Environmental Education and Education for Sustainable Development

Therese Hume, Institute of Technology, Ballinode, Ireland
John Barry, Queens University Belfast, Belfast, UK

Abstract

This article attempts a broad characterization of environmental education (EE) and education for sustainable development (ESD), and includes a short overview of the history of the field, key debates, the main approaches to ESD and EE, and a look toward the future. However, such a brief account should not be considered to be fully comprehensive, and can only be considered to provide a broad overview of the field from the authors' perspectives.

Introduction

The ecological crisis and its associated problems in the social, cultural, political, and economic spheres is, in part, the product of ignorance, and as such knowledge of our global dilemma is a prerequisite for addressing it. For many, what we need is nothing less than a new enlightenment, an ecologically based one orientated around the needs of people and planet, and a clear eyed recognition that it is 'unsustainability' not 'sustainability' that characterizes our current global reality (Barry, 2012). Thus, what is needed is to investigate the role of education (both formal and informal) and its role in the transition from current unsustainability.

Environmental education (EE) and education for sustainable development (ESD) are not, nor can they ever be, 'just another' subject to be taught, given the challenges and opportunities outside the classroom and lecture theater to which it addresses. Following the contours and character of the ecological crisis that has given rise to it, ESD necessarily must be interdisciplinary, action-orientated, and holistic and combine both cognitive and conative aspects, as well as integrating both ethical and political analyses. This is a tall order! It is no easy task, but ESD did not create the conditions and problems, which has given rise to its development. Thus, given the knowledge context of unsustainable development, it is vital that a role to be found within the formal education system and outside to recover a sense of purpose fit for the times we live in and the multifaceted challenges and opportunities in the transition from 'actually existing unsustainability' (Barry, 2012).

Definitions and Declarations: a Brief History

EE in its current form emerged in the mid to late 1960s as a response to environmental problems caused through processes of modernity such as industrialization, consumerism, and urbanization. Its precursors included traditions of nature study, natural history, and conservation education. In the UK, the Council for Environmental Education first met in 1968 (Sterling, 2004); the *Journal of Environmental Education* was first published in the United States in 1969, and a seminal article, 'The Concept of Environmental Education,' gave one of the earliest definitions of the field (Stapp, 1969). According to Stapp, the aim of EE was to produce a motivated and knowledgeable citizenry concerning the biophysical environment, its problems, and their solution. Another major objective of EE, in addition to fostering an understanding of the environment and environmental problems and motivation to deal with them, was to ensure that individuals acquired a clear understanding that

> man is an inseparable part of a system, consisting of man, culture [organizational strategies, social processes and social arrangements] and the biophysical environment and that man has the ability to alter the relationships of this system.
>
> Stapp, 1969: 34

The sexist language used in these early declarations has been commented upon by Gough (2013b: 16), who also notes the 'man-made' nature of the foundational discourses of EE – women were largely absent in their formulation, and the discourse is that of a modernist science that separates 'man' and 'nature.' The long association of EE with science education (Gough, 2013a: 10) only began to change in the 1990s with the emergence of more socioecological approaches, which saw the natural science perspective as a simplification and inadequate to address the complex multilayered environmental problems (Kyburz-Gruber, 2013). Gough also argues that this gendered and science-based discourse also had implications in terms of a heavily positivist epistemology and ontology, which influenced much early research in EE (Robottom and Hart, 1993) and also influenced practice. Sterling (2004: 51) notes the early (and still predominant) 'environmental responsibility' view of sustainability education where the major aim was instrumental: changing unsustainable behavior through addressing environmental ignorance. Later studies such as Kollmuss and Agyeman (2002) demonstrated the paucity of such a linear 'deficit' model, and this has been reflected in an increasing emphasis on processes of learning as well as outcomes seen in, for example, socioecological approaches to education involving constructive, reflective, critical, and participatory elements (Kyburz-Gruber, 2013: 24).

The United Nations Conference on the Human Environment in Stockholm (UNEP, 1972), marked one of the first international acknowledgments of human–environmental problems, recommended the establishment of an international program of EE. Following this, a series of international

declarations and initiatives provided a more solid foundation for the emerging 'interdiscipline.' It is interesting that the first of these, in Belgrade Charter (1975), very clearly situated EE within a framework, which acknowledged growing global inequality and the need for a holistic approach to address environmental problems in the context of other issues such as hunger, poverty, illiteracy, and class, racial, and gender exploitation and domination. Possibly reflecting the influence of the *Limits to Growth* study (Meadows et al., 1972), the Belgrade declaration also challenged an uncritical approach to orthodox economic growth and articulated a need for a new global ethic, which not only considered humanity's place within the biosphere, but also would enable change leading to "an equitable distribution of the earth's resources" (Belgrade, 1975: 1–2). The environmental goal for nations was to improve all ecological relationships through clarifying what was meant by such concepts as 'quality of life' and 'human happiness' (Belgrade, 1975: 3). Consequently, the goal of EE was "to develop a world population with the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solution to current problems and the prevention of any new ones" (Belgrade, 1975: 3).

