

The Global Movement of Sustainability Education and Its Impact on the Field of Instructional Design.

– DRAFT –

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Introduction

At the Earth Summit in 1992, education received international attention as critical to the process of sustainability development during the 21st century (Blewitt, 2004). The most used and common definition of ‘sustainability’ was developed in 1987 by the Brundtland commission, which defined sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (The World Commission on Environment and Development, 1987). In this review the authors will first present a historical brief, which includes a narrative of the details that led up to and define the concept of sustainability, as well as present the changes the history of sustainability has brought upon global governance, and sustainability education on the international level. The narrative will further describe projected activities and plans of organizations and their educational or training needs as they pursue the implementation of sustainability projects. From these needs, The authors will elaborate in the section *Education & Training Needs Arising from the Sustainability Movement* on the impact and effect of sustainability education to Instructional Technology in the United States, as well as the resultant opportunities for instructional technologists. Finally, the review will conclude with remarks regarding the sustainability movement and the field of instructional technologists and designers.

Sustainability: A Historical Brief

The concept of sustainability dates back to the United Nations Conference of the Human Environment in Stockholm, Sweden (1972). However, the focus on the environment dates back almost two hundred years. There are numerous statements written by Henry David Thoreau and Ralph Emerson regarding the nature as a teacher to the humans. Two other authors, Marx and Malthus, were also well known for their discussions regarding the importance of nature and the environment (Dresner, 2002). After Thoreau and Emerson came John Muir who, in 1892, started the Sierra Club and influenced powers to be to create Mount Rainer, Petrified Forest, and Grand Canyon National Parks. Theodore Roosevelt was also influenced by these concepts, and so he established numerous conservation programs, which include Yosemite National Park.

In the United States during the early 1970s, two very important legislations were passed: The Clean Water Act (1972) and The Endangered Species Act (1973). These two pieces of legislation have been protecting the biological wealth in America from corporate pressures (Speth, 2004).

In *The Global 2000 Report to the President* in 1980, then President Carter released the following statement to explain the climate disruption: “In recent decades the concentration of carbon dioxide (CO₂) in the atmosphere has been increasing in a manner that corresponds closely with the increasing global use of fossil fuels. The burning of fossil fuels – oil, natural gas, and coal – releases carbon dioxide, about one-half of which appears to be retained in the atmosphere...atmospheric carbon dioxide plays a critical role in warming the earth, it absorbs heat radiation from the earth’s surface, trapping it and preventing it from dissipating into space. As the concentration of carbon dioxide in the atmosphere increases, more of the earth’s radiated heat is trapped.” Yet, even with this information, not much has been done by Presidents Reagan, Bush, Clinton, or Bush. Instead, local municipalities and governments have taken necessary steps to make changes.

Currently there is only one nation that still has not signed off on the Kyoto Protocol, a document that focuses on reducing the green house gases that cause climate change; namely, the United States Government. It is, however, not accurate to say that the *United States* has not signed the treaty. Some states such as California, which is actually larger than most other countries, have signed a global warming solutions act that will bring down the state of California's green house gases by 25% by the year 2020.

The Endangered Species Act was discussed in Congress in the beginning of the 1980s and the biologist E.O. Wilson made the following statement: "The worst thing that can happen during the 1980s is not energy depletion, economic collapse, limited nuclear war, or conquest by a totalitarian government. As terrible as these catastrophes would be for us, they can be repaired within a few generations. The one process ongoing in the 1980s that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats. This is the folly our descendents are least likely to forgive us" (Worldwatch Institute, 2002). Aldo Leopold in his Sand County Almanac *Land Ethic* writes, "...which changes the role [of] homo sapiens from conqueror of the land – community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such...A thing is right, when it tends to preserve the integrity, beauty and stability of the biotic community" (Speth, 2004).

In 1987 the Brundtland commission defined sustainability as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (The World Commission on Environment and Development, 1987). A slightly different definition was presented by Viederman: "Sustainability is a vision of the future that provides us with a road map and helps us focus our attention on a set of values and ethical and moral principles by which to guide our actions" (Mumier, 2005). What the Brundtland Commission and Viederman introduced was the three concepts of development, present, and the future (Mumier, 2005). To evaluate the development concept, the following three areas are represented: the economic growth, the social progress, and the environmental protection. The second concept describes the present with the intention of growth through not only economy but also through environmental and social advancement. Finally, the future is described as a long-term overhaul of all existing systems in society (Mumier, 2005). Experience has provided the importance of instruments that have given companies the indications from and to individuals to change the unsustainable life-styles or to companies to change unsustainable production methods but that allow for the working of decentralized, market -based economic systems and do not rely on command-and-control methods (Commission on Global Governance, 1995).

