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Article

Environmental Education: Reflecting on Application of Environmental Attitudes Measuring Scale in Higher Education Students

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Abstract: The Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EAATSD) scale measures environmental concern in relation to sustainable development. This article will discuss how this scale was tested with three groups of Dutch higher education students. Findings demonstrate that anthropocentric and ecocentric values are independent of the students' chosen course of study, suggesting that students attracted by the 'sustainable development' course title do not necessarily associate 'sustainability' with ecocentric aims. This article discusses why ecocentric values are beneficial to the objective of a sustainable society and proposes ways forward in which these values can be enhanced in learners.

Keywords: anthropocentrism; ecocentrism; environmental attitudes; sustainable development

1. Introduction

1.1. Environmental Values in 'Sustainability'

Greater interest in environmental education (EE) has emerged as even short educational programs that involved ecocentric values development proved to stimulate environmental awareness in children [1,2] and college students [3–6]. Studies of environmental views by school and college students come from a wide variety of fields including sociology, social psychology, pedagogical studies, and the life sciences (e.g., [7–9]). Social psychologists have applied knowledge from the research literatures on attitudes [10,11], conversion of environmental intentions to environmental behaviors [12], behavior-based environmental attitudes [13], moral reasoning and persuasion [14,15], reasoning about environmental dilemmas [16], commitment [17], normative influence [18], and incentives [19]. A number of environmental attitudes and behavior measuring scales were developed, measuring behavioral commitments, affective states, and knowledge [20], such as the Environmental Concern Scale [21]. Based on these scales, the New Ecological Paradigm (NEP) scale for measuring environmental attitudes [22] became a widely used measure of people's shifting worldviews from a human-dominant view to an ecological one. While the NEP scale has been applied in cross-cultural studies [23,24], it was not always found to be cross-culturally applicable (e.g., [25,26]). Very few of these studies explicitly measure ecocentric values, with the exception of the Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EAATSD) scale [27].

The Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EAATSD) scale is based on Ecocentric and Anthropocentric Attitudes towards the Environment (EAATE) scale [28]. The EAATSD scale adapted EAATE to sustainable development. EAATSD scale was used in studies related to environmental education (EE) and education for sustainable development (ESD) (e.g., [29–32]), teachers' conceptions of the environment [33] and other studies that apply environmental values in educational contexts. A ecocentric perspective that derives from land ethics [34] and deep ecology [35] refers to an ethical position that the integrity of an ecosystem is essential to human and environmental sustainability. Earlier, EE was often instructed by the ecocentric position as exemplified by *The Belgrade Charter—A Global Framework for Environmental Education* developed by UNESCO and UNEP in 1976. EE refers to programs that take place in schools or protected nature areas, promoting environmental awareness, encouraging sustainable behaviors, and disseminating specific kinds of knowledge about the environment. ESD shifts the focus away from problems with environmental degradation to the inclusion of social issues and economic development. ESD refers to programs developed after the introduction of the Sustainable Development agenda by the so-called Brundlandt report in 1987. The UN Conference on Environment and Development (1992) produced a key set of plans termed *Agenda 21*, expanding upon those formulated in the Brundlandt report and aimed at achieving sustainable development. *Agenda 21* assigned education a central role: "Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues."

Ecocentric education includes conservation education (e.g., [36,37]), education for deep ecology (e.g., [38,39]), post-humanist education (e.g., [40]), animal rights (e.g., [41,42]), and animal welfare education (e.g., [43]). These types of EE focus on unity between environmental ethics and sustainability [4–6,27,44–73]. These types of education will collectively be referred to as ecocentric education.

In the context of business education, as well as liberal arts, a number of concrete programs aimed to enhance ecocentric values have been reported [50,51,62,63,65]. This article will draw recommendations in relation to EE and ESD by discussing case studies and ecocentric values in education.

