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Can we meet the sustainability challenges? The role of education and lifelong learning

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Abstract

Education and lifelong learning are increasingly being mobilised to address the global environmental crisis and accompanying sustainability challenges. This article discusses the many roles of education about and for sustainable development, drawing on evidence and arguments put forward in the 2016 Global Education Monitoring Report, *Education for People and Planet*. It highlights specific viewpoints, values and ways of thinking that best characterize effective learning for sustainability. It also emphasises the importance of a 'whole school' or 'whole institutional' approach to education for sustainability.

1 | THE GLOBAL ENVIRONMENTAL CRISIS AND THE SUSTAINABILITY CHALLENGE

A conclusive body of accumulated evidence shows that the actions and habits of a single species, *Homo Sapiens*, are leading to the planet's unprecedented dysfunction (World Wildlife Fund [WWF], 2016).[1] The scale and pace of biodiversity loss, land degradation, stratospheric ozone depletion and climate change are all attributable to human activities. Humans are responsible for the massive release of carbon dioxide and other heat-trapping gases into the atmosphere. Human behaviour has caused irreversible damage to some plant and animal species. The variety of vertebrates such as mammals, birds, reptiles, amphibians and fish has declined by 52% since 1970 (McLellan, Lyengar, Jeffries, & Oerlemans, 2014). The largest extinction is happening among freshwater species, mostly due to habitat loss and extensive hunting and fishing.

According to climate scientists, Earth is entering a new geological era, the Anthropocene, where human activities are undermining the planet's capacity to regulate itself (Crutzen & Stoermer, 2000; Waters et al., 2016). Until the beginning of the Industrial Revolution in the late-1700s, global environmental changes were not linked to human actions. They were essentially the product of slow-occurring natural causes, such as variations in the sun's energy or volcanic eruptions. However, since the spread[2] of industrial manufacturing, during which time many countries have benefited from increased trade, economic growth and longer, healthier lives, the natural world has suffered environmental deterioration. Consequently, an increasing share of the world's population is living beyond the ecological limits set by Earth's finite natural resources and support systems.

The relationship between human development and environmental impact is not straightforward. On the one hand, people living in wealthier countries with higher levels of education are more likely to lead lifestyles that leave a harmful

footprint on global ecosystems, from increases in water usage and food waste to higher levels of carbon dioxide emitted through car and aeroplane use. On the other hand, expanding access to environmental education and ecological literacy has encouraged people to alter their personal attitudes and everyday behaviour to support recycling, reduce litter, conserve energy and improve water sanitation. This means that some, but not all, kinds of education can be effective tools in improving local environments and planetary health.

This article, based on material compiled for the 2016 Global Education Monitoring Report (United Nations Educational, Scientific and Cultural Organisation [UNESCO], 2016) to which both authors contributed, discusses the ways education can help people and institutions understand and respond to global, regional and local environmental issues. The term 'education' is used here in the broadest sense: all forms of formal, non-formal and informal education and training that equip individuals and institutions in the public, private and community sectors to effectively respond to pressing environmental challenges. To be most impactful, education and lifelong learning should be part of an *integrated* approach that also includes changes in governance, legislation, research, financing and regulation towards greater environmental sustainability.

2 | GLOBAL CHALLENGES, NATIONAL AND LOCAL SOLUTIONS

The world's available resources are not distributed evenly among countries and even among regions within countries. While humans as a species are responsible for the global environmental crisis, the fact is that people living in different countries face different environmental challenges in terms of scale and scope (United Nations, 2015).

The most populous countries and those with rapidly growing populations are more likely to deplete surrounding natural resources than smaller countries or those with slow growing populations. Resource depletion can be measured by an ecological footprint indicator[2] which examines a country's use of land and water resources and shows a deficit of resources compared to consumption. For example, countries with expanding urban areas are more likely to leave large ecological footprints and confront serious environmental problems: water scarcity and contamination, land shortage, polluted air and insufficient sanitation.

