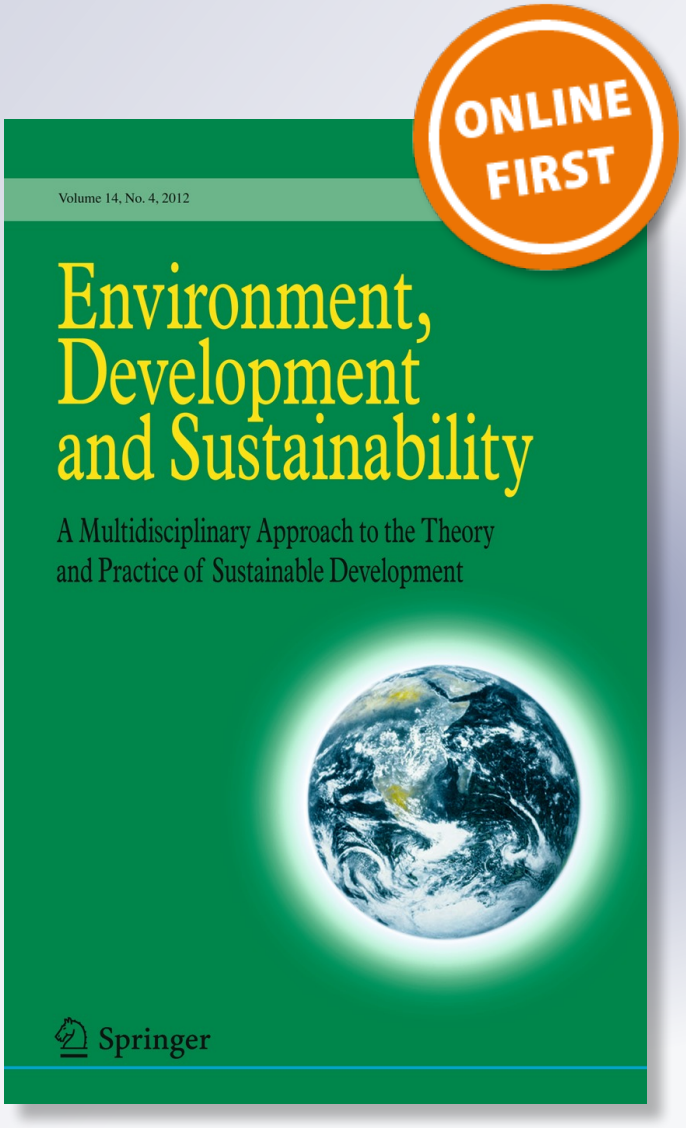
Evaluating education for sustainable development (ESD): using Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EAATSD) scale

Helen Kopnina

Environment, Development and Sustainability
A Multidisciplinary Approach to the Theory and Practice of Sustainable Development

ISSN 1387-585X

Environ Dev Sustain
DOI 10.1007/s10668-012-9395-z



Springer

Environ Dev Sustain
DOI 10.1007/s10668-012-9395-z

Evaluating education for sustainable development (ESD): using Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EAATSD) scale

Helen Kopnina

Received: 15 June 2012 / Accepted: 22 September 2012

Abstract With the emergence of education for sustainable development (ESD), robust literature on ethics and ESD has emerged; however, ecocentric perspective developed within environmental ethics is marginalized in current ESDebate. The questions discussed in this article are as follows: Why is the distinction between anthropocentric and ecocentric view of environment salient to ESD? How can this distinction be operationalized and measured? Until now, little has been done to address complement quantitative studies of environmental attitudes by qualitative studies, exploring the sociocultural context in which ecocentric or anthropocentric attitudes are being formed. Neither of existing scales engaged with the interface between environmental ethics and sustainable development. This article will discuss ESD in the context of environmental ethics and present the results of the case study conducted with the Dutch Bachelor-level students. Results of qualitative evaluation of the scale measuring ecocentric and anthropocentric attitudes will be presented, and the new Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EAATSD) scale will be proposed.

Keywords Anthropocentrism · Ecocentrism · Environmental education (EE) · Education for sustainable development (ESD) · Environmental ethics · Sustainable development

1 Introduction

Based on the emerging evidence of the uncanny correlation between the escalating rates of global economic growth and environmental degradation, environmental education (EE) was to address global trends in population, resource and energy consumption, pollution and species extinction (Stapp et al. 1969). Emerging from The Club of Rome's *The limits to*

H. Kopnina (✉)
The Hague University of Applied Science, The Hague, The Netherlands
e-mail: alenka1973@yahoo.com; h.kopnina@hhs.nl

H. Kopnina
Barentszstraat 144, 1013 NS Amsterdam, The Netherlands

Published online: 09 October 2012

growth (Meadows et al. 1972), the United Nations Environment Program (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) produced *The Belgrade Charter—A Global Framework for Environmental Education*. EE grew to have a lot of meanings and applications (for reviews, see Fensham 1978; Smith 1992; Sauvé 1996; Palmer 1998), but the core of it can be summarized in the words of the Belgrade Charter, with EE aiming to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (McKeown and Hopkins 2003; Reid and Scott 2006; Wals 2007).

A Decade of Education for Sustainable Development or DESD (2005–2014) was declared by the United Nations. The emergence of ESD was hailed by some as a progressive (although not necessarily 'positive') transition in the field of EE (Smyth 1995; Stevenson 2006; Kemp and Martens 2007). The original aim of EE has recently been defined more broadly to describe the goals of higher education in fostering the development of creative, resourceful, independent, critical individuals and, simultaneously, fulfilling a range of broad policy goals (Gough and Scott 2007). Proponents of ESD have pointed out that orientation toward environmental problems is negative and tends to underplay human capacity for solving both social and environmental problems. ESD was meant to harmonize economic, environmental and social issues (e.g., Hicks 2007). The general message of the limits to growth advocates that biodiversity protection requires drastic measures, including the halt of continuous economic growth and fostering 'steady state economy' and the curbing of human population, proved to be unpalatable to political leaders (Eckersley 2012). While empirical evidence is accumulating to support the prediction of the limits to growth model (e.g., Hall and Day 2009), the discourse of limits to growth seems overshadowed by the optimism of 'sustainable development.'

Huckle (1983) drew a useful distinction between EE as education *for* and *about* the environment. More recent articles focus on the debates between those that propagate an instrumental approach to education (such as education *for* sustainable development or EfS) and those that take a more normative or liberal approach opening up ESD to debates (e.g., Jickling 1992; Fien 2000). Some of these debates touched upon the question as to what extent only the effect on human welfare should be the basis of ESD, and whether the consequences for non-human species should be taken into account (e.g., Stevenson 2006). While SD emphasizes poverty eradication, according to some critics, it is less concerned with issues associated with expansion of human population, agriculture and industry and destruction of pristine habitats that accompany increasing economic demand (Lotz-Sisitka 2004). Sustainable development framework may be inadequate in addressing issues such as biodiversity loss because

> Mass extinction could conceivably come to pass without jeopardizing the survival of the human species; and because people might be materially sustained by a technologically biora made to yield services and products required for human life (Crist 2003:65).

