Environmental education and/or education for sustainable development: what role for technology education?

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Abstract

The current co-existence of environmental education (EE) and education for sustainable development (ESD) poses a number of questions for educators and policy makers regarding the differences and similarities between EE and ESD. This co-existence has created a concern among international and national communities regarding overlap and duplication of goals and programs in EE and ESD. The simultaneous existence and development of EE and ESD has resulted in some confusion in policy formulation and implementation. Lack of clarity has sometimes led to inefficiencies in achieving goals and development of initiatives. Some countries call for distinctions, others for convergence between the EE and ESD (UNESCO, 2009). This paper reflects on the historical development of EE and ESD to identify similarities and differences between the concepts. It suggests that differences in the models of EE and ESD relationships can be seen in technology education policies and practices. The paper argues that an emphasis on the social dimension of design for SD need to be strengthened to align technology education with global developments.

Introduction

The current co-existence of environmental education (EE) and education for sustainable development (ESD) poses a number of questions for educators and policymakers regarding the differences and similarities between EE and ESD. This coexistence has created a concern among international and national communities regarding overlap and duplication of goals and programs in EE and ESD. The simultaneous existence and development of EE and ESD has resulted in some confusion in policy formulation and implementation. Lack of clarity has sometimes led to inefficiencies in achieving goals and development of initiatives. Some countries call for distinctions, others for convergence between the EE and ESD (UNESCO 2009). The relationships between the EE and ESD has been considered by a number of authors (e.g., McKeown and Hopkins 2003; Cartea 2005; Wals in UNESCO 2009).

Cartea (2005) presented the results of the 'ESDebate' held in 1999 where a majority of representatives from UNESCO-invited counties shared the view that ESD is 'a stage in the evolution of EE'. However, other models, such as those that conceptualise 'EE as a part of ESD', 'ESD as a part of EE', and 'EE and ESD' as partly overlapping fields were envisioned by participants.

A more recent analysis (UNESCO, 2009) concluded that the type of relationships between EE and ESD that currently exists in different countries depends on "the historic role EE has played in a country (prominent or marginal) and the way EE itself is interpreted (broad or narrow)" (p.28). This analysis is based on evaluation of the regional synthesis reports and the regional ESD strategies prepared for the Global Monitoring report on implementation of the Decade of ESD (DESD). It identifies three models of EE-ESD relationships: 'EE equals ESD' (e.g., USA, Taiwan, Brazil), 'EE as a part of ESD' (e.g.,

Vietnam, Arab countries) and 'ESD and EE as distinct, although they do overlap and both are legitimate and necessary' (e.g., The Netherlands, Canada, Greece).

The first set of models (Hesselink, van Kempen, and Wals, 2000) present more of the hypothetical/theoretical views on the EE - ESD relationships. The second set of models (UNESCO, 2009) is based on current practical experiences of the countries that participated in the review. Both sets of models consider *social and economic issues as playing important parts in identifying similarities or differences between EE and ESD, and therefore providing the basis for categorisation.* However, as it is argued in the paper, the inclusion of social and economic issues does not constitute the main differences between EE and ESD.

The intention of this paper is to examine the historical development of political discourse and progressive transitions within the field at the international level to explore EE/ESD inclusion in and influence on technology education policy and curriculum.

Environment and development: political discourses

At a particular moment EE stopped being the main reference for the UN educational response to the contemporary environmental crisis. The 1997 international conference in Thessaloniki on Environment and Society: education and public awareness for sustainability organised by UNESCO emphasised the transition from EE to ESD. This step has been viewed by many academics as a progressive transition in the field, as a new step in developing our understanding of the nature-human relationships. For others, this step generated resistance and controversy as some in the EE field could not understand why such a conceptual change was necessary.

> *… we are currently in the throes of a situation in which the environment-related work formerly known as 'environmental education' (EE) is being aggressively and extensively 're-badged' as 'education for sustainable development' (ESD). There are strong attempts internationally to supplant the use of the term EE with the newer term ESD. (Robottom 2007, 90)*

> *I can find no logical, epistemological, theoretic-pedagogical, methodological or ideological reasons to accept without question that ESD is or could become something substantially different, 'superior' or more 'efficient' in answer to the socio-environmental crisis than EE. (Cartea 2005, 285)*

These and similar statements have criticised the movement towards ESD and led to tensions within the field. The policy discourses on ESD and EE were initially constructed by policy-makers through a number of international conferences and summits. The overview below refers to only some of them with the aim to develop an argument. It is evident that since the Biosphere Conference in 1968 (Paris), the UN system, in particular UNESCO and UN Environmental Program (UNEP), has played an important part in the development of EE and later ESD in answer to current global problems. This includes progression in theoretical, methodological and social adjustments to the discourse over the period of four decades.

