Across the Spectrum

RESOURCES FOR ENVIRONMENTAL EDUCATORS

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Across the Spectrum: Resources for Environmental Educators

Introduction

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Environmental education practices often follow larger trends in society. Not surprisingly, the origins of environmental education in the 1970s reflected a growing global concern about environmental degradation. While such concerns remain central to environmental education today, the following societal trends have emerged since then and are being integrated into environmental education as practiced in diverse settings around the world.

- The journalist Richard Louv brought to the world's attention the possibility that as people spend increasingly more time in front of TV, computers, and other electronic devices, they may become victims of "nature deficit disorder." Louv's work suggests a role for environmental education for children and parents not just in transmitting knowledge or building skills, but also in creating opportunities for unstructured outdoor play, exploration, and observation, which are critical to human development and restoration.
- The rapid rate of urbanization has raised questions about what types of environmental education experiences are important for the vast majority of the world's population. In the face of urbanization, environmental educators can help participants learn about urban ecosystems or "social-ecological systems." They also may engage participants in restoring pockets of nature to cities, for example through planting trees or working and learning alongside community gardeners.
- Society is increasingly realizing that environmental education has a role to play in helping alleviate the stresses faced by communities. For example, some children face the threat of violence daily and lack access to loving relationships and other forms of social support. Environ-

Environmental educators are joining forces with youth and community development professionals; museums, zoos, and botanical gardens; and urban green space managers and planners to come up with new practices that reflect societal concerns.

mental education can provide these children with the emotional and psychological benefits of spending time in nature, as well as with "caring" adults and positive role models. For these reasons, educators and youth program leaders in community, faith-based, and other organizations are increasingly looking to environmental education as a platform to address youth and community development in stressed communities.

- Climate change brings additional stresses, including flooding, drought, forest fire and sea level rise. These stresses present society with an imperative to change energy and other consumption patterns, as well as to discover how existing and new practices can become part of the solution. This suggests the need for environmental education to engage participants in learning, experimenting, deliberating, and developing practices that contribute to climate change mitigation and adaptation.
- Schools face challenges in interesting young people in science and other subjects. Environmental education outside of the classroom can readily apply the results of research that shows how learning occurs through active engagement of the student—with other people, with other organisms, and with one's physical surroundings.

These five interrelated trends—concern about the psychological well-being of people with limited access to nature, urbanization, social stresses as well as those brought about by climate change, and academic achievement of students—pose significant challenges to the field of environmental education. Yet these same challenges are sparking innovative paths in environmental education. Environmental educators are joining forces with youth and community development professionals; museums, zoos, and botanical gardens; and urban green space managers and planners to come up with new practices that reflect societal concerns. Many of these practices occur outside of the classroom, involve youth and elders working together, and engage a diversity of professionals and participants in urban as well as suburban and rural communities.

As many of those working in these settings have little formal training in environmental education and may feel isolated from other professionals with similar interests, we have begun this e-book with three goals in mind. First, we hope to provide a foundation in environmental education history and application to help newcomers to the field orient practices within a body of knowledge and experience that has accumulated since the formal launching of environmental education in the 1970s. Second, we hope to introduce the readers to environmental education practices that reflect recent societal trends. Finally, we also hope that this e-book will help create a community of interested professionals working in diverse settings but sharing common concerns. New chapters may be added as new practices emerge, and opportunities are planned so that users of these materials will be able to share thoughts about the chapters online.

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This e-book is being written by professionals and volunteers *for* professionals and volunteers who want to engage young people and adults in learning about and developing healthy environments. We invite you—whether you are working in a community center or half-way house; church, synagogue, temple or mosque; zoo, botanic garden, or museum; Scout, 4-H, or boys and girls club; community garden or nature restoration program; or a senior center, nature center, or park—to explore the rich tradition of environmental education and to learn how your peers across the continent and in other countries are creating new practices to address societal and environmental concerns. We also invite you to contact us if you have ideas about how to expand our vision of non-formal environmental education.

CHAPTER 1

Foundations of Environmental Education

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Overview

Environmental education (EE) in the United States (U.S.) evolved from a rich assortment of practices in the early 1900s and now embraces a suite of formal and nonformal youth and adult education programs. This chapter highlights the history of EE and provides a foundation to understanding how the field currently accommodates the political and social realities of the context in which it operates.

Foundations and Founders

Nature walks in a city park, planting native trees to build a corridor between forest fragments, a student poster contest to encourage public transportation, and study circles to explore local food options—how can so many different activities all be called environmental education (EE)? These activities and many more help increase environmental literacy and engage people in environmentally responsible actions. The full constellation of strategies, techniques, and opportunities that move the citizenry toward this goal have fallen under the banner of EE for several decades.

A variety of philosophers and practitioners in both education and natural resource management contributed to the origins of EE. While the development of EE was a global phenomenon, this chapter focuses more on American contributions. American writers and thinkers such as John Muir, Henry Thoreau, Aldo Leopold, and Rachel Carson popularized the environment and spurred concern about environmental problems through their writings, contributing to readers' awareness and knowledge about the natural world. The pedagogy of EE, however, was influenced by people who thought about learning and teaching, particularly the importance of experiential education outdoors. Jean Jacques Rousseau (1712–1778), for example, called for returning to nature and discovering information rather than memorizing facts about science. Sir Patrick Geddes (1854–1933), a Scottish botanist and urban planner, implemented an interdisciplinary approach to educating the whole person by encouraging students to learn by doing.[1] His contemporary in the U.S., John Dewey (1859–1952), was a strong proponent of experiential education that included opportunities to explore, reflect upon, and apply newly learned concepts. Dewey also heralded education as a way to promote democratic ideals.[2] The writings of these thinkers greatly shaped EE by influencing its early predecessors—nature study and conservation education—and continue to challenge us to consider ways to engage learners, build skills, and create effective learning environments.

The fields of nature study, outdoor education, and conservation education set the basic stage from which EE emerged.[3] Launched in 1891 by American Wilbur Jackman's book *Nature Study for the Common Schools*, and enhanced by the work of Liberty Hyde Bailey and Anna Botsford Comstock at Cornell, nature study was practiced in the United States and Europe during the early 1900s. It revolutionized elementary science education by emphasizing the observation of nature while in the outdoors and through exploration of the relationships of plants, animals, and the physical systems that support them.[4] The movement was driven, in part, by a surge in urban growth, migration from rural farms to industries, and a concern that youth were missing vital interactions with the natural world that could shape their future careers. Comstock's 1911 *Handbook of Nature Study* clearly suggested that the role of the teacher was to promote interest and excitement in the discovery of nature,[5] yet since many teachers lacked sufficient training in science and nature observation, the movement found limited appeal.

Outdoor education, in contrast, encouraged teachers to go outdoors for lessons in every subject area, not just science, and aimed to advance not only an appreciation for the natural world, but also outdoor knowledge and skills. As the outdoor education movement of the 1940s and 1950s evolved into residential and day camping, recreation skills were emphasized to encourage youth to continue with outdoor pursuits in their leisure time.[6] Though it declined somewhat in the 1980s, outdoor education still persists in ubiquitous camp settings across the continent, such as the YMCA's residential programs for elementary and middle schools.

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Conservation education differed from both nature study and outdoor education in that it was led by U.S. governmental agencies. During the Dust Bowl of the 1930s, when erosion and water quality problems were devastating agriculture in the Midwest, government agencies realized the resolution of resource problems must go beyond creating and enforcing legislation. They initiated conservation education to increase awareness about conservation issues, espouse the importance of wise use of natural resources, and encourage the public to understand and comply with environmental laws.[7]


Stapp

In 1968, **William Stapp,** Ph.D., engaged his students at the University of Michigan in discussions of the limits of conservation education (too descriptive and focused on the natural world) and outdoor education (too limited to using the outdoors to enrich school programs). Stapp and his students came to believe that there was need for a new field that considered the total environment and emphasized problem-solving skills.[8] Thus, environmental education was developed, and the definition and rationale for EE based on the work of Stapp and his students was appropriately published in the first issue of the *Environmental Education Journal* in 1969. Stapp continued to play a leadership role in the development of EE both in the U.S. and globally as the first director of the International Environmental Education Programme, jointly funded by UNESCO and UNEP[9]; and as organizer of the first international conference at Tbilisi, Georgia, USSR in 1977. It was at Tbilisi where the field of EE received an internationally recognized definition, objectives, and action steps.