The management of a successful business in today's environment must include balance. The key is to balance competing stakeholder interests with a focus on the improvement of corporate, social, environmental, and financial performance (Epstein, 2008). The interesting thing in this balancing act is that if management wants to respond in a sensible and open-minded way to activists calling for corporate change, they should view and deal with this issue the same way as with any other business problem (Epstein, 2008). It is only through the identification, measurement, and management of sustainability impacts that social, environmental, and financial performance can be improved, and value created (Epstein, 2008). There is an opportunity that should not be underestimated, and that is for companies to turn social responsibility into a competitive advantage (Epstein, 2008). Unilver Group Chief Executive, Patrick Cescau stated, "We have come to a point now where this agenda of sustainability and corporate responsibility is

not only central to business strategy but will increasingly become a critical driver of business growth... how well and how quickly businesses respond to this agenda will determine which companies succeed and which will fail in the next few decades” (Epstein, 2008).

Below are a few core questions that should be asked when pursuing a more sustainable approach towards our lives here on Earth.

1. How can the dynamic interactions between nature and society – including lags and inertia – be better incorporated into emerging models and conceptualizations that integrate the Earth system, human development, and sustainability?
2. How are long-term trends in environment and development, including consumption and population, reshaping nature – society interactions in ways relevant to sustainability?
3. What determines the vulnerability or resilience of the nature – society system in particular kinds of places and for particular types of ecosystems and human livelihood?
4. Can scientifically meaningful “limits” or “boundaries” be defined that would provide effective warning of conditions beyond the nature – society systems incur a significantly increased risk of serious degradation?
5. What systems of incentive structures – including markets, rules, norms, and scientific information – can most effectively improve social capacity to guide interactions between nature and society toward more sustainable trajectories?
6. How can today’s operational systems for monitoring and reporting on environmental and social conditions be integrated or extended to provide more useful guidance for efforts to navigate a transition toward sustainability?
7. How can today’s relatively independent activities of research planning, monitoring, assessment and decision support be better integrated into systems for adaptive management and societal learning?

(Kates, 2001)

These questions are the core of sustainability, and there are no absolute answers. Instead the questions are used as a guide towards a world that takes the three E’s, or now four E’s, seriously. The three E’s (Ecology/Environment, Economy/Employment, Equity/Equality) and the recently added fourth E (Education) can provide consensus and a broader understanding of what can and should be undertaken in the future to become sustainable. Ecology, or the environment, (Edwards, 2005) includes three crucial issues to be considered. The first, short-term versus long-term perspectives, looks at the environment in terms of short-term solutions and decisions or long-term solutions and decisions – we can make that choice. The second can be described as, “Piecemeal versus systematic understanding of the indispensability of ecosystems for the viability of human existence” (Edwards, 2005). Simply put, we need to better understand how our eco-system works, and how we are affecting it so that we can make the right decisions to increase our overall living. The third and final concept is that there is a limit to how much our eco-system can withstand from human impact.

In 1989, The Natural Step was started in Sweden by Karl Henrik Robèrt. The goal of the organization is to “develop a society in which natural resources are not consumed faster than they can be replaced” (Robert, 1997). The organization now exists in the following countries: Sweden, USA, UK, Canada, France, Japan, New Zealand, and the list of countries constantly grows. The main difference of this organization is that it operates from consensus rather than

threats, meaning that the organization invites countries and organizations into dialogues and seminars to gain a better understanding of what is actually happening around the world and how things can be changed.