The ESDebate initiated by The World Conservation Union IUCN (Hesselink et al. 2000) consisted of an online debate between EE-experts about the possibilities and constraints of ESD in relation to EE. More recently, the Mid-DESD review (UNESCO 2009) and UNEP report (2012) had a whole section on this relationship. In the vast literature addressing the paradoxes and contradictions of sustainable development in general and EE/ESD in particular, anthropocentric bias is only mentioned in passing, as one of the many issues.

Publications in journals associated with EE, such as Environmental Education Research (EER), Journal of Environmental Education (JEE), Canadian Journal of Environmental Education (CJEE) as well as journals that are more associated with ESD, for example, Journal of Education for Sustainable Development (JESD) and International Journal of Sustainability in Higher Education, reveal a degree of 'hybridity' in scholars' and practitioners' approach to these fields. Diversity of approaches and plurality of conceptualization of EE/ESD mask the 'elephant in the room,' namely robust anthropocentric bias (Scott and Gough 2004; Gonzalez-Gaudiano 2005; Kopnina 2012a, 2012b).

This article will address the question: How can insights from environmental ethics and paradoxes of sustainable development be addressed? How students' perception of these paradoxes can be operationalized and measured? Why is distinction between anthropocentric and ecocentric view of environment salient to ESD? How can this distinction be operationalized? After discussing ESD in the context of environmental ethics, the case study conducted with the Dutch Bachelor-level students will be presented. Results of qualitative evaluation of the scale measuring ecocentric and anthropocentric attitudes will be used in order to develop a new revised scale for testing ecocentric orientations, called Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EA-ATSD). Consequently, preliminary qualitative testing of EAATSD scale will be discussed and recommendations for further testing of the scale's validity will be made.

2 Ethics and ESD

Traditionally, ethics dealt with relations and conflicts between individuals and relations between individuals and society, assessing both the individual good and the common good. Aldo Leopold (1949) noted that throughout the history of ethics, there has been an underlying theme of moral extensionism, both from individual to society in traditional ethics and from humans to other species in what was termed Land ethics. Land ethics arises out of a criticism of the conventional way of viewing the land in purely economic terms, since most members of the land community do not have an economic value and there is no grounding for prohibiting or even restricting their destruction. In an economic capture approach to biodiversity conservation, for example, promoted by powerful international organizations such as United Nations or The World Bank, biodiversity is preserved for the sake of 'natural resources' as it provides 'ecosystem services' useful for humans (e.g., World Bank 2012). According to the Land ethics perspective, such an approach might be inadequate in addressing the loss of biodiversity that is not directly 'useful' to humans. Indeed,

> If the world's air is clean for humans to breathe but supports no birds or butterflies, if the world's waters are pure for humans to drink but contain no fish or crustaceans or diatoms, have we solved our environmental problems? Well, I suppose so, at least as environmentalism is commonly construed. That clumsy, confused, and presumptuous formulation 'the environment' implies viewing air, water, soil, forests, rivers, swamps, deserts, and oceans as merely a milieu within which something important is set: human life, human history…(Quammen 1998, Quoted in Crist 2003:66).

habitats like wetland areas, dunes and deserts are considered 'wasteland'; a variety of plants not used for consumption or esthetic enjoyment are branded as 'weeds'; and species of wild animals that trample agricultural lands are seen as 'pests.' As such, economically 'useless' land and species have no moral rights.

Leopold proposes a fundamental shift in the criterion of moral consideration, with the direct result of an extension of the boundaries of the moral community. Instead, in the ecological outlook, which recognizes that all species are ecologically valuable, since 'A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise' (Leopold 1987:224–225). Once evolved, the Land ethic is not likely to lead to ending of alteration, management and use of 'natural resources,' but could also be recognized as a living organism (Lovelock 2009) or as a foundation of the surrounding ecosystems or the biotic communities (Naess 1973).

J. Baird Callicott noted that Leopold's Land ethic was not well received as the claim that the 'Land' is deserving of some kind of moral respect is a radical departure from conventional anthropocentric ethics. Callicott (1999) claimed that conventional extensionism is limited by certain fundamental ideas; such as that only humans have moral standing. Drawing on the work of ecologists and environmental sociologists such as Leopold and Callicott, social psychologists Stern et al. (1993) distinguished between the self-interest, social altruism (altruistic humanism) and biospheric altruism basis of environmental concern. Self-interest and social altruism come from caring about the environment because it influences us and those we care about, which can be broadened from one's self and family to a larger community. While the first two approaches are anthropocentric and assign only instrumental values to other species or the environment, biospheric altruism, like Leopold's Land ethic, is an extension of concern beyond the boundary of humans.

Anthropocentric thought, be it self-interest or altruistic humanism (caring for other people), not only entails human moral superiority vis-à-vis other species, but also ethical consideration is exclusively confined to human beings (Ehrenfeld 1978). The values associated with nature are instrumental, and non-human beings have no intrinsic value outside their use to humans (Lundmarck 2007).

Taylor (1986) has argued that all living things have an inherent value and so are deserving of moral consideration. For Taylor, all that is required to have inherent value is to be alive—essentially, striving toward staying alive. In this view, the good or well-being of all individual living things is of primary concern. This implies that all living things, and not only humans, have inherent value and that all living things have a good of their own and can be benefited or harmed. Following from this, there is no reason to think that our special set of attributes and capabilities is somehow superior—to do so is analogous to the hierarchical class structure artificially imposed throughout the human history. Thus, human interests count for not more than the interests of any other living thing or system.

Sterba (1994) outlines some conditions of this argument, arguing that it can be morally permissible to show preference for human interests on self-defense grounds or in order to meet basic needs. However, it is impermissible to show preference to economic interests such as clearing land for agriculture when the goal of enrichment is disproportionate to the harm caused to other species.

Similar to Taylor, Goodpaster (1978) argues for a biocentric or 'life centred' environmental ethic, arguing that restricting moral consideration to either humans only or to sentient beings only is not convincing. Unlike Taylor, however, Goodpaster argued that although all living things have intrinsic value, there are degrees of moral worth—in other words, some animals are indeed 'more equal than others.' Goodpaster implied that anything that is either rational or sentient will have the relevant moral standing, thus distinguishing between *moral rights*, *moral consider ability* and *moral significance*.

