanding of sustainability. For instance, Sophie's shift towards more sustainable food options was strongly influenced by work on developing her understanding of sustainability and her philosophy statement. This highlights the importance of action flowing from increases in understanding when engaging in sustainability education.

Change in teaching and learning strategies

There were several examples of new or modified teaching and learning initiatives, activities, or strategies from teachers in this project. Bryn utilised his relatively well developed knowledge of sustainability to explore how different teaching and learning contexts and activities might engender in his students a greater sense of connection to and care for their environments. Josh implemented teaching and learning activities which focused on human impacts on the planet using the account of environmental degradation and subsequent social collapse on Easter Island (see Diamond, 2005). He then made connections to students' attitudes and practices in outdoor education and how different outdoor learning experiences can be utilised to help people be aware of their impact on the planet. Josh suggested these teaching sessions were well received by students and helped them to think further about the place of sustainability in outdoor education. Sophie made subtle changes to some of her teaching and learning activities to include more place responsive approaches (Wattchow & Brown, 2011), particularly focusing on cultural history and geography of local places with which she and her students interacted. Rachel introduced a variety of new teaching and learning initiatives into her Year 12 outdoor education course through her "Buy New Zealand Made" unit which was based on an education for sustainability achievement standard. She reported that the teaching and learning content and process of this unit appeared to be well received by teachers and students and was an effective way of incorporating sustainability principles and issues into her outdoor education course.

All of the above examples provide evidence of the importance of overtly weaving concepts of sustainability into teaching and learning contexts if outdoor education is to more effectively incorporate sustainability education. Change in the area of teaching and learning strategies provides a significant opportunity for impacting student learning. As detailed by Hattie (2009; 2012) what teachers do and how they do it makes a significant difference to student learning. A key part of this is teacher professional learning and development, and content knowledge. This research offered opportunities for teachers to develop both knowledge and teaching and learning aproaches related to sustainability education. It is important to acknowledge there is no recipe for "doing sustainability" in outdoor education. The teachers in this research all took different approaches to the teaching and learning strategies that they implemented. In all cases these initiatives were grounded in teachers' understanding of sustainability issues and principles and their belief that sustainability was important to include in their teaching program.

Underlying change principles

The change-model for sustainable outdoor education presented in this article is underpinned by seven important principles. In an implicit manner, these principles have guided the changes that teachers made through their involvement in this research. Underlying change principles were established at the beginning of the study drawing from participatory action research, teacher professional learning and development, and sustainability education literature. Throughout the research process these principles were discussed with teachers in the research and in final interviews many of the teachers commented on how these principles helped to make the research effective in bringing about pedagogical change. It is useful to briefly outline the contribution of each principle at the base of the change model here:

Continuous and non-linear: The continuous nature of effective change means it takes place over an extended period of time rather than at a discrete point. Timperley et al. (2007) suggest that attending one-off workshops rarely changes teacher practice significantly and that extended timeframes are more conducive to effective change, although quality use of time is important. The non-linear component of change refers to the action research spiral (Kemmis & McTaggart, 2005) where educators may make changes and then revisit and modify these changes on multiple occasions based on observation and critical reflection.

Collective learning community: Kemmis and McTaggart (2005) also speak of the importance of a collective community to bring about effective change in action research. Timperley, et al. (2007) suggest a professional community of practice is a key aspect of effective professional learning and development.

Action competence focus: As previously discussed, developing action competence is a key component of effective education for sustainability pedagogy and therefore important for sustainable approaches to outdoor education.

Principles of sustainability: This refers to principles offered by theories of sustainability/sustainable development and education for sustainability as discussed in an earlier section of this paper. Although it is acknowledged there are multiple understandings and uses of the term sustainability, there are some key tenets or concepts, such as the three-way interaction of economic, socio-cultural, ecological aspects, which should inform any changes towards sustainable approaches in outdoor education.