Many other leaders made important contributions to the founding and development of the EE field internationally. For example, Robert Roth and Harold Hungerford (United States) and Peter Fensham and Arthur Lucas (Australia) are among those named as founders.[10] Roth, a contemporary of Stapp, published the fundamental concepts of environmental education in the *Journal of Environmental Education* in 1970 and subsequently became the journal's editor. Fensham, the first president of the Australian Association for Environmental Education, pursued educational reform to prepare students to become informed and active citizens by integrating study and analysis of the impacts of science and technology on society in everyday life. Lucas is most known for his detailed analysis of early EE literature, from which he concluded that the term EE had been used to classify education *about* the environment (that is, the content), *for* the environment (that is, skill development to resolve environmental issues), and *in* the environment (that is, located outdoors). This conclusion has significantly aided our understanding of the scope of EE and the distinction between EE and other "educations." Finally, Hungerford and his students played an essential role in developing methods of research and generally defining EE practice through the 1980s and 1990s. Specifically, they explored how to convey and teach skills for investigating issues. Since then, EE has been adapted to the needs of communities throughout the world, with leaders in many nations advancing EE to make it appropriate and relevant.

Lucas concluded that the term EE had been used to classify education about the environment, for the environment, and in the environment.

Evolution of Environmental Education Definitions and Objectives

The evolution of EE into a global practice was facilitated by a series of international meetings and conferences with similar ideas coming from several arenas **(Table 1)**. The development of its definition traces an interesting growth from a scientific perspective of ecology to a more integrated and interdisciplinary field. The first discussion occurred at the 1968 UNESCO Biosphere Reserve conference in Paris.[11] A call was made at this meeting for developing curricula for all grade levels, promoting technical training, and increasing awareness of global environmental problems. A subsequent meeting co-sponsored by UNESCO and IUCN[12] in Nevada in 1970 set forth the following definition of EE:

> *…the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality.*[13]

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That same year, the United States was the first country to establish EE policy through the Environmental Education Act and creation of the Office of Environmental Education to award grants for the development of EE curricula and to provide professional development for teachers.[14] Two years later, in 1972, the Stockholm conference on Human Environment resulted in a declaration that education in environmental matters was essential for younger generations as well as adults. This declaration was put into action through the creation of the International Environmental Education Programme jointly funded by UNESCO and the newly UNEP.

The first major goal for the international program was to organize a series of regional workshops for education practitioners in preparation for a much larger international conference for governmental delegations interested in creating EE policy. The final practitioner workshop, held in Belgrade, Yugoslavia, resulted in the influential Belgrade Charter of 1975, which stated the following:

The goal of EE is to develop a world population that is aware of, and concerned about, the environment and its associated problems and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.[15]

The Belgrade Charter was taken to the first international intergovernmental conference devoted to EE in Tbilisi in 1977. Sixty-six UNESCO member states and multiple NGO[16] representatives participated. Delegates adopted the Belgrade statement and prepared the Tbilisi final report that characterizes EE as a lifelong process; as interdisciplinary and holistic in nature and application; as an approach to education as a whole, rather than a subject; and about the interrelationship and interconnectedness between human and natural systems. The report also formalized the following goals and objectives to guide UNESCO member states in the development of environmental education policies, which are repeated here in their entirety.

Environmental Education Goals:

- **to foster** clear awareness of and concern about economic, social, political, and ecological inter-dependence in urban and rural areas;
- **to provide** every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;
- **to create** new patterns of behavior of individuals, groups, and society as a whole towards the environment.

Environmental Education Objectives:

- **Awareness:** to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.
- **Knowledge***:* to help social groups and individuals gain a v ariety of experience in, and acquire a basic understanding of, the environment and its associate problems.
- **Attitudes:** to help social groups and individuals acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.
- **Skills:** to help social groups and individuals acquire the skills for identifying and solving environmental problems.
- **Participation:** *t*o provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.[17]

The Tbilisi goals of awareness, knowledge, and ability to take action are often collectively referred to as "environmental literacy." While the first and second goals are undisputed components of this definition, the third goal (to create new patterns of behavior) is still the subject of modest debate. Different interpretations lead environmental educators to disagree about the extent to which EE should recommend specific behaviors, versus focusing on developing the knowledge and skills necessary for learners to explore the advantages and disadvantages of different behaviors.[18] This is based on the notion that education, rather than promoting

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On the international stage, the next major international initiative for EE was the World Conservation Strategy developed in 1980 by IUCN with funding from UNESCO, UNEP, and the World Wildlife Fund.

specific behavior changes, has traditionally focused on providing information so that learners can make more informed choices on their own. Some maintain that this should also be the role of EE; that is, to promote environmental awareness and critical thinking, problem solving, and decision-making skills but not specific changes in behavior.[19] Others, however, citing the Tbilisi definition, see the promotion of specific behavior changes as an important component and goal of EE. A more neutral middle ground suggests that quality education is engaging and youth should be appropriately challenged and involved in relevant and meaningful projects that are framed with opportunities to investigate and explore multiple perspectives. Educators find this easier to accomplish with noncontroversial topics such as gardening, ecosystem restoration, or public awareness programs. Environmental Education programs worldwide have followed these guidelines to varying degrees, and they have adopted all or some of the Tbilisi goals and objectives in their quest to enhance environmental literacy.[20]

Once objectives were set in place, nations around the world began to implement environmental education through the development of curricula, courses, and training programs. On the international stage, the next major international initiative for EE was the World Conservation Strategy developed in 1980 by IUCN with funding from UNESCO, UNEP, and the World Wildlife Fund. This key document stressed the importance of sustainable development for conservation and is the first internationally documented discussion on the subject. It clarifies that the goal of EE is to increase public participation in planning, decision making, and management with education programs that target legislators, professionals, interest groups, industry and commerce, local communities, and school children.[21]

This was only the first of many conferences held by the United Nations (UN) to support the development of EE; UN conferences occur at 10-year intervals. In 1987, Moscow hosted the Tbilisi+10 Conference to evaluate the progress of EE since the pivotal statements of 1977. That same year, the Brundtland Report (also known by the title *Our Common Future*) was published, which expanded ideas from the World Conservation Strategy by making economic development a key complement to conservation and providing the most widely used definition of sustainable development. The report states "Humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs."[22]

Continuing this theme of sustainability, the 1992 Earth Summit in Rio de Janeiro, held two decades after the Stockholm Human Development conference, was attended by 120 heads of state and delegates from 170 countries. The resulting Agenda 21 set a global plan for sustainable development. Each of the 40 chapters of the Agenda makes some mention of education, but chapter 36 specifically defines the term Education for Sustainable Development with four mandates: to improve access to basic education, to reorient education toward sustainability themes, to improve public awareness, and to engage in training.[23] Ten years later, in 2002, the Johannesburg Summit on Sustainable Development created a more targeted agenda to focus on five areas: water and sanitation, energy, health and environment, agriculture, and biodiversity and ecosystem management. At this conference world leaders also adopted the UN-sponsored Decade of Education for Sustainable Development from 2005–2014, which became the theme of the 4th International Conference on Environmental Education in 2007 in Ahmedabad, India.

"Humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs."

In addition to the opportunities presented by the Decade of Education for Sustainable Development, EE is supported in the United Nation's Millennium Development Goals and the results of the Millennium Ecosystem Assessment. The Millennium Development Goals challenge nations and international organizations to achieve eight ideals by 2015. These include ending world poverty and hunger, establishing universal education, promoting gender equality, improving child and maternal health, combating AIDS, seeking environmental sustainability and engaging in global partnerships.[24] 'The objectives of environment education fit many of these goals, but are particularly relevant to the pursuit of environmental sustainability. The Millennium Ecosystem Assessment, on the other hand, details a scientific basis for promoting conservation and the sustainable use of the world's resources, which educators can use to frame or justify educational programs.[25]

The 1974 Environmental Education Activities Manual grouped activities into five major concepts: ecosystems, population, economics and technology, environmental decisions, and environmental ethics.

Environmental Education and Education for Sustainable Development

Recent global events pertaining to EE focus on sustainable development. There is much debate about whether EE is a part of Education for Sustainable Development (ESD), whether ESD is a part of EE, or whether the two must be considered separate entities. ESD's equal focus on society, economy, and environment and its attention to equity, democracy, and human rights, is considered by some to be inherently different from EE, which is perceived as focusing more on developing critical thinking and problem solving skills in, about, and for the environment.[26] Also, ESD was given the agenda of improving basic education worldwide, and such an emphasis clearly separates it from efforts aimed strictly toward environmental improvement.[27] The attention to development, economics, ethics, and values that some assume to be unique to ESD, however, are considered also vital to EE by those who believe that resolutions to environmental issues are only possible when the full complement of interacting elements are considered. In the 1974 Environmental Education Activities Manual, Stapp and Cox, for example, grouped activities into five major concepts: ecosystems, population, economics and technology, environmental decisions, and environmental ethics.[28]

If there is a difference between EE and ESD, it may be in the ultimate goal that motivates the respective educational enterprises. For EE, this has been addressing environmental issues and for ESD, it has been sustainable development. Consequently, the behavioral goals that each strives toward have different names. EE has historically focused on problem-solving skills and promotion of environmentally responsible behaviors (that is, those that improve or prevent damage to the environment), while ESD has called for sustainable behaviors (those that minimize negative environmental, economic, and social justice impacts and foster development). In some nations, sustainable development is a politically accepted goal; in others environmental protection carries more weight.