The objectives and guiding principles defined in Belgrade were further refined at the first major international intergovernmental conference on environmental education, held in Tbilisi, Georgia in 1977. The subsequent declaration (though not without criticism) was one of the most influential founding documents in the field and laid out the fundamental role, objectives, and characteristics of EE. Those characteristics included its necessarily multidisciplinary nature due to the biological, ethical, social, cultural, and economic aspects of environmental issues. Concepts such as complexity and interdependence were also introduced as key elements. The scope of EE was to encompass lifelong learning, critical and independent thinking within formal and informal learning contexts (UNESCO, 1977). These ideas were to heavily influence subsequent UN initiatives (see Tbilisi, 2012 for a detailed account of these).

Following the Brundtland report (WCED, 1988), which introduced the (much contested) concept of 'sustainable development,' the 1992 United Nations Conference on Environment and Development in Rio (UNEP, 2010) catalyzed a shift in emphasis toward ESD. Agenda 21 Chapter 36 laid out a set of recommendations and actions in education for national governments underpinned by the Tbilisi principles and proposals. Significantly, Agenda 21 stressed the *criticality* of education in "promoting sustainable development and improving the capacity of the people to address environment and development issues" (UNCED, 1992: Chapter 36, para 3). This also brought EE closer to the field of development education, which had emerged via a separate trajectory, involving NGOs and aid agencies and emphasizing individual and collective empowerment, participation, democratization, and social action (Sterling, 2004: 45). Development education brought a more radical set of influences such as the critical pedagogy of Freire (1972). More interpretative approaches to EE research became evident from the 1980s onward, increasing significantly in the 1990s (Gough, 2013b: 18). This coincided with a growth in more constructivist approaches to education generally. The influence of critical pedagogy has also become more prominent. For example, approaches using action research (Reason and Bradbury, 2006) and participatory action research (Tandon, 2008) have increased exponentially since the 1990s (Gough, 2013b: 19).

Further conferences included ECO-ED in Toronto (1992) and Thessaloniki (1997), where the concept of 'Education for a Sustainable Future' was introduced (UNESCO, 1997; Tbilisi, 2012). In Thessaloniki, a broad conceptualization of sustainability that encompassed poverty reduction, health, food, security, democracy, human rights, and peace was emphasized: "Sustainability is, in the final analysis, a moral and ethical imperative in which cultural diversity and traditional knowledge need to be respected" (UNESCO, 1997: para 10). These international initiatives added impetus to existing national strategies and catalyzed action in particular educational sectors. For example, Chhokar (2010) notes that, in 1992, the Indian Supreme Court ruled that EE should be a mandatory part of all higher education. The Talloires declaration (October 1990) included a commitment by university leaders to create cultures of sustainability within their institutions, ensure environmental literacy, and educate for environmentally responsible citizenship; to collaborate internally to promote interdisciplinarity and externally with relevant bodies to contribute to the global effort for sustainability. An organization, University Leaders for a Sustainable Future, was set up and a journal – the *International Journal for Sustainability in Higher Education* was established. The Copernicus Charter played a similar role in Europe.

The next significant development was the establishment of a UN Decade of Education for Sustainable Development (DESD) from 2005 to 2015, following a recommendation made at the World Summit on Sustainable Development in Johannesburg in September 2002 (Tbilisi, 2012). Each member country was encouraged to incorporate ESD into all relevant subjects in their formal education systems and to develop policies and practices to achieve this. Detailed recommendations and a framework for national implementation were outlined in the strategy document (UNECE, 2005). A network of Regional Centres of Expertise was also established to promote learning for a sustainable future (Mochizuki and Fadeeva, 2008). Other supporting initiatives included the Mainstreaming Environment and Sustainability in African Universities (MESA) programme, developed to support the mainstreaming of environment and sustainability concerns into teaching, research, community engagement, and management of universities in Africa.

