



**SUSTAINABILITY  
EDUCATION LITERATURE  
REVIEW**

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**1. A plurality of meanings (Polissemia dos conceitos)**

The core ideas and principles of sustainability science, as summarised by Martens, Roorda, and Cörvers (2010, p. 295), are:

- Inter- and transdisciplinary research,
- Co-production of knowledge,
- Co-evolution of a complex system and its environment,
- Learning through doing and doing through learning,
- System innovation instead of system optimization.

"Simply stated, this new approach promoted by sustainability science can be represented as *coproduction*, *co-evolution*, and *co-learning*. The theory of complex systems can be employed as an umbrella mechanism to bring together the various different parts of the sustainability puzzle", a perspective that authors such as Morin, Ciurana, Motta (2002), O'Sullivan (1999) and Sterling (2003) have explored in its pedagogical implications.

At the core of such an approach is the concept of sustainable life. Moacir Gadotti (2009) suggests to consider a **sustainable life** as "a lifestyle that harmonizes human environmental ecology by means of appropriate technologies, cooperation economies and individual effort. It is an intentional lifestyle whose characteristics are personal responsibility, commitment to other people and a spiritual life. A sustainable lifestyle is related to ethics in managing the environment and economy, trying to keep balance between the fulfilment of current needs and the fulfilment of the future generations' needs".

A typology of conceptions of the environment and examples of teaching strategies and key competences in education for sustainability is outlined by Sauv  (1996) and it is summarised in the following table.

Environment...	type of relationship	principal characteristics	examples of teaching / learning strategies
as nature	to be appreciated, respected, preserved	the original, "pure" environment; nature-as-a-cathedral; nature-as-a-uterus	<ul style="list-style-type: none"> <li>• nature exhibitions;</li> <li>• immersion in nature</li> </ul>
as a resource	to be managed	our collective biophysical heritage, sustaining quality of life	<ul style="list-style-type: none"> <li>• 3Rs campaigns;</li> <li>• audit of energy consumption</li> </ul>
as a problem	to be solved	the biophysical environment, supporter of life, threatened by pollution, deterioration	<ul style="list-style-type: none"> <li>• problem-solving strategies</li> <li>• case study</li> </ul>
as a place to live	to know and learn about, to plan for, to take care of	our daily living environment with its sociocultural, technological and historical components	<ul style="list-style-type: none"> <li>• environmental story of our place</li> <li>• eco-gardening project</li> </ul>
as the biosphere	in which we all live together, into the future	the spaceship Earth, object of planetary consciousness, a world of interdependence between beings and things	<ul style="list-style-type: none"> <li>• case study on a global issue;</li> <li>• storytelling illustrating different cosmologies</li> </ul>
as a community project	in which to get involved	a shared living milieu; the focus of socially critical analysis; a political concern for the community	<ul style="list-style-type: none"> <li>• integral action-research (participatory process aimed at transformation);</li> <li>• environmental issue forums</li> </ul>

In terms of pedagogical approaches, Tucker (2003, pages 48–49) reminds us of the Confucian perspective espoused by Tu Weiming: "Human beings are (. . .) an integral part of the 'chain of being,' encompassing Heaven, Earth, and the myriad things. However, the uniqueness of being human is the intrinsic capacity of the mind to 'embody' (. . .) the cosmic in its conscience and consciousness. Through this embodying, the mind realizes its own sensitivity, manifests true humanity and assists in the cosmic transformation of Heaven and Earth". Tucker (2003, p. 49) observes that "This cosmic transformation implies that humans have a special role in being aligned with the fecund, nourishing powers of life. They need to be responsive to other humans but also to the larger macrocosm of the universe in which humans are a microcosm".

## **2. Ecopedagogy, education for sustainability, education for social and environmental justice (Ecopedagogia e educação para a sustentabilidade/justicia social y ambiental)**

In claiming that we should adopt a relational perspective in thinking about the world we live in, Gregory Bateson (1972, p. 461) reminds us that we are "governed by epistemologies that we know to be wrong".

Sterling (2003) summarises in seven sets of questions the epistemological changes that educators need to address in order to step out of the deterministic Western paradigm in order to recognise it and to master it rather than it mastering us:

- *holistic*: how does this relate to that?, what is the larger context here?
- *critical*: why are things this way, in whose interests?
- *appreciative*: what's good, and what already works well here?
- *inclusive*: who/what is being heard, listened to and engaged?
- *systemic*: what are or might be the consequences of this?
- *creative*: what innovation might be required?; and
- *ethical*: how should this relate to that?, what is wise action?, how can we work towards the inclusive wellbeing of the whole system?