Naess (1973) distinguished between 'deep' and 'shallow' ecology, whereas deep ecology involved a shift from anthropocentric concerns for the environment such as pollution and resource depletion to 'deeper' non-anthropocentric concerns for nature for its

own sake. Naess propagated biospherical egalitarianism—'equal right to live and blossom' (Naess 1973: 98).

From this, ecocentrism, a new way of seeing ourselves in and on this Earth, has emerged. Ecocentrism has been described as post-humanism, for it transfers the reality-spotlight from humanity to the Ecosphere, from the part to the whole (DesJardins 2005). The outside-the-human focus brings with it new standards for thought, conduct and action on such seemingly intractable problems as world population, urbanization, globalization, maintenance of cultural diversity and ethical duties to the Ecosphere with its varied natural ecosystems and their wild species (http://www.ecospherics.net).

Biospheric altruists feel a moral imperative to care about 'wild' nature, independent of its material or esthetic value to humans (e.g., Thompson and Barton 1994; Stern and Dietz 1994). Studies of anthropocentric and ecocentric attitudes have indicated that people with ecocentric orientation are much more likely to actually act upon their values, attitudes and beliefs in order to protect the environment than those with anthropocentric orientations (Kortenkamp and Moore 2001; Karipak and Baril 2008).

Conservation psychologists Dietz et al. (2005) have acknowledged the fact that there is a range of ecocentric and anthropocentric positions and that generalized altruism may blend the distinctions between them.

3 Implications for ESD

Can population growth and economic welfare be sustained without further compromising the needs of the biosphere and its capacity to accommodate human needs? According to many theorists, economic development resulting in population and consumption growth might have created current ecological problems in the first place (e.g., Spring 2004). Another question discussed in the current literature is whether SD discourse and ESD are adequate for addressing urgent issues such as the rapid extinction of species as a result of destruction of habitats or the expansion of agriculture and industrial areas (Rees 1992).

Studies indicate that only a biospheric altruism centered approach leads to sacrifice rather than quality-of-life solutions to environmental problems (Kaplan 2000). Political scientists (e.g., Ferry 1995; Eckersley 1997) and conservation psychologists (e.g., Clayton 2000; Schultz 2001) have argued that if deep green perspective is taken into account, environmental justice should also involve issues that embrace multispecies stakeholders, not just equal distribution of environmental risks and benefits, as charities such as Oxfam would propagate. Sustainable development framework may also be inadequate in addressing even the most basic of animal (let along plant) rights. *Mass* 'production' and consumption of animals by growing human population and poor treatment of form animals are rarely seen as serious issues when sustainable development is promoted by organizations such as UNESCO. Liddick, in his exploration of environmentalist movements, notes:

> Aren't the medical and health needs of humans, for example, more important than the suffering of a rodent? Animal liberationists respond that most people are hopelessly blinded by speciesism and that animal suffering to benefit humans is morally wrong (2006:81).

Jickling (1992) argues that he wants students of ESD to be aware of the fact that there are ecocentric as well as anthropocentric views of the environment. In their chapter, 'Key issues in sustainable development and learning,' Scott and Gough (2004) mention anthropocentrism as one of the characteristics of the ESD discourse.

While there is robust literature on ethics and ESD (e.g., Jickling et al. 2006), environmental ethics and especially deep green perspective on environment is marginalized in current ESDebate. The workbook exploring ethics for education prepared for UNEP (Jickling et al. 2006: 1) invites stakeholders to 'think outside the box' and to 'creatively re-imagine the future with new possibilities' as well as 'to think about how ethical questions are being discussed in different places and cultures around the world.' However, aside from in passing references,[1] ESDebate does not explicitly discuss the marginalization of deep green perspective evident from priority areas outlined by main financers of SD. While combating social problems are acknowledged in all ESD objectives, speciesism (discrimination against other species) is considered to be a non-issue (Bolscho and Hauenschild 2006). In fact, recent articles call for 'humanizing' education by highlighting the ways in which environment '*benefits* humans, and focuses on the social dimensions of environmental problems and their solutions' (Strife 2010:180). Publications in aforementioned journals reveal scarcity of ecocentric and particularly deep green perspectives espoused by earlier forms of nature and conservation education (e.g., Author 2012).

Main financers of the (sustainable) development programs, such as the International Monetary Fund (IMF) and the World Bank, outline a number of priorities in their related spending, often focused on social and economic rather than environmental priorities. Subjects discussed under the header of 'environment' are exclusively concerned with (preservation of) natural resources and fair distribution of material benefits. International organizations such as IUCN and UNEP are mainly focused on equity in the distribution of natural resources, with IUCN seeking to 'influence, encourage and assist societies throughout the world … to ensure that any use of natural resources is equitable' (Hesselink et al. 2000). A recent UNEP report on environment *for* (sic!) development emphasizes six themes: climate change (with particular emphasis on developing countries); Disasters and Conflicts; Ecosystem Management; Environmental Governance; Harmful Substances; and Resource Efficiency (UNEP 2012). Similarly, leading international social and health focus charities *discuss* 'environment' in relation to urban pollution, food safety and energy supply as biodiversity in relation to agriculture (e.g., Oxfam 2012). Protection of environment independent of human interests is rarely discussed.[2] While dominant sustainable development discourse takes ethical considerations of racial and gender equality and economic equity as starting points, species equality would be the focal point of 'ecologically enlightened' curriculum.[3] Environmental anthropology literature offers many

[1] For example, Jickling (1992:6) states, without further elaborating 'I would like my children to… realize that there is a debate going on between a variety of stances, between adherents of an ecocentric worldview and those who adhere to an anthropocentric worldview. I want my children to be able to participate intelligently in that debate'.

[2] As many educational curriculum may be subject to corporate 'sponsorship' and the market-oriented beneficiaries (Crossley and Watson 2003; Jickling and Wals 2007), and education is increasingly seen as a provider of graduates with the transferable competencies enabling students to operate in the global economy (Wesselink and Wals 2011), the question of who develops national-level ESD curriculum becomes quite complex. It is not so much the question of whether EE has 'taken over' ESD and banished ecocentric perspectives, but rather a question of shift in education in general reflecting a change in political climate which seems to marginalizing the importance and intrinsic value of nature and environment. While it may be argued that ESD is 'inspired' by international initiatives such as the UNESCO, as well as the work of charitable NGO's (Blum 2009), its financers at the national levels could be government ministries concerned with 'development', as well as 'commercial partners' involved in development enterprise through their trade operations.