Many companies have been involved with the natural step, such as Scandic Hotels in Sweden, but also McDonalds, Starbucks, and the Whistler, British Columbia, Canada have utilized the natural steps principles. There are four “systems conditions” that the Natural Step follows. 1) *Extracted substances from the Earth’s crust must not systematically increase in the biosphere.* This means that under a sustainable society the current use of fossil fuels, metals and other minerals cannot be taken from the Earth’s crust faster than mother earth can replenish it. This is to not change or disturb the ecosystem. In practicality, this means that mining of scarce elements in nature should halt to an absolute minimum and that stop consuming fossil fuels without any control. 2) *Substances produced by human society must not systematically increase in the biosphere.* Since these substances are man-made it is very hard for nature to break the substances down. This will in turn effect change to the eco-system. 3) *The productivity and biodiversity of the Earth itself must not systematically be physically deteriorated.* Basically, we cannot keep on taking from the nature without reconstruction. 4) *Human needs must be met with a fair and efficient use of energy and other natural resources.* The natural step also uses the back-casting strategy (Holmberg, 2000).

In 1992, at a conference called the Earth Summit, the United Nations had its second Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil. There were more than 180 world leaders who attended and presented the 27 principles on environment and development called the Rio Declaration on which Agenda 21 is based. The Declaration mentions “we can no longer think of environment and economy and social development as isolated fields” (The Rio Declaration on Environment and Development (1992)).

Agenda 21, presented in Table 1, includes a comprehensive plan of action to be taken globally, nationally, and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which there are human impacts on the environment. Originating from the Earth Summit was also: 1) the statement of principles on the Management, Conservation and Sustainable Development of All Types of Forests; 2) the UN framework Convention on Climate Change; 3) the UN Convention on Biological Diversity; and 4) A recommendation for an international convention on desertification (United Nations Association in Canada).

Table 1 – Detailed account of Agenda 21

Priority	Objective
Waste Minimization	To minimize resource inputs, maximize product quality, and minimize waste outputs.
Energy Conservation and Management	To reduce energy use and reduce potentially damaging atmospheric emissions
Management and Fresh Water Resources	To protect the quality of water resources and to use existing resources efficiently and equitable.
Wastewater Management	To minimize wastewater outputs in order to protect the aquatic environment, to safe guard flora and fauna, and to conserve and protect the quality of fresh water resources.

Hazardous Substances	To replace products containing potentially hazardous substances with more environmentally benign products.
Transportation	To reduce or control harmful emissions into the atmosphere and other environmental effects of transport.
Land-use planning and Management	To deal with the multiple demands on land in an equitable manner, ensuring that development is not visually intrusive and contributes to conserving environment and culture while generating income.
Involving staff, customers, and communities in environmental issues.	To protect and incorporate the interests of communities in developments and to ensure that the environmental lessons learned by staff, customers, and communities are put into practice at home.
Design for sustainability.	To ensure that new technologies and products are designed to be less polluting, more efficient, socially and culturally appropriate, and available worldwide.
Partnerships for sustainability development	To form partnerships to bring about long-term sustainability.

In Table 2 below, the authors present, *the mission for the President's Council on Sustainable Development (PCSD) established in 1993 by President Clinton*, which further provides evidence of U.S. participation in the sustainability movement.

Table 2 – The mission for the President's Council on Sustainable Development (PCSD) established in 1993 by President Clinton

Mission of the President's Council on Sustainable Development (PCSD)

Forge consensus on policy by bringing together diverse interests to identify and develop innovative economic, environmental and social policies and strategies.

Demonstrate implementation of policy that fosters sustainable development by working with diverse interests to identify and demonstrate implementation of sustainable development

Get word out about sustainable development

Evaluate and report on progress by recommending national, community, and enterprise level frameworks for tracking sustainable development

In 1999, the council presented their third and final report titled *Towards a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century*,

which recommended 140 actions that aims to “improve our economy, protect our environment, and improve our quality of life” (Presidents Council on Sustainable Development). In 2002, in Johannesburg South Africa the World Summit on Sustainable Development (WSSD) focused less on the environmental issues of sustainability itself, but instead added the economy and aspects of equity sustainability: “At the global level, sustainability is oriented toward solutions that do not doom developing countries to a permanently secondary place in the world economy under the rubric of ‘environmental protection’” (Edwards, 2005).

Sustainability Education

As mentioned in the President’s Council on Sustainable Development and the Earth Summit, education has become increasingly crucial to the success of sustainable development. In Kiev (2003) and later on Vilnius (2005), the Ministers represented in UNECE were united behind a European strategy for Education for Sustainable Development. The meetings contributed to launch the United Nations Decade for Education for Sustainable Development in the region.