Although when compared to the idea of sustainable life its objectives are often more narrowly defined, today Education for Sustainable Development (**ESD**) has a dominant role in bridging concepts and educational approaches concerning environment, sustainability, climate change, lifestyles and learning. ESD has its roots in the 1972 Stockholm United Nations Conference on the Human Environment, in the Brundtland Commission Report (1987) and in the 1992 and 2002 Earth Summits.

According to UNESCO, Education for Sustainable Development (ESD) implies **four main areas of work**.

The first area concerns improving access and retention in quality basic education: enrolling and retaining both girls and boys in a quality basic education is important to the well-being of individuals over their lifetime and to the society in which they live. Basic education should focus on learners gaining knowledge, skills, values and perspectives that encourage sustainable livelihoods and support citizens to live sustainable lives.

Reorienting existing educational programmes to address sustainability represents a second area of work and it implies rethinking and revising education from early childhood education to university to include knowledge, skills, perspectives and values related to sustainability is essential. The students of today need to be able to solve the problems of tomorrow.

Unfortunately, such solutions are rarely found within existing textbooks and educational practices. Therefore, students must also develop creativity and problem-solving skills to create a more sustainable future.

A third area of work concerns increasing public understanding and awareness of sustainability, achieving the goals of sustainable development requires citizens who are knowledgeable about sustainability and the actions needed to reach sustainability goals. Such citizens will require widespread community education and responsible media committed to encouraging lifelong learning in an informed and active population.

The fourth area of work focuses on providing training to all sectors of society as all of them can contribute to sustainability. Both public and private sector employees should receive ongoing vocational and professional training infused with the principles of sustainability, so that all sectors of the labour force can access the knowledge and skills necessary to make decisions and perform their work in a more sustainable manner.

Within this scenario authors like Haigh (2005) highlights the needs for education to "green the curriculum". William Scott's Keynote Address to the Fourth World Environmental Education Congress, Durban, July 2007 (Scott 2009) explores what environmental education researchers might learn from the previous 30 years of work (since the Tbilisi conference), and presents some of the current challenges in doing, and using, research. Scott's suggests that greater openness to new approaches should be promoted, as well as different ways of thinking and working, more understanding across cultures, and a stronger research focus on understanding the relationship between sustainability, society and learning. According to Scott there are two main reasons for the environmental education community to reach out to other researchers and users of research, and especially to policy-makers:

- because they need to know more about the significance of what environmental education researchers do; and

- because environmental education researchers need to work with them if environmental education researchers are to make a significant contribution to resolving the issues the planet faces.

A critique of a strict environmentalist approach to Education for Sustainable Development comes from authors such as Bonnett (2002, p.11) that shows as this approach “assumes that it implies a systematic action policy developed by those who ‘know’ and imposed on those who don’t. Furthermore it is assumed that its success can be measured in terms of consumption levels, that its underlying values are largely economic and unproblematic, that relevant knowledge is generated by subject experts and that its implications for the moral/social/political structure of society are basically consistent with the status quo. ‘Sustainable development’ rapidly converges with ‘common sense’ and an instrumental rationality determines the means for achieving a set of taken-for-granted ends”. According to Gadotti (2008a, p. 20–21) education for sustainability should not be limited to the cognitive aspects, as it “involves challenges, behaviours, attitudes and intentions,” as well as the ability ‘to feel bound to the human community’. Drawing upon this Latin American popular education tradition that refers to authors such as Freire, and to the critical pedagogy debate Kahn (2010) summarises the key ecopedagogy issues and outlines its philosophical implications for the “global north”. Such ecopedagogy perspectives challenges dominant ecoliteracy approaches and questions the definition of education for sustainable development drawing inspiration from worldwide debate and practice such as the Earth Charter process, centred on the Charter that was formally launched by the Earth Charter Commission in 2000, with endorsements by over 5,000 organizations, including many governments and international organizations. It contains a preamble, 16 main principles, sixty-one supporting principles, and a conclusion entitled “The Way Forward.” The Preamble affirms that “we are one human family and one Earth community with a common destiny,” and the Earth Charter encourages all people to recognize their shared responsibility, each according to his or her situation and capacity, for the well-being of the whole human family, the greater community of life, and future generations. Recognizing the interrelationship of humanity’s environmental, economic, social, and cultural problems, the Earth Charter presents an inclusive, integrated ethical framework. The titles of the four sections into which the principles are divided indicate the breadth of the vision: I Respect and Care for the Community of Life; II Ecological Integrity; III Social and Economic Justice; and IV Democracy, Non-Violence, and Peace. The Earth Charter identifies a number of widely shared spiritual attitudes and values that can strengthen commitment to its ethical principles, and the document culminates with a vision of peace and the joyful celebration of life.