Criticality, Judgement, Reflection, and Evaluation: These are key aspects of both action research theory (Kemmis & McTaggart, 2005) and effective professional learning and development (Timperley et al., 2007). Education for sustainability is inherently critical of the unsustainable status-quo, therefore any engagement with sustainability must be accompanied by critical thinking and reflection. The process of evaluation is also an important part of teachers improving their practice and praxis.

Conclusion

As Earl (2007) has argued, teachers' philosophies, values, understandings, and skills, are critical for both student learning and achievement. Clearly what teachers know and do makes a difference to student learning. This is of importance when considering the goals of educating for a sustainable future. Outdoor learning experiences are ideally placed to facilitate learning about and for sustainability; however, if the field of outdoor education is to seriously confront and contribute to addressing social, economic, and environmental sustainability issues, change needs to occur in what teachers know and do. At the heart of this lies pedagogical change which can be both complex and difficult. This article has presented and discussed a model which represents ways that a small group of teachers instituted pedagogical change related to sustainability and their outdoor education programs and practices. For these teachers, change took place at three levels: philosophy, values and understandings, programming and resource use, and finally, teaching and learning strategies. It is at the nexus of these three levels that perhaps the most effective shifts in pedagogy were achieved. This represents the reality that sustainability is not a recipe that can be copied from one educational context to another in a one-size-fits-all mentality. It also reveals the profound ways that sustainability impacts at a personal, philosophical and identity level. Teachers in this research found it difficult to teach for or about sustainability perspectives if they were not somehow personally invested in the broader sustainability project. In plain terms, teachers who seek to educate for a sustainable future need to walk the talk.

The extent to which this research can be generalised to broader teaching and outdoor education professional audiences may be limited. The research approach, upon which this article was based, never claimed to present "the answer" for doing sustainability in outdoor education. Notwithstanding this caveat, I believe that this model provides a useful way of viewing the interrelated and complex ways that pedagogical change might take place for teachers. As the social, economic, and environmental issues that now loom so large in our collective consciousness become increasingly prevalent in the 21st century, teachers everywhere will need to re-consider the purposes of their educational endeavours. The model presented in this article might provide a useful starting point for educators wanting to further develop their ability to educate for a sustainable future. I am mindful that such a model may only provide a framework for change. Specific examples of sustainability initiatives that teachers can implement in their outdoor education programs and practice may also be useful for educators. It is my intent to share some examples of pedagogical change towards more sustainable approaches to outdoor education in a forthcoming article.

Notes

1. Aotearoa New Zealand is used throughout this article to recognise the bicultural foundation of New Zealand whereby Maori and non-Maori (Pakeha) are equal partners based on the Treaty of Waitangi.

References

Australian Bureau of Statistics. (2010a). *Australia's environment: Issues and trends, 2010.* Retrieved from http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyTopic/22DF603EA8680B40CA256A8A00836F8A?OpenDocument

Australian Bureau of Statistics. (2010b). *Measures of Australia's progress, 2010.* Retrieved from http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyTopic/F015C06D6ECDD91CCA25779E001CD737?OpenDocument

Australian Bureau of Statistics. (2011). *Household income and income distribution, Australia, 2009-2010.* Retrieved from http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/6523.0Main%20Features22009-10?opendocument&tabname=Summary&prodno=6523.0&issue=2009-10&num=&view=

Bell, M. (1996). Feminists challenging assumptions about outdoor leadership. In K. Warren (Ed.), *Women's voices in experiential education* (pp. 141-156). Dubuque, Iowa: Kendall Hunt.

Bowers, C. A. (2001). *Education for eco-justice and community*. Athens, Georgia: The University of Georgia Press.

Boyes, M. (2012). Historical and contemporary trends in outdoor education. In D. Irwin, J. Straker & A. Hill (Eds.), *Outdoor education in Aotearoa New Zealand: A new vision for the twentyfirst century* (pp. 26-45). Christchurch, NZ: CPIT.