[3] Indeed, racism in this view might be no more salient than conflicts between different subspecies of hyenas, and sexism could be compared to concerns about the slaughter of praying mantis male by post-coital female.

examples of traditional, preindustrial societies' environmental learning and ecocentric worldviews, passed on through generations (Black 2010; Anderson 2012; Baines and Zarger 2012). In contrast to traditional ecocentric learning, ESD follows the prescriptions of 'official' UNESCO guidelines on learning to manage the environment and to develop competencies to preserve natural resources.[4]

A number of recent articles on ESD emphasize the economic and social development, with environmental protection coming as last, and only as it is relevant to human interests. For example, recent studies of curriculum developed for elementary schools in Iceland (Jóhannesson et al. 2011) and Sweden (Ärlemalm-Hagsér and Sandberg 2011) practically exclude non-anthropocentric environmental concerns. In education, presenting environmental problems as the issue of depletion of natural resources implies that protection of environment is seen as only important in as far as it serves human interests and that students are not taught to recognize the intrinsic value of the nature (Orr 1994). If this approach is reflected in ESD, it is a far cry from teaching students about the necessity of restoring the ecological equilibrium and recapturing the 'biocentric outlook on nature'.

SD espouses the oxymoronic goal of both promoting development through economic growth and redistribution of wealth and keeping the health of the ecosystem intact (Rees 1992; Mander and Goldsmith 1996). Critiques of top–down development projects have noted that foreign aid and structural adjustment programs may have caused more harm than good in exacerbating global inequalities and have largely failed in addressing ecological crises (e.g., Goldsmith 1996; Shiva 2000; Lee 2001; Lewis 2005; Bodley 2008; Oliver-Smith 2010). In fact, it seems that ESD may be distracting students from addressing 'environment' by emphasizing socioeconomic issues at the expense of ecological environmental issues.

How can these paradoxes and insights from environmental ethics be addressed when evaluating ESD curriculum? The following section describes the case study in the Netherlands: the adapted anthropocentric and ecocentric scale to evaluate students' perception of the relationship between environmental and social issues.

4 Case study

In the Netherlands, ESD programs were set up in a number of Universities (UNESCO 2011); however, this study examines the second- and third-year Bachelor students of the

Footnote 3 continued
As Paul Watson (http://www.ecospherics.net/pages/wonw.htm) has pointed out, racism and sexism are not relevant to the survival of the biosphere, while speciesism does indeed endanger the teleological centers of life of other species. In fact, issues concerned with sexism and racism are rarely as extreme as the very physical survival of individuals or subspecies, which is the case in anthropogenically induced species' extinctions.

[4] There are notable exceptions to anthropocentric bias in ESD. One initiative that has been developed during the DESD that shows that these generalizations do not hold is a special issue of *The Journal of Education for Sustainable Development* the Earth Charter (Volume 4, Number 2, 2010), do emphasized ecological values and ethics and included articles referencing non-anthropocentric views of biodiversity (e.g. Sarabhai 2010). In this special issue, Kim (2010:307) discusses the ESD program inspired by the Earth Charter principles of Florida Gulf Coast University: "Here, humanities education becomes eco-education through exploring the relationships of humans not only to their internal worlds but also to their external worlds. In the course, students and instructors explore traditional definitions of ethics and sustainability, which sets the stage for engaging with the Earth Charter and thinking beyond anthropocentric views. The study of literary words through the lens of the Earth Charter allows students the opportunity to broaden their listening to include the forgotten voices of the natural world and of our elders."

Hague University of Applied Science (HHS) who does not have any special ESD programs. Twenty-eight students between the ages of 22 and 24 were selected from International Business Management Studies (IBMS) department, drawn from different elective minors to ensure heterogeneity of responses (Finance, Areas in Marketing and Sustainable Business minors). The students were asked to complete the Ecocentric and Anthropocentric Attitudes toward the Environment scale (EAATE) which will be described in more detail below.

The study based on completion of EAATE scale and in-depth interviews about the items on the scale was conducted between January and April 2012, with the follow-up qualitative testing of the EAATSD scale conducted in September 2012. The results of this study were not used to establish the statistical correlations but intended as an opening for the exploratory qualitative testing of the comprehension and evaluation of items on the original scale and for instructing researchers as to possible revisions to the scale. Following completion of the scale, in-depth interviews were conducted with the students on the subjects ranging from 'sustainable development' (with the researcher stimulating the students to talk about their comprehension of the term with probing anthropocentrism–ecocentrism continuum (results discussed below).

These interviews served as a basis for the formation of the alternative measuring scale that addresses anthropocentric views of students. Generally, research studies including semistructured or in-depth interviews cannot be used to make statistical generalizations about the entire population from a small non-probability sample. In semistructured interviews, a 'high level of validity may be achieved where these are conducted carefully due to the scope to clarify questions, to probe meanings and to be able to explore responses and themes from the variety of angles' (Saunders et al. 2012:384). The resulting revised scale yet needs to be tested for statistical reliability, which the author of the article is currently involved in. The results of this study will be reported in the follow-up publication.

5 Adapted Ecocentric and Anthropocentric Attitudes toward the Environment scale (EAATE)

Since the early nineteen seventies, many different measuring scales were developed to test environmental attitudes. Maloney et al. (1975) developed a scale of adult environmental attitudes based on measurements of behavioral commitments, affective states and knowledge. The New Ecological Paradigm or NEP scale for measuring environmental attitudes, first developed in the seventies and revised (Dunlap 2008), became a widely used measure of people's shifting worldviews from a human dominant view to an ecological one. The general environmental behavior (GEB) was developed by Kaiser and colleagues (Kaiser 1998). More recently, these measurements were complemented by Connectedness with Nature and Environmental Identity scales; Environmental Attitudes scales; and Environmental Behavior and Environmental Concern scales (for an excellent resource on these and other scales, see Research Tools of Conservation Psychology website: http://www.conpsychmeasures.com/CONPSYCHMeasures/).

In comparing results of many different surveys tapping environmental values, Dietz et al. (2005) reflected that the survey items that are intended to tap ecocentrism and anthropocentrism sometimes load on the same factor in factor analyses, indicating that survey respondents are treating them as one thing, a kind of generalized altruism, rather than as two distinct values (Stern et al. 1999). That is, those who care about the environment also care about other people. However, Dietz et al. (2005:358) note through

extensive review of literature, most studies do find this distinction. Un till now, little has been done to address these surveys by qualitative studies, exploring the sociocultural context in which the range of ecocentric or anthropocentric attitudes are being formed. Neither of the above scales addressed deep ecology values or explicitly engaged with the interface between environmental ethics and sustainable development (Lundmarck 2007; Riley Dunlap, personal communication 2011; Kopnina 2011, 2012c).