### **3. Sustainability education practice (Práticas de educação para a sustentabilidade)**

Authors-practitioners such as Paulo Freire and Carlos Rodrigues Brandão stress that “nobody teaches anybody” as learning is always a personal and an “internal” process. Within this perspective, the sustainability dimension is closely linked with the use and abuse of new technologies in education, triggering (or not) through learning environments the ability to reflect upon choices about technology also in non technological ways and providing room for hacker ethics, copyleft and creative commons examples of new technology production and use. What are students’ attitudes towards issues of sustainability? A recent paper by Eyuboglu, Uslu and Oz (2010) highlights that in the case of Turkish Higher Education students the majority of them show an awareness of environmental issues, they “care for the environment and other people around them, consider the health and quality of life of future generations as very important and willing to take action to create a fair, healthy, and safe world for all. However, the respondents are not familiar with the term, the definition or the importance of sustainability, which shows serious problems with the dissemination of knowledge, information and thoughts about the environment, environmental protection and sustainability among the university students in Turkey. The knowledge students have is transferred mainly through commercial media and not through proper education”.

The UNESCO report on progress since the 1992 Rio Summit, prepared for the 2002 Durban World Summit on Sustainable Development highlighted how “much of current education falls

far short of what is required’, and calls for a ‘new vision’ and ‘a deeper, more ambitious way of thinking about education” (UNESCO, 2004).

There is, yet, no agreement within the international debate on what are the most important ESD key competencies. In a Delphi study conducted by Rieckmann (2011), the following question was asked to experts from Europe (Germany, Great Britain) and Latin America (Chile, Ecuador, Mexico):

Which individual key competencies are crucial for understanding central challenges facing the world society and for facilitating its development towards a more sustainable future?

The discussion involved the reflection upon a number of key competencies. These were condensed to twelve key competencies, all of which are considered relevant for sustainable development both in the North and the South. However, the results also reveal some differences between the European and Latin-American perceptions although the key competencies identified by the Rieckmann study show similarities with other sustainability competence concepts.

Martens, Roorda, and Cörvers (2010) summarise the key sustainability competences as four functions (apply, integrate, improve, innovate) of the capacity to co-operate in inter- and trans-disciplinary ways, as outline in the following table:

<b>Table 3. Competence S1: Cooperate in an Inter- and Transdisciplinary Way</b>	
<b>Level 1: Apply</b>	<ul style="list-style-type: none"> <li>In your professional activities, you consider aspects of other disciplines, i.e., in a multidisciplinary approach.</li> </ul>
<b>Level 2: Integrate</b>	<ul style="list-style-type: none"> <li>You carry out these activities as a member of an interdisciplinary team.</li> </ul>
<b>Level 3: Improve</b>	<ul style="list-style-type: none"> <li>You involve stakeholders, including those who do not represent a specific professional discipline, actively in the activities, thus creating a transdisciplinary approach.</li> </ul>
<b>Level 4: Innovate</b>	<ul style="list-style-type: none"> <li>You enlarge the target area of the activities to new kinds of stakeholders and/or cultures.</li> </ul>

### **3.1 Environmental Audits**

Sterling (2011) summarises the tasks that should be part of the education institutions contribution to the UN Decade beyond generic teaching and research on sustainability. “They are also encouraged to provide practical leadership through modeling good practice in areas such as their own energy use, carbon emissions, procurement policies, recycling and campus management” (Sterling, 2011, p.667). Within this perspective sustainability audit acquire an important role. Angeles Murga-Menoyo M. (2009) reports how in Spain, most schools

committed to the implementation *Agenda 21* “perform an environmental audit as part of the process to reveal their institutional situation from the point of view of documented criteria of sustainability. Each educational community (teachers, students, relatives and the entire school staff) decides what aspects to evaluate, which usually have to do with the ecological dimension of school life, and it generally asks outside experts for support in carrying out the diagnostic process, which is done in different phases:

1. Creation of an initial working group, an *environment committee*, in charge of posing the first objectives and activities for starting up the project.
  2. Selection of the items to audit, taking into account the educational and environmental needs “felt” as such by the school. One obvious problem, for example, the use and sustainable management of waste, energy or water, could be set up as the backbone of the project to orient the initial environmental audit and determine subsequent actions.
  3. Preparation of materials and instruments for gathering the data needed to perform the audit; these materials and instruments could be created ad hoc, as an activity that virtually trains the educational community itself, or borrowed from other schools or institutions (There are some approved institutions that can provide support at the early stage).
  4. Action planning; environmental actions oriented toward improving the school’s infrastructures, and also specifically educational actions: changes in rules, environmentalisation of the curriculum, didactic changes, etc.
  5. Development of internal mechanisms for disseminating information and the structures for participation by the entire educational community.
  6. Evaluation of actions (clear, practical, conclusive evaluation) and reporting of the results to all members of the educational community. There is a wide variety of specific models that, in substance, follow this sequential outline. They all have the common denominator of assigning a central role to the entire educational community’s participation in decision making”.
- Scott and Gough (2010) support the importance of this type of initiatives and their potential pedagogical impact by arguing that “rigorous institutional engagement with marketing sustainability credentials can have a significant impact on the quality and depth of sustainability performance by helping spread, enrich and diversify the institutional sustainability culture”.

#### **4. Economical models and sustainability (Sustentabilidade e modelo econômico)**

Authors as Sterling (2003) stress that we are educated by and large to “compete and consume” rather than to “care and conserve” and that most educational theory and practice still supports unsustainable practices.

Within the dominant neoliberal economical model, Hendry (2010, p. 11) identifies seven key (pricing and regulation) issues facing economics in relation to “climate change externalities”:

- (1) the consequences for economic analyses of shifts in distributions;
- (2) risk perceptions and attitudes to anthropogenic effects on climate;
- (3) how to evaluate the future costs of climate changes and possible benefits from mitigation;
- (4) designing mechanisms, permits and auctions to mitigate greenhouse gas emissions;
- (5) global negotiations about emissions abatement;
- (6) intellectual property rights and prizes for new technological investment; and
- (7) modelling and forecasting climate change and reactions to any resulting price and income changes.

In his conclusions Hendry (2010, p.17) highlights that “the first mitigation steps need not be costly, and a rising price of carbon could lower usage and stimulate innovation. International negotiations are more likely to succeed if some actions have already been taken at the country level—potentially creating opportunities as new technologies develop”.

Other authors such as Gadotti (2009, p.87) show a concern for five interlinked “deep crises” scenario that are sparked by the present unsustainable economical model:

- *world social crisis*: cruel and pitiless poverty and exclusion of members of our own species;
- *drinking water crisis*: many children die from diseases caused by the lack or treatment of water and sewage. Drinking water is becoming scarce;
- *food crisis*, which will come attached to water crisis;

- *greenhouse effect crisis* (climate change). If this crisis is not overcome, there will be nothing else to share;
- *energy crisis*: how long will we still keep using non-renewable fuels? Petroleum is currently the planet's blood".

The sustainability dimension is explored by [CEAPA](#) in a recent [document](#), and by political organisations such as Izquierda Unida (Spain, see for example the document by [Rafael Pla López: Educación para la sostenibilidad](#)) while the de-growth perspective is the subject of a series of bi-annual international conferences that took place in 2008 in Paris ([Economic De-Growth for Ecological Sustainability and Social Equity](#)), ([FR](#)) in 2010 in Barcelona and is scheduled to take place in Venice in 2012. The de-growth perspective is being translated into several political decisions by grassroots movements and political parties. An example is the document drafted by [Enrique Javier Díez Gutiérrez](#) (Área Federal de Izquierda Unida), [Educación para el decrecimiento: más allá de la sostenibilidad](#) (De-growth education: beyond sustainability).

Various organisations pledge for a significant cultural change: a focused declaration was recently issued by [Ecologistas en Acción](#) and [the Madrid Federation MRP](#).