Sterling (2004: 46) acknowledges that in the first 30 years from the 1960s, a huge amount of work has been done on the underlying philosophy, research methodologies, pedagogy, curricula, resources, communication, and dissemination strategies of EE/ESD, supported and resourced by international bodies such as UNESCO and other NGOs such as the WWF. The agenda has influenced national policies in many countries and many educational sectors, and there has been growing academic involvement and research networks (see also Wals and Blewitt, 2010). However, despite such sustained international attention and commitment, the 2007 Ahmedabad conference on Environmental Education explicitly acknowledged that, "the state of the planet has gone from bad to worse" (Ahmedabad, 2007: 3–4). Regarding EE/ESD (following

another series of international conferences and declarations Gothenburg, 2008; Bonn, 2009; Rio+20, 2012; Tbilisi, 2012), a recent review of the DESD (UNESCO, 2012) evidences mixed progress. ESD is increasingly seen as a means to renew education, teaching, and learning; however, despite a number of inspiring examples around the world, the reality is that, "ESD remains marginal if considered as a separate and distinct entity and commonly understood concept in schools' everyday conversations" (UNESCO, 2012: 85).

More than 40 years since the inception of the field, in the introduction to the *Handbook on Research in Environmental Education*, Stevenson et al. (2013: 2) provide a broad *consensus* on the characteristics of EE as currently manifest. For them, it embraces normative questions: it is interdisciplinary, with environmental, sociocultural, and economic dimensions; agency is important in addition to knowledge, understanding, attitudes, and values; it involves engaged, situated learning, which must also take place in the public domain; and has global and local aspects. In addition to this, perhaps above all else, it is explicitly (though unevenly) viewed as a political and transformative project. However, the breadth and, some would argue, necessary vagueness of terms used to define ESD have meant that the EE/ESD project has been widely criticized and to some extent fragmented (Sterling, 2004). The next section hence addresses key conflicts and contradictions in the field.

Problems and Key Contradictions

As discussed above, if we were to assess the effectiveness of the ESD project in terms of lessening what Barry (2012) has termed 'actually existing unsustainability,' we might conclude that there has been limited (if any) progress. One possible reason for this might be lack of implementation of the many declarations on ESD: Filho (2012), in a commentary preceding the Rio+20 summit, observes that the majority of declarations and action plans have never been fully implemented, particularly at regional and local levels. Martin et al. (2013: 1537), commenting generally on the DESD, note that most evidence indicates a rather ill-focused and half-hearted awareness raising campaign leading to a patchy impact and limited engagement. However, problems may run deeper than a failure to implement broadly agreed international strategies. Cook et al. (2010: 313–314) raise the question that "formal education, as it is currently organized is incapable *of* coming to grips with the problem?"

One core contradiction here is that ESD is mostly conducted within political and educational systems whose basic assumptions, particularly those underpinning how their economies are run, might fundamentally militate against ecological sustainability. As Wals and Corcoran (2012) note, it is impossible to examine questions of sustainability education without acknowledging the other processes taking place in society that are moving us toward unsustainability; these raise ethical and political issues of the unequal distribution of power and agency, social injustice, in addition to uncertainty and other complexities. This contradiction has been acknowledged as early as 1974 when the Institute for Earth Education was set up in the United States (Van Matre, 1990) on the basis that EE had been trivialized and diluted by both mainstream education and the agencies and industries who themselves are the main contributors to continuing unsustainability problems. David Selby points out the thorny problem of how a democratic citizenry, "immured in a pervasive consumerist ethic, can be squared with an environmental narrative predicated on the finiteness of the earth" Selby (2011: 10). The way that formal education systems themselves are structured and their fundamental epistemological objectives clearly militate against effective, that is, *transformative forms of ESD*. For example, one evaluation of the progress of the DESD (UNESCO, 2012: 86) suggests that colleges and universities around the world are starting to make more systemic changes toward sustainability, "amid educational reforms toward efficiency, accountability, privatization, and forms of management and control processes that often hamper their efforts" (UNESCO, 2012: 86). That is, the reform process within higher education institutions offers an unconducive context for ESD.

Other criticisms of ESD include the overemphasis of a tendency to view the student as an *individual* actor. As Scott and Gough put, this "neglects the picture of the student as a social and more public actor – as someone engaged in the messy but vital business of democratic citizenship that is so central to the received view of sustainable development and ESD" (Scott and Gough, 2010: 3737). This [individualized] view also lends itself to a serious dilution of a necessary politicized approach to learning and acting about current unsustainability and the transition to resilience and sustainability. However, the danger that such a politicized approach might turn prescriptive or dogmatic in certain cases has also been articulated: Sund and Lysgaard (2013) note that prescriptive, normative forms of ESD, which focus on learning outcomes as opposed to learning processes are problematic, as they often neglect educational best practice. Earlier criticisms of ESD concern politically prescriptive, dogmatic content using "emotionalism, myths and misinformation" (Kwong, 1997: 90). This raises the dilemma of how normative and ethical issues can be *effectively* explored in educational settings in a nondogmatic way, given the urgency of the need for change. The next section thus addresses a range of approaches to EE/ESD.