1.2. Ecocentric Perspective on Sustainable Development

Critics have emphasized that promoting economic development is not likely to address the root causes of poverty, namely the transnational politics of competition in global markets and industrial capital [74,75]. Simultaneously, sustainable development rhetoric tends to privilege human welfare over concerns with the environment [76,77]. This prioritizing of economic objectives negates the very chance of other species' evolutionary unfolding [78,79] and ecological justice [80,81].

The studies of environmental values indicate that respondents that are more ecocentric are more prone to pro-environmental and sustainable action, including commitment to pay [28,82]. Gifford (2011) [83], for example, notes that although many individuals are engaged in some ameliorative action to address climate change, they are hindered by a number of psychological barriers, such as ideological worldviews that preclude pro-environmental attitudes and behavior.

Since humans depend completely on earth's ecosystems and their services, such as "clean air, food, water, climate regulation, spiritual fulfillment, and aesthetic enjoyment" (e.g., [84] (p. 224)), there are material, spiritual, educational, recreational benefits to nature protection (e.g., [85]). There is also evidence that high interdependency of species is a precondition for sustaining human welfare (e.g., [86]). Therefore, conversion theory [87] postulates that preservation of nature for the sake of humanity is most effective. At present, much of ESD is based on the assumption that social, economic and environmental interests do indeed converge, and that plural ethical perspectives in education are desirable (e.g., [88–91]). However, while an anthropocentric motivation can produce environmentally positive outcomes in situations where both humans and nonhumans are negatively affected, as in cases of pollution or climate change, anthropocentrism is not enough to protect natural elements that have no utilitarian value [77,81,92–99]. Critical scholars have argued that mainstream ESD ignores the

urgency of environmental problems through the discursive politics of neoliberal ideology of equitable economic growth (e.g., [100–104]). While the ecocentric position recognizes congruity between human and environmental interests, it also recognizes intrinsic value of nature (e.g., [105]). While species extinctions may indirectly affect human welfare, the loss of some biodiversity does not affect humanity in any negative way—yet it has an *existential* effect upon nonhumans [79,106].

Thus, anthropocentric position does not protect “left over” species, nor safeguard animal welfare [96,107–109]. In order to safeguard environmental sustainability for humans and nonhumans alike, the environmental predicament requires commitment, as well as urgent measures combining care for individual animals, species, habitats, and people [110,111]. Some EE/ESD scholars and practitioners have succeeded not just in raising environmental awareness among their students and scholastic audiences, but also in positively influencing environmentally sustainable behavior, and they have done so via the types of education that this research seeks to better comprehend. Yet, there is no research into the prevalence, characteristics, and efficacy of ecocentric education that places environmental protection as the cornerstone of sustainability. Nor are there specific assessments of the programs that use environmental integrity as a starting point of sustainable economy, such as Cradle to Cradle [112] or circular economy [113]. Applications of these theories in education were discussed by Kopnina & Blewitt (2014) [114] but no over-arching inventory of ecocentric education has yet been made.

At present EE/ESD research is dominated by uniform, generic indicators and embedded in an anthropocentric perspective. This is problematic because the studies of environmental values indicate that people with ecocentric orientation are more likely to act upon their values in order to protect the environment (e.g., [82,115,116]) since anthropocentrism as one of the main drivers of the current ecological crisis (e.g., [117]).

Critical theorists have pointed out that there are some salient paradoxes present in ESD that may in fact undermine the original aims of EE (e.g., [59,66,118,119]). In the article *The turn away from ‘environment’ in environmental education* [66] it was argued that environmental sustainability in EE and ESD (further referred to as EE/ESD) is becoming subservient to paradoxical and largely anthropocentric agendas of sustainable development. Ad hoc studies evaluating efficacy of EE/ESD use social, economic and environmental indicators without dealing with these paradoxes. Aside from Chawla and Cushing’s (2007) [120] study of strategic environmental learning, and the growing body of research on varieties of EE/ESD, little research engages with the efficacy of EE/ESD in bringing about social change in educating *for* the environment. There are no consistent studies providing evidence of how EE and/or ESD help to develop a population ‘that is aware of, and concerned about, the environment and its associated problems’ [121].