Wealthier countries—typically encouraging lifestyles with less environmentally-friendly consumption patterns—leave the highest ecological footprints and are mostly found in Europe and Northern America (Ewing et al., 2010; WWF, 2016). Countries such as the Republic of Korea and Singapore, which have experienced rapid increases in living standards, health and education, have seen a near doubling of their ecological footprint in less than 20 years due to changing consumption patterns. By contrast, countries with low levels of development, mostly in sub-Saharan Africa, have much lower ecological footprints. Eritrea and Timor-Leste have ecological footprints that are less than 5% of those with the highest footprints. Cuba, Georgia, Moldova and Sri Lanka are noteworthy countries since they are balancing human development and sustainable practices within a range of sustainable production and consumption (UNEP, 2015; WWF, 2016).

While overpopulation, urbanisation and unsustainable lifestyles harm local resources, they have impacts that transcend national borders. This also means that the environmentally-friendly decisions and behaviour taken by individuals and institutions in one locale have impacts that go beyond the areas in which they reside. Although the challenge for all countries is essentially the same—namely, finding an acceptable level of human development without overburdening the Earth's biocapacity[3]—, each path will be different depending on local conditions and, as we will argue, educational opportunities.

3 | EDUCATION AND ENVIRONMENTAL SUSTAINABILITY

Expanding education opportunity has long been recognised as an important contributor to long-term economic growth (Gundersen & Oreopoulos, 2010; Hanushek & Woessmann, 2010, 2012; Psacharopoulos & Patrinos, 2014). With the rapid decline of the Earth's biocapacity and a related rise in concern for environmental sustainability, many view education as critical in the transition to more sustainable forms of development. Degree programmes, adult education

TABLE 1 An historical perspective of education in relation to people and planet

	Nature Conservation Education (NCE)	Environmental Education (EE)	Sustainability Education (SE)	Environmental and Sustainability Education (ESE)
Starting period	Late 19th century, early 20th century	Late 1960-ties, early 1970-ties	Early 1990-ties. end of the DESD (2014)	Present
Alain focus	Connecting with nature, understanding web-of-life, protecting species, raising awareness, knowledge and understanding	Raising environmental awareness about pollution of water, soil and air. (note: there are forms of critical EE that resemble the focus and impact of SE)	Increasing citizen engagement, participation in sustainable development issues and increasing their understanding of the connections between environment, economy, culture and ecology and how today's actions affect future generations	As under SE but also: connecting with place and the non-human world (deepening of relations) as well as attention for both agency (learning to make change) and the critique and transgression of unsustainable societal structures. Global citizenship and local identity.
Intended impact	Ecological literacy, societal support-base for nature conservation through national parks	Changing individual environmental behaviors, developing agency and societal support for environmental legislation	A more holistic or integrated approach of dealing with issues around water, food, energy, poverty biodiversity in governance, education, business.	A transition towards a more relational way of being in the world and a society based on values and structures that make sustainable living the default.
Examples	Visitor centers in National Parks, Public awareness campaigns, nature programs in schools, school gardening	Environmental education centres in cities. Public awareness campaigns, school curricula, teacher training	Multi-stakeholder platforms focusing on sustainable development issues. Whole institution approaches to sustainability. Corporate Social Responsibility	Brokering learning and engagement within transitions: Intentional communities such as eco villages, transition towns, whole school approaches, local food movements, shared economies, cradle-to-cradle design.

Source. Adapted from Wals (2012).

courses, community initiatives, media campaigns and on-line websites are some of the many ways that education is being used to improve learners' understanding of environmental issues. Through education, students gain insight into an environmental problem, its consequences and the types of actions required to address it. With greater environmental and ecological literacy, students are more inclined to alter their behaviour regarding specific environmental issues. Environmentally-literate individuals are better equipped to see the links between specific issues and global environmental change. Formal education supplies the knowledge, vocabulary and key concepts, as well as important historical and philosophical background, for environmental literacy. Put another way: education and lifelong learning have the potential to help to reduce our collective ecological footprint and increase our ecological handprint—actions that positively impact our ecology and environment.