Brookes, A. (1994). Reading between the lines: Outdoor experience as environmental text. *Journal of Physical Education, Recreation & Dance*, *65*(8), 26-34, 39.

Brookes, A. (2003a). A critique of Neo-Hanian outdoor education theory. Part one: Challenges to the concept of "character building". *Journal of Adventure Education and Outdoor Learning, 3*(1), 49-62.

Brookes, A. (2003b). A critique of Neo-Hanian outdoor education theory. Part two: "The fundamental attribution error" in contemporary outdoor education discourse. *Journal of Adventure Education and Outdoor Learning, 3*(2), 119-132.

Brown, M. (2008). Outdoor Education: Opportunities provided by a place-based approach. *New Zealand Journal of Outdoor Education, 2*(3), 7-25.

Brown, M. (2009). Reconceptualising outdoor adventure education: Activity in search of an appropriate theory. *Australian Journal of Outdoor Education, 13*(2), 3.

Brown, M., & Fraser, D. (2009). Re-evaluating risk and exploring educational alternatives. *Journal of Adventure Education and Outdoor Learning, 9*(1), 67-77.

Carspecken, P. F. (1996). *Critical ethnography in educational research: A theoretical and practical guide.* New York: Routledge.

Christen, M., & Schmidt, S. (2011). *A formal framework for conceptions of sustainability - a theoretical contribution to the discourse in sustainable development.* Sustainable Development, Wiley Online Library. doi: 10.1002/sd.518

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education* (7th ed.). Oxon, UK: Routledge.

Cooper, G. (1994). The role of outdoor education in education for the 21st century. *The Journal of Adventure Education and Outdoor Leadership*, *11*(2), 9-12.

Cosgriff, M. (2008). What's the story? Outdoor education in New Zealand in the 21st century. *New Zealand Physical Educator, 41*(3), 14.

Creswell, J. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* (1st ed.). Upper Saddle River, N.J: Pearson Education / Merrill Prentice Hall.

CSIRO, & Australian Bureau of Meteorology. (2012). *State of the Climate - 2012.* Retrieved from http://www.csiro.au/en/Outcomes/Climate/Understanding/State-of-the-Climate-2012.aspx

Denzin, N. K., & Lincoln, Y. S. (2005). *The Sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.

Department of the Environment Water Heritage and the Arts. (2009). *Living Sustainably: the Australian Government's National Action Plan for Education for Sustainability.* Canberra: Commonwealth of Australia.

Diamond, J. (2005). *Collapse: How societies choose to fail or survive*. London, UK: Penguin.

Eames, C., Barker, M., Wilson-Hill, F., & Law, B. (2010). *Investigating the relationship between whole-school approaches to education for sustainability and student learning.* Wellington: Teaching & Learning Research Initiative.

Earl, L. (2007). Foreword: International. In H. Timperley, A. Wilson, H. Barrar & I. Fung (Eds.), *Teacher professional learning and development: Best evidence synthesis iteration [BES]* (pp. vii-ix). Wellington, NZ: Ministry of Education.

Flannery, T. F. (2005). *The weather makers: the history and future impact of climate change.* Melbourne, Australia: Text Publishing.

Gough, A. (2007). Outdoor and environmental studies: More challenges to its place in the curriculum. *Australian Journal of Outdoor Education, 11*(2), 19-28.

Haluza-Delay, R. (1999). Navigating the terrain: Helping to care for the earth. In J. Miles & S. Priest (Eds.), *Adventure programming* (pp. 445-454). State College, PA: Venture.

Hamilton, C. (2010). *Requiem for a species: Why we resist the truth about climate change.* London, UK: Earthscan.

Hattie, J. (2009). *Visible learning: A synthesis of meta-analyses relating to achievement.* Oxon, UK: Routledge.

Hattie, J. (2012). *Visible learning for teachers: Maximising impact on learning*. Oxon, UK: Routledge.

Higgins, P. (1996). Outdoor education for sustainability: Making connections. *Far Out, 1*(4), 4-11.

