Annotated Bibliography

K-12 ENVIRONMENTAL EDUCATION IN NATURAL WORLD HERITAGE SITES


Kirstenbosch National Botanical Garden, in Cape Town, is the first botanical garden to be recognized as a natural World Heritage Site. The Kirstenbosch Environmental Education Program supports the World Heritage Convention’s mission to encourage participation of the local population in the preservation of their cultural and natural heritage. The program’s stated mission is to inspire and enable people from all walks of life to take responsibility for their environment. Learners/youth from the disadvantaged areas and under-resourced schools of the Cape Flats in the Western Cape participate in a curriculum-linked, garden-based and outreach greening program which cover a wide variety of themes, learning program and activities. The article does not describe and specific outcomes or how program successes were measured and evaluated.


In 2009, the Southern Environmental Association (SEA) implemented a project entitled *Providing Hands-on Learning Experiences for Students of the Southern Marine Protected Areas within the Belize Barrier Reef Reserve System – World Heritage Site*. The overall goal of the project was to complement the existing environmental education programs in local schools with hands-on learning experiences. The program's activities were designed to build awareness of marine protected areas. SEA trained 65 teachers to be “Field Directors” i.e. capable of leading field trips in order to provide hands-on learning opportunities for students from their respective schools. With support from SEA, field directors implemented field trips to Laughing Bird Caye National Park and Sapodilla Cayes Marine Reserve, which are part of Belize’s Barrier Reef Reserve System World Heritage Site. The target audiences for the program included teachers from local schools; and primary and high school students. Eight (8) communities and eleven (11) primary and two (2) high schools participated. SEA involved 400 students and adults, in classroom settings and in events at Laughing Bird Caye National Park and the Sapodilla Cayes Marine Reserve. The program was funded for two years by the Community Management of Protected Areas Conservation Programme (COMPACT), which provides funding for community projects that support the conservation and protection of the Belize Barrier Reef Reserve System - World Heritage Site. No information on how the program outcomes were evaluated in terms of changes in attitudes, behaviors or knowledge was included on the web site.

This paper reports observations on environmental education in the Galapagos Islands, and discusses the effectiveness of some of the education environmental learning programs of the Charles Darwin Foundation (CDF). The author discusses environmental education in the formal education system, lessons learned, recommendations for future projects, and strategy implications in the Galápagos Islands. Past programs were reviewed with an eye to working toward future positive and creative solutions to environmental problems in the islands. The review was written in the context of work with year 10-12 students at the Colegio Nacional Galápagos in the departments of science, English and tourism. The impetus for the report was the scarcity of information available about education in such an important location.

Howard, M.W. (2005). Evaluation Report Seaflower Biosphere Reserve Implementation: The first five years 2000 – 2005. Archipelago of San Andres, Old Providence & Santa Catalina Colombia. *Report of the Corporation for the Sustainable Development of the Archipelago of San Andres, Old Providence and Santa Catalina (CAROLINA)*. The Seaflower Biosphere Reserve, an archipelago in the South West Caribbean, is under acute environmental pressure (e.g. from the USA as a strategic storage port near the Panama Canal). During its first five years as a Biosphere Reserve, environmental education has been on-going. A number of programs—formal and informal—for all ages and classes of individuals and institutions have been carried out. In formal education, CORALINA’s environmental education group designed programs to incorporate biosphere reserve education into curricula, including a bilingual marine resources curriculum that has been introduced in some schools. Collaboration with the Mangrove Action Project (MAP) resulted in a Spanish mangrove curriculum for primary schools and an adaptation of the English version, first introduced in the Cayman Islands, for use in Old Providence. MAP’s global education coordinator provided a teacher-training course on curriculum implementation that awarded continuing education credits to participating teachers. Additionally, many educational materials have been produced and were distributed to schools, tourists, and adults at educational activities and events e.g. bilingual (English and Spanish) coloring books on sea turtles and coral reefs strengthen primary school programs on these subjects. A video, flyers, booklets, coloring books, a jigsaw puzzle, and information sheets have been produced on the biosphere reserve. Materials have also been designed and distributed that deal with specific subjects like corals, mangroves, groundwater, waste management, and the marine protected area. As funds allow, materials are reprinted and new materials are developed. The report does not include information on evaluation metrics for determining changes in behavior, attitudes or knowledge of teachers, students or other learners as a result of program efforts. More information available online at:

http://www.oldprovidence.com.co/eng/r_b.html
http://www.sandwatch.ca/copy_of_contacts &_activities24110.htm
http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?code=COL+05&mode=all

(n.d.). Grupo Ecológico Sierra Gorda, I.A.P. Environmental Education: Developing environmental awareness in the Sierra Gorda Biosphere Reserve (also a World Heritage Site), Mexico.