Mobilising education to respond to ecological and environmental challenges is not new. Roughly four waves of education-related responses can be distinguished: nature conservation education, dating back to the late 19th century; environmental education, dating back to the 1960s; sustainability education, dating to the 1992 Earth Summit; and environmental and sustainability education, which critically blends elements from earlier approaches (Wals, 2012). The first focused on (re)connecting people with nature; the second on developing ecological literacy and changing environmental behaviour and lifestyles; the third on citizen engagement and capacity building for sustainable development; and the final one on rethinking humanity's place in the world and global citizenship (see Table 1). All responses co-exist today, although the emphasis varies depending on context and history.

The evidence, while uneven, suggests that education-based responses to environmental challenges have been influential. The vast majority of 15-year-olds in Organization for Economic Cooperation and Development (OECD) countries are familiar with environmental issues, including air pollution, energy shortages and extinction of plants and animals (OECD, 2009). More educated adults express greater concern about environmental matters. Education encourages pro-environmental political behaviour—for example, supporting environment-friendly policies, voting for green parties or causes, and becoming involved in environmental activism (Coan & Holman, 2008; Meyer, 2015; UNEP, 2012; UNESCO-LSE, 2013). Furthermore, the foundational skills that education affords constitute an important precondition for environmentally-friendly decisions made by individuals, corporations and institutions.

There are, however, critiques of mobilising education in this manner. Some point out that these responses have never been integral to the central purposes and intended content of education and have remained at the margins of education systems. In addition, such responses tend to disregard the broader notion of human development and leave untouched issues of equity and social justice.[4] Much education for sustainable development supports existing forms of economic and technological development and its unequal distribution, thereby preparing people for a lifetime of unsustainable work and consumption (Huckle & Wals, 2015). In this way, education is simply making us 'more effective vandals of the Earth' (Orr, 1994, p. 5). Other critics argue that environmental crises are partly the unintended consequence of education's contribution to pervasive 'industrial mind-sets' that steer students towards individualism, materialism and hyper-rationality. They suggest that Western education has been—albeit unwillingly—an effective tool for rationalising and popularising environmental destruction (Harris, 2008; Orr, 1996). Many such critiques focus on the contents and tone of the messages conveyed by and through education rather than on education *per se*. With this in mind, it is worth distinguishing between two complementary ways of understanding the role of education for environmental sustainability. The first focuses on education that aims to develop specific environmental behaviours that are deemed right and necessary; the second focuses on education that develops autonomous, responsible and reflective citizens who are capable to make up their own minds and follow suitable courses of action. The former has been called an 'instrumental' approach and the latter an 'emancipatory' approach (Wals, 2012). In practice, these approaches are not mutually exclusive; they often exist concurrently.

Instrumental education develops knowledge, awareness, skills and technical solutions that can contribute to changes in environmental behaviour, especially where consensus exists as to the needed behaviour. It is appropriate when people agree on the definition of the environmental problem, its consequences and the best response. Examples include public awareness campaigns and school programmes on recycling, reducing litter, energy conservation and water sanitation in Latin America, or using vocational schools to train workers how to make use of new green technologies in sub-Saharan Africa. Instrumental education is particularly helpful when specific behaviours help to resolve a particular issue such as recycling, reduced greenhouse-gas emissions or water conservation. In general, instrumental approaches promote learning that is instruction-oriented, social marketing-based and expert- and policy-driven.

Emancipatory approaches aim to contribute to a deeper transition to sustainability where education develops capacities, literacies and forms of citizenship based on sustainable values and principles. Emancipatory education encourages self-reflective learners who are capable of altering their values and behaviour and finding solutions for themselves, especially when the desirable course of action is unclear. It can involve learning about the nature of people's relationships with each other and with the planet in order to enable citizens to tackle the root causes of environmental mismanagement. Overall, emancipatory education seeks to create spaces for learning in schools, universities, workplaces and communities so that individuals can engage in behaviour towards more meaningful, equitable and sustainable societies. Emancipatory approaches tend to promote action-oriented, collaborative, participatory and transformative learning.