1.3. Ecocentric and Anthropocentric Values in Education

Initially, EE was intended “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” [121]. The intended result of these programmes was social change towards a more environmentally sustainable society, assuming that social and economic sustainability is dependent on environmental integrity. At the time, ecocentric education was found to be best suited for this aim as it enables radical and disruptive change.

However, following decades have witnessed a reversal of this conviction, with anthropocentric motivations and agendas taking central stage. Since the completion of the Decade of Education for Sustainable Development (2005–2014) [122], the emergence of education for sustainable development (ESD) has been hailed as a progressive transition in the field.

The relationship between EE and ESD is explored in publications of *Canadian Journal of Environmental Education* (e.g., [123]); *Journal of Curriculum Studies* (e.g., [118]) and *The Journal of Environmental Education* (e.g., [104,124]). Some authors argue that ESD is not likely to replace EE but become one of its goals (e.g., [125,126]) that ESD is a dominant perspective of EE [123] or that EE has in fact become ESD (e.g., [127]). Similarly, distinctions were drawn between ESD, sustainable development education (SDE), and ‘education for sustainability’ (EfS) (for historical overview see [128] and [129], for recent debates see [6,130,131]). Entire editions of *Environmental Education Research* journal were devoted to ESD, such as, Denmark and Sweden (Volume 16, Number 1, 2010), Iceland (Volume 17, Number 3, 2011), and The Benelux (Forthcoming in 2017).

2. Materials and Methods

This confirmation study, following the pilot conducted in 2013, involved two student populations: students of International Business at The Hague University of Applied Science who followed the required course Business Ethics and Sustainability, with 42 participating students; and Leiden University College (LUC) students of the elective course Environment and Development, with 18 participants. All student populations consisted of international students in their second and third year of study, between the ages of 20 and 24, with a roughly equal male to female ratio. At The Hague University, 49 students (out of total of 270 of the student population) were selected from different elective minors to ensure heterogeneity of responses. Among these, 33 students chose the Sustainable Business minor and 16 students chose other minors.

The confirmation study took place between January and March 2016. Students were asked to rate a degree of agreement on the scale from one to five. All students were asked to complete the scale without initial discussion of what the scale was about, or about ecocentric values. Completion of the scale by the students was accompanied by an in-class discussion about perceptions and attitudes toward the relationship of humans to nature.

3. Theory/Calculation

Results

As reported in Kopnina and Cocis (2017) [132], which discuss detailed results of this study, calculations included of frequency, mean, standard deviation and Chi-square, using simple or cross tabs. Kopnina and Cocis (2017) [132] have concluded that there is a large variation between individual students but not so much between the groups. The group statistics are presented in Tables 1 and 2. Detailed SPSS results are shown in the Supplementary Materials.

The in-class discussion has revealed that student perceptions of ‘sustainability’ and particularly ‘sustainable development’ are not necessarily linked to environmental problems. Social and economic sustainability were sometimes discussed as cornerstones of sustainability, without the realization that neither long-term poverty alleviation or general human well-being and indeed financial stability are dependent on the availability of natural resources. Some of the students thought that social justice and economic equality were more important than environmental integrity. It needs to be noted that after instruction in critical thinking and discussion of select literature, films, and case studies, students’ perceptions were noted to shift towards a more ecocentric world-view (for more discussion of teaching students about paradoxes of sustainability see [6]).

Table 1. Group statistics.