The environmental education program in the Sierra Gorda Biosphere Reserve is the first of its kind in the region and has served local communities for 16 years. The program targets primary and secondary school students in addition to the general local population. Environmental education coordinators conduct monthly visits to 161 schools in 112 communities of the five counties that make up the Reserve as well as in buffer areas surrounding the Reserve. There are 17 environmental educators who provide training on teaching methods and materials including a series of location-appropriate themes such as watershed, soil, flora and fauna, renewable energies, ecological alternatives, natural resources, air, birds, forests, solid waste management, etc. Outreach materials such as signs with environmental messages, posters, brochures and the “Our Earth” educational series package are also distributed. This program is carried out in coordination with the Queretaro State Educational Services Department (USEBEQ) and local and municipal authorities. Evaluation / assessment information was not included on the program’s web site.

http://www.sierragorda.net/noticias/Boletin%20Trimestre%20II%20Trimestre%20III%20-..htm
http://www.sierragorda.net/educacion/index~.htm
http://www.cec.org/Page.asp?PageID=122&ContentID=1627&SiteNodeID=376

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EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD): ON THE GROUND


This article describes research with schoolteachers using participatory methods and reflective practice. These approaches have been used to enable teachers to integrate education for sustainability (EfS) into their teaching practice while maintaining the integrity of their subject disciplines. The participatory methods are derived from various sources used in different contexts, with the purpose of being empowering and democratic. The intention is to develop knowledge and action that is directly useful to the participating group through a process of collective self-enquiry, where reflection helps to focus on the learning process rather than the outcomes. The ways that these methods have been applied, their derivation from other fields of research, their strengths, as well as the problems encountered when applying them, are discussed.


Within UNESCO’s conception of Education for Sustainable Development (ESD), schools should implement approaches to teaching and learning that integrate goals for conservation, social justice, appropriate development and democracy into a vision and a mission of personal and social change. ESD also involves developing the kinds of civic virtues and skills that can empower all citizens and, through them, our social institutions, to play leading roles in the transition to a sustainable future. Thus, ESD encompasses a vision for global society that is not only ecologically, but also socially and economically, sustainable. This paper traces the history of ESD in Victorian (Australia) schools and analyzes the current sustainability policies and initiatives in terms of their achievement of the educational, environmental, economic and social indicators of ESD. It also problematizes the feasibility, and desirability, of any one program being able to incorporate all aspects of ESD as elaborated by UNESCO.


This study reviews several international whole-school initiatives that reflect a range of innovative approaches to sustainability, and documents their experiences, achievements and lessons learned. The research was carried out by Macquarie University and commissioned by the Department of the Environment and Heritage, Australian Government, over a 4-month period from March-June, 2004. Some of the initiatives documented include Enviroschools, New Zealand; Green School Award, Sweden; Green School Project, China; FEE Eco-schools and ENSI. Additionally, this study was informed by other initiatives such as Learning through Landscapes, Learnscapes and Evergreen. The review reflects upon the experiences and learning of these programs in an attempt to answer the questions: What does a sustainable school look like? Is there a formula for ‘how’ to run an effective and wide-reaching whole-school sustainability program? Is there evidence of effective methods to engage the community in these endeavors? How can a program be effective? The study attempts to address these questions as well as identify critical success factors for whole-school sustainability programs. A number of key features that characterize a Sustainable School are identified. While the study found that there is a lack of evaluation and research findings to address questions regarding implementation and effectiveness conclusively, there is some evidence which points to a number of critical success factors for whole-school sustainability programs. These include: alignment with national government priorities; access to expertise in EE and/or EFS during program design and implementation; significant and continuous funding; alignment with EFS approaches; investment in professional development of program team as well as school partners; creating
This study has documented through research as well as anecdotal evidence that whole-school approaches to sustainability have an important contribution to make in shifting communities towards sustainability. National policy and initiatives that support these approaches at the state and local level enhance involvement as well as quality of practice. In conclusion, the report makes recommendations, relating to research, program frameworks and practice.


The authors argue that for successful implementation of ESD principles at school, the school education system should be changed into a resource centre that initiates and supports students’ inclusion into processes of sustainable development in their own communities. Teachers’ self-definition as co-learners in the educational process is an essential part of this change. Moreover, in many instances the integration of nonformal educational initiatives led by youth into the formal educational system makes the transition to ESD more effective and sustainable. By introducing the activities of Youth International Education Club NEWLINE (Belarus), the authors provide examples of nonformal educational tools and methods implemented in several Belarusian schools.


This paper presents perspectives on sustainability, quality and relevance of education found in a resettlement community in Zimbabwe. The exploratory research triangulated data from community meetings, interviews, focus group discussions and digital photography. The results showed that the community lived in a context of risk and vulnerability where a range of economic, cultural, social and environment issues and poor quality of education posed a threat to the quality of life. Tensions in the community, and between the school and community, lack of solidarity, and the weakening of the traditional Unhu/Ubuntu moral and ethical framework contributed to the community’s failure to envision and implement interventions towards quality education and towards sustainable development. The participatory research helped ease these tensions, enabling it to realize opportunities to deal with some of its sustainability issues. It enhanced teacher–community relations, leading to cooperation and solidarity around school improvement and environmental projects. The case study demonstrated the relevance of EE and education for sustainable development to quality of formal education in the school community and to the quality of formal and informal education in the broader community context.


Following an official commitment by the Costa Rican government to implement the UN Decade of Education for Sustainable Development (DESD), the challenge was how to put the commitment into action. An opportunity presented itself with an initiative called Peace with Nature (Iniciativa Paz con la Naturaleza–IPN), under which a teacher professional development course called Education for Sustainable Development Regional Course (CREADS) was implemented. A coalition of governmental and nongovernmental organizations, coordinated by the Ministry of Education and IPN, was put in place to deliver the course using the Earth Charter as the course framework. The course was delivered to more than 200 teachers and administrators, and many participants proceeded to develop ESD projects at their respective schools, and plan for continuous professional development in ESD. This article describes the process of creating this course, its content and methodology, and analyzes the course impact, lessons learned and challenges ahead.