At the 2007 International Conference on Environmental Education in Ahmedabad, India, the director of India's Centre for Environmental Education avoided debating the distinctions between these concepts and suggested instead a focus on the future integration of EE and ESD. In his introduction to the conference materials included the following:

> *EE, at this moment in its journey, stands at the crossroads. It needs to champion ESD so that other disciplines too can play a vital role. It needs to reach out to other stakeholders including the media, the business community, local groups and city governments. EE needs to scale up, and play the role required of it in a world in crisis.*[29]

Regardless of historical foundations or past differences, EE will play a role in ESD in some nations. In other nations ESD is perceived as the more appropriate term and mention of EE has vanished. And some educators believe EE is the bigger umbrella that includes ESD! For the purposes of this chapter, ESD is a logical continuation of and partner to EE, and both are essential for moving society toward change. We suggest that the ultimate goals of affecting knowledge, skills, and behavior as described in the Tbilisi documents are broad concepts that include both environmentally responsible and sustainable behaviors.[30]

Education for Sustainable Development is a logical continuation of and partner to environmental education, and both are essential for moving society toward change.

Centre for Environmental Education in Ahmedabad, India hosts the 4th International Conference on Environmental Education in 2007. Photo by M. Monroe

Formats and Venues for EE

In addition to its varied definitions, EE takes multiple forms and can be implemented in a variety of settings that contribute to environmental literacy. EE activities are often broadly categorized as formal, nonformal and informal, although terms such as "free choice" and "self-directed" are often used as modifiers. While many terms exist, we will focus this section on common differences between formal, nonformal and informal EE. It is important to note that the lines between these definitions are fuzzy (that is, some activities may seem to fall within more than one category), and learners of all ages can engage in activities in each format.

In Florida, the Brevard Zoo partnered with the Brevard County Schools to offer a field trip to and unit on a local estuary for all fourth grade classes.

Fourth graders learn about non-point source water pollution at the Lagoon Quest program in Melbourne, Florida. Photo by M. Monroe

Formal EE refers to activities where the educational goals and strategies to reach those goals are determined by the school or other institution developing the program in compliance with standardized school curricula. Most typically this involves primary, secondary, and tertiary (college and university) education that leads to graduation, but formal EE can also be implemented in adult literacy and professional training programs that offer licensure or certificates of completion. It includes instruction within a classroom, as well as lessons directed by classroom educators in schoolyard outdoor classrooms and natural areas, day field trips to local venues like zoos, museums and nature centers, and service learning projects that are specific components of the standardized curriculum.

In Cape Town, South Africa, for example, students whose schools are partnered with the Schools Environmental Education and Development program learn about organic permaculture by working in their school gardens.[31] In Florida, the Brevard Zoo partnered with the Brevard County Schools to offer a field trip to and unit on a local estuary for all fourth grade classes.[32] The unit was designed to support and enhance the science curriculum.

Depending on institutional requirements, classroom EE may be a stand-alone topic, or it may be incorporated into subject areas such as science or social studies. The environment may also be a unifying theme in schools through the implementation of an integrated curriculum. In those schools, students may read books focused on the environment in their language and literature classes, learn nature photography in art classes, and gather and analyze data about natural processes such as species' populations or tree growth in math classes. Project Learning Tree, Project WILD (Wildlife in Learning Design), and Project WET (Water Education for Teachers) are resources commonly used by teachers to enhance environmental education in the classroom in a variety of subjects.

Several forms of EE can enrich or be independent of formal EE. In nonformal EE, the learner can participate in long-term educational opportunities with objectives that are often tailored to their learning needs or desires.[33] For example, a Boy Scout may engage over time in nonformal EE which leads merit badges. While the procedure to earn the badge is determined by the Scout leaders and their handbook, EE within a Boy Scout setting is nonformal in that it is not part of a standardized school curriculum. Nonformal EE includes extracurricular enrichment programs like those run by parks, museums, and nature centers. Nonformal EE experiences can complement concepts learned in school by encouraging connections to real world examples, but they can also target adult audiences quite well. The Cooperative Extension Service, for example, offers voluntary programs such as Master Gardener for those who wish to learn more about growing flowers and food. Once enrolled, participants follow the established curriculum, provide hours of service, and receive a certificate.

Informal EE can also support classroom curricula, but it differs from nonformal EE in that it is more short term and often interpretive by nature. Informal education occurs anywhere educational information is displayed or conveyed, including but not limited to museums, nature trails and parks, agencies and organizations, educational fairs, and the media.[34] While touring the White House in Washington, D.C., for example, visitors might see the organic Victory Vegetable Garden, which has interpretive signs about the purposes and workings of the garden. In Sydney, Australia, visitors to Australia's Mount Annan Botanic Garden can read interpretive signs during self-guided tours about how to landscape one's home to conserve water.[35] Informal EE can also include television programs, radio shows, and Web content.

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EE is characterized as a learning process, whose ultimate goal is to educate and encourage people in engaging in more sustainable and environmentally responsible practices.

State and federal agencies provide many informal EE programs for adults and families who want to learn how to compost kitchen waste in their backyards or how to reduce the use of energy. When a region faces an environmental crisis, such as a water shortage or threat of wildfire, government agencies and Extension services deliver informal environmental education programs by sharing background information, skill-building opportunities, demonstration areas, and media campaigns to alert the public to the problem and what they can do to help resolve it. In many U.S. states, for example, Cooperative Extension, state forest agencies, state emergency response agencies, and the U.S. Forest Service use workshops, field tours, and presentations to help the public understand the risk of wildfire and how they can assist in reducing it.

Informal environmental education opportunities at the Honister slate mine near Keswick, UK. Photo by M. Monroe

Indeed, there are many roles and venues for EE. Fundamentally, however, EE is characterized as a learning process, whose ultimate goal is to educate and encourage people in engaging in more sustainable and environmentally responsible practices. Later chapters present examples of how EE supports and promotes environmental knowledge, skills, and changes in behavior to reach environmental literacy goals.

EE in Context

Though the definition and general goals of EE remain consistent, EE does not occur in a vacuum. The strategies and priorities pursued through EE are strongly shaped by political power, current environmental issues, social priorities, and trends in educational policy. For example, EE within schools has been influenced by the development of curriculum standards. In the 1970s there was a focus on easily implemented activities, while more recent trends in many countries emphasize curriculum standards, student achievement, and service learning projects. Additionally, because in most nations EE is not a standardized academic subject like science, it has the advantage of flexibility and can, therefore, be aligned with a variety of disciplines and championed by partners from different sectors. On the other hand, this flexibility can result in its omission from formal education curricula when budgets are cut and tests restructured. The salience of environmental issues can be similarly influential on EE content. When there is an environmental problem, EE is often a critical strategy in addressing the issue. In the 1970s, U.S. based EE paid a great deal of attention to endangered species and recycling, issues at the forefront of the social consciousness. More recently, programs in urban settings and about sustainability have gained momentum.

Though some form of central government support is critical to launch national curricula, EE is not entirely dependent on funds and authorization from government agencies.

Environmental education can also be influenced by government fiscal and administrative policy decisions. In the U.S., EE implementation occurs within many different departments and is shaped by the executive and legislative branches of government, through presidential appointments and congressional funding appropriations. In India, for instance, the government provides financial and administrative support for the Centre for Environmental Education (CEE), which represents a unique partnership between the Ministry of Environment and Forests and an NGO conducting a number of ESD focused projects nationwide.[36] Also in India, an NGO was asked by a national advisory committee to develop an EE course to "facilitate changes in attitudes and develop skills for the sustainable management of village resources" in the rural mountains of Uttaranchal. After pilot testing, the program was expanded to five grade levels and is currently a part of the state curriculum,[37] which is an illustration of how NGO projects can both influence and be enhanced by government EE policy.

Though some form of central government support is often critical to launch national curricula, EE, especially nonformal and informal EE, is not entirely dependent on funds and authorization from governmental agencies. In many instances, nonprofit and for-profit organizations develop and implement EE programs with substantial or very little external funding. For

EE strategies are flexible and influenced by environmental, political, economic, and cultural realities.

Preschool near Almora, Uttarakand, India helps youngsters learn the basic counting and alphabet skills. Photo by M. Monroe

example, environmental organizations such as the Sierra Club, World Wildlife Fund, and numerous zoos and aquaria place substantial financial priorities on EE. The Uttarakhand Environmental Education Centre in northern India, on the other hand, developed a minimal-cost program to establish preschools in rural villages at the request of the village women. With local young women as teachers, and training and supervision provided by local staff, the program has required minimal costs to develop social skills and empower village women to resolve issues around cleanliness, electricity, and reforestation.[38]

Conclusion

Environmental Education has a long international history leading to its current definitions and strategies for engaging the public in sustainable, environmentally responsible discourse. EE strategies are flexible and influenced by environmental, political, economic, and cultural realities. While these characteristics allow EE to adapt and survive, they can also make identifying EE somewhat difficult. In the following chapters, a variety of examples illustrate how EE is implemented in diverse contexts.