Up to date, the only scale that explicitly addresses environmental ethics is the Ecocentric and Anthropocentric Attitudes toward the Environment scale (EAATE). Thompson and Barton (1994) developed the EAATE consisting of 33-items (presented below) which has been used for scholars to develop theories pertaining to models of justice in the environmental debate (e.g., Clayton 2000), as well as studies of moral reasoning and concern for the environment (e.g., Karipak and Baril 2008). The author has thus chosen this scale as a starting point as it is most suitable for addressing moral dilemmas and paradoxes inherent in sustainable development debate. However, as shortcomings of the scale were identified, the need for developing a revised scale was identified and will be discussed below.

In the original scale, respondents are asked to 'rate the degree to which you agree or disagree with the following statements.' This scale is administered using a 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). The EAATE is composed of three subscales: *Ecocentric*, *Anthropocentric* and *Environmental Apathy*. A mean score can be taken for each subscale, ranging from 1 to 5. The *Ecocentric* subscale consists of 12 items (items: 1, 2, 5, 7, 12, 16, 21, 26, 28, 30, 32 and 33). This subscale measures an appreciation for nature, separate from the gains provided for humans. High scores on the *Ecocentric* subscale indicate a greater appreciation for environment and positive physiological changes as a result of being in nature. The *Anthropocentric* subscale consists of 11 items (items: 4, 8, 11, 13, 14, 22, 23, 24, 27, 28 and 31). This subscale measures an appreciation for nature, but in respect to the quality of life and survival of humans. High scores on the *Anthropocentrism* subscale indicate an egoistic concern as in how the environment affects the quality of life for humans. The *Environmental Apathy* subscale consists of nine items (items: 3, 6, 9, 10, 15, 17, 18, 20 and 25). This subscale measures a disbelief in the reality of environmental issues and a lack of interest in these issues. High scores on the *Environmental Apathy* subscale indicate their strong apathy for environmental issues.

1. One of the worst things about overpopulation is that many natural areas are getting destroyed for development.
2. I can enjoy spending time in natural settings just for the sake of being out in nature.
3. Environmental threats such as deforestation and ozone depletion have been exaggerated.
4. The worst thing about the loss of the rain forest is that it will restrict the development of new medicines.
5. Sometimes it makes me sad to see forests cleared for agriculture.
6. It seems to me that most conservationists are pessimistic and somewhat paranoid.
7. I prefer wildlife reserves to zoos.
8. The best thing about camping is that it is a cheap vacation.
9. I do not think the problem of depletion of natural resources is as bad as many people make it out to be.
10. I find it hard to get too concerned about environmental issues.
11. It bothers me that humans are running out of their supply of oil.
12. I need time in nature to be happy.

13. Science and technology will eventually solve our problems with pollution, overpopulation, and diminishing resources.
14. The thing that concerns me most about deforestation is that there will not be enough lumber for future generations.
15. I do not feel that humans are dependent on nature to survive.
16. Sometimes when I am unhappy I find comfort in nature.
17. Most environmental problems will solve themselves given enough time.
18. I don't care about environmental problems.
19. One of the most important reasons to keep lakes and rivers clean is so that people have a place to enjoy water sports.
20. I'm opposed to programs to preserve wilderness, reduce pollution and conserve resources.
21. It makes me sad to see natural environments destroyed.
22. The most important reason for conservation is human survival.
23. One of the best things about recycling is that it saves money.
24. Nature is important because of what it can contribute to the pleasure and welfare of humans.
25. Too much emphasis has been placed on conservation.
26. Nature is valuable for its own sake.
27. We need to preserve resources to maintain a high quality of life.
28. Being out in nature is a great stress reducer for me.
29. One of the most important reasons to conserve is to ensure a continued high standard of living.
30. One of the most important reasons to conserve is to preserve wild areas.
31. Continued land development is a good idea as long as a high quality of life can be preserved.
32. Sometimes animals seem almost human to me.
33. Humans are as much a part of the ecosystem as other animals.

This measurement scale was administered to twenty-eight students from HHS. Consequently, the students were asked to reflect upon their comprehension of the items. The students were also asked to guess after a short introduction by the researcher—which items fell within ecocentric, anthropocentric or apathy categories. In the follow-up in-depth interviews, students were asked to reflect on the notion of 'sustainable development,' as well as asked to ponder the anthropocentrism–ecocentrism continuum, their own environmental values and individual items on the scale.

6 Results of interviews: qualitative testing of EAATE scale

Interviews with students have indicated that a number of revisions needed to be made in order to address the following issues:

Some items in the original EAATE scale were found to blend anthropocentric and ecocentric items, while students felt that anthropocentric and ecocentric values were sometimes closely related (concerns for the quality of water, for example, could be seen as both anthropocentric—not safe for humans to drink—and ecocentric—concern for the water itself or species that live there). However, in line with Dietz et al. (2005) analysis of similar studies, students also felt that there was a difference—to quote one interviewee—

between 'caring about people… and about animals,' *or to* use another quote 'concern for what we need and concern about what needs us.'

Some items were felt to be confusing as they tested cognitive knowledge about human dependency on resources rather than affective or emotional state. For example, in the interview discussing item 27, the student reflected: 'I can agree with this statement… but that's because *I know* we need to preserve nature to enjoy (high quality) life… Another question is—is this the *only* reason why we need to preserve nature? And how do I *feel* about nature being destroyed. I think it matters if you ask this question.'

The adapted scale suitable for testing in ESD items excluded items that were not directly related to SD or raised questions as to the validity and reliability of measurement.[5] Specifically, the following items were excluded: item 2, 12, 16 and 28 (as these items were interpreted as anthropocentric by some students as they are related to personal benefit from being in nature); 7,[6] 8,[7] 16,[8] 17,[9] 32[10] and 33[11] (as these were not found to correspond to either ecocentric or anthropocentric values); 20 (this was found to be a double-barred question[12]); and 27 (this item was found to be confusing as it tested cognitive knowledge about human dependency on resources rather than affective or emotional state). Some items were changed to be more suitable for testing ecocentric and anthropocentric values associated with sustainable development.[13] Due to the helpful reviewer's comments[14] on the first draft of this article, two extra items have been added at the end of the list.

[5] In view of these findings, originally two studies were reported by Thompson and Barton (1994) to develop the Ecocentric and Anthropocentric Attitudes towards the Environment scale (EAATE) will need to be further tested. The study was conducted at the Logan International Airport in Boston. One hundred and twenty-nine respondents (58 females and 51 male) completed the questionnaires, ranging in age from 19 to 82. In study 1, Cronbach's alpha ranged from .58 to .83 (*Ecocentrism* = .63; *Anthropocentrism* = .58; and *Environmental Apathy* = .83). In study 2, Cronbach's alpha ranged from .67 to .78 (*Ecocentrism* = .78; *Anthropocentrism* = .67; and *Environmental Apathy* = .82).