This master’s thesis report uses the UNESCO ESD five strategy framework to analyze the goals of formal (youth), non formal (adult and community), and informal (living in community) education processes in the Galápagos Islands, as public means for achieving institutionalized common visions of sustained community development. Data collection methods included ethnographic and participatory action research.

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(PAR), as well as surveys and secondary data sources collected from 2006 to 2010. The main social challenges found are a lack of jobs, immigration, conflict resolution, public administration, and an impartial justice system. Findings show that while education does play a role, both nonformal and informal education sectors have greater impacts on citizens than formal education. Survey findings show that citizens offer creative solutions to local problems, yet the communities still lack robust civil mechanisms to translate ideas into actions. The author concludes that leadership and governance will be central to encourage collective and sustainable behavioral change. Recommendations to the local government focus on improving education processes with a hybrid approach to formal education, community learning teams to democratize nonformal education, and a holistic program evaluation to institutionalize knowledge sharing and excellence throughout the islands.


The Education for Sustainable Development Toolkit aims to help schools and communities develop a process for creating locally relevant and culturally appropriate education that integrates the efforts of educational systems and local communities. The ESD Toolkit has eight major components: 1) An introduction to sustainability; 2) description of the major thrusts and components of education for sustainable development and a method of bringing ESD to the school level; 3) A discussion of 12 major issues that have slowed the progress of ESD; 4) A case study of the Toronto Board of Education's community consultation and subsequent curriculum revision that indirectly addressed ESD as a result of the citizens' visions and desires; 5) A description of management techniques for initiating change in schools; 6) A brief description of public participation methods for including the citizenry in community decisions regarding sustainability and ESD; 7) Exercises to help schools and communities to understand sustainability, create sustainability goals, reorient the curriculum to address sustainability, and initiate change within an educational system; 8) Links to other Web sites on sustainability, education for sustainability, historic United Nations documents, and communities that have developed sustainability plans.


This article outlines a partnership of the Siemens Foundation, Discovery Communications, and the National Science Teachers Association (NSTA) to inspire student achievement in sustainability through a comprehensive education initiative, the *We Can Change the World Challenge*. The initiative claims to be the first and only national K-12 sustainability education initiative aligned to state education standards and uniquely tailored to match students' growing comprehension abilities throughout their school-aged years. The program engages science teachers and allows students the opportunity to model scientific thinking, learn more about key environmental issues, and to develop critical-thinking skills that will help them to make informed decisions about stewardship of the planet, with the goal of transforming participants into “active citizens for a greener tomorrow.” The laddered program begins by introducing students to the basic concepts of sustainability and the importance of protecting the environment. At each subsequent stage, the concepts expand to engage students beyond their classrooms, into their communities and to the global world. Tools and activities include standards-based lesson plans and teacher materials, student projects, and prizing to foster learning, teamwork, and problem-solving about sustainability.

**ESD: CHALLENGES, OPPORTUNITIES AND PERSPECTIVES**


In Australia there has been a rapid move to an acceptance of education for sustainability as mainstream environmental education. The authors argue that education for sustainability, with its platform of assisting individuals in making apparently informed decisions to create a more sustainable world, is at some distance...
from promoting more ethically-based environmental responsibility. If environmental education is to encourage environmental responsibility, then ethically challenging curricula should provide more suitable mechanisms to encapsulate a sense of what it means to care for country, described by Leopold as “an intense consciousness of land,” and foreseen decades ago with his concept of the land ethic.


The article describes the status of ESD in Argentina. According to the author, only a few groups recognize the value of ESD: environmental education activists who are connected to environmental issues and organizations, teachers providing environmental education at different levels, and within some university circles. The Decade of Education for Sustainable Development (DESD) carries no significant weight in governmental and nongovernmental circles, and does not appear in any agenda, recommendations for policy-making, proposals for decision-making, nor in any public or private sector or area. The author suggests Argentina could take advantage of opportunities offered by the DESD by promoting public recognition of ESD's strategic value in achieving a successful implementation of sustainable social, environmental, and economic policies; and defining what sustainable development means for Argentina. The author recommends a need for an all-inclusive state policy in order to have a just and equitable society that considers a new concept of development; that takes into account the needs and aspirations of all people; that understands pluralism and the balance and harmony between humans and the environment; that allows the creation of alternative ways to eradicate the basic causes of poverty, hunger, illiteracy, pollution, exploitation, and domination; and that deals with the crucial problems not in a fragmentary way but in a holistic manner. According to the author, education in Argentina, which is viewed as a social transformation process on our way to sustainable development, should occupy the place it deserves in public policies.


The article discusses opportunities that education for sustainability (EFS) can offer to environmental education (EE) that will strengthen its capacity over the Decade for Education in Sustainable Development. These include the contribution of the tools, concepts, archetypes, and “habits of mind” of systems thinking and system dynamics education—a core content area of EFS. Two examples of concepts of systems thinking and system dynamics education—entry points and mental models—are described to highlight their usefulness to EE.


The author describes the vision, objectives and the International Implementation Scheme developed by UNESCO and partners for the Decade of Education for Sustainable Development, which is defined as "a world program to reorient education around the three pillars of sustainable development: economic, social, and environmental." Five pillars of learning for sustainability or fundamental types of learning are outlined: learning to know, learning to do, learning to be, learning to live together, and learning to transform oneself and society; the latter was recommended by Latin American educators to reflect perspectives on education in the region.