TABLE 1. An Evolution of EE

YEAR	EVENT
1968	UNESCO Biosphere Reserve Conference in Paris calls for environmental curricula, training and awareness development.
1970	UNESCO and IUCN provide initial EE definition.
1970	U.S. creates the Environmental Education Act.
1972	Human Environment Conference in Stockholm sparks UNESCO & UNEP funded EE Programme.
1975	Belgrade Charter proposes initial EE goals.
1977	First international EE congress at Tbilisi—EE goals and objectives established.
1980	World Conservation Strategy declares sustainable development as important for conservation.
1987	Tbilisi+10 in Moscow provides an opportunity to evaluate EE progress.
1987	Brundtland Report provides globally recognized definition of sustainability.
1992	Earth Summit in Rio develops Agenda 21, the first global agenda for sustainable development.
2002	Johannesburg Summit on sustainable development refines 5 target areas.
2005–2014	UN Decade of Education for Sustainable Development (DESD).
2007	4th International Conference of EE in Ahmedabad, India, focuses on the DESD.

Although the roots of EE run into the late 1800s, its formal history is relatively recent.

References

1 Kartikeya V. Sarahbhai, Mamata Pandya & Rajeswari Namagari. 2007. *Tbilisi to Ahmadabad: The Journey of Environmental Education, A Sourcebook*, pp 1.

2 Dewey, J. 1929. *Experience and nature*. London: George Allen and Unwin, Ltd.

3 Disinger, J. 1983. Environmental Education's Definitional Problem, 2 ERIC Clearinghouse for Science, Mathematics and Environmental Education Information Bulletin, pages 17,18. OR Disinger, J. 1985. What research says: Environmental Education's Definitional Problem, School Science and Mathematics, 85(1): 59-68 AND Swan, M. 1975. Forerunners of Environmental Education, in McInnis, N. and D. Albrecht (eds.) *What Makes Education Environmental?* Louisville, KY: Data Courier, Inc. 4-20.

4 Palmer, J. A. 1998. *Environmental Education in the 21st Century: Theory, Practice, Progress and Promise* London/New York: Routledge. In the UK, Geddes is thought to be a founding figure, particularly in conjunction with field study centres and urban environmental education; see page 4.

5 Comstock, A. B. 1939. *Handbook of Nature-Study for Teachers and Parents* (24th ed.). Ithaca NY: Comstock Publishing Associates, Division of Cornell University Press

6 Swan, 1975 (see note 3).

7 Swam, 1975 (see note 3).

8 Gough, A. 1997. Founders of Environmental Education: Narratives of the Australian Environmental Education Movement, *Environmental Education Research*, 3(1): 43-57.

9 UNESCO is the United Nations Education, Scientific, and Cultural Organization. UNEP is the United Nations Environment Programme. Both are agencies of the United Nations.

10 Gough, 1997 (see note 8, page 45).

11 Palmer, 1998 (see note 4, page 5).

12 IUCN was first known as the International Union for the Conservation of Nature, but now goes by the name Wold Conservation Union. It was established after World War II to provide a platform for scientists to work on common problems without requiring the approval of their government. It often works with United Nations agencies, but does not report to them.

13 IUCN. 1970. International Working Meeting on Environmental Education in the School Curriculum: Final Report.

14 McCrea, E. J. 2006. The Roots of Environmental Education: How the Past Supports the Present. Environmental Education and Training Partnership (EETAP). 12 pages, Online URL: http://cms.eetap.org/repository/moderncms_documents/History.Final.20060315.1.1.pdf

15 UNESCO-UNEP. 1976. The Belgrade Charter: A Global Framework for Environmental Education, Connect: UNESCO-UNEP Environmental Education Newsletter 1(1): 1-2 Online URL: http://unesdoc.unesco.org/images/0015/001533/153391eb.pdf_

16 NGO refers to Non Governmental Organization and refers to an enormous variety of organizations that work in the environment, education, and development sectors, such as World Wildlife Fund, Oxfam, and the World Conservation Union.

17 UNESCO-UNEP. 1978. Final Report: Intergovernmental Conference on Environmental Education Organized by UNESCO in Co-operation with UNEP. And Connect: UNESCO-UNEP Environmental Education Newsletter, 3(1): 1-8. Online URL: http://unesdoc.unesco.org/images/0015/001563/156393eb.pdf

18 For more info, see: E.A. Johnson & M.J. Mappin. 2005. *Environmental Education and Advocacy: Changing perspectives of ecology and education*. Cambridge: Cambridge University Press. 333 pages.

19 North American Association for Environmental Education (NAAEE) 2004. Excellence in Environmental Education — Guidelines for Learning (Pre K-12) 2 (revised), Washington DC: NAAEE

20 Monroe, M.C., E. Andrews, and K. Biedenweg. 2007. A framework for environmental education strategies, *Applied Environmental Education and Communication* 6(3-4): 205-216.

21 IUCN, UNEP and WWF. 1980. World Conservation Strategy: Living Resource Conservation for Sustainable Development.

22 World Commission on Environment and Development. 1987. *Our Common Future*. Oxford: Oxford University Press. pp 8.

23 McKeown, R. and C. Hopkins. 2003. EE≠ ESD: Diffusing the Worry, *Environmental Education Research* 9(1): 117-128.

24 See http://www.undp.org/mdg/

25 See http://www.millenniumassessment.org/en/index.aspx

26 Fien, J. and D. Tilbury. 2002. The Global Challenge of Sustainability. In Tilbury, D., Stevenson, R. B., Fien, J., and Schreuder, D. *Education and Sustainability: Responding to the Global Challenge*. Gland, Switzerland: IUCN Commission on Education and Communication. 1-12.

27 McKeown, R. and C. Hopkins. 2002. Education for Sustainable Development: An International Perspective. In *Education and Sustainability: Responding to the Global Challenge*. Gland, Switzerland: IUCN Commission on Education and Communication. 13-24.

28 Stapp, W. B. & D. A. Cox. 1981. *Environmental Education Activities Manual* (4th ed.) and Monroe, M. C. 2012. The co-evolution of ESD and EE. *Journal of Education for Sustainable Development.* 6(1): 43-47.

29 Kartikeya, 2007 (see note 1, on page ii).

30 Monroe, M.C. 2012. The co-evolution of ESD and EE. *Journal of Education for Sustainable Development.* 6(1): 43-47.

31 For more info, see: http://www.seed.org.za/

32 An evaluation of the Lagoon Quest program can be found at http://edis.ifas.ufl.edu/pdffiles/FR/FR26100.pdf.

33 Heimlich, J. E. 1993. Non-formal environmental education: Toward a working definition. Educational Resources Information Center (ERIC Document Reproduction Service No. ED 360 154). Based on original model proposed by: Donald W. Mocker & George E. Spear. 1982. Lifelong learning: Formal, nonformal, informal and self-directed. Educational Resources Information Center (ERIC Document Reproduction Service No. ED 220 723).

34 Heimlich, J. E., see note 32, on page 4.

35 For more info, see: http://www.rbgsyd.nsw.gov.au/welcome_to_bgt

36 For more info, see: http://www.ceeindia.org/cee/history.html

37 Pande, A. 2001. Environmental education in rural central Himalayan schools. *Journal of Environmental Education*, 32(3): 47-53.

38 Nanda, M.. 2001. The Balwadi: Binding the Himalayan Village iii, 1, 4, 8, 17, 24 & 34

CHAPTER 2

A Variety of Strategies Characterize Environmental Education

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A few tried-and-true strategies are used across the spectrum of formal, nonformal, and informal education venues.

Overview

Environmental education (EE) programs cover a wide range of strategies, audiences, and opportunities. This chapter presents seven common approaches that environmental educators have adopted to address environmental and social challenges through communities, agencies, nonformal programs, and schools. Rather than presenting an exhaustive list of strategies and programs, we use these examples to illustrate the wide range of approaches that EE takes in its pursuit of environmental understanding, skill building, and behavior change.

A Wealth of Opportunities

Classroom teachers do it; zoos and museums do it; faith-based study circles do it; evening campfire programs at the state park do it, too. Environmental education can be a chameleon that changes color in various contexts, enabling many educators to create educational opportunities for learners to gain knowledge, attitudes, and skills to understand and adopt actions that enhance the environment. Despite this variation, a few tried-and-true strategies are used across the spectrum of formal, nonformal, and informal education venues. In this chapter we highlight seven such commonly used strategies and provide examples of how they can be implemented in different contexts.