Higgins, P. (2009). Īnto the big wide world: Sustainable experiential education for the 21st century. *Journal of Experiential Education, 32*(1), 44-60.

Hill, A. (2009). Outdoor education: What are we educating for? *Ki Waho: Into the outdoors, Spring*(3), 10-13.

Hill, A. (2010a). Connection to place as a central theme for sustainable outdoor education. *New Zealand Journal of Outdoor Education, 2*(4), 26-46.

Hill, A. (2010b). Reflections on beliefs and practices from New Zealand outdoor educators: Consistencies and conflicts. *Australian Journal of Outdoor Education, 14*(1), 30-40.

Hill, A. (2011). *Re-envisioning the status-quo: Developing sustainable approaches to outdoor education in Aotearoa New Zealand.* Unpublished PhD Thesis, University of Otago, Dunedin, NZ.

Hill, A. (2012). Introducing a critical socio-ecological approach for educating outdoors. In D. Irwin, J. Straker & A. Hill (Eds.), *Outdoor education in Aotearoa New Zealand: A new vision for the 21st century* (pp. 38-56). Christchurch: CPIT.

IPCC. (2008). *Climate change 2007: Synthesis report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K and Reisinger, A. (Eds.)]. Geneva, Switzerland: IPCC.

Irwin, D. (2008). Weaving the threads: Challenges encountered while educating for sustainability in outdoor education. *New Zealand Journal of Outdoor Education, 2*(3), 36-53.

Irwin, D. (2010). *Weaving the threads of education for sustainability and outdoor education.* Unpublished PhD Thesis, University of Canterbury, Christchurch, NZ.

Jacobs, M. (1999). Sustainable development as a contested concept. In A. Dobson (Ed.), *Fairness and futurity: Essays on environmental sustainability and social justice* (pp. 21-45). New York: Oxford University Press.

Jensen, B. B., & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research, 3*(2), 163 - 178.

Jucker, R. (2002). "Sustainability? Never heard of it!" Some basics we shouldn't ignore when engaging in education for sustainability. *International Journal of Sustainability in Higher Education, 3*(1), 8-18.

Kemmis, S., & McTaggart, R. (2005). Participatory action research: Communicative action and the public sphere. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 559-602). Thousand Oaks, CA: Sage.

Kincheloe, J., & McLaren, P. (2005). Rethinking critical theory and qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 303-342). Thousand Oaks, Ca: Sage.

Loynes, C. (1998). Adventure in a bun. *The Journal of Experiential Education, 21*(1), 35.

Lugg, A. (1999). Directions in outdoor education curriculum. *Australian Journal of Outdoor Education, 4*(1), 25-32.

Lugg, A. (2007). Developing sustainability-literate citizens through outdoor learning: Possibilities for outdoor education in higher education. *Journal of Adventure Education & Outdoor Learning, 7*(2), 97-112.

Martin, P. (1999). Critical outdoor education and nature as friend. In J. Miles & S. Priest (Eds.), *Adventure programming* (pp. 463-471). State College, PA: Venture.

Martin, P. (2008a). Outdoor education in senior schooling: Clarifying the body of knowledge. *Australian Journal of Outdoor Education, 12*(1), 13.

Martin, P. (2008b). Teacher qualification guidelines, ecological literacy and outdoor education. *Australian Journal of Outdoor Education, 12*(2), 32-38.

Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: synthesis.* Washington, DC: Island Press.

Monbiot, G. (2007). *Heat: How we can stop the planet burning.* London, UK: Penguin Books.

Nicol, R. (2002). Outdoor education: Research topic or universal value? Part one. *Journal of Adventure Education & Outdoor Learning, 2*(1), 29 - 41.

Nicol, R. (2003). Outdoor education: Research topic or universal value? Part three. *Journal of Adventure Education & Outdoor Learning, 3*(1), 11 - 27.