This article addresses issues regarding implementation of Education for Sustainable Development (ESD) within formal education systems, and specifically seeks to identify the basic essential components of ESD pedagogy. The authors present a theoretical pedagogical framework based on accumulated theory and experience in the field. The framework aspires to encompass the majority of prevailing pedagogies within a simple set of four basic principles. The authors argue that the four principal pedagogies are basic and indispensable prerequisites for achieving the goals of ESD, and the lack of one is sufficient to undermine the ESD's pedagogical construct.


This article reflects on the potentialities of education practices guided by the concept of sustainability, and how these can contribute to the reformulation of learning content and methods and to the quality of education. Sustainability entails the transformation of all aspects of school life, from preschool to the university. The article also points to challenges and strategies for integrating sustainability into education practices and into the school curriculum. The key challenge is the need for a different pedagogy, an ecopedagogy, defined as a holistic pedagogy that overcomes the anthropocentrism of classic pedagogies. Sustainability represents an opportunity for the renewal of old education systems founded on competitive principles and values and based on a predatory view of the world. Educating for sustainability means educating for the emergence of a different, possible world.


Initiatives of the Mexican government in response to The Decade of Education for Sustainable Development (DESD) and implications for the Ministry of Public Education are discussed. Recommendations by the author are presented for taking advantage of the institutional opportunities in Mexico presented by DESD.


Research on education for sustainable development (ESD) is not a unified body of work and, much like the literature for environmental education (EE), research is published in many arenas. The trends, however, capture some of the major foci of the research that is emerging on ESD, especially in the early years of the Decade of Education for Sustainable Development (DESD). This article attempts to frame some of the themes in which ESD research is emerging in the United States.


In countries as diverse as Belgium, Mexico, Bangladesh and China, 1998 brought severe flooding which threatened the lives and livelihoods of countless millions of people. More and more disaster experts, development agencies, and citizens’ groups are supporting the theory that the globalization of economies is largely responsible for such human misery. Structural adjustment programs, deregulation and the opening of markets may be good for international capital, but such processes increase inequalities, encourage people and countries to over-exploit natural resources, and contribute to reductions in spending on social and environmental welfare. The global environmental crisis cannot be separated from the global economic crisis and any analysis of the causes and possible solution to environmental problems should start from this fact.


The article states the need for a specific action plan for the Latin American implementation of the Decade of Education for Sustainable Development (DESD). In Brazil, a "deficient educational system", characterized by diminishing resources devoted to education and research, and low salaries and poor working conditions, makes ESD implementation particularly challenging. The author recommends that Brazil's government agencies and national associations facilitate the DESD success by supporting and empowering formal and nonformal educators, and encouraging them to develop and implement efficient educational curricula and programs, and to insert efficient transdisciplinary strategies of ESD in all courses and schools. Effective ways to identify and apply the best strategies to promote and implement education for sustainable development nationally are presented and discussed.


In this article the authors look at the similarities between environmental education (EE) and education for sustainable development (ESD), and describe some lessons learned from more than 35 years of EE history that could help ESD avoid pitfalls common to emerging disciplines and to advance its efforts and chance of success.


With the recent debates concerning the UNESCO's proposals of Education for Sustainable Development (1992, 1988) or Education for a sustainable future (1997), environmental education is confronted with the necessity of restating its aim and establishing its niche in a global educational project, whose foundations have to be reconstructed in light of the development of responsible societies. This article presents an analysis of the epistemological, ethical and pedagogical basis of the UNESCO's recent proposals, so as to verify their offer of an appropriate integrative framework for environmental education, and other dimensions of contemporary education, that aim at the reconstruction of the person-society-environment web of relationships. This analysis is based on the referential framework of modernity and postmodernity.


The UNESCO-UNEP International Environmental Education Program (1975-1995) provided impetus for developing, legitimizing, and institutionalizing environmental education. More recently, UNESCO was mandated by the United Nations to carry out a worldwide shift towards education for sustainable development. As international organizations’ recommendations and guidelines often act as beacons for the conception and implementation of national formal and nonformal education programs, it is necessary to critically appraise their content. The authors’ hermeneutical analysis of United Nations documents concerning environmental education, which is now subsumed to sustainable development, highlights an instrumental view of education, a resourcist conception of the environment, and an economist view of development. Such a worldview needs to be discussed.

This essay explores a central question for all those involved in education and sustainability (ESD): What are you really most interested in: educational or social outcomes—what learners learn, or what they do? Although this is hardly a new question, the paper argues that it is one that needs to be emphasized at this time when we see a tightening focus on modifying behaviors, and the conscription of educational institutions and programs to these ends. The essay takes the promotion of Fairtrade, a contemporary view on how ESD might be conceptualized, and a recent report from the English schools inspectorate, to explore where an appropriate balance might be struck between these. The essay argues that, although both educational and social outcomes are important, when it comes to making judgments about school effectiveness, this needs to be tightly focused on what young people are learning rather than on, say, the amount of energy they have saved or waste they have recycled.