4 | HOW DOES EDUCATION BEST SUPPORT SUSTAINABILITY?

4.1 | Draws on diverse viewpoints, particularly indigenous knowledge and practices

Education for sustainable development promotes the value of diversity and respect for different viewpoints. This means, for example, moving beyond dominant anthropocentric, scientific and 'Western' materialist ways of viewing the

world to include local and indigenous perspectives. Traditional—and specifically indigenous—knowledge plays an important role in environmental sustainability. Indigenous knowledge refers to knowledge that local communities pass down from generation to generation, usually by word of mouth and cultural rituals. Traditional knowledge has long been the basis for sustainable agriculture, food preparation, health care, socialisation and conservation in indigenous communities.

About 370 million indigenous peoples live in over 90 countries worldwide. Many have lived and continue to live in particularly vulnerable ecosystems. Ranging from the Arctic, high mountains, floodplains, tropical rainforests, desert margins to small islands and low-coastal areas, indigenous territories are directly affected by the current ecological crisis that has brought climate change and the loss of biodiversity. Despite hostile conditions, some indigenous peoples have managed to survive, finding ways to resist and adapt to environmental changes, based on their deep knowledge of and relationship with the environment (Nakashima, Galloway McLean, Thulstrup, Ramos Castillo, & Rubis, 2012). Many indigenous peoples share norms and values that are central to sustainable livelihoods. Fundamental to these values are notions of living well (or *buen vivir*), community, equality and complementarity (Gudynas, 2011; Ibañez, 2011), where the conditions for well-being focus on sufficient food, caring for family and community, reciprocity and solidarity, the freedom to express one's identity and practise one's culture and promoting a safe and non-polluted environment (UN Permanent Forum on Indigenous Issues [UNPFII], 2008). These ideas have deep relevance for the sustainability of our planet.

4.2 | Emphasises learning that crosses boundaries

A critical way for education to encourage sustainability is through the notion of environmental stewardship (Islam, 2012; Murphy, 2006; Orr, 2010; Wolff, 2014). This idea, which highlights the ethical and moral commitments individuals make to a more sustainable planet, encourages principles such as empowerment, local ownership, collaboration, transformation and resilience and is supported by diverse civil society groups as well as political, religious, cultural and intellectual leaders (Dalai Lama, 2016; Earth Charter Initiative [ECI], 2000; Islam, 2012; Pope Francis, 2015).

Education for sustainability and environmental stewardship should provide opportunities for learners to become part of multi-stakeholder platforms and multi-level coalitions involving diverse actors, values, interests and strategic alliances (Leduc & Crate, 2013; Sen, 1999; Strang, 2008; Wals, 2007). Issues addressed in such platforms include local development challenges such as improved sanitation, food and nutrition, water management and promoting climate-smart cities, off-the-grid sustainable energy communities. Concrete examples can be seen in community groups in Detroit, Michigan, that have taken over vacant property to develop urban farming projects (Detroit, 2015); participatory budgeting in Porto Alegre, Brazil as a tool for greater transparency and improved governance (Touchton & Wampler, 2013); and urban farming in parts of Viet Nam that reduces the heat-island effect and serves as an opportunity for ecotourism ventures and organic food production (Climate and Development Knowledge Network [CDKN], 2014). Within these configurations, blended learning in formal, non-formal and informal settings drawing on different disciplines and sources is common.

4.3 | Helps learners acquire new skills and competencies for life

Many argue that governments, corporations and institutions need to learn how to develop and use more holistic frameworks to analyse and respond to environmental issues (UNEP, 2012). This implies the need to include perspectives from different sectors and disciplines when considering, formulating and implementing new policies and programmes (Baer & Reuter, 2015). To do this effectively new skills and competences are increasingly required.