Approaches to EE/ESD: Moving Toward a Paradigm Shift

In 1993, three basic paradigms were identified by Robottom and Hart, roughly corresponding to the dominant research paradigms of the time: positivist, interpretivist, and critical. To these, Fien (2002) has added poststructuralism and more recently, Gough (2013b: 19) has noted the increasing influence of poststructuralism and multivoice, multicentred studies foregrounding indigenous knowledge, postcolonial and feminist perspectives, in addition to work on socioecological resilience. These basic paradigms or worldviews reflect particular approaches to education.

Vare and Scott (2007: 191) identify *instrumental* ESD, or ESD 1, as "the promotion of informed, skilled behaviours and ways of thinking," reflecting a more behavioristic, outcome-focused approach. The *intrinsic* ESD approach or ESD 2 is concerned with individual learning and involves "building capacity to think critically about what experts say and to test

ideas, exploring the dilemmas and contradictions inherent in sustainable living" (Vare and Scott, 2007: 191). This is based on a more constructivist educational philosophy and as such focuses more on the processes of learning (e.g., Wals, 2006). A third, more critical, approach to EE is concerned with social learning. Scott and Gough (2010: 3743) argue that "ESD can helpfully be seen as an education in citizenship: a responsive social learning process which is a preparation for informed, open-minded, social engagement with the main existential issues of the day that can be experienced in the family, the community and workplace, indeed, in all aspects of lifelong learning." More radical approaches derive from explicitly political and critical pedagogies (e.g., Freire, 1972), which place an emphasis on education for social and political transformation (see also Huckle, 2008). However, Freire's critical pedagogy, as well as other liberal education approaches such as Dewey's, has been criticized by Bowers (2005) who argues that the one key mistake these approaches have made is to assume that there is one 'true' approach to learning. To counter this, Bowers advocates examining "ecologically problematic cultural assumptions" (Bowers, 2005: 13) to dominant knowledge (including 'commonsense' taken for granted ideas of 'economic growth' as an agreed societal imperative), and a reappraisal of local knowledge systems and traditions reflects cultural and bioregional diversity.

The acknowledgment that content studied processes of learning, and diverse regional and political contexts of learning are *all* important, have led to more integrative models of ESD, utilizing social–ecological systems approaches. This shift can be seen in the work of educators such as Stephen Sterling (2003), who, echoing O'Sullivan (1999) note that (notwithstanding some essential differences) critical, transformative pedagogy and ESD can be complementary. For example, Sterling's (2003) model of 'sustainable education' essentially integrates and transcends a range of existing approaches and adopts a whole systems thinking approach, which he equates with a "postmodern ecological worldview" (Sterling, 2003: 39). Gregory Bateson's (1972) 'levels of learning' are used as a frame to enable the examination of learning in different contexts, and in different ways, all of which may have their uses. Learning 1 or learning within paradigm (a particular set of choices for action available within a particular worldview) can be seen as roughly corresponding to more instrumental forms of ESD or to "single-loop learning" (Argyris and Schön, 1996). Learning 2, more closely associated with critical thinking, and Argyris and Schon's "double-loop learning" involves awareness of alternative paradigms or worldviews that frame sets of choices. The third level of learning identified by Bateson, is essentially transformative, involving a more enlightened self-awareness of what frames choice in the individual. Thus, Sterling conceptualizes 'sustainable education' as:

> a change of educational culture which both develops and embodies the theory and practice of sustainability in a way which is critically aware. This would be a transformative paradigm which values, sustains and realizes human potential in relation to the need to attain and sustain social, economic and ecological well-being, recognizing that they are interdependent.
>
> Sterling, 2003: 233

This broader view incorporates individual, organizational, and social transformation and can also provide a pragmatic basis for change in existing formal education systems. For example, to engender change in higher education institutes, Jones et al. (2010), in common with many ESD practitioners advocate the use of a holistic definition of sustainability that brings into play dimensions of culture, economy, health, peace, and conflict, human rights, gender equality, science and technology, and social, global and intergenerational justice. This broader view also links to other more psychological approaches to how ESD can motivate behavioral change, i.e., move from critical thinking to action, such as the reasoned action approach (Fishbein and Ajzen, 2010). Multifaceted approaches inspire exploration of alternative problem definitions and solutions, and foster deliberation and debate, which require contribution from a wide range of disciplines.