[6] Some students who were generally sympathetic to ecocentrism actually preferred zoos—since they have never been to wildlife reserves.

[7] Generally, ecocentrically inclined students preferred not to go camping unless financially necessitated. This may have to do with the fact that Dutch camping implies groomed caravan parks with neither of the typical wilderness activities, such as open fires or fishing allowed.

[8] Anthropocentrically inclined students reported that they sometimes enjoyed being in nature.

[9] Belief in resilience of nature and its strength was not necessarily seen as undermining ecocentric values.

[10] Students indicated that disregarding of their values and orientations, some animals, like monkeys, did seem human to them.

[11] Similarly, anthropocentrically inclined students still felt that humans are part of the ecosystem.

[12] Question 'I'm opposed to programs to preserve wilderness, reduce pollution and conserve resources' involves both anthropocentric and ecocentric questions.

[13] Item 19 *One of the most important reasons to keep lakes and rivers clean is so that people have a place to enjoy water sports* has been changed to *The most important reason to keep lakes and rivers clean is so that people have a place to have drinking water.*

[14] I actually think that all 20 statements are anthropocentric one way or another: They are either supporting or given pleasure/succor to humans, and I wonder what sort of 'eco-centricity' this is, given that the ecocentric statements are so reasonable. Why, for example, there were no statements that are so ecocentric that they place humans at a disadvantage? Examples would be:

All testing of medicines on animals is morally wrong, even though it saves lives.
Human vaccination programs should stop because of their effects on other species.

7 The EAATSD scale

EAATSD scale consists of 22 items. Items 1, 4, 9, 17, 19, 21 and 22 belong to ecocentric subscale.

1. One of the worst things about overpopulation is that many natural areas are getting destroyed for development
2. Environmental threats such as deforestation and ozone depletion have been exaggerated
3. The worst thing about the loss of the rain forest is that it will restrict the development of new medicines and that there not be enough lumber for future generations
4. It makes me sad to see forests cleared for agriculture
5. It seems to me that most conservationists are pessimistic and somewhat paranoid
6. I do not think the problem of depletion of natural resources is as bad as many people make it out to be
7. I find it hard to get too concerned about environmental issues
8. Humans are justified drilling for oil as it satisfies economic needs, even though it might be bad for the environment
9. The thing that concerns me most about deforestation is that many species may be endangered by it
10. I don't care about environmental problems
11. The most important reason to keep lakes and rivers clean is so that people have drinking water
12. It makes me sad to see natural environments destroyed
13. The most important reason for conservation is human survival
14. Best thing about recycling is that it saves money
15. Nature is important because of what it can contribute to the pleasure and welfare of humans
16. Too much emphasis has been placed on conservation
17. Nature is valuable for its own sake, independent of human interests
18. Nature conservation is important to ensure a continued high standard of living
19. Nature conservation is important to preserve wild areas for plants and animals
20. Continued land development is a good idea as long as a high quality of life can be preserved
21. Animal testing should be prohibited even if this will slow the development of new medicines for humans
22. Animal rights are as important as women rights, minority rights, gay rights and other equality issues

8 Results of interviews: qualitative testing of EAATSD scale

This scale was evaluated in September 2012 by twenty students drawn from the earlier stratified sample using in-depth interview structure similar to the evaluation of the original scale. Evaluation showed (in line with Dietz et al. 2005) that separating anthropocentric and ecocentric values, as in the case on items 8 and 13, is not always easy or seen as necessary as human and environmental interests may be intertwined. As one student of

Sustainable Business minor remarked: 'If humans are seen as part of nature, then their selfish concern about nature… or natural resources is still… valid.'

Ecocentric subscale items 1, 4, 9, 17, 21, 22 elicited most discussions, indicating that while other items could be seen as more 'neutral,' items concerned with explicit choices between human and non-human species interest required more explicit moral engagement. To quote a student of Marketing minor student, these items made them 'think sharper about what choices… people in developing countries and here [The Netherlands] need to make… That you cannot always have both—people and animals profiting from one forest.' Another student of Marketing added: 'Sometimes you cannot protect both, humans and nature. This scale makes one more aware of that.' This opinion was somewhat contradicted by a student of Finance minor who noted that financial aspects of environmental protection, as in items 14 and 20, can stimulate people to protect 'both nature and humans.' The majority of the students felt that this scale made their comprehension of and understanding of anthropocentricity and ecocentricity (both distinctions and similarities in perspectives) in general and of sustainable development (both its objectives and challenges) in particular sharper than the original scale did.

9 Reflection

This scale needs to be further tested. There are also many limitations, such as the students' understanding of the 'big picture,' with the different political and corporate leaders involved in the project of 'sustainable development,' may be insufficient to justify their opinions and attitudes. Another issue is the complexity of disentangling of ecocentric and anthropocentric values and the challenge of addressing empirical dilemmas and paradoxes of sustainable development, such as striving toward equal distribution of wealth and simultaneous protection of biodiversity.

According to the results of preliminary qualitative evaluation, however, the EAATSD scale can be used for testing anthropocentric and ecocentric attitudes toward sustainable development in students of higher education. Based on preliminary results, the revised scale tackles the critical view of at least some of the dilemmas, paradoxes and challenges inherent in multiple goals of sustainable development. Reliability of the scale needs further statistical testing, and as is the case in conventional EE/ESD evaluations, consequent research is necessary to improve institutional, national and international applicability to particular cases.

10 Conclusion

Literature reviewed at the beginning of this article demonstrates that trade-offs and paradoxes of development are rarely discussed, and social, economic and environmental issues are rolled into one. While there is robust literature on ethics and ESD, environmental ethics and especially deep green perspective on environment is marginalized in current ESDebate. Anthropocentrism embedded in sustainable development (SD) discourse implies that humans are largely in control of the surrounding world and that problems arising from modern living can be taken care of through technological development. While this might not be the case in all circumstances, especially considering national and organizational variations in interpreting SD, ESD may obscure inherent paradoxes of both

maintaining a growing and increasingly wealthy population and protecting the environment.

The author has argued that distinction between ecocentric and anthropocentric values marks a new critical approach to ESD and discussed the differences between anthropocentric and ecocentric perspectives and their implications for education for sustainable development. Implications of the shift toward anthropocentrism were examined in the light of environmental ethics theory and implications as to the efficacy of the present ESD in fostering young people's care for environment. The EAATSD scale to evaluate students' perception of the relationship between environmental and social issues was proposed. In-depth interviews with students were conducted to evaluate their comprehension of and call for critical reflection of the items on the scale. While the proposed scale reflects a normative perception of the implication of ESD, and might not be the case at international (prescriptive), national (policy) or organizational (concrete and particular) level of ESD, the EAATSD scale, if further tested, may be used to challenge anthropocentric bias often inherent in sustainable development discourse. Given the hypothesis that ecocentrically oriented individuals are more likely to act on behalf of the environment, consequent research can address implications of ESD curriculum for fostering environmentally aware citizenry by testing and further developing proposed evaluative tools.