Activity Guides

One way formal and nonformal educators have facilitated the inclusion of environmental education in primary and secondary instruction is through pre-packaged supplemental activity guides. Often designed to be used by elementary school teachers but adapted for learners of many ages and in other venues, activity guides provide basic background information, step-by-step instructions for classroom activities like role-plays, discussions, experiments, and often student worksheets. An educator can choose from a variety of activities that require minimal materials and preparation time and can be adapted to a variety of settings. Because many elementary teachers do not have a background in environmental issues, the activity guides provide strategies for students to explore concepts while educators guide and facilitate the exercise. The lack of familiarity with environmental issues among teachers also creates a window for nonformal educators, who can provide content assistance to schools and use these activities when classes visit their centers. Kananaski Country Park in Alberta, Canada, for example, offers a variety of free educational activity guides as well as low cost programs such as field trips and rentable educational kits for classroom teachers.[1] While activity guides of this type are often convenient and somewhat self-explanatory, training workshops are usually suggested to help teachers make the best use of the materials.

There are a large number of activity guides, and many include easy-to-perform science labs or interactive games on environmental topics from wetland ecology to recycling. They are most commonly produced by environmental organizations or sponsored by businesses that have an interest in the environment. Three programs are considered international leaders due to the quality of their activity guides: Project Learning Tree (PLT) uses forests and trees to introduce youth to environmental issues,[2] Project Wildlife in Learning Design (Project WILD) covers wildlife and conservation issues,[3] and Project Water Education for Teachers (Project WET) is a water education curriculum.[4] Each is sponsored and implemented by different environmental agencies and organizations at the national and local level. PLT, WET, and WILD materials are made available to educators through workshops and trainings.

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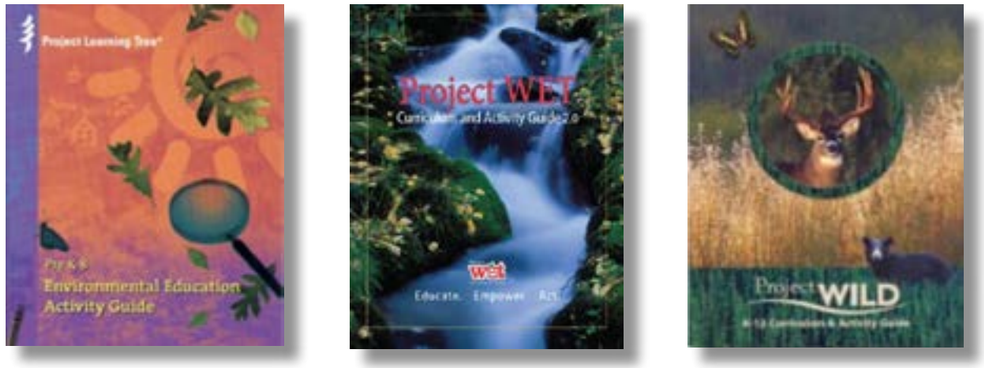

Project Learning Tree, Project WET, and Project WILD provide popular and high quality activity guides for educators.

Activity guides are a useful introduction for teachers to become familiar with EE concepts and objectives and may put them on a course of professional development to become comfortable with more advanced EE opportunities.

Critics of this type of material cite educators' lack of time and training to appropriately incorporate the activities into current curricula. In addition, they claim that reliance on pre-packaged activities without thorough consideration of how these fit into learning goals, local context, and existing knowledge of students may not build contextually appropriate understanding, skills, and behaviors.[5] In our opinion, activity guides are a useful introduction for teachers to become familiar with EE concepts and objectives and may put them on a course of professional development to become comfortable with more advanced EE opportunities. In addition, community educators can sponsor curriculum adaptation workshops to help teachers consider which activities could be most appropriately used at each grade level, creating a sequential guide to EE resources. In sum, activity guides may allow educators to use and students to access environmental information relatively easily. They may support a more effective program if activities are thoughtfully organized in age-specific concepts to effectively promote environmental literacy and meet educational standards, as discussed in the next section.

Integration into Standards-based Education

Public primary and secondary education around the world is increasingly shaped by pressure for accountability. In many countries, particularly more industrialized ones, curriculum is standardized; classroom teachers submit plans that indicate the progress students are making on curriculum benchmarks, and tests measure whether students know the required information. In the U.S., this is driven by education policies such as the No Child Left Behind Act of 2001, which links federal funding with student performance in a way that school districts as well as individual teachers and

administrators are held accountable for the outcomes of their students on standardized tests.[6] By emphasizing the results of math and reading tests as primary indicators of success, state education agencies have created incentives for these subjects that can negatively affect instruction in nontested subjects like social studies. Some teachers turn their attention toward preparing students for tests to the exclusion of integrative and creative learning opportunities. A 2008 study by the Center on Education Policy reveals that in the process of attempting to meet state and federal standards, environmental education, social studies, and other nontested subjects were sacrificed to spend more time on high-stakes testing subjects like reading and math. A similar cutback in outdoor activities and fieldtrips was noted in the study.[7]

Community educators have responded to the demand for standards-driven programs by emphasizing EE activities and experiences that help teachers support subject-area standards. One way this is done is through the correlation of EE activities to relevant standards. Educators at the Brevard Zoo in Melbourne, Florida, developed classroom activities to supplement the Lagoon Quest program, tying each activity to relevant state standards.[8] Another strategy is to design curricula that specifically address skills included in achievement tests, such as activities to help biology students practice and improve writing skills.[9]

In addition to subject area curriculum standards, many school systems establish goals for process skills such as critical thinking, problem solving, and communication. Because the emphasis of EE is not just on content but also on skills, EE programs that engage learners in interdisciplinary, community-based projects can be used to increase student achievement, interest, motivation, and test scores.[10] A study in Florida found that 9th and 12th graders who participated in these projects improved their critical thinking skills and the likelihood that they would use those critical thinking skills.[11]

Following guidelines for best practices is yet another strategy to promote quality education. Seeking to assist educators in their endeavors to provide high quality EE that promotes an environ-

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Louv reported evidence from a number of studies and coined the term "nature-deficit" disorder to help describe several alarming trends, including increased childhood obesity, attention disorders, and depression.

mentally literate citizenry, the National Project for Excellence in Environmental Education (NPEEE) developed a set of Guidelines for Excellence in Environmental Education (see chapter on Guidelines). NPEEE began in 1993 through the leadership of the North American Association for Environmental Education (NAAEE), a professional association for environmental educators in Canada, Mexico, and the United States. A series of publications, written by EE experts and extensively peer-reviewed, present guidelines (not restrictive standards) for the development of balanced, scientifically accurate, comprehensive, and high-quality EE programs. The guidelines are derived from the Tbilisi definition of EE and address important learning objectives in EE at the 5th, 8th, and 12th grade levels. They also describe key characteristics of EE activities and curricular materials, from ensuring that materials provide fair and accurate accounts of issues to making sure that resources teach skills and are easily used by educators. The guidelines also address the preparation and professional development of environmental educators, nonformal EE programs, and early childhood EE; in addition, community EE Guidelines are in development.[12]

Connecting People with Nature

Environmental education strives to reconnect people of all ages with nature for educational, psychological, and physical benefits. In his 2005 book *Last Child in the Woods*, Richard Louv popularized what environmental psychologists have known for a long time—that direct exposure to nature is critical for the development and sustenance of an emotionally and physically healthy individual. He presented the idea that children today suffer from "nature-deficit disorder," a consequence of a growing divide between children and the outdoors. As children spend more and more time with technology and entertainment that keeps them indoors, and as parents' fears about their children's safety and security grow, children fail to gain the many benefits derived from playing outdoors. Louv reported evidence from a number of studies and coined the term "nature-deficit" to help describe several alarming trends, including increased childhood obesity, attention disorders, and depression.[13]

Unfortunately, many adults already exist in worlds devoid of nature. However, the recent popularity of family events at parks and

Enjoying the view over Keswick, England. Photo by M. Monroe

Get Outdoors Day and similar programs help promote the importance of spending time in natural areas.

other natural areas speaks to their interests in enjoying nature. The annual Get Outdoors Day,[14] the More Kids in the Woods campaign,[15] and many other examples sponsored through local, state, and federal agencies and organizations acknowledge that spending time outdoors should be a priority. Similar efforts have been made in other countries. In Honduras, after recognizing that youth were increasingly engaging in delinquent behaviors and that experiences promoting environmental appreciation were rare, a nationwide program established nine environmental education camps with the goal of providing rural and urban youth an alternative pastime.[16] Young and not-so-young adults were recruited to participate in a three-phase leadership training program where they used intensive experiences in nature to develop teamwork, self-esteem, leadership, and ecological knowledge and behaviors.