	Minor	N	Mean	Standard Deviation	Standard Error Mean
Environment Threat	Sustainable Business	32	20.56	1.243	0.220
	Other Minor	16	20.69	1.302	0.326
Overpopulation	Sustainable Business	33	3.42	1.173	0.204
	Other Minor	16	3.06	1.124	0.281
Loss of Rain Forrest	Sustainable Business	33	3.09	1.011	0.176
	Other Minor	16	2.69	1.014	0.254
Forest Cleared for Agriculture	Sustainable Business	33	3.09	1.128	0.196
	Other Minor	15	2.73	1.387	0.358
Conservationists	Sustainable Business	32	2.63	1.070	0.189
	Other Minor	16	2.81	1.047	0.262
Problem of Depletion	Sustainable Business	32	2.34	1.125	0.199
	Other Minor	16	2.44	0.892	0.223
Environmental Issues	Sustainable Business	32	2.72	1.276	0.226
	Other Minor	16	2.56	1.094	0.273
Drilling for Oil	Sustainable Business	32	3.34	1.208	0.214
	Other Minor	16	3.56	0.964	0.241
Deforestation	Sustainable Business	33	3.73	1.206	0.210
	Other Minor	15	3.07	1.100	0.284
Don't Care about Environment Problems	Sustainable Business	33	1.67	1.109	0.193
	Other Minor	16	1.75	1.291	0.323
Lakes Andrivers Clean	Sustainable Business	33	3.33	1.164	0.203
	Other Minor	16	2.69	1.195	0.299
Natural Environments Destroyed	Sustainable Business	33	4.00	0.968	0.169
	Other Minor	16	3.69	1.401	0.350
Human Survival	Sustainable Business	33	3.21	0.992	0.173
	Other Minor	15	3.27	0.961	0.248
Recycling	Sustainable Business	33	2.67	1.164	0.203
	Other Minor	16	2.88	1.258	0.315
Contribute to Humans	Sustainable Business	33	3.91	0.879	0.153
	Other Minor	16	3.44	0.629	0.157
Conservation	Sustainable Business	33	2.94	0.966	0.168
	Other Minor	15	2.27	1.033	0.267
Valuable Forits Own Sake	Sustainable Business	32	3.28	1.301	0.230
	Other Minor	16	2.75	1.065	0.266
High Standards of Living	Sustainable Business	33	3.79	1.053	0.183
	Other Minor	16	3.75	0.931	0.233
Plants and Animals	Sustainable Business	33	3.91	0.947	0.165
	Other Minor	16	4.00	0.632	0.158
Land Development	Sustainable Business	33	3.39	0.998	0.174
	Other Minor	16	3.38	1.025	0.256
Animal Testing	Sustainable Business	33	3.06	1.029	0.179
	Other Minor	16	3.19	1.377	0.344
Animal Rights	Sustainable Business	33	3.09	1.128	0.196
	Other Minor	16	3.44	1.365	0.341

Table 2. 2016 Study.

	Minor								
	E&D			BE&S			Total		
	Mean	N	Stand Deviation	Mean	N	Stand Deviation	Mean	N	Stand Deviation
EASTSD1	3.9444	18	0.93760	3.7619	42	0.90553	3.8167	60	0.91117
EASTSD2	1.1667	18	0.38348	2.3333	42	1.05152	1.9833	60	1.04948
EASTSD3	2.2778	18	0.89479	3.0476	42	1.08093	2.8167	60	1.08130
EASTSD4	3.8889	18	0.67640	3.3333	42	0.92833	3.5000	60	0.89253
EASTSD5	2.0588	17	1.34493	2.6341	41	0.88758	2.4655	58	1.06319
EASTSD6	1.3529	17	0.86177	1.9286	42	0.89423	1.7627	59	0.91612
EASTSD7	1.7778	18	1.16597	2.5714	42	0.85946	2.3333	60	1.01958
EASTSD8	2.2778	18	1.36363	3.0000	42	0.85540	2.7833	60	1.07501
EASTSD9	3.5556	18	0.98352	3.5750	40	1.10680	3.5690	58	1.06148
EASTSD10	1.1667	18	0.38348	1.4048	42	0.58683	1.3333	60	0.54202
EASTSD11	2.7778	18	1.21537	3.3333	42	1.07446	3.1667	60	1.13745
EASTSD12	4.1667	18	1.20049	3.7143	42	1.17465	3.8500	60	1.19071
EASTSD13	3.0556	18	0.93760	3.2857	42	0.96993	3.2167	60	0.95831
EASTSD14	2.2778	18	0.75190	2.6190	42	1.03482	2.5167	60	0.96536
EASTSD15	3.5000	18	0.70711	3.6429	42	1.05510	3.6000	60	0.96023
EASTSD16	1.9444	18	0.72536	2.5238	42	0.63392	2.3500	60	0.70890
EASTSD17	4.2778	18	0.82644	3.5952	42	1.14890	3.8000	60	1.10162
EASTSD18	3.0556	18	1.10997	3.3659	41	1.01873	3.2712	59	1.04767
EASTSD19	4.0000	18	0.90749	3.7381	42	0.88509	3.8167	60	0.89237
EASTSD20	2.4444	18	0.92178	3.4762	42	1.01784	3.1667	60	1.09183
EASTSD21	2.5556	18	1.14903	2.6905	42	1.19935	2.6500	60	1.17639
EASTSD22	2.9444	18	1.05564	3.0952	42	1.37592	3.0500	60	1.28122