References

Anderson, E. N. (2012). Tales best told out of school: Traditional life-skills education meets modern science education. In H. Kopnina (Ed.), *Anthropology of environmental education*. New York: Nova Science Publishers.

Ärlemalm-Hagsér, E., & Sandberg, A. (2011). Sustainable development in early childhood education: In-service students' comprehension of the concept. *Environmental Education Research, 17*(2), 187–200.

Baines, K., & Zarger, R. K. (2012). Circles of value: Integrating Maya environmental knowledge into Belizean schools. In H. Kopnina (Ed.), *Anthropology of environmental education*. New York: Nova Science Publishers.

Black, C. (2010). *Schooling the world: The White Man's last burden'*. Documentary film. Lost People Films. www.schoolingtheworld.org.

Blum, N. (2009). Teaching science or cultivating values? Conservation NGOs and environmental education in Costa Rica. *Environmental Education Research, 15*(6), 715–729.

Bodley, J. H. (2008). *Victims of progress*. Mountain View, CA: Mayfield.

Bolscho, D., & Hauenschild, K. (2006). From environmental education to education for sustainable development in Germany. *Environmental Education Research, 12*(1), 7–18.

Callicott, J. B. (Ed.). (1999). Moral monism in environmental ethics defended. In *Beyond the land ethic: More Essays in environmental philosophy* (171–183). Albany: State University of New York Press.

Clayton, S. (2000). Models of justice in the environmental debate. *Journal of Social Issues, 56*(3), 459–474.

Crist, E. 2003. Limits-to-growth and the biodiversity crisis, *Wild Earth*, Spring, pp. 62–65.

Crossley, M., & Watson, K. (2003). *Comparative and International research in education: Globalisation, context and difference*. London: Routledge Falmer.

DesJardins, J. R. (2005). *Invitation to environmental philosophy*. New York: Thomson.

Dietz, T., Fitzgerald, A., & Shwom, R. (2005). Environnemental values. *Annual Review Environmental Resources, 30*, 335–372.

Dunlap, R. E. (2008). The new environmental paradigm scale: From marginality to worldwide use. *The Journal of Environmental Education, 40*(1), 3–18.

Eckersley, R. 1997. *Green justice, the state and democracy*. Paper presented at the environmental justice: Global ethics for the 21st century conference at Melbourne University.

Eckersley, R. (2012). Global environmental politics. In R. Devetak, A. Burke, & J. George (Eds.), *Introduction to international relations*. Cambridge: Cambridge University Press.

Ehrenfeld, D. (1978). *The arrogance of humanism*. New York: Oxford University Press.

Fensham, P. J. (1978). Stockholm to Tbilisi—The evolution of environmental education. *Prospects, 8*(4), 446–455.

Ferry, L. (1995). *The new ecological order*. Chicago, IL: University of Chicago Press.
Fien, J. (2000). Education for the environment: A critique'—An analysis. *Environmental Education Research, 6*(2), 179–192.
Goldsmith, J. (1996). The winners and the losers. In J. Mander & E. Goldsmith (Eds.), *The case against the global economy: And for a return to the local*. San Francisco: Sierra Club Books.
Gonzalez-Gaudiano, E. (2005). Education for sustainable development: Configuration and meaning. *Policy Futures in Education, 3*(3), 243–250.
Goodpaster, K. E. (1978). On being morally considerable. *Journal of Philosophy, 75*(6), 308–325.
Gough, S., & Scott, W. (2007). *Higher education and sustainable development: Paradox and possibility*. Abingdon: Routledge.
Hall, C., & Day, J. (2009). Revisiting the limits to growth after peak oil. *American Scientist, 97*, 230–238.
Hesselink, F., Van Kempen, P. P., & Wals, A. J. (2000). ESDebate. International debate on education for sustainable development. IUCN Commission on Education and Communication. http://data.iucn.org/dbtw-wpd/edocs/2000-034.pdf.
Hicks, D. (2007). Education for sustainability: How should we deal with climate change? In H. Claire & C. Holden (Eds.), *The challenge of teaching controversial issues* (pp. 175–187). Stoke-on-Trent/Sterling, VA: Trentham.
Huckle, J. (1983). Environmental education. In J. Huckle (Ed.), *Geographical education: Reflection and action*. Oxford: Oxford University Press.
Jickling, B. (1992). Why I don't want my children to be educated for sustainable development. *Journal of Environmental Education, 23*(4), 5–8.
Jickling, B., Lotz-Sisitka, H., O'Donoghue, R., & Ogbuigwe, A. (2006). *Environmental education, ethics and action. A workbook to get started.* UNEP. http://openjournal.lakeheadu.ca/public/journals/22/Ethics_book_english.pdf.
Jickling, B., & Wals, A. E. J. (2007). Globalization and environmental education: Looking beyond sustainable development. *Journal of Curriculum Studies, 40*(1), 1–21.
Jóhannesson, I. Á., Norðdahl, K., Óskarsdóttir, G., Pálsdóttir, A., & Pétursdóttir, B. (2011). Curriculum analysis and education for sustainable development in Iceland. *Environmental Education Research, 17*(3), 375–391.
Kaiser, F. G. (1998). A general measure of ecological behavior. *Journal of Applied Social Psychology, 28*, 395–422.
Kaplan, S. (2000). Human nature and environmentally responsible behavior. *Journal of Social Issues, 56*(3), 491–508.
Karipak, C. P., & Baril, G. L. (2008). Moral reasoning and concern for the environment. *Journal of Environmental Psychology, 28*, 203–208.
Kemp, R., & Martens, P. (2007). Sustainable development: How to manage something that is subjective and never can be achieved? *Sustainability: Science, Practice, & Policy, 3*(2), 1–10.
Kim, R. E. (2010). The principle of sustainability: Transforming law and governance. *Journal of Education for Sustainable Development, 4*(2), 307–312.
Kopnina, H. (2011). Applying the new ecological paradigm scale in the case of environmental education: Qualitative analysis of the ecological world view of Dutch children. *In Factis Pax, 5*(3), 362–373.
Kopnina, H. (2012a). Education for Sustainable Development (ESD): The turn away from 'environment' in environmental education? *Environmental Education Research*. http://dx.doi.org/10.1080/13504622.2012.658028.
Kopnina, H. (2012b). Revisiting Education for Sustainable Development (ESD): Examining anthropocentric bias through the transition of environmental education to ESD. *Sustainable Development*. http://onlinelibrary.wiley.com/doi/10.1002/sd.529/abstract.
Kopnina, H. (2012c). People are no plants, but both need to grow: Qualitative analysis of the new ecological paradigm scale for children. *The Environmentalist*. doi:10.1007/s10669-012-9401-x.
Kortenkamp, K. V., & Moore, C. F. (2001). Ecocentrism and anthropocentrism: Moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology, 21*, 1–12.
Lee, C. (2001). All pain, no gain: How structural adjustment hurts farmers and the environment. *Global Pesticide Campaigner, 11*(1), 8–10.
Leopold, A. (1949). *A sand county almanac*. The Green Lagoons: Colorado River Delta.
Leopold, A. 1987 (1949). *A Sand County almanac and sketches here and there*. New York: Oxford University Press.
Lewis, D. (2005). Anthropology and development: The uneasy relationship. In J. G. Carrier (Ed.), *A handbook of economic anthropology*. Edward Elgar, Cheltenham, pp. 472–486. http://eprints.lse.ac.uk/253/.