The present paper acknowledges the need for sustainable development education in Cuba, after a short review of their national health status and educational system. The environmental situation of the island is outlined, including the role played by EE in the current environment system. EE in Cuba is presented, and the problems related to its implementation are analyzed. Recommendations and possible solutions towards the use of education for sustainability as a tool for environmental management are presented.


This explorative paper works across discourses to suggest the possibility and potential of an integrative paradigm for sustainability education that reconciles instrumental and intrinsic educational traditions, informed and infused by resilience theory and social learning. It argues that such an integrative view is required in the context of the urgency of building more resilient local social–ecological systems, and that such a view offers the possibility of new energy and direction in the sustainability education debate. The paper is essentially a thinkpiece that attempts to look at touchstones between discourses to suggest the possibilities and potential of mutual illumination and better integration. The paper begins by reviewing tensions between an instrumentalist view and an intrinsic value view of environmental and sustainability education, the former seeing such education as a means to individual and social change, the latter upholding the primacy of the autonomous learner who, secondarily may – or may not – take action towards sustainability. The paper then considers the discourse of the resilient learner, before reviewing social learning literature linked to resilience and discussing how far these various views can be brought together and reconciled. Parallels are made with tensions in the debate on sustainability when seen as a desirable ideal, or as a process. Transformative learning theory is then introduced in relation to addressing the paradox of resilient but maladaptive worldviews and the need to educate for resilience. The paper concludes with an argument for a transformative education paradigm – ‘sustainable education’ – which necessarily integrates instrumental and intrinsic views and which nurtures resilient learners able to develop resilient social–ecological systems in the face of a future of threat, uncertainty and surprise.


Whether we view sustainable development as our greatest challenge or a subversive litany, every phase of education is now being urged to declare its support for education for sustainable development (ESD). In this paper, the authors explore the ideas behind ESD and, building on work by Foster and by Scott and Gough, argue that it is necessary now to think of two complementary approaches: ESD 1 and ESD 2. ESD 1 is the promotion of informed, skilled behaviors and ways of thinking, useful in the short-term where the
need is clearly identified and agreed, and ESD 2 as building capacity to think critically about what experts say and to test ideas, exploring the dilemmas and contradictions inherent in sustainable living. The paper notes the prevalence of ESD 1 approaches, especially from policy makers; this is a concern because people rarely change their behavior in response to a rational call to do so, and more importantly, too much successful ESD 1 in isolation would reduce our capacity to manage change ourselves and therefore make us less sustainable. The authors argue that ESD 2 is a necessary complement to ESD 1, making it meaningful in a learning sense.


The report provides a mid-decade review of the United Nations Decade of Education for Sustainable Development (DESD, 2005-2014) to take stock of what has been accomplished during the first five years. The review also identifies the obstacles encountered in creating structures, provisions and conditions that facilitate the development and implementation of ESD. Finally, the review aims to generate possible actions, based on the lessons learned during the first five years, for the remainder of the Decade.

SOUTH AMERICA: ENVIRONMENTAL EDUCATION, PLACE-BASED EDUCATION AND OTHER APPROACHES


The current educational emphasis on the "global community" misses the most immediate and concrete area where students can make a difference: the locality. Without negating the importance of having a sense of responsibility toward the global community, a pedagogy of place argues that children cannot comprehend, much less feel a commitment toward, issues and problems in distant places until they have a well-grounded knowledge of their own place. The place that one inhabits can teach about the interdependency of social and natural systems. Understanding a pedagogy of place is understanding the purpose of education: the development of competence, care, and appreciation in political, environmental, and aesthetic areas. Two public secondary schools serving poor students in Colombia promote a pedagogy of place that defends the integrity of the community and surrounding environment. Fernandez Guerra Secondary School in the semi-urban town of Santander de Quilichao uses an interdisciplinary approach in which each grade focuses on a locally relevant theme and a social or ecological project. Tomas Herrera Cantillo Secondary School in the isolated village of Penoncito engages students in organic agriculture and animal husbandry projects relevant to sustainable community development. Examples show how the schools transmit competence, care, and appreciation in the direction of political, aesthetic, and environmental awareness and also prepare students for national standardized tests and avoid parochialism.


The reality of the Puna altiplano schools in Latin America is similar to other rural poor areas in third world countries; that is, poverty and environmental degradation, if left unaddressed, could result in a situation where unsustainable practices of natural resource use predominate, accelerating resource depletion and increasing poverty. The authors posit that a program of EE within a natural resource management strategy can help avoid or reverse this situation. In order to preserve the vicuña, EE should be integral to strategies for poverty alleviation. The “Vicuña: tesoro del altiplano” book has proved useful in informing people about vicuña and their role in the Puna ecosystem. EE courses were offered to teachers because they are integrated into the world of community traditional experiences and when provided with scientific information teachers can take on the responsibility of implementing an EE curriculum. EE trained teachers more often engage their students in local environmental activities, especially if they have developed a relationship with the local species. When school students are educated about conservation this has a strong influence on their commitment to conserving species and habitats. EE can best be achieved in places where the school is deeply rooted within the surrounding community, as is the case in a number of towns in the

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Argentinean Puna. Programs were aligned closely with local school and community contexts, with the view that if teachers could provide EE not only at school but also in the community, it would be the most effective way of achieving changes in communities’ attitudes to wildlife and nature. In Cieneguillas, people started mapping their future, the community named the school, a name it shares with the ecosystem in which they live. Also, the community initiated a process that resulted in capacity building for vicuña conservation and management. This result illustrated how the group was able to achieve concrete goals as well as the scientific research towards the sustainability and the conservation of the area.