4. Reflection on the Study

The hypothesis formed in this comparative study was that business students might be less ecocentric than environmental sustainability course students. However, the findings have revealed that both groups exhibit individual differences in environmental attitudes, but little difference between groups. Thus, ecocentric orientation does not necessarily correspond with the choice of course. Students from The Hague University and Leiden University who choose the Sustainable Business or Environment & Development courses prioritize anthropocentric concerns in more or less equal measure to other business students. Generally, it appeared that all students tend to be more ecocentric than anthropocentric, with individual differences in ecocentric and anthropocentric orientations independent of the students' choice of a minor. As reported by Kopnina and Cocis (2017) [132], the chi-square analysis revealed that the assumption of the non-dependent variables is confirmed by looking at the likelihood ratios, with ecocentric and anthropocentric values not related. This suggests that the students who have chosen the course on sustainability do not necessarily think of sustainability as being primarily environment-focused, but also related to social and economic aspects of sustainable development'. As discussed in the Introduction, while sustainable development rhetoric does indeed include and even privilege social and economic aspects of sustainability, it tends to downplay the fundamental role of environmental integrity that supports both social and economic interests, as well as ignores the ethical questions associated with ecological justice. Further implication of this is that if the educator wants to develop an ecocentric orientation in students, self-selection of choosing (or not) 'sustainability' courses does not seem to be an obstacle as all students in the present sample seem potentially open to ecocentric values, with individual differences between them.

This is confirmed by in-class discussions that occurred after the scale was completed. The discussion involved the instructor's assignment asking students to reflect on readings related to trade-offs between economic growth and ecological integrity. These discussions have led to shifting student perceptions towards a more inclusive ecocentric world-view—which could admittedly be the result of the students wanting to comply to teacher's expectations, but could also have resulted from indeed a more critical a = but also compassionate understanding of environmental problems. Full

literature list and other didactic strategies used by instructor in these courses are discussed in Kopnina 2017 [6].

5. Discussion

The relatively uniform results across different courses need to be related to a larger context of sustainability. As mentioned in the introduction, sustainability rhetoric is intertwined with sustainable development that seeks to combine social, economic and environmental objectives [40,75]. The EAATSD scale and discussions reported in this article were taken at the start of the course, before the students were exposed to instruction, critical literature and discussions geared towards a more complex understanding of environmental problems and their causes, including discussion of anthropocentric world-views. Understanding of the paradoxes and bottlenecks of sustainable development (an attempt to decouple poverty alleviation from resource consumption) as well as ethical deficiency of favoring one-species perspective (anthropocentrism) is likely to develop after the information (cognitive aspects) has ‘sunk in’. This ‘sinking’ is not likely to happen immediately after the course as it involves deeper alteration in cognitive and affective attitudes have further evolved through continuous learning. This continuous learning is supported by both what students have learned in class and future events in their professional lives.

As discussed in the Introduction, while pragmatist environmental ethics postulates that the intrinsic values have little practical value [87,133], ecocentric ethics argued that the intrinsic value discourse is to environmental policy what the human rights discourse has been to social reform movements [134]. Basically, it is argued that without acknowledging the intrinsic value, the rights and welfare of nonhuman nature that are not functionally useful to human welfare are likely to be continuously ignored [135]. Essentially, anthropocentric orientations make a portion of biological diversity expendable and ignore animal welfare concerns, because no negative side effects for people ensue [77,78].