How to communicate the present unsustainable patterns of human consumption? According to Aubauer (2011) the Ecological Footprint (EF) is rapidly becoming the single indicator, which converts human interactions with nature into a proportion of the Earth's surface it indirectly consumes. The EF meets only some of the challenges of a single indicator. Aubauer (2011) stresses that it indicates the demand for biologically productive land and water area with world-average productivity (in units of —global hectares) by individual people, groups of people (such as a nation), or activities (such as manufacturing a product), delivering all of the biological materials consumed by these individuals or groups and absorbing all biological wastes generated by them, in a given year. In addition to the areas necessary for producing biological materials, such as cropland (for crops), grazing land (for animal products of pasture-fed animals), fishing grounds (for fish), forest land (for forest products), cropland is also taken into account as a site for building infrastructure (land take) and forest areas for the sequestration of emissions of carbon dioxide (CO<sub>2</sub>), or for the production of fuel wood. Nuclear energy was considered as if it were fossil energy and is not taken into account at all now. Although facing a number of deficiencies, the EF can be compared with the —biocapacity of the Earth, indicating the supply of the existing biologically productive area on Earth.

## 5. The United Nations Decade and other initiatives within the globalization framework (A Década das nações Unidas e outras ações no contexto da globalização)

The United Nations launched the UN Education for Sustainable Development Decade (2005-2014) and provide a set of teaching and learning principles and tools at <http://www.unesco.org/education/tlsf/>.

According to UNESCO, ESD is

- education that allows learners to acquire the skills, capacities, values and knowledge required to ensure sustainable development;
- education at all levels and in all social contexts (family, school, workplace, community);
- education that fosters responsible citizens and promotes democracy by allowing individuals and communities to enjoy their rights and fulfill their responsibilities;
- education for life-long learning;
- education that fosters the balanced development of the individual.

According to Gadotti (2009, p. 10) "there is a strong link between the **Earth Charter** Initiative and the Decade of Education for Sustainable Development. Mikhail Gorbachev, president of Green Cross International, sees the Earth Charter as sustainable development's "third pillar". The first pillar is the UN's Foundation Charter; the second one is the Human Rights

Declaration. He asserts that the Earth Charter has to be “universally adopted by the international community” (In: Corcoran, ed., 2005:10). The Earth Charter has been an ethical inspiration for the United Nations’ “goals of the millennium (...) The ecopedagogy movement, emerging from the heart of the Earth Charter initiative, is supporting its process of discussion and diffusion, indicating an appropriate methodology that is not a simple methodology of governmental “proclamation”, a formal declaration, but the translation of an experienced process of critical participation of the “demand” , as said by Francisco Gutiérrez and Cruz Prado (1998)”.

## 6. Social and environmental justice and International co-operation (Justicia social y ambiental y cooperacion internacional)

In *The Development Dictionary* (Sachs, ed., 1994), authors such as Ivan Illich and Vandana Shiva show the links between the development discourse as implemented since 1948 by the USA and the United Nations and the neo-colonialist attitude of liberal economies and their worldwide impact upon ideas of “needs” and “resources”.

There have been several attempts to discuss the development discourse from a human and an environmental perspective, including the papers collected recently by [Gardy Augusto Bolívar Espinoza and Antonio Elizalde Hevia in \*Desarrollo humano y justicia\*](#), introduced by the article *¿Qué desarrollo puede llamarse sostenible en el siglo XXI? [La cuestión de los límites y las necesidades humanas by Antonio Elizalde Hevia.](#)*

Santos and Meneses (2009) contribute to deconstruct what authors such as Enrique Dussel and Anibal Quijano define as the “coloniality of power” pointing at the process of embodiment as the key focal issue in exploring power and cultural conflicts. While the idea of “buen vivir” is incorporated into Andinean pluri-national constitutions, the “myth” of economic development (Furtado, 1974) is questioned from a variety of perspectives as the “local” and the “social” dimensions of economical relations gain weight again (Coraggio, 2004). This is a challenging scenario for international development co-operation donors and agencies while their global investment, impact and role is decreasing and the sustainability dimension has not been incorporated into co-operation policies to the extent promised by the Rio 1992 Summit declarations. A new co-operation approach is bound to address in a different way the relations between sustainability and peace culture. As Gadotti (2009) notes: “The Earth paradigm is a civilizing one. And since a culture of sustainability offers a new perception of the Earth, considering it as a single community of human beings, it becomes a basis for a culture of peace. Wars and violence exist because we do not know each other (Ricoeur, 1991)”.

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### **Sites**

Green Theory and Praxis

<http://greentheoryandpraxis.org/journal/index.php/journal>

Journal of Education for Sustainable Development,

<http://jsd.sagepub.com/content/2/1/21.short?rss=1&ssource=mfc>

Journal of Sustainability Education,

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<http://learningforsustainability.net/>