Emancipatory environmental education (EE) emphasizes natural and social environments in its definition and practice, transcending naturalist and conservationist approaches often used in formal environmental education. Emancipatory EE should support its learners in the development of a critical consciousness, empowering them to plan and participate in action, with the aim of individual and societal transformation. The teaching, learning, and curriculum used in this tradition of EE must intersect with these dimensions to bring about a learning that is critical, empowering, and transformative. Within this context, this major paper explores formal EE used in elementary classrooms in Taboão da Serra, located in greater São Paulo, Brazil. Using the author’s research framework, which defines emancipatory EE, together with an exploration of national and state EE programs, survey results from four elementary school teachers are analyzed regarding understandings and practices in EE. This analysis illustrates the strengths and weaknesses in formal environmental education in Taboão da Serra. The paper concludes by drawing on this analysis and cites recommendations for moving toward emancipatory EE in elementary schools across Taboão da Serra possible.


A key ongoing debate in environmental education (EE) practice and its research relates to the content and goals of EE programs. Specifically, there is a long history of debate between advocates of educational perspectives that emphasize the teaching of science concepts and those that seek to more actively link environmental and social issues. In practice, educators and organizations respond to these tensions in a variety of ways, often strongly reflecting the particular social and economic contexts in which they are located. Much of the research in the area, however, has tended to take a narrow focus on either purely theoretical concerns or on individual programs in schools or protected areas. In contrast, this research used an ethnographic approach to explore debates about the content and aims of educational programs between diverse educational actors in one community in Costa Rica. The research revealed that environmental education: (1) is an important local site for the active contestation of understandings of the natural world and humans’ relationships to it; and (2) can be part of wider struggles over the control of processes of local development and environmental management. The study further suggests that while theoretical discussion about the relative merits of diverse approaches to environmental teaching and learning is important, if that analysis is not situated within a particular social, economic and political context, it is likely to reveal relatively little about how or why particular perspectives on EE may dominate or remain marginal in a specific place.


This study examined the similarities and differences among 171 Grade 7-12 science teachers from three different countries (54 U.S, 63 Bolivian, and 54 Turkish) with respect to their attitudes toward environmental education (EE) and instructional practices. The instrument employed explored how teachers’ knowledge, instructional practices, decision-making process, and cultural features influenced their EE attitudes and praxis. The instrument, which was translated into Spanish and Turkish and then back into English, contained a personal data form that included demographic questions and a three-part
questionnaire. Based on the analysis completed, significant differences were found between these three countries with respect to 1) teacher’s knowledge about global environmental issues, 2) teachers rationales for including environmental education in their science classroom instruction, and 3) while there were no significant differences in the importance of religion in the teachers lives, there were significant differences in the extent to which teachers reported religion influencing instructional decisions. In addition, there were differences regarding the resources that teachers reported drawing on as they included EE in their classrooms. There were no significant differences found when comparing the three countries with respect to extent to which each country reported including technological and/or environmental problems in science classroom instruction. Finally, generally there was agreement regarding teachers’ goals and objectives in science classrooms with respect to EE and the most important global environmental problems/threats.


This paper describes the problems encountered in developing environmental education (EE) in Federal protected areas in Brazil. Results of a survey on the current status of EE in four categories of Federal protected areas; namely national parks, biological reserves, ecological stations and environmental protection areas, are described and discussed. The study suggests that the development of EE in protected areas in the country has several limitations: financial resources, lack of training, material resources and a lack of policy on environmental education. It also identifies that some of these problems seem to be inter-related with those of the National System of Conservation Units of the country, which may result in a retarding of the development of EE in such areas.


This research investigated the status of environmental education (EE) in private American and international middle and high schools throughout Latin America and the Caribbean. The study population consisted of all 50 dues-paying member schools in the Association of American Schools of Central America, Columbia-Caribbean, and Mexico (the Tri-Association). Members include 17 schools in Mexico; 8 schools in Colombia; 4 schools each in Costa Rica, Guatemala, and the Dominican Republic; 3 schools in Jamaica; 2 schools each in El Salvador, Honduras, and Venezuela; and 1 school each in Nicaragua, Haiti, Ecuador, and Panama. Results of the survey indicated that even in the best situations throughout Latin America, EE implementation is hindered by a lack of available quality regional EE curriculum materials, a lack of access to teaching materials, and widespread teacher misconceptions about EE infusion and the definition of EE. Findings strongly support the need for quality regional EE curriculum development and ongoing teacher training in Latin American schools. Studies involving teachers of grades 7-12 in the United States yielded similar results. Teachers' perceptions of important environmental issues differed from what the community and students considered important, but the teachers' perceptions were all compatible with the EE goals and objectives set forth by the United Nations Environment Programme.


The authors present a model for ecology education, which employs inquiry-based processes for active science learning, including first-hand investigations and reflections on implications of the results. Targeted to school-age children, teachers and nature interpretation professionals, this approach helps create a foundation for critical thinking skills, a critical component of ecological literacy. The model which involved partnerships between ecologists and educators, showed promise in several South American settings; this paper describes its implementation and outcomes in two unique settings—school yards and nature trails—in southern Argentina in San Carlos de Bariloche, Patagonia Lake District.