Models such as Sterling's, by integrating and effectively transcending a number of approaches, thus fulfill the requirement articulated by the Ahmedabad conference (2007: 4) for "fundamental change in the purpose and practice of education." The American College and University Presidents' Climate Commitment, following Cortese (2003), describe what such change might look like in higher education:

> - The *context* of learning would change to make human/environment interdependence, values and ethics a seamless and central part of teaching of all the disciplines, campus operations should be sustainable, and partnership should occur between local, regional and global communities.
> - The *content* of learning would further reflect interdisciplinary systems thinking, dynamics and analysis for all majors and disciplines and bring lateral rigor across the disciplines as well as the vertical rigor currently within them.
> - The *process* of education would complement formal curriculum with active, experiential, inquiry-based learning and real-world problem solving both campus-based and within the larger community.
>
> ACUPCC, 2009: 6

Emerging areas in higher education, which reflect such a paradigm shift include the emerging field of sustainability science that: "seeks to understand the fundamental character of interactions between nature and society" (Kates et al., 2001: 641).

Moving toward the Future: ESD and the Building of Resilient Communities

A more recent movement in EE/ESD, reflecting the need to address emerging and potential environmental problems, has been in the area of learning for resilience and in examining the role of learning in the building of resilient communities in the context of exacerbating ecological and resource problems, such as climate change and 'peak oil.' This has been influenced by grassroots movements, such as the 'transition towns' movement (Hopkins, 2008; Barry, 2012), and studies of resilience and adaptive capacity in

socioecological systems (e.g., Folke et al., 2002). This also reflects a shift from more reductionist paradigms toward a complex adaptive systems worldview (Barry, 2012), which can be seen in fields such as education, ecology, ecosystem management, and reflexive governance for sustainability. This worldview sees reality as complex and dynamic, there is no 'one right answer,' and sustainability and resilience are seen as emergent properties of specific social–ecological systems. Thus sustainability and resilience (and therefore education for both) will differ in different socioecological contexts so that ESD/EE in Belfast will not necessarily be the same as EE/ESD in Boston, Berlin, or Beijing.

Thus, building resilience in bioregions involves "diagnosing, mapping and adapting to" (Giddens, 2009: 163) existing and *emerging* vulnerabilities. It also involves attending to "slowly-changing, fundamental variables that create memory, legacy, diversity, and the capacity to innovate in both social and ecological components of the system" (Folke et al., 2002: 8). This implies *on-going* processes of learning, innovation, and knowledge creation utilizing a diverse range of existing and historical knowledge and skills. In this way, learning for resilience occurs at different levels: individual, group, community, organization – and in different settings (home, school, work, street, community, formal and informal contexts, etc.). Sterling (2010) equates the resilient learner with the *intrinsic* approach to sustainability education (Vare and Scott, 2007), focused on building the capacity in the individual to be critically aware, inquire, and learn. How individuals collectively learn is also important in building resilience at community and societal levels. Lundholm and Plummer (2010), citing Glasser (2007), note that social learning depends on the maturity and competence of the individuals involved and the rules that guide particular organizational learning, public participation, and decision-making processes. Thus learning for resilience is lifelong, both responsive and anticipatory, and multifaceted. It requires a rethink of how learning and institutions of learning are structured, to reflect a more outward-looking social focus and provide a public resource for learning, action, and political transformation. And given the continuing unsustainability of human–nature relations, ESD must also be seen as an essential element in creating a "safe operating space for humanity" (Rockström et al., 2009).

Conclusion

At a fundamental level, Thomas Berry cites the relationship between humans and the other than human components that we live in as the "missing element" in education (Berry, in O'Sullivan, 1999: x). For Berry, educationalists have forgotten that "we and all our institutes of learning are primarily in a learning position in reference to the larger world around us," and that "every occupation must be established *within* the integral functioning of the planet" (O'Sullivan, 1999: xiv, emphasis added). Thus, there is an imperative to renew "our acquaintance with the sensuous world in which our techniques and technologies are all rooted" (Abram, 1996: x). To this end, Orr (2004) notes that education should be reshaped in a way that fosters cultivation of 'biophilia' ("the urge to affiliate with other forms of life" Wilson (1984)), a process that should begin in childhood and continue throughout life. Such an approach is evident in earth education (Van Matre, 1990), forest education (www.forestededucation.org), and the civic ecology (www.civicecology.org) movements – effectively outdoor and/or community-based education, which will draw out "our affinity for life" (Orr, 2004: 213), and foster a love of nature. The idea of 'sustainability competence' (Wals and Corcoran, 2012: 24) thus includes the ability to put oneself in the mind of others, even other species, having different backgrounds or living elsewhere, in addition to abilities to see relationships and interdependencies and to envision future implications.