Presently, a large part of ‘sustainability’ education is dominated by social and economic concerns, placing environmental protection, at best, as one of many possible objectives [101]. ESD often conflates social and economic sustainability with environmental sustainability, resulting in mutually exclusive objectives [75]. While one of the key objectives of sustainable development is alleviating poverty, it is unclear how this objective can be decoupled from increase in the consumption of natural resources, which in turn is likely to exacerbate social unrest and economic competition and inequality. If an alternative path to economic development cannot be found, the planet is not likely to sustain present and future generations in the long terms [76,114,136]. Without fundamentally altering the unsustainable production system, adapting existing production methods in developing countries is likely to exacerbate sustainability challenges and worsen the economic conditions due to competition for resources [137]. Yet, as demonstrated by the case studies above, students that choose ‘sustainability’ courses do not necessarily see the environment as a foundation that makes social and economic sustainability possible. Thus, further research, as well as teaching practice that explicitly focuses on explaining why ecocentrism provides a distinct and better path for sustainability, is necessary [117].

Besides EE/ESD evaluations in country-specific or program-specific contexts (e.g., [138–140]) the overarching research examining the efficacy of EE/ESD in bringing about environmental sustainability is lacking. The efficacy in this context involves success in promoting awareness of environmental problems and encouraging environmentally sustainable behaviors, as well as developing specific skills and competencies necessary for building a circular economy [112,113]. At the moment, ecocentric EE/ESD is still marginal within educational institutions, policy-making and social scientists. Assuming that a very significant part of ‘greening’ happens in the educational sector, the implicit application of this research is ‘learning from comparison’ from ‘best practices’.

6. Conclusions

Spanning (2016) [110] (p. 12) has pointed out a number of ways in which nonhumans can be addressed in education, calling for a serious and sustained attention to anthropocentrism and speciesism. Indeed, this article fully supports this call. The appropriateness and socio-cultural sensitivity [141] of disparate components of educational policy can then instruct the design of ecocentric EE/ESD programs. The follow-up research will draw on distinctions between the goals of environmental education ‘in, ‘about’ or ‘for’ the environment, with explicit focus on ecological values that have been marginalized in mainstream EE/ESD. Follow-up research can then address the following questions: What is the prevalence and characteristics of EE/ESD, and especially ecocentric education? Does EE/ESD positively influence environmental knowledge and attitudes in school children and help develop competencies and skills necessary for transition to a sustainable society in students of higher education? What are the most effective forms of EE/ESD taking environmental sustainability as an ultimate goal? How can context-specific studies of EE/ESD contribute to the scholarship of social change that contributes to environmental sustainability?

Administration of the EAATSD scale and discussion of issues embedded in (environmental) ethics in education. The expected societal and economic consequences of this research will be development, stimulation, maintenance and monitoring of successful programs and their adaptation in the wider international context. Understanding how complex variables such as national and institutional context, ideology and ethics (e.g., ecocentric orientation) and pedagogical skills (e.g., didactic qualities) can be supported to ensure a sustainable future, represents a high-reward objective. Subsequent research needs to focus on nationally contextualized studies on the nexus of education, environment, and sustainable future by examining how a wide range of educational programs have influenced the students’ worldview and raised particular moral concerns in relation to the environment and our common future.

Supplementary Materials: The following are available online at www.mdpi.com/2227-7102/7/3/69/s1. Table S1: Report, Table S2: EAATSD2 * EAATSD4 Crosstabulation, Table S3: Chi-Square Tests, Table S4: EAATSD6 * EAATSD12 Crosstabulation, Table S5: Chi-Square Tests, Table S6: EAATSD16 * EAATSD19 Crosstabulation, Table S7: Chi-Square Tests, Table S8: EAATSD3 * EAATSD9 Crosstabulation, Table S9: Chi-Square Tests.

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