This article discusses the history of interdisciplinary environmental education (EE) and its perspectives in...
light of 21st century socio-environmental problems. The United Nations has an ambiguous role in promoting international congresses on environmental protection, two of which took place in Brazil. Ambiguity was demonstrated in the discussions involving the terms "sustainable development" and divergence of the ideas discussed during the Rio 92 and Eco-Forum conferences in Brazil. The article highlights environmental problems in developing countries and the importance of more effective EE programs.


This study focused on how democratic values and citizenship education are promoted through environmental education in Costa Rica. Data were collected through the examination of textbook and curriculum guides and interviews with classroom teachers. The qualitative study utilized Bowers' (2001) and Gruenewald's (2003) theories of eco-justice and critical place-based pedagogy respectively to analyze Costa Rican elementary EE curriculum and its relationship to social justice and democracy. Findings suggest that the curriculum did promote environmental sensitivity and, to a lesser extent, democratic values and social justice. Moreover, the study found that the curriculum allowed teachers to become environmental advocates who encouraged their students to actively question and analyze contradictions between the reality in their communities and official economic and environmental policies.


Since 2003, researchers, faculty, graduate and undergraduate students from the State University of Maringá have been working alongside teachers from the state and local schools in the municipality of Porto Rico (Paraná State), located on the banks of the Paraná River. Their objective is to outline actions and strategies with the purpose of building paths to insert environmental education (EE) into the school curriculum. Based on the action-research methodology, the group has developed the following programs: a) the Continuing Education Program in Environmental Education; b) the Development of Interdisciplinary Projects; c) the Insertion of Information and Communication Technologies (ICTs); and d) the Production of Teaching Materials. Program evaluations indicate that teachers have been able to gradually build a theoretical and methodological basis for EE while simultaneously growing into the role of teacher-researchers as they create the conditions to investigate their pedagogical practices, reflect upon them, share experiences, innovate, and make the teaching-learning process more significant. Allied to the advances in educational practices and with the aid of ICTs, the activities developed in the classroom, in the field and in the lab - all of which involve natural and cultural aspects of the region - have contributed to teachers' and students' better understanding of the ecological, cultural, social and economic value of the floodplain, and consequently, of the importance of preservation and management in order to maintain local biodiversity.


There is general agreement among conservation practitioners about the need for (1) social involvement on the part of scientists; (2) interdisciplinary approaches; (3) working on local, regional, and global levels; and (4) implementing international agreements on biodiversity and environmental protection. However, a major challenge in conservation today is how to integrate and implement these multiple dimensions. Few researchers have actually offered hands-on examples for showing in practical terms how such integration can be accomplished. To address this challenge the authors present an innovative case study: the Omora Ethnobotanical Park, a long-term biocultural conservation initiative at the southern extreme of the Americas. Located near Puerto Williams, Cape Horn Archipelago region, Chile, the Omora Park is a public-private reserve that provides material and conceptual foundations for three complementary conservation actions: (1) interdisciplinary scientific research; (2) informal and formal education, i.e., school, university, and training programs for adults; and (3) unique local practices that preserve and transmit traditional knowledge. The park serves as a living laboratory for scientists, students, and the community, and demonstrates how the integration of conservation, education, and traditional knowledge can lead to sustainable development.
courses; and (3) biocultural conservation. The latter entails an actual reserve that protects biodiversity and the water quality of Puerto Williams’ watershed, as well as programs on Yahgan traditional ecological knowledge and interdisciplinary activities, such as “field environmental ethics” and ecotourism, carried out in the reserve. Being at the “end of the world,” and within one of the most remote and pristine ecoregions on the planet, Omora Park offers a “bio-cultural treasure.” At the same time, its geographical and technological isolation presents a challenge for implementing and sustaining conservation actions. To achieve the general conservation goals, the authors have defined 10 principles that have guided the actions of Omora: (1) interinstitutional cooperation, (2) a participatory approach, (3) an interdisciplinary approach, (4) networking and international cooperation, (5) communication through the media, (6) identification of a flagship species, (7) outdoor formal and informal education, (8) economic sustainability and ecotourism, (9) administrative sustainability, and (10) research and conceptual sustainability for conservation. These principles have been effective for establishing the long-term Omora initiative, as well as involving multiple actors, disciplines, and scales. The Omora initiative has extended its local goals to the regional level through a successful 5-year process in cooperation with the Chilean government to create the Cape Horn Biosphere Reserve, designated by UNESCO in June 2005, with the goal of establishing a long-term institutional-political framework that promotes social well-being and biocultural conservation at the southernmost tip of the Americas.


This research, commissioned by the U.S. Department of State, Office of Overseas Schools, was designed to determine the status of environmental education in private U.S. and international elementary schools throughout Latin America and the Caribbean. The study population consisted of all 50 dues-paying member schools in the Association of American Schools of Central America, Colombia-Caribbean and Mexico (also known as the Tri-Association). Members include 17 schools in Mexico, 8 schools in Colombia, four schools each in Costa Rica, Guatemala, and the Dominican Republic, 3 schools in Jamaica, 2 schools each in El Salvador, Honduras, and Venezuela, and 1 school each in Nicaragua, Haiti, Ecuador, and Panama. Response rate was 72%, with 36 schools responding. Results of the survey indicated that even in the best situations throughout Central and Latin America, environmental education (EE) is being hindered by lack of available quality regional environmental education curricula, lack of access to teaching materials, and widespread teacher misconceptions about EE infusion. Findings of this study strongly support the need for quality regional EE curriculum development and ongoing teacher training in Latin American schools. Studies involving K-6 teachers in the United States yielded similar results. Teacher perceptions of environmental issues differed from those the community and students considered important, but these teacher perceptions were all compatible with the EE goals and objectives set forth by the United Nations Environmental Programme (UNEP).