However, to be effective in addressing existing forces of unsustainability, ESD must (in our view) be profoundly *political* and aimed at real world transformation (Barry, 2007). As mentioned above, almost 40 years ago, the Belgrade (1975) very clearly situated EE within an ethical and political framework, which would enable change leading to "an equitable distribution of the earth's resources […] more fairly satisfying the needs of all people" (Belgrade, 1975: 2) and improve socioecological relationships through clarifying what was meant by such concepts as 'quality of life' and 'human happiness' (Belgrade, 1975: 3). To grow such an ethical framework requires broader, systemic, and political conceptualizations of ESD incorporating individual and social learning, in addition to the acquisition of practical skills and diverse knowledge. As the 2007 Ahmedabad conference noted, "we need recommendations that help alter our economic and production systems, and ways of living radically. We need an educational framework that not only follows such radical changes, but can take the lead" (Ahmedabad, 2007: 4). And, in that way, we find that both EE and ESD are, properly speaking, concerned not so much with humanity 'learning' about nature, but learning about ourselves and nature within the central learning objective of how to understand and ultimately transform our species' foundational and ineliminable relationship with the nonhuman world.

See also: Communities of Practice; Education and Economic Growth; Educational Effectiveness Theory and Research: Recent Advances; Educational Philosophy; Environments for Education; Equity and Education; Gender and Education; Learning Theories and Educational Paradigms; Moral Development and Education; Science Education.

Bibliography

Abram, David, 1996. The Spell of the Sensuous. Random House.

ACUPCC, 2009. Education for Climate Neutrality and Sustainability. Guidance for ACUPCC Institutions. http://www.presidentsclimatecommitment.org/documents/EducationforClimateNeutralitySustainability_2009.05.07_finalWEB.pdf (accessed 16.12.11.).

Ahmedabad, 2007. The Ahmedabad Declaration 2007: A Call to Action. http://www.tbilisiplus30.org/Ahmedabad%20Declaration.pdf (accessed 16.12.11.).

Ahmedabad Recommendations, 2007. Moving Forward from Ahmedabad: Environmental Education in the 21st Century. http://www.tbilisiplus30.org/Final%20Recommendations.pdf (accessed 16.12.11.).

Argyris, C., Schön, D., 1996. Organisational Learning II: Theory, Learning and Practice. Addison-Wesley Publishing, Reading, MA.

Barry, J., 2007. Spires, plateaus and the infertile landscape of education for sustainable development: re-invigorating the university through integrating community, campus and curriculum. International Journal of Innovation and Sustainable Development 2 (3/4), 433–452.

Barry, John, 2012. The Politics of Actually Existing Unsustainability. Oxford University Press.

Bateson, G., 1972/1987. Steps to an Ecology of Mind. Aronson.

Belgrade, 1975. International Workshop on Environmental Education – Belgrade Charter. http://unesdoc.unesco.org (accessed 21.07.13.).

Bonn, 2009. Bonn Declaration, UNESCO World Conference on Education for Sustainable Development. www.esd-world-conference-2009.org (accessed 14.02.12.).

Bowers, Chet, 2005. Educating for a Sustainable Future: Mediating between the Commons and Economic Globalization. www.c-a-bowers.com (accessed 21.07.12.). (Refers to Bowers, Chet, 2005. Silences and Double Binds: Why the Theories of John Dewey and Paulo Freire Cannot Contribute to the Revitalization of the Commons. www.c-a-bowers.com (accessed 21.07.12.).)

Chhokar, Kiran Banga, 2010. Higher education and curriculum innovation for sustainable development in India. International Journal of Sustainability in Higher Education 11 (2), 141–152.

Cook, R., Cutting, R., Summers, D., 2010. If sustainability needs new values, whose values? Initial teacher training and the transition to sustainability. In: Jones, P., Selby, D., Sterling, S. (Eds.), Sustainability Education: Perspectives and Practice across Higher Education. Earthscan, London, pp. 313–328.

Cortese, Anthony D., 2003. The critical role of higher education in creating a sustainable future. Planning for Higher Education March-May, 15–22. http://www.scup.org/asset/48483/cortese.pdf (accessed 21.07.13.).

Fien, John, 2002. Advancing sustainability in higher education: issues and opportunities for research. International Journal of Sustainability in Higher Education 3 (3), 243–253.

Filho, Walter Leal, June 17, 2012. Future Challenges for Sustainable Development. University World News. http://www.universityworldnews.com (accessed 21.07.13.).

Fishbein, M., Ajzen, I., 2010. Predicting and Changing Behavior: The Reasoned Action Approach. Psychology Press.