An intergovernmental conference in 1968 brought together experts to discuss the scientific basis for rational use and conservation of the resources of the biosphere, which was defined as a "part of the world in which life can exist; it therefore includes certain parts of the lithosphere, hydrosphere and atmosphere" (UNESCO 1968, I.6).

The conference stated that the utilisation and conservation of land and water on our planet should go hand in hand. The conference also highlighted the role of education in this process:

> *The global approach on nature and its problems should induce people to think ecologically, maintaining a realistic approach towards nature. Man should be considered as being in partnership with nature, the ethical value of which was stressed. (UNESCO 1968, VII.74)*

For this conference the meaning of environment was taken to be nature. Environmental education was seen as an introduction or reinforcement of ecology in curriculum at all levels. Formal and non-formal sectors of education were asked to recognise the importance of understanding "the broad ecological principles involved in man's [sic] use of natural resources and the interactions that exist between man

and his physical and biological environments" (UNESCO 1968, 85.1 and 85.2). The conference did not question economic development and called only for rational use and conservation of resources as an imperative of satisfactory living conditions of future generations. Environmental education was regarded as contributing to the enhancement of the economic and social capital of the biosphere. This conference was the first intergovernmental forum to discuss and adopt a series of recommendations concerning environmental problems and their global nature.

This Biosphere conference became a starting point in developing an internationally agreed approach to environment–development issues. It marked a new stage in the evolution of the relations between humans and the rest of the biological environment.

The next step in this development was the UN Conference on the Human Environment in Stockholm (1972), which adopted a broader concept of environment that included the natural and man-made aspects. The document claims "The protection and improvement of the human environment is a major issue which affects the well-being of peoples and economic development throughout the world" (UN 1972, proclamation 2).

Improvement of the environment for present and future generations was introduced as an important aspect of people's and governments' duty. Rational planning and contribution of science and technology were highlighted as essential tools for "reconciling any conflict between the needs of development and the need to protect and improve the environment" (UN 1972, principle 14). Under-development of developing countries and industrialisation and technological development of the industrialised countries were seen as the reasons for the environmental problems. The essential role of 'education in environmental matters' as stated in the recommendations of the Stockholm conference was fully explored at the world's first intergovernmental conference on environmental education organised by UNESCO in cooperation with the U.N. Environment Programme (UNEP) and held in Tbilisi in 1977.

In the Tbilisi Declaration environment was interpreted in its "totality—natural and built, technological and social (economic, political, cultural-historical, ethical, aesthetic)" (UNESCO-UNEP 1977, 3). The goals formulated for environmental education went far beyond ecology in the curriculum and included development of a "clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas" (UNESCO-UNEP 1977, 2). These historical progressions demonstrate that in the international arena discussions of the environment developed from narrow, purely nature-oriented focuses to broader interpretations that included economic, social, political and economic aspects and their interdependence. Development was mostly interpreted in economic terms. Environment was the focus of attention.

The radical change in interpretations of environment–development relationships occurred in 1992 when the first principal of the Rio Declaration on Environment and Development (UN 1992a) proclaimed that "Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature". The document reinforced the message that developmental and environmental needs should be considered as integral components of the process of development. Therefore it represents the turning point from separating development and environment to its representation as sustainable development: "In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it" (UN 1992a, principle 4).

A concern for the human condition was also linked to economic development that was viewed only as a contributing factor for human development, and not an end in itself. Where the Tbilisi's statements referred to environment, Agenda 21 (UN,1992b) referred to environment and development, suggesting a transition to a greater concern for development and poverty alleviation. Inclusion of development into the international agenda required further examination of the dominant theories and practices of growth and development, in particular the role of economic development related to poverty reduction: "From the point of view of sustainable development, poverty reduction is the central concern of the economic element, but must be understood in relation to the other three elements: social, environmental and cultural" (UNESCO 2006, 20).

At the same time the current model of the market economy has been questioned as it "does not protect the environment and does not benefit roughly half of the world's people" (UNESCO 2006, 20). Therefore there is a need to search for different economic models that can contribute to SD and that include reduction of excessive wealth and more equitable distribution of it. "One basic challenge is to create global governance systems that harmonize the market more effectively with environmental protection and the goal of equity" (UNESCO 2006, 20). Until very recently the priority of economic growth had not been questioned. However, concern about redistributing the world's wealth appeared within SD discourses and became an important point on the international agenda. SD debates emphasised the impossibility of continued growth on our planet. The call has become one to find different patterns of consumption and production to safeguard Earth's regenerative capacities and communities' well-being. ESD proposes a framework for reconstruction of the complexities of modern life in global/local scales.

Thus, a concern for the human condition, in addition to the environmental condition, is now truly present in the political SD agenda. Economic development is viewed as a means of contributing to human development, and not an overarching goal. Of course it needs to be recognised that, since SD and ESD agendas have appeared in international political discourses, development of EE has not stopped and has started to include ESD elements and emphases within the EE field. Table 1 summarises development of EE and ESD agendas on the policy level.