The main objective of the strategy is to incorporate all aspects of sustainable development into all aspects and levels of education. These themes include a wide range of issues: poverty alleviation, peace, ethics, democracy, justice, security, human rights, health, social equity, cultural diversity, economy, environmental protection, and natural resource management. The next milestone in the process is the implementation of the Strategy. Countries agreed to develop indicators to assess the implementation, organize thematic and sub-regional workshops and compile good practices in education for sustainable development.

There are a number of different educational programs around the world that currently focus on sustainability and how to better educate the community and society. The Oregon School Sustainability Initiative focuses on the overall school systems’ understanding of the concepts of sustainability, thus allowing for the community to work hand-in-hand toward a sustainable vision. There are currently two ways of teaching sustainability. The first way is to educate about sustainable development. This is a lesson of awareness or a theoretical discussion. The second way is on sustainable development, which utilizes education as a transformational tool for societies to achieve sustainability.

According to chapter 36 of Agenda 21, education for a sustainable future has four main components. The first component is for everyone to be able to have access to basic education. The second is to re-orient existing education. Currently the most educated societies around the world actually have the biggest ecological footprints. The third component is the importance of improving public awareness and understanding about the topic of sustainability. The fourth and last component is the need to provide training.

Changes in Global Governance

Winson (2006), after researching the Cuban tourist policies, stated that Socialism had made a difference in Cuba in forging a new political project around sustainable ecotourism. More research and time will eventually prove this statement true or false. It seems as if countries with a more social embrace, meaning a focus that is more on social equity rather than that of a pure capitalistic view, have been more receptive to the sustainability movement. This research, if

proven correct, will have a substantial impact on the overall strategy of teaching sustainability in the United States.

Education & Training Needs Arising from the Sustainability Movement: Opportunities for Instructional Designers

The education and training impact arising from this movement include both formalized education programs, which are fully accredited and given by universities, as well as informal, informational sessions designed for specific purposes to the public. The authors first present a brief overview of several of these programs, and then we present a general discussion on projected work within which instructional designers might find themselves involved.

The University of Saskatchewan, Canada, has a School of Environment and Sustainability, wherein they offer a Master's level program in Sustainable Environmental Management (M.SEM), as well as thesis-based Master and Doctoral programs. Specialization programs include the following disciplines and topic areas: toxicology and environmental contaminants, hydrology, wildlife biology, environmental law and ethics, alternate energy and biofuels, sustainable agriculture, climate change, atmospheric science, environmental engineering, and social dimensions of environmental and resource management. Further, the mission of the school is to work "...with partners within and beyond the University to undertake original interdisciplinary research and scholarly activities, establish innovative learning opportunities, and promote knowledge translation and exchange to foster sustainability" (U S, 2008).

The Master of Sustainable Environmental Management (M.SEM.) program is an interdisciplinary, course-based, professional-style program that can be completed within one year of full-time study. However, students can study on a part-time basis. The length of the program will then vary accordingly. The study program for individuals seeking the M.SEM) is the following:

- 24 credit units of course work
 - 12 credit units of core courses
 - 6 credit units of electives from a restricted list
 - 6 credit units from this list or anywhere else on campus (as approved by the Graduate Affairs Committee or the faculty advisor)
- A 6 credit unit research project
- A Seminar in Environment and Sustainability

The school website describes the doctoral degree requirements as follows.

The Doctor of Philosophy (Ph.D.) in Environment and Sustainability program is an interdisciplinary, research-based program that can be completed within three years of full-time study. Students enrolled in this program are required to complete 6 credit units of course work, a dissertation based on original research,

and must participate in the Environment and Sustainability Seminar. Ph.D. students must also complete a qualifying exam within four months of their first registration and a comprehensive exam (written and oral examination) within 16 months of their first registration. The goal of the Ph.D. program in Environment and Sustainability is to prepare interdisciplinary scholars for leadership roles in advancing the understanding of Environment and Sustainability as a field of academic study. Ph.D. students will participate in critical appraisal, research analysis and synthesis, and knowledge generation and translation. (U S, 2008b)

The University of British Columbia, Canada offers more than 300 courses on a variety of sustainability-related topics, and programs geared specifically to promote efficiencies and the sustainability mission in many areas of the university's operations. The programs include training and policy adjustments in areas such as: Energy Management, Green Buildings, Residential Environmental Assessment Programs, and Paper Reduction. There are also specific training workshops for Sustainability Coordinators (University of British Columbia, 2008).