The report, presented to the United Nations, includes a section describing elements of Argentina’s national environmental education strategic plan, including its goals, primary constituents, successes and challenges, and lists of related education initiatives and projects.


A non-formal Environmental Education (EE) Program was implemented in the natural conservation area (Ecological Station of Jataí, Luiz Ant nio, São Paulo State), through (EE) paradigms, which consider the objectives of education about, in and for the environment within cultural and natural perspectives. The aim

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of this program was to support information and scientific knowledge to provide opportunities to the local population to be aware of environmental impacts and risks resulting from the soil use that threaten the environmental quality and the biodiversity of the Ecological Station of Jataí. The underlying concept is that the promotion of community empowerment could evoke a sense of participation and the directives to management for decision-making for local sustainable. The model was developed in the context of local realities, while considering the global issues of environmental paradigms. The environmental characterization (biophysical components) through a Geographical Information Systems was related to the hydrographic basin analysis. Environmental perception was utilized as a main tool to analyse population understanding of local environment, and (EE) pedagogical tools were produced to promote environmental awareness. Since the ecological dimension of (EE) was the main approach, the programme intends to assemble the cultural perspective, achieving the global view of (EE).


This study draws on information from 11 in-depth interviews, two focus groups and 72 written questionnaires to evaluate an extra-curricular environmental education (EE) program on forestry designed for preparatory school students from a small rural community in Mexico. Specifically, the study assessed the impact of the program on the ecological knowledge of 72 students. Qualitative feedback suggests that students learnt about forestry, acquired greater awareness of the importance of conservation for the local environment and enjoyed the participatory teaching methods used in the program. Quantitative results show a positive and significant association between the number of times a student participated in the programs and the student’s ecological knowledge. Students who participated in the programs once had a 16.3% higher knowledge on ecological concepts and knew, on average, 1.5 more local forest plants than students who never attended it. Findings suggest that the inclusion of participatory EE programs in preparatory schools would improve the acquisition of ecological knowledge. Further research could consider the consistency of the findings by replicating participatory methods presented here and by using an experimental research design.


This paper explores ways to bring together local and global knowledge systems in the context of education. It first discusses the concepts of native science and of intercultural education, key ideas in Ecuadorian indigenous education today. Both of these concepts seek to unite the local and the global in new ways. It explores the views of Ecuadorian indigenous educators and leaders around issues of education and science. The primary need voiced by these individuals is that of defending their communities against various kinds of encroachment, economic as well as cultural, and education is viewed within this reality. Finally, the paper discusses the paradigm of place conscious education, which the author argues is a unifying conceptual framework that speaks to the concerns voiced by these educators as well as those of educators elsewhere.


Sea turtles throughout the world’s oceans are endangered, and species such as the leatherback (Dermochelys coriacea) and hawksbill (Eretmochelys imbricata) turtles of the eastern Pacific are nearing extinction (Sarti-Martínez et al. 2007; Chaloupka et al. 2004). In response to this crisis, governments, communities, and non-governmental organizations (NGOs) are forming new partnerships to increase protection for sea turtles. Such alliances can provide valuable lessons for involving local communities in conservation. This paper seeks to share the strategies and approaches applied by the organization Paso Pacifico to partner with local communities in sea turtle protection. Paso Pacifico is a non-profit organization founded in 2005, and is focused on restoring and protecting the endangered ecosystems along the Pacific slope of Central America. The program activities aim to conserve ecosystem processes operating at a landscape scale. Thus, forest conservation efforts are paired with complementary actions in the coastal and nearshore marine environments. Paso Pacifico currently focuses its conservation efforts on southwestern Nicaragua, where it is developing the Paso del Istmo Biological Corridor, a series of private protected areas connected through sustainably managed landscapes.
World Fisheries Trust, together with its Brazilian and Canadian partners, implemented a project designed to improve sustainable livelihoods and conservation in Brazil’s inland fisheries in the Sao Francisco River. This included the development and application of environmental education (EE) into the Brazilian school curriculum: Over three weeks, 19 classes and formal workshops for teachers, administrators and students were conducted, and 15 meetings and planning sessions were held. The goal was to assist teachers to develop methods of integrating EE into the curriculum using community mapping and the watershed model. Community mapping proved to be highly effective as a means of focusing attention on the local environment, generating enthusiasm among students, teachers and community members. Further development and follow-up in the form of teacher training and classroom support was strongly recommended.


A booklet that examines quality education that fosters the knowledge, skills, perspectives, and values that lead to a more sustainable future.

SELECTED ARTICLES ON WORLDWIDE MODELS OF EE / SCIENCE EDUCATION

MODELS OF EE / SCIENCE EDUCATION


Environmental Education (CJEE) 7 (1).


SELECTED ARTICLES ON TEACHER PROFESSIONAL DEVELOPMENT IN EE


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**EXAMPLES OF WHOLE-SCHOOL APPROACHES TO SUSTAINABILITY**


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