On the policy front, a No Child Left Inside (NCLI) movement grew from the popularity of Louv's book to establish a national campaign in the U.S. to help teachers use the outdoors as a classroom.[17] The campaign sought to amend the federal emphasis on testing and standards by adding funding for EE and encouraging outdoor classroom activities. Similarly, states such as California and Florida established Children's Rights to Nature

EE also encourages urban residents to learn more about their surroundings and engage in behaviors that could improve those environments.

statements that promote connections between state and federal agencies and EE and outdoor recreation opportunities. Through policy and programs, a variety of strategies are designed to provide opportunities for individuals of all ages to connect with nature and receive the social, psychological, and physical benefits of outdoor experiences. Many educators believe that in addition to these benefits, outdoor experiences can help develop an individual's connection with the local environment[18] and result in the development of environmental awareness and behaviors.

Participants in the Honduras Environmental Youth Leadership Development Program, 2004. Photo by K Biedenweg

Urban Environmental Education

In addition to encouraging people to get outdoors, EE also encourages urban residents to learn more about their surroundings and engage in behaviors that could improve those environments. Helen Ross Russell's *Ten-Minute Field Trips*,[19] first published in 1973 and recently revised, was one of the first manuals to help educators use sidewalks, playgrounds, and other sources of nearby nature to enthrall youngsters and convey science. Since its beginning, EE has addressed environmental issues associated with urban environments including air and water quality, toxic and hazardous wastes, food production, and energy. Urban EE is essential, since the majority of the earth's population lives in urban areas, and residents of urban areas are uniquely poised to positively impact their own environment. More information on the development of urban EE can be found in the urban EE chapters in this handbook (coming soon).

Current trends in urban EE include urban agriculture on school grounds, in community gardens, in public spaces, and at private residences. The public is encouraged to practice local organic gardening to promote appreciation of nature, reduce the use of chemicals for food production, reduce the amount of transportation required to bring food to the home, provide quality and specialty foods more economically, and promote healthier lifestyles. There is a clear and important link between these goals, environmental health, and urban environments. In the United States, Vermont FEED is a school-based program that links the curriculum, school lunch program, and school garden with local farmers. Youth learn about nutrition and farming practices as they grow their own food and eat local produce in the cafeteria.[20]

Other examples of urban environmental education include municipal solid waste programs and urban beautification. King County, which includes the city of Seattle, Washington, provides not only curbside recycling of most materials, but also curbside compost. Residents can place their used paper and food and yard waste in a compost container that is taken to the city's larger compost facility.[21] Online videos and brochures educate the public about this technique, and result in less trash in the landfill and the creation of usable compost. Urban-focused environmental educators can be found in formal and nonformal education working with both youth and adults.

King County composting program provides handy bins. Photo by D. Erickson and E. Canfield. http://sfrc.ufl.edu/extension/ee/woodenergy/index.html

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Investigating Issues

While learning about and experiencing the local environment is important (and may be the most appropriate approach for younger learners), working on the resolution of environmental issues, whether in urban environments or wilderness areas, is also an essential component of EE. This involves developing a specific set of skills, including learning about the context (both ecological and social), exploring alternatives and the predicted consequences, and identifying solutions that maximize benefits and minimize costs for a variety of stakeholders.[22] Some programs also encourage learners to work toward realizing reasonable solutions by

Teachers who orchestrate the interdisciplinary study of a local issue in concert with local stakeholders can serve a helpful role as community educators.

engaging with political processes. Students in Chester, Pennsylvania, realized that their lack of fresh produce indicated an environmental problem linked, through food, to community health. With assistance from Earth Force and Home Depot, they created a school garden; tended it over the summer; and harvested beets, squash, and carrots which ended up on the school lunch menu. They also took the time to write to First Lady Michelle Obama about their efforts, and she invited them to Washington. D.C., to help plant the White House Kitchen Garden.[23]

Though an important part of EE, teaching young people about environmental issues can be challenging. If learners select a controversial issue or one that includes deeply entrenched positions, their queries may upset the status quo and could generate negative reactions among parents or within the local power structure. Most classroom teachers shy away from the prospect of such notoriety, and students lose a potentially valuable learning opportunity. In addition, real-world environmental issues are complex, often involving natural resources, pollution, jobs and economic development, ethics, health, culture and diversity, and science in

Youth from Stetser Elementary in Chester, PA, get their hands dirty while addressing food access in their community by planting a garden on their school grounds. Photo from Earth Force.

an intertwined and interdisciplinary web. Few educators feel competent to tackle the mix of topics likely to arise in an exploration of current controversial issues. For instance, in the case of using wood for energy, science teachers may be able to teach about the conversion of biomass to heat and power but not the economics of obtaining a sustainable supply of biomass or the policies that could be needed to make biomass a viable fuel. Additionally, if there is a local paper mill, parents, who may be employed there, may not want students researching and suggesting a competing use of wood. Nevertheless, teachers who orchestrate the interdisciplinary study of a local issue in concert with local stakeholders can serve a helpful role as community educators.[24] Local experts may serve as guest speakers, or local residents may be asked to respond to polls about existing values and perceptions, during which they may learn more about the issue as well.[25]

Finally, it is difficult to address controversial issues without appearing to sway learners to one solution or another. Even in adult programs, audience members may ask about the sources of funding for a program and who will reap the benefits of certain decisions if educators present information that appears to favor one perspective.[26] As a result, many environmental educators make it clear that they have no opinion[27] and encourage learners to become familiar with all possible perspectives. These challenges are often addressed in teacher training programs and through guidelines for approaching complex issues in the classroom.[28]

For adults, faith-based organizations, Cooperative Extension Service offices, and public libraries may sponsor study circles, workshops, or classes where people can investigate environmental issues and work together to take action. In Australia, an EE program called Sustainability Street enables people to meet each other, develop friendships, and support each other's efforts to reduce waste and save energy. A three-year evaluation of the program reports a remarkable 30 to 40 percent reduction in greenhouse gas emissions and suggests these groups are "beacon communities" that can help demonstrate what is possible to others.[29] Such issue investigation programs enable youth and adults to increase their environmental literacy by developing the knowledge and analytical skills that can contribute to behavior change.

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Service-learning programs link youth with the community and provide a multitude of ways that schools can engage in community EE, which can be a benefit to community educators.

Service Learning and Citizen Science

While issue investigations allow learners to gain an in-depth understanding of environmental concerns, learners often stop short of implementing a change. Service learning and citizen science are two popular strategies educators use to help learners participate in real-world activities that provide mutual benefits to learners, communities, and researchers—thus helping to bring about change.[30] Though not focused exclusively on the environment, service-learning opportunities engage learners with local issues that are intrinsically interesting. Authentic service learning experiences, while almost endlessly diverse, have general characteristics that are similar to EE. They are positive, meaningful, and real to the participants, and they involve reflecting on one's experiences to enhance learning. They often involve cooperative experiences, promote citizenship skills, address complex problems in real settings, and offer opportunities to engage in problem solving. Finally, they promote deeper learning because the results are immediate and uncontrived, and as a consequence, service-learning activities are more likely to support social, emotional, and cognitive learning and development.[31] Service-learning programs link youth with the community and provide a multitude of ways that schools can engage in community EE, which can be a benefit to community educators.

A group of elementary school children in Guatemala's Maya Biosphere Reserve, for example, were invited to assist in the collection of nest survival data for an endangered native bird, the scarlet macaw.[32] While collecting the nest survival data is valuable, this activity alone is not considered service learning. The activity was transformed into service learning by adding exercises that build skills addressed in the school's curriculum. The Guatemalan students analyzed the data and shared results with community leaders and scientists. In this example, students engaged in their own learning and skill development while also providing a valuable service to the community.

In some cases, the service also directly benefits the environment. The Global Rivers Environmental Education Network (GREEN) operates in many nations to facilitate opportunities for middle and high school students to study and improve the quality of their local rivers while sharing data with other students around the world. Students develop critical thinking, problem solving, and decision making skills as they collect water quality data, identify problems, and plan steps to improve water quality in local watersheds.[33] In another context, a 2008 study of 54 air quality education programs in the U.S. reported that nearly half of the programs resulted in improved air quality. Those that employed community-based service projects were more likely to report air quality improvements.[34]

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In citizen science programs, scientists engage the public in environmental data collection and broaden public participation in science research. Programs are often organized by scientists for the purpose of answering their research questions about migration patterns, preferences for bird seed, or sea bird mortality and can be facilitated or sponsored by community educators who may organize and train citizens to collect data.[35] Citizen science can develop participants' knowledge and sense of stewardship for local resources through participation in research and discovery. One of the most well-known citizen science projects in the Americas is National Audubon Society's Christmas Bird Count in which volunteers from throughout the Americas record every bird they see and hear on a particular day.[36] For more than 100 years, the event has created friendly competition, provided an opportunity to get outdoors and appreciate nature, and resulted in a useful scientific endeavor. Data from the Christmas Bird Count are compiled to assess the long-term status and health of bird populations and have fostered a greater public awareness and stewardship of birds in participants' backyards. Citizen science projects allow participants to engage in beneficial, illuminating data collection that can increase awareness and environmental literacy. For more information on this strategy, see the chapter by Ballard (coming soon).