A recent paper by the UN Environment Programme argues that education and training should equip all people—particularly policy-makers—with transformational skills that emphasise cognitive flexibility, the need for trial and error, an openness to change and support for lifelong learning (UNEP, 2015). Education most supports sustainability when it encourages people in positions of authority to seek critical information, embrace innovation and identify where change

is needed—all with the well-being of people and planet in mind. These new skills are thought to be especially useful where technical demands change quickly, where new innovations are being integrated in policy frameworks and where work is being reconceived with sustainable purposes in mind. Such skills are not only important for decision-makers, but also for entrepreneurs who work in sustainable production frameworks. There is a rapidly growing number of small and medium enterprises, as well as large enterprises involved in sustainability initiatives.

5 | TRANSFORMING SCHOOLS TO MEET ENVIRONMENTAL CHALLENGES: THE WHOLE INSTITUTION APPROACH

Reviews of education of and for sustainable development have consistently highlighted the importance of developing practical knowledge and providing hands-on experience to tackle substantive environmental issues (Anderson, 2013; Benavot, 2014; UNESCO, 2014). Completing basic education is also a key condition insofar as it succeeds in developing foundational skills, scientific literacy, transformative attitudes and the ability to learn throughout life. Basic education is also important for conveying information about tools and resources that are available in the public sphere to promote sustainable consumption and production (UNEP, 2012).

Evidence suggests that schools should not only strengthen the connection between learners and nature, but also their ties to the places and communities in which they are rooted. Many studies show that taking children outdoors has educational benefits, such as better concentration when back in school and health benefits, such as improved psychological and physical well-being (Dillon et al., 2006; MacKenzie, Son, & Hollenhorst, 2014; Van den Berg, Hartig, & Staats, 2007, Van den Berg, Maas, Verheij, & Groenewegen, 2010). Place-based education and providing opportunities to create personal and emotional connections to nature through lived experiences and hands-on engagement with environmental issues are critical aspects of education for sustainability, especially in the digital age where people spend more and more time behind screens (Anderson, 2013; Gruenewald & Smith, 2008; Theimer & Ernst, 2012; Zaradic & Pergams, 2007). Despite this growing evidence, only a limited number of countries systematically incorporates the outdoors and the community in the school curriculum.[5]

The challenge for schools is to create an integrated and systemic response that addresses sustainability issues meaningfully, consistently and effectively. Schools typically respond to environmental challenges in one of four ways: denial (denying that challenges such as climate change are worthy of attention); 'bolt-on' (adding environmental management to operations in response to external pressure), 'build-in' (taking the challenge seriously by integrating environmental sustainability across operations and the organisation) and a 'whole system redesign' (rethinking the values and assumptions upon which the institution is based and completely overhauling and redesigning structures and organisation) (Sterling, 2004).

In primary and secondary education today, environment and/or sustainability are mainly treated as stand-alone subjects and not mainstreamed into the curriculum or everyday life of the school (Benavot, 2014). At the university level, the International Association of Universities, through its Higher Education for Sustainable Development initiative, promotes sustainability on campuses, including in business and community outreach, student engagement, management, institutional development, research and curriculum. However, in reality, most initiatives are of the 'bolt-on' or 'add-on' variety. Whether due to policy or incentive constraints, the orientations of most institutions and individuals lack a clear and consistent sustainability dimension. This highlights the practical limitations of realising a deeper institutional transformation towards sustainability (Bickford, Posa, Qie, Campos-Arceiz, & Kudavidanage, 2012; Mader & Rammel, 2015).