Lotz-Sisitka, H. (2004). *Positioning Southern African environmental education in a changing context*. Howick: Share-Net & Southern African Development Community-Regional Environmental Education Programme.

Lovelock, J. (2009). *The vanishing face of Gaia: A final warning: Enjoy it while you can*. London: Allen Lane.

Lundmarck, C. (2007). The new ecological paradigm revisited: Anchoring the NEP scale in environmental ethics. *Environmental Education Research, 13*(3), 329–347.

Maloney, M. P., Ward, M., & Braucht, G. (1975). A revised scale for the measurement of ecological attitudes and knowledge. *American Psychologist, 30*, 787–790.

Mander, J., & Goldsmith, E. (Eds.). (1996). *The case against the global economy: And for a return to the local*. San Francisco: Sierra Club Books.

McKeown, R., & Hopkins, C. (2003). EE ≠ ESD: Defusing the worry. *Environmental Education Research, 9*(1), 117–128.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. W, I. I. I. (1972). *The limits to growth*. New York: Universe Books.

Naess, A. (1973). The shallow and the deep, long-range ecology movement. *Inquiry, 16*, 95–100.

Oliver-Smith, A. (2010). *Defying displacement: Grassroots resistance and the critique of development*. Austin: University of Texas Press.

Orr, D. (1994). *Earth in mind: On education, environment, and the human prospect*. Washington, DC: Island Press.

Oxfam. (2012). *Agro-biodiversity*. http://www.oxfamnovib.nl/Pub/2012-Nr-1-English/agro-biodiversity ventura.html.

Palmer, J. A. (1998). *Environmental education in the 21st century: Theory, practice, progress and promise*. New York: Routledge.

Quammen, D. (1998). Planet of weeds. Tallying the losses of Earth's animals and plants. Quoted in Crist (see reference Crist, E. 2003. Limits-to-growth and the biodiversity crisis, *Wild Earth*, Spring, pp. 62–65).

Rees, W. (1992). Understanding sustainable development, In B. Hamm, G. Zimmer, and S. Kratz (Eds.), *Sustainable development and the future of cities*. Proceedings of an international summer seminar, Bauhaus Dessau, 7–14 September 1991, pp. 17–40.

Reid, A., & Scott, W. (2006). Researching education and the environment: Retrospect and prospect. *Environmental Education Research, 12*(3), 571–587.

Sarabhai, K. V. (2010). An ethical framework for a sustainable world. *Journal of Education for Sustainable Development, 4*(2), 155–156.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students*. Essex: Pearson Education Limited.

Sauvé, L. (1996). Environmental education and sustainable development: A further appraisal. *Canadian Journal of Environmental Education, 1*, 7–24.

Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology, 21*(4), 327–339.

Scott, W., & Gough, S. (2004). *Key issues in sustainable development and learning*. London: Routledge.

Shiva, V. (2000). Globalization and poverty. *Resurgence*, issue 202 http://www.gn.apc.org/resurgence/issues/shiva202.htm.

Smith, G. (1992). *Education and the environment: Learning to live with limits Albany*. NY: SUNY Press.

Smyth, J. C. (1995). Environment and education: A view of a changing scene. *Environmental Education Research, 1*(1), 3–20.

Spring, J. (2004). *How educational ideologies are shaping global society: Intergovernmental organizations, NGO's, and the decline of the state*. Mahwah, NJ: Laurence Erlbaum Associates.

Stapp, W. B., et al. (1969). The concept of environmental education. *Journal of Environmental Education, 1*(1), 30–31.

Sterba, J. P. (1994). Environmental justice: Reconciling anthropocentric and nonanthropocentric ethics. *Environmental Values, 3*, 229–244.

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues, 50*, 65–84.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A social psychological theory of support for social movements: The case of environmentalism. *Human Ecology Review, 6*, 81–97.

Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender and environmental concern. *Environment and Behaviour, 25*, 322–348.

Stevenson, R. (2006). Tensions and transitions in policy discourse: Recontextualising a decontextualised EE/ESD debate. *Environmental Education Research, 12*(3–4), 277–290.

Strife, S. (2010). Reflecting on environmental education: Where is our place in the green movement? *The Journal of Environmental Education, 41*(3), 179–191.
Taylor, P. (1986). *Respect for nature. A theory of environmental ethics*. Princeton, NJ: Princeton University Press.
Thompson, S. C., & Barton, M. A. (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of Environmental Psychology, 14*, 149–157.
UNEP. (2012). *United Nations Environment Programme environment for development*. hqweb.unep.org.
UNESCO. (2009). United Nations Decade of Education for Sustainable Development (DESD, 2005–2014). Review of contexts and structures for education for sustainable development. http://www.bne-portal.de/coremedia/generator/unesco/.
UNESCO. (2011). National journeys towards education for sustainable development. The Netherlands, p. 77. http://unesdoc.unesco.org/images/0019/001921/192183e.pdf.
UNESCO school profile documents http://www.unesco.nl/documents/documenten-natcom/Brochure%20UNESCO-Schoolprofiel.pdf.
Wals, A. E. J. (2007). *Social learning: Towards a sustainable world*. Wageningen: Wageningen Academic Publishers.
Wesselink, R., & Wals, A. E. J. (2011). Developing competence profiles for educators in environmental education organisations in the Netherlands. *Environmental Education Research, 17*(1), 69–90.
The World Bank. (2012). Biodiversity. http://go.worldbank.org/08H25N3QY0.