Prompts like these help remind people to practice responsible environmental actions that they might intend, but forget to do.

Social Marketing

While many of the aforementioned examples involve investigating the environment to improve individual understanding and skills, social marketing is used to guide people toward a particular course of action. Many people fail to engage in environmental behaviors either because they do not know how, they forget, they do not have the resources, they do not have the time, their neighbors are not doing the behavior, or they are reluctant to change their habitual ways of doing things.[37]

Social marketing applies concepts from marketing and social psychology to promote specific, generally accepted environmentally responsible and sustainable behaviors. Social marketing is not oriented toward developing critical thinking and problem solving skills, but focuses on promoting behavior change when the audience generally understands why the behavior is important and agrees that the behavior is a good one.[38] Social marketing programs employ basic tools to reduce barriers and increase perceptions of benefits of a particular behavior. Common social marketing tools include visual reminders, modeling the behavior, using role models, providing feedback, establishing incentives, and requesting a commitment.

A community organization or an agency that has a specific mandate to protect a particular resource is often the most appropriate entity to launch a social marketing campaign.[39] Examples of social marketing include road signs throughout the world that remind the public not throw trash out their car windows; Canadian municipalities that have been successful at reducing vehicle idling at bus stops and schools with their "Turn it Off" campaign,[40] and prompts at storm drains to remind pedestrians that anything that enters the drains goes directly into a local lake.

The World Wildlife Fund's Earth Hour is an example of a social marketing campaign that uses many of these tools.[41] Every March since 2007, the Earth Hour project has asked people from all over the world to commit to turning off their lights for one hour to save energy. The project first provides information and persuades a visitor to the World Wildlife Fund website to participate and to make commitment to join this global effort. An email address is all that is necessary to become a member and be counted in the program. Asking people to commit to a behavior is highly effective at ensuring the action. Most people dislike being inconsistent in their words and actions, and thus expressing commitment will likely lead to engaging in the behavior as long as the person remembers to do it. Once a member, the Earth Hour project sends reminder emails one week, one day, and one hour before the programmed time to turn off lights. These emails serve as reminders, also called prompts, for participants to engage in the behavior that they already committed to do. The website also requests that participants invite as many friends as possible to join. These invitations and the adjoining information about other participants show new recruits that it is both possible and desirable to be part of the process. Such role modeling by people of a similar social group is often crucial to encourage behaviors. After the actual Earth Hour, World Wildlife Fund posts a thank-you video and the results of the night-time activity. This feedback helps participants see that their behavior had a real benefit which encourages them to continue the behavior in the future. In 2007, the Earth Hour program began with 2.2 million homes and businesses in Sydney, Australia, and with its successful use of social marketing tools, had grown to hundreds of millions of people in 150 countries throughout the world by 2013.[42]

While people enjoy being part of positive change, some critics of social marketing see it as manipulation. Indeed, agencies and industries have always manipulated the public by providing information in particular ways. Nonetheless, the use of social marketing in transparent, careful programs that engage community representatives in making decisions is a useful method for encouraging environmentally responsible behaviors. Social marketing is less appropriate, however, for a youth program or for controversial issues where there is not yet agreement on how to resolve the issue. In this context, it is more appropriate to engage in dialogue about the controversy rather than push for a specific behavior.[43]

Community educators may wish to organize offerings to best provide age-appropriate, repeated, and sequential opportunities to residents.

In Summary

In any community it is likely that various agencies and organizations use all of these seven strategies to help achieve their own missions as well as improve residents' environmental literacy. Community educators may wish to organize offerings to best provide age-appropriate, repeated, and sequential opportunities to residents. This coordination may help reduce the overlap between programs, provide better coverage to the community, and match strategies to those best able to implement them. Such coordination could help community educators make the most of their EE opportunities.

References

1 For more info, see: http://www.albertaparks.ca/kananaskis-country/education.aspx

2 Project Learning Tree. 2004. *Our Mission and Goals,* PreK-8 Environmental Education Activity Guide. (2004). For more info, see: http://www.plt.org/cms/pages/21_19_3.html

3 For more info, see: http://www.projectwild.org

4 For more info, see: http://projectwet.org

5 Knapp, D. 2000. *The Thessaloniki Declaration: A wake-up call for environmental education?* Journal of Environmental Education, 31(3): 32-39.

6 For more info, see: http://www.ed.gov/nclb/overview/intro/factsheet.html

7 McMurrer, J. 2008. Instructional Time in Elementary Schools: A Closer Look at Changes for Specific Subjects, Center on Education Policy. http://www.cep-dc.org/displayDocument.cfm?DocumentID=309

8 Lagoon Quest Teacher Guide, 2006-2007. Developed in a partnership between Brevard Public Schools and Brevard Zoo, Melbourne Florida.

9 Wilson, J. R. & M. C. Monroe. 2005. *Biodiversity curriculum that supports education reform*, Applied Environmental Education and Communication, 4(2): 125-137.

10 Lieberman, G. A. and L. J. Hoody. 1998. Closing the Achievement Gap: Using the environment as an integrating context for learning. Executive Summary. For more info, see: State Education and Environment Roundtable at http://www.seer.org

11 Ernst, J. and M. C. Monroe 2004. *The effects of environment-based education on students' critical thinking skills and disposition toward critical thinking,* Environmental Education Research, 10(4): 507-522.

12 For more info, see: http://www.naaee.org/programs-and-initiatives/guidelines-for-excellence/

13 Louv, R. Last Child in the Woods. 2005. Chapel Hill, NC: Algonquin Books. For example data, see: Frances E. Kuo & Andrea Faber Taylor. 2004. *A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study,* American Journal of Public Health, 94(4): 1580-1586.

14 For more info, see: http://www.nationalgetoutdoorsday.org/

15 The US Forest Service has provided cost-share funding to enhance children's programs aimed at connecting them to nature and the outdoors. For more info, see: http://www.fs.fed.us/news/2012/releases/03/kids.shtml

16 Biedenweg, K. 2005. Environmental Leadership Development in Honduras: Impacts on Environmental Attitudes, Behaviors, and Community Activities, Antioch New England, Keene NH, Unpublished Masters thesis.

17 No Child Left Inside Coalition: http://www.cbf.org/page.aspx?pid=687 (2009)

18 For more info about connection with local environment, or sense of place, in EE, see: Sobel, D. 2004. Place-Based Education: Connecting Classrooms & Communities. Great Barrington, MA: The Orion Society, and Smith, G. A.. 2007. *Place-based education: Breaking through the constraining regularities of public school*, Environmental Education Research, 13(2): 189-207.

19 Russell, H.R. 1973. Ten-Minute Field Trips. NY: J G Ferguson and republished by NSTA in 2001.

20 For more info, see: http://www.vtfeed.org/

21 For more info, see: http://your.kingcounty.gov/solidwaste/garbage-recycling/recycle-food.asp

22 Bardwell, L. V., M. C. Monroe & M. T. Tudor. 1994. Environmental Problem Solving: Theory, Practice & Possibilities in Environmental Education. Troy OH: NAAEE.

23 For more information, see Earth Force Annual Report 2011, http://www.earthforce.org/AR-2011%20online%20(12).pdf

24 An example is a high school unit on woody biomass, *Should we use wood for energy?* It is available at http://sfrc.ufl.edu/extension/ee/woodenergy/index.html

25 Volk, T.L. & M. J. Cheak. 2003. *The effects of an environmental education program on students, parents and community*. Journal of Environmental Education 34(4): 12-25.

26 Monroe, M. C., A. Oxarart, L. McDonell, and R. Plate. 2009. *Using community forums to enhance public engagement in environmental decisions,* Journal of Education for Sustainable Development, 3(2): 171-182. Additional info about this important dimension of EE is carefully outlined in the edited volume: Johnson, E. & M. Mappin, eds. 2005. Environmental Education and Advocacy: Changing Perspectives of Ecology and Education. Cambridge UK: Cambridge University Press.

27 Hug, J. 1985. *Two Hats*, in Engleson, D. E. A Guide to Curriculum Planning in Environmental Education. Madison WI: Wisconsin Department of Public Instruction.

28 Pennock, M.T. and L. V. Bardwell. 1994. *Approaching environmental issues in the classroom.* EE Toolbox—Workshop Resource Manual, Ann Arbor, MI: NCEET, University of Michigan.

29 For evaluation report, see: http://www.sustainabilitystreet.org.au

30 For more info, see: http://www.servicelearning.org/

31 For more info, see: http://www.service-learning.org/what_is_service-learning/characteristics/index.php

32 For more info, see: http://archive.wcs.org/globalconservation/latinamerica/mesoamerica/guatemala.html. (2008)

33 For more info, see: http://www.earthforce.org/section/programs/green

34 Duffin, M., M. Murphy & B. Johnson. 2008. Quantifying a relationship between place-based learning and environmental quality: Final report, http://www.peecworks.org/PEEC/FV4-0001B456/S01795C3F-01BB870F

35 Jacobson, S.K., M. D. McDuff, & M. C. Monroe. 2006. Conservation Education and Outreach Techniques. Oxford: Oxford University Press.