Neumayer, E. (2003). *Weak versus strong sustainability: Exploring the limits of two opposing paradigms* (2nd ed.). Cheltenham, UK: Edward Elgar.

O'Connell, T., Potter, T., Curthoys, L., Dyment, J., & Cuthbertson, B. (2005). A call for sustainability education in post-secondary outdoor recreation programs. *International Journal of Sustainability in Higher Education, 6*(1), 81-94.

Orr, D. (2004). *Earth in mind: On education, environment, and the human prospect.* (10th Anniversary ed.). Washington, DC: Island Press.

Parliamentary Commissioner for the Environment. (2004). *See Change: Learning and education for sustainability*. Wellington, NZ: PCE.

Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Payne, P. (2002). On the construction, deconstruction and reconstruction of experience in 'critical' outdoor education. *Australian Journal of Outdoor Education, 6*(2), 4-21.

Payne, P., & Wattchow, B. (2008). Slow pedagogy and placing education in post-traditional outdoor education. *Australian Journal of Outdoor Education, 12*(1), 25.

Plumwood, V. (2002). *Environmental Culture: The ecological crisis of reason.* London: Routledge.

Rathzel, N., & Uzzell, D. (2009). Transformative environmental education: a collective rehearsal for reality. *Environmental Education Research, 15*(3), 263 - 277.

Shiva, V. (2008). *Soil not oil: Environmental justice in a time of climate crisis.* New York: South End Press.

Statistics New Zealand. (2009). *Measuring New Zealand's progress using a sustainable development approach: 2008.* Wellington: Statistics New Zealand.

Sterling, S. (2010). Learning for resilience, or the resilient learner? Towards a necessary reconciliation in a paradigm of sustainable education. *Environmental Education Research, 16*(5-6), 511-528.

Stewart, A. (2004). Decolonising encounters with the Murray River: Builiding place responsive outdoor education. *Australian Journal of Outdoor Education, 8*(2), 46-55.

Sustainable Aotearoa New Zealand Incorporated. (2009). *Strong sustainability for New Zealand: Principles and scenarios.* Wellington, NZ: Nakedize.

Tasmanian Qualifications Authority. (2012). *Food, hospitality & personal services courses.* Retrieved from http://www.tqa.tas.gov.au/2602

Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Teacher professional learning and development: Best evidence synthesis iteration [BES].* Wellington, NZ: Ministry of Education.

UNFCCC. (2011). *National greenhouse gas inventory data for the period 1990-2009.* Retrieved from http://unfccc.int/resource/docs/2011/sbi/eng/09.pdf

United Nations Environment Programme. (2007). *GEO4 global environment outlook: Summary for decision makers.* Retrieved from http://www.unep.org/geo/geo4.asp

Warren, K. (1998). A call for race, gender, and class sensitive facilitation in outdoor experiential education. *The Journal of Experiential Education, 21*(1), 21.

Wattchow, B. (2008). Moving on an effortless journey: Paddling, river-places and outdoor education. *Australian Journal of Outdoor Education, 12*(2), 12-23.

Wattchow, B., & Brown, M. (2011). *A pedagogy of place: Outdoor education for a changing world.* Clayton, Victoria, Aus: Monash University Press.

Wilkinson, R., & Pickett, K. (2009). *The spirit level: Why greater equality makes societies stronger.* New York: Bloomsbury.

Williams, C., & Millington, A. (2004). The diverse and contested meanings of sustainable development. *The Geographical Journal, 170*(2), 99-104.

World Commission on Environment and Development. (1987). *Our common future.* Oxford, UK: Oxford University Press.

Zink, R. (2003). Abseiling at 5, rafting at 10, what do we do with them when they are 15? Why pursuits might seem like an obvious choice for outdoor education? *New Zealand Journal of Outdoor Education, 1*(2), 56-62.

Zink, R. (2010). Asking 'Who are you?' when going into the wild: moving beyond an individualized form of outdoor education. *Journal of Adventure Education & Outdoor Learning, 10*(1), 19-32.

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