Folke, C., et al., 2002. Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations, Scientific Background Paper on Resilience for the Process of the World Summit on Sustainable Development. Environmental Advisory Council to the Swedish Government. www.mvb.gov.se (accessed January 2011).

Freire, P., 1972. Pedagogy of the Oppressed. Penguin, London.

Giddens, Anthony, 2009. The Politics of Climate Change. Newleaf.

Glasser, Harold, 2007. Minding the gap: the role of social learning in linking our stated desire for a more sustainable world to our everyday actions and policies. In: Wals, A.E.J. (Ed.), Social Learning towards a Sustainable World. Principles, Perspectives, and Praxis. Wageningen Publishers, Wageningen, The Netherlands, pp. 35–62.

Gough, Annette, 2013a. Historical, contextual and theoretical orientations that have shaped environmental education research. In: Stevenson, Robert B., Brody, Michael, Dillon, Justin, Wals, Arjen E.J. (Eds.), International Handbook of Research on Environmental Education. Routledge, pp. 9–12.

Gough, Annette, 2013b. The emergence of environmental education research: a 'history' of the field. In: Stevenson, Robert B., Brody, Michael, Dillon, Justin, Wals, Arjen E.J. (Eds.), International Handbook of Research on Environmental Education. Routledge, pp. 13–22.

Gothenburg, 2008. Gothenburg Recommendations on Education for Sustainable Development. University of Gothenburg.

Hopkins, Robert, 2008. The Transition Handbook from Oil Dependency to Local Resilience. Green Books.

Huckle, J., 2008. Sustainable development (Chapter 26). In: Arthur, J., Davies, I., Hahn, C. (Eds.), The Sage Handbook of Education for Citizenship and Democracy. Sage Publications, London, pp. 342–354.

Jones, P., Selby, D., Sterling, S., 2010. Sustainability Education: Perspectives and Practice across Higher Education. Earthscan, London.

Kates, R.W., Clark, W.C., Corell, R., Hall, J.M., Jaegar, C.C., Lowell, I., et al., 2001. Sustainability science. Science 291, 641–642.

Kollmuss, Anja, Agyeman, Julian, 2002. Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research 8 (3), 239–260.

Kwong, Jo, 1997. A Critique of Environmental Education in Environmental Education by Benjamin Aldrich-Moodie and Jo Kwong. IEA Education and Training Unit and IEA Environment Unit, London.

Kyburz-Gruber, H., 2013. Socioecological approaches to environmental education and research. In: Stevenson, Robert B., Brody, Michael, Dillon, Justin, Wals, Arjen E.J. (Eds.), International Handbook of Research on Environmental Education. Routledge, pp. 23–32.

Lundholm, C., Plummer, P., 2010. Resilience in social-ecological systems: the role of learning and education. Environmental Education Research 16 (5–6), 475–491.

Martin, S., Dillon, J., Higgins, P., Peters, C., Scott, W., 2013. Divergent evolution in education for sustainable development policy in the United Kingdom: current status, best practice, and opportunities for the future. Sustainability (5), 1522–1544.

Meadows, Donella, Meadows, Dennis, Jørgen, Randers, William, Behrens, 1972. Limits to Growth, Club of Rome 1972. New American Library, New York.

Mochizuki, Yoko, Fadeeva, Zinaida, 2008. Regional centres of expertise on education for sustainable development: an overview. International Journal of Sustainability in Higher Education 9 (4), 369–381.

O'Sullivan, Edward, 1999. Transformative Education. University of Toronto Press.

Orr, David, 2004. Earth in Mind, 10th anniversary ed. Island Press.

Reason, P., Bradbury, H., 2006. Handbook of Action Research. Sage.

Robottom, I., Hart, P., 1993. Research in Environmental Education: Engaging the Debate. Deakin University, Geelong.

Rockström, J., et al., 2009. Planetary boundaries: exploring the safe operating space for humanity. Ecology and Society 14 (2), 472–475. www.ecologyandsociety.org (accessed 26.03.11.).

Rio+20, 2012. Education for a Sustainable Future. http://www.unesco.org/new/en/rio-20/educating-for-a-sustainable-future/ (accessed 21.07.13.).

Scott, William, Gough, Stephen, 2010. Sustainability, learning and capability: exploring questions of balance. Sustainability (2), 3735–3746.

Selby, D., 2011. Education for sustainable contraction as appropriate response to global heating. Journal for Activism in Science & Technology Education 3 (1), 5.

Stapp, William, 1969. The concept of environmental education. Journal of Environmental Education 1 (1), 33–35.