Creating institutions where policies, operations, contents and practices work together in an integrated fashion is challenging. Among the most promising approaches is the 'whole school' or 'whole institution' approach in which schools make concurrent changes to curriculum, extracurricular activities, teacher training, human resources and infrastructure operations and processes (Mcmillin & Dyball, 2009). This approach probably comes the closest to the 'whole system redesign' mentioned above. In addition to rethinking curricula (are emerging subjects and concepts covered and new competencies being taught?), the 'whole school' approach implies reconsidering and redesigning

schools' operations and environmental management (does the school conserve water and energy, provide healthy food, minimise waste and provide green and healthy school grounds?), pedagogy and learning (are teaching, learning and participation in decision-making adequate and appropriate?) and community relationships (does the school connect with community issues and resources?) (Anderson, 2012; Hargreaves, 2008). While data on such schools are difficult to obtain, they appear to be growing in number.[6]

Research on the impact of a whole school approach in the United Kingdom shows that it improves the school ethos, the quality of both health and students' learning and reduces the school's ecological footprint (Barratt Hacking, Scott, & Lee, 2010). While still an ideal model, some schools and universities are aligning their programmes with a whole school approach (Iyengar & Bajaj, 2011). For example, Eco-Schools is a network that supports the quality of 'whole-of-institution' approaches to sustainability in primary and secondary schools by providing a programme of resources and certification standards (www.ecoschools.global).

6 | CONCLUSION

Education and lifelong learning can play a major role in the transformation towards more environmentally-sustainable societies, working alongside initiatives by government, civil society and the private sector. Not only does education shape values, behaviour and worldviews, it also contributes to the development of competencies, skills, concepts and tools that can be used to reduce or halt unsustainable practices and build resilience in the face of environmental degradation and climate change.

Education plays a multifaceted role in sustainability, albeit not always positive. It may contribute directly or indirectly to ideologies promoting resource overconsumption as well as the marginalisation of indigenous knowledge and traditional ways of living in and with the environment. Education may contribute to cultural homogenisation through the loss of linguistic diversity and the undermining of sustainability-relevant norms and values that indigenous communities have historically shared (Mato, 2015; Stavenhagen, 2015).

In analysing whether and how education contributes to sustainability it is important to look at the aims, content, forms and settings in which it is situated. Some forms of education for sustainability address specific environmental challenges and aim to promote certain behaviour (instrumental). Other forms aim to build key competencies—to reflect and think critically, to work collaboratively, to engage with diverse viewpoints—in order to identify possible solutions (emancipatory).

The main point is that there is no single model of education and learning for environmental sustainability, nor should there be. Different communities and institutions should tailor content and pedagogy to the interests of different audiences, as well as different political, economic and social circumstances and geographic locations. Learning can take place in formal, informal and non-formal settings. It can promote indigenous knowledge systems, (re)connect learners with nature, embark on a whole institution approach and develop the agency of learners to act in meaningful ways towards the environment.

What is clear is that neither 'business as usual' nor 'education as usual' are adequate. Given the scale of humanity's environmental crisis, education for sustainability will require efforts from many sectors, with many actors and at many levels. To ensure pro-environmental outcomes, schools must be embedded in their communities, seeking to influence not only the views and actions of learners who walk their halls, but also the decisions made by policy makers in government and business to ensure that they have the long-term interests of their citizens and the planet in mind.

ENDNOTES

[1] Reviews of research spanning different disciplines are difficult to identify, but many of the key studies are listed here: en.wikipedia.org/wiki/Human_impact_on_the_environment

[2] Estimates how rapidly people are depleting Earth's biocapacity by comparing the area required to produce renewable resources used by humans and absorb their waste, including areas occupied by human infrastructure, and how much land and sea area is available.

[3] Biocapacity is the biological capacity of an ecosystem (productive land areas such as forests, pastures, croplands and fisheries) to produce useful biological materials and to absorb carbon dioxide emissions and waste material generated by humans, under current management schemes and extraction technologies.

[4] This point is made by a range of scholars representing different vantage points. See: Islam, 2012; Leduc & Crate, 2013; Murphy, 2006; Nussbaum, 2010; Orr, 1996.

[5] For a study of the decline of the possibilities for outdoor learning in the early years of education in England see: Waite (2010).

[6] See: www.unesco.org/new/en/education/worldwide/single-view/news/unesco_associated_schools_engage_in_a_whole_school_approach/ or gemreportunesco.wordpress.com/2016/11/15/what-is-the-whole-school-approach-to-environmental-education/

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