Table 1. Development of ideas.

Paradigm		Concepts		Links
EE	Environment is in the centre of concerns; it is external to the person; the focus on curriculum and learning	environment	Nature → nature + man-made → totality of nature, built, technical and social Utilisation and conservation → improvement	Environment and development are not closely linked
		development	Economic development is not questioned → economic development within the Earth's capacity	
ESD	Human beings are in the centre of concerns; it is internal to the person; aim is to promote a new model of society; the focus is on provision of education, curriculum and learning	environment	Natural, built, social, cultural	Linking of environment and development
		development	The model of the market economy is questioned; social development is emphasised: to eliminate poverty and illiteracy, to empower people	

Human – environment relationships are central for both EE and ESD. However, considering the differences depicted above it is important to clarify the preferred paradigm for technology education. EE focuses on environmental problems and how they could be resolved so we can have a better future; ESD focuses on a human condition and works through the social development towards a desirable future.

Role of technology education

Different models of EE/ ESD provisions at the national level illustrate different approaches to planning and implementing educational programs concerning the environment – development relationship. Some models use a narrow interpretation of the environment and are introducing ecological education in schools (e.g. Russia); others historically interpret environment in a broader sense and include social and economic aspects into education processes (e.g. countries of South America); another approach identifies the move from ecologically oriented EE to a broader ESD framework (Australia) and the forth model includes ESD themes and approaches into a newly developed EE curriculum (e.g. Namibia) (Pavlova, 2010). All models represent suitable steps in educating children about environment-development relationships; however, the level of effectiveness, coherence and complexity of issues addressed could dramatically vary across these models. In terms of pedagogy, teaching and learning, EE and ESD have many shared features: life-long learning and inclusion of formal and non-formal education; interdisciplinarity; inclusion of social, environmental and economic realms; and use of a variety of pedagogical techniques that promote participatory learning, first-hand learning, and development of higher-order thinking skills (problem solving and critical thinking in Tbilisi's version).

It is possible to suggest that within technology education the broad spectrum of EE/ESD types of relationships can be observed, and in simplified terms it is expressed in a continuum between 'eco-design' and 'design for social development'. It is also possible to suggest that 'eco-design' is a more familiar and comfortable concept for technology teachers than a 'design for social development' (Elshof, 2005; Pavlova, 2009a).

In the countries where environment- development issues are addressed through technology education the main focus is on environmental impacts of design that are often studied through a life-cycle analysis of the designed products. An emphasis is on cleaner production processes, efficiency maximisation, recycling and waste minimisation, design for durability and disassembling. However, learning about issues that are related to human/ social development and design are less common, in particular as it often relates to design for 'foreign contexts" (Pitt & Lubben, 2009). Design of low-cost products that could increase the quality of life for people in low-income countries (Pavlova, 2009b) has not found their ways into technology education classroom on a large scale. For example, in the Technology Studies Syllabus (Queensland, Australia) the list of sustainability issues includes the following suggested subject matter: systems to ensure sustainability; eco-footprint, recycling, lifecycle analysis, and principles of sustainable design. While teachers, could address the social aspects of sustainable design as the 'principles of sustainable design' allow very broad interpretations, in practice (evident from the author's service on the State moderation panel where examples of students work are presented for the evaluation) students almost never address them.

To align technology education with the global agenda, a stronger emphasis on social development is required. However, this could pose challenges for many D&T curriculum designers and practitioners as not all teachers see these aspects of learning as essential for design and technology education (e.g. Hill & Elshof, 2007). Less than half of the teachers in Pitt and Lubben's study (2009) reported that they are confident in teaching the social dimension of sustainability. However, Pavlova (2009a) concluded that students need a strong guidance from teachers to see the relevance of the 'social development' aspect of design to their lives. A stronger focus on environmental/ecological issues than on the issues of social well-being of communities, and particularly, 'other communities' is definitely a case in many countries (e.g Russia, Australia) (Pavlova, 2008 -2011).

Conclusion

It has been argued that among the major differences between EE and ESD is their standing within the environmental–developmental paradigms. Although tensions between ESD and EE discourses are

present at the level of political debates, at the level of practice an overarching aim is to achieve the provision of more inclusive, quality education. The ultimate goal is to move towards the achievement of sustainable development goals and to use both EE and ESD structures/curriculum to support these processes. Countries are using different approaches to planning and implementing education that reflects different approaches to the human-nature relationships (UNESCO 2009). Some use a narrow interpretation of the environment and are introducing ecological education (environmental education in a narrow sense); while others interpret environment in a broader sense and include social aspects into education processes; and still others use a broader ESD framework or include ESD themes and approaches in existing curricula and nevertheless still call it EE.

These processes are also reflected in ways the issues of environment and development are addressed in technology education. It is proposed that the analysis presented in this paper could help to clarify and evaluate current practices within technology education, identify desirable models for a particular context, and include more emphasis on social development in design.

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