Sterling, Stephen, 2003. Whole Systems Thinking as a Basis for Paradigm Change in Education: Explorations in the Context of Sustainability. University of Bath. www.bath.ac.uk/cree/sterling/sterlingthesis.pdf (accessed 20.07.13.).

Sterling, Stephen, 2004. An analysis of the development of sustainability education internationally: evolution, interpretation and potential transformation. In: Blewitt, John, Cullingford, Cedric (Eds.), The Sustainability Curriculum: The Challenge for Higher Education. Earthscan, pp. 43–62.

Sterling, Stephen, 2010. Resilience and education. Environmental Education Research 16, 5–6.

Stevenson, Robert B., Brody, Michael, Dillon, Justin, Wals, Arjen E.J. (Eds.), 2013. International Handbook of Research on Environmental Education. Routledge.

Sund, Per, Lysgaard, Jonas Greve, 2013. Reclaim "education". In: Environmental and Sustainability Education Research Sustainability, vol. 5, pp. 1598–1616.

Tandon, Rajesh, 2008. Search of Relevance: Higher Education for Participatory Research and Sustainable Development, in Reinventing Higher Education: Towards Participatory and Sustainable Development. UNESCO, Bangkok. http://unesdoc.unesco.org/images/0016/001631/163155e.pdf (accessed 28.07.13.).

Tailloires, October 1990. Tailloires Declaration. http://www.ulsf.org/talloires_declaration.html (accessed April 2009).

Tbilisi, 2012. Tbilisi+35 a History of Education for Sustainable Development. Ministry of Environment Protection of Georgia.

UNCED, 1992. Agenda 21. Chapter 36, para 3. http://www.un-documents.net/a21-36.htm (accessed 21.07.13.).

UNECE, March 23, 2005. UNECE Strategy for Education for Sustainable Development, United Nations. CEP/AC.13/2005/3/Rev.1.

UNEP, 1972. Declaration of the United Nations Conference on the Human Environment. http://www.unep.org/Documents.Multilingual/Default.asp?documentID=97&ArticleID=1503 (accessed 21.07.13.).

UNEP, 2010. Climate Change Factsheet. http://www.unep.org/climatechange/ (accessed 21.12.11.).

UNESCO, 1977. Intergovernmental Conference on Environmental Education: Final Report. UNESCO. http://unesdoc.unesco.org/images/0003/000327/032763eo.pdf (accessed 23.07.13.).

UNESCO, December 1997. Thessaloniki Declaration UNESCO-EPD-97KONF.40 IKLD.212. http://resources.spaces3.com/f49d326a-5930-45cf-a9ef-4d23a0670a6d.pdf (accessed 20.07.13.).

UNESCO, 2012. DESD Monitoring and Evaluation 2012. http://unesdoc.unesco.org/images/0021/002164/216472e.pdf (accessed 21.07.13.).

Vare, P., Scott, W.A.H., 2007. Learning for a change: exploring the relationship between education and sustainable development. Journal of Education for Sustainable Development September 1 (2), 191–198.
Van Matre, Steve, 1990. Earth Education: A New Beginning. Institute for Earth Education, Greenville, WV.
Wals, Arjen E.J., 2006. The end of ESD … the beginning of transformative learning – emphasizing the E in ESD. In: Cantell, Mikko (Ed.), Seminar on Education for Sustainable Development. Wageningen University, The Netherlands. Translation: Laura Murto, 2006. Publication Series of the Finnish National Commission for UNESCO, No. 83. Helsinki.
Wals, Arjen E.J., Blewitt, J., 2010. Third-wave sustainability in higher education, some (inter)national trends and developments. In: Jones, P., Selby, D., Sterling, S. (Eds.), Sustainability Education: Perspectives and Practice across Higher Education. Earthscan, London, pp. 55–74.
Wals, Arjen E.J., Corcoran, Peter B., 2012. Learning for Sustainability in Times of Accelerating Change. Wageningen Academic.
WCED, 1988. Our Common Future, Report of the World Commission on Environment and Development. Oxford University Press, Oxford, England.
Wilson, E.O., 1984. Biophilia. Harvard University Press, Harvard.

Relevant Websites

http://www.civicecology.org/ – Civic Ecology.
http://www.copernicus-alliance.org/ – Copernicus Alliance.
http://www.desd.org/ – Decade of Education for Sustainable Development.
http://www.ecojusticeeducation.org/ – Ecojustice Education.
http://www.foresteducation.org/ – Forest Education.
http://www.resalliance.org/ – Resilience Alliance.
http://www.transitionnetwork.org/ – Transition Network.
http://www.ulsf.org/ – University Leaders for a Sustainable Future.