Brown University is also green. Similar to the other universities presented, Brown University is active on a number of fronts with sustainability. Brown supports sustainability initiatives and activities in four distinct areas:

1. University Commitments: carbon reduction, energy and emissions management, recycling, high performance building designs, transportation, local food initiatives, and environmentally friendly procurement policies
2. Student Initiatives and Groups: sustainable product design and development, Eco-Reps (selected undergraduate students who work to educate their campus mates about sustainability issues), empower student groups (students promoting responsibility for its contributions to end global warming), engineers without borders (engineers dedicated to using engineering for social and environmental good), Rhode Island Student Climate Coalition (carbon reduction programs), and Sustainable Food Initiative
3. Community Collaborations: the Community Carbon Use Reduction at Brown
4. Research and Teaching: the Brown Graduate Program in Environmental Studies (A Ph.D. program offered through a partnership between Brown and the Marine Biology Laboratory), the Center for Environmental Studies (activities include integration of teaching, research, and service, and takes an applied approach to environmental education and problem-solving), the Environmental Change Initiative (fosters interdisciplinary collaborations across the campus and with colleagues around the world), Global Environment: The Watson Institute for International Studies (addresses the challenge of global environmental change through scholarly, policy-relevant analysis drawing on the natural and social sciences), Division of Engineering (Bachelor of Arts degree in Engineering with a focus in Environmental is offered in cooperation with the Environmental Studies Program and is intended for students who want to prepare for

positions and/or graduate programs in environmental policy, planning, and regulation), and the Superfund Basic Research Program (federally funded program-National Institute of Environmental Health Sciences-designed to address health and environmental issues associated with hazardous waste sites) (Brown University, 2008).

Other universities pursuing similar levels of adoption of the Sustainability movement include Clemson University, S.C., Tufts University, MA, and the University of Vermont. The opportunities for instructional technologists and designers are limitless. As a result of this movement's adoption into university missions and operations, instructional technologists/designers might find themselves doing some of the following (note: this list is not all inclusive):

- Faculty support for course designs (traditional or online),
- Institutional support towards university adopted programs and institutes,
- Program specific support in the design of workshops and other training solutions on a wide variety of topics with varying delivery requirements and session lengths, and
- Providing support in the development of online information solutions and job aids.

Instructional designers will find themselves collaborating with a very wide variety of disciplines, topics, people, projects – both short-term and long – and cultures.

Some of the work that instructional technologists/designers will be asked to participate in might require some form of evaluation. The concept of evaluation in context with this review is to consider whether the outcomes that might be evaluated will be equated to changes in people's or society's behaviors, or changes to the environment, or whether the outcomes will be the formation, restructuring, or institutionalization of formal academic programs within the growing field of sustainability. We, as instructional technologists or designers, can expect that 'evaluation' will therefore take many forms.

Although the process of evaluation will probably not change a great deal due to sustainability, more stringent evaluation may become necessary. Some situations may require proof that not only are the programs being evaluated, but proof that correct implementation of sustainable methods may also be required. For instance, evaluation using paper methods which would draw from the lessons taught in "going green" would be contradictory and probably an unsatisfactory method for clients. Also, if the United States were to continue in the path of other countries, sustainability programs would more than likely be tied to government efforts. This being said, a great deal more guidelines would be generated for the design, development and evaluation of training and/or education programs.

The evaluation of the instruction, training, or performance can take any of the usual forms: formative, summative, any of the Kirkpatrick four level evaluation strategies, including ROI calculations. This means there will be plenty of opportunity for instructional designers to be involved with not only the building of education or training programs, but also with the development of evaluation strategies.

Conclusion

The international trend of sustainability has been growing continuously for more than two decades and has shown no signs of slowing. Rather, with the rise of fossil fuel prices and the overwhelming amount of information regarding the status of the global environment, the opposite has occurred. This has been done through detailed and specific education provided by various sources such as books, journals, and media. The mass amount of projected change brought about through sustainability education will bring forth many opportunities for the instructional design and technology field. As the sustainability movement continues to evolve and increase in participation, our field of instructional design and technology will need to become more informed and focused. Instructional design practitioners will need to define our particular role as specific objectives and learning outcomes that relate to sustainability become identified and adopted.

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