36 For more info, see: http://www.audubon.org/Bird/cbc/

37 Monroe, M. C. 2006. *Social Marketing in the Wildland-Urban Interface*, FOR193. Gainesville, FL: University of Florida IFAS Extension. Online: http://edis.ifas.ufl.edu/fr254. For more detail, see McKenzie-Mohr, D. 2011. Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing, Third edition. Gabriola Island BC: New Society Publishers.

38 McKenzie-Mohr, D. 2011. Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing, Third edition. Gabriola Island BC: New Society Publishers.

39 Monroe, M. C. 2006. *Social Marketing in the Wildland-Urban Interface*, FOR193. Gainesville, FL: University of Florida IFAS Extension. Online: http://edis.ifas.ufl.edu/fr254.

40 For more info, see: http://www.toolsofchange.com/English/firstsplit.asp

41 For more info, see: http://www.earthhour.org

42 For pictures of the 2013 earth hour, see http://www.theatlantic.com/infocus/2013/03/earth-hour-2013/100479/

43 Monroe, M.C., E. Andrews, and K. Biedenweg. 2007. *A framework for environmental education strategies.* Applied Environmental Education and Communication 6(3-4): 205-216.

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CHAPTER 3

Current Trends in Environmental Education

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At the core of environmental education is a commitment to make the world a better place for people and other organisms.

Overview

This chapter explores several opportunities that environmental education (EE) practitioners are using to increase their influence in a rapidly changing world, both within the traditional definition of EE and beyond. The themes and approaches described here are not necessarily new. In fact, many of these ideas have existed within EE for several decades, but they are becoming increasingly popular as environmental educators work to increase awareness of and promote skills to respond to new environmental challenges and possibilities. In exploring these future directions, we also offer our perspective on the future challenges and promise for EE.

Introduction

Environmental education is a vibrant field. Because practitioners are dedicated to meeting needs, reaching new audiences, and addressing emerging issues, the strategies and programs that define environmental education are broad and continue to evolve. At the core of EE is a commitment to make the world a better place for people and other organisms.

In this chapter, we address some ideas and approaches relevant in EE today. Namely, we discuss how EE is interfacing with communication technology; themes of systems thinking, sustainability, and environmental justice in EE; the role that EE practitioners can have in resource and environmental management decision-making processes; and the importance of ensuring that EE is implemented in culturally appropriate ways. We conclude by reflecting on the challenges EE is likely to face in the future and how practitioners may be able to overcome these challenges to enhance EE implementation moving forward.

Communication Technologies

The steady march of technological change alters the ways that environmental educators obtain information and skills for themselves and deliver information to others. It also changes how learners interact with one another and available information, potentially providing greater opportunities to communicate, share data and experiences, and draw on others' resources and insights. The prevalence of technology, however, has the potential to have a dramatic influence on our engagement with the environment. A 2005 study found that decreased attendance to National Parks in the United States (U.S.) over the previous 16 years correlated with increased time spent with electronic media such as video games, watching TV and movies, and surfing the Web.[1] These results do not mean that technology is causing these changes in attendance, but these types of studies provide food for thought about our relationship with technology versus the natural world. Particularly with the advent of the Internet, the pace of global communication, scientific collaboration, and technological discovery has been permanently altered.

Technology provides many tools to more quickly communicate with larger groups of citizens on environmental issues.

While an increase in time spent online probably means people are spending less time experiencing the natural world,[2] there can be a silver lining to using technology for communication. Technology provides many tools to more quickly communicate with larger groups of citizens on environmental issues. Since 1992, the director of the Belize Zoo[3] in Central America has conveyed conservation and educational messages about the flora and fauna of the country of Belize through the popular *Walk on the Wild Side* series, which airs on the radio through the British Forces Broadcasting Service.[4] Such radio programs are relatively common throughout the world and build on the hugely successful experience of rural health radio education programs. Although these may be considered more environmental communications than EE per se, given their focus on sharing information rather than skill building, these are nevertheless tools that are sometimes employed by EE practitioners.

Television is another effective mass communication outlet for informal EE messages that is very popular worldwide. From a base in England, Television for the Environment (TVE) airs films about the environment and development that have reached viewers in more than 170 countries. Their production *Earth Report* is the longest-running environmental series on global television.[5] TVE and other international organizations including UNICEF and the European Commission supported the development of the Environmental Education Television Project for China, later called the Environmental Education Media Project, which reaches many

The Internet has become a common source of information, and EE programs have quickly expanded into this medium.

millions of people with relevant information on environmental issues.[6] Discovery Channel and Animal Planet, though originally based in the U.S., are now broadcast worldwide, bringing environmental information about distant reaches of the globe to an expanding audience.

Most recently, the Internet has become a common source of information, and EE programs have quickly expanded into this medium. In the U.S., the number of people who cited the Internet as their primary source of science and technology information more than doubled between 2002 and 2006.[7] Museums, parks, aquariums, and government agencies are some of the organizations that have recognized the potential to reach people via the Internet, and they are doing so with substantive programs, not just marketing messages. Many offer virtual field trips on their Websites that are accessible anytime and include online exhibits, Web games, photos, live cams, and readings. For example, NASA[8] and Woods Hole Oceanographic Institute[9] in the U.S. offer online expeditions for students to "travel" to distant places like Antarctica and the International Space Station with scientists. Some programs, such as the National Estuarine Research Reserve's Estuary Live Program, provide real-time footage of actual scientists in field settings and are simultaneously broadcast to hundreds of classrooms.[10] The Internet is also particularly useful for social marketing, public participation, and even citizen science programs such as the Christmas Bird Count,[11] which successfully uses the Web to connect people and engage them in environmental inquiries.[12]

The IveGot1 mobile phone app allows hikers to report sightings of invasive species in Florida. Photo from http://www.nps.gov/ever/parknews/ivegot1mobileapppr112911.htm.

An explosive expansion of mobile technology platforms and Web-enabled applications has created new ways to reach people and for people to engage in EE opportunities. Trail signs provide phone numbers for visitors to listen to recorded messages, and downloadable applications allow people to identify trees or birds as they hike.[13] They can also enable citizen scientists to report findings; for example, the Florida Invasive Species Partnership collects data from sightings of invasive species through GPS-enabled cell phones.[14] People can connect through Facebook, Twitter, and other social media websites to learn more about environmental issues or EE opportunities. Outdoor Afro, a social community focused on connecting African Americans with nature, provides information about opportunities to engage through various Web-based programs including an active Twitter feed.[15]

In addition to providing educational opportunities to learners, environmental educators can now use the Internet to find professional development opportunities. Improved Internet connections, interactive software programs, and course management systems are opening new channels for distance education. Online EE courses from University of Wisconsin-Stevens Point[16] and Cornell University[17] provide opportunities for educators to gain information, enhance skills, and develop a learning community of peers. Similarly, Alaskan educators, whose remote communities are an expensive flight away from any training workshop, can participate in online Project Learning Tree (PLT) and Project WILD (Wildlife in Learning Design) certification programs.[18]

Although there are concerns about the potential for information overload and the trustworthiness and reliability of new technologically enabled sources,[19] technology will continue to alter people's interaction with each other and their environment. EE, in turn, will continue to adapt to these changes by using technology to provide current, relevant information about global environmental issues and opportunities for people to learn from one another.

Systems Thinking

The increasing complexity and interconnectedness of global environmental issues—for example climate change and the decline of marine fisheries—requires that they be understood through a systems perspective.[20] This involves scaling up our thinking so that instead of focusing on one piece of a large puzzle, such as car exhaust, we look at many interactions among the parts of the larger system, such as the global carbon cycle and its links to economic and political systems. To help prepare individuals to understand and resolve increasingly complex issues, some EE programs encourage what is commonly referred to as systems thinking.[21] The term suggests that complex problems require a view of the big picture of relationships and interactions rather than the traditional view of subdivided pieces.[22] Systems thinking involves training our brains to look for cycles, feedback loops, and resource flows, and to understand that different events may interact over different time scales. Some educators attempt to build systems thinking skills at a small scale, such as a school or community, which can help learners identify systems at larger scales.[23]

Visitors to Paynes Prairie Preserve State Park in Florida can access interpretive messages from their cell phone. Photo by M. Monroe

Causal and cognitive mapping exercises suggest that students can learn systems thinking skills and apply them to novel situations.

A study of two groups of students and their abilities to use systems thinking skills suggests that people readily transfer skills from one system to another.[24] At the University of Florida, students taking a class on environmental politics were taught about nonlinear, causal relationships in natural resource topics such as global warming and water management. Similarly, in a middle school in Oregon, students practiced systems thinking concepts for non-environmental issues. In both cases, students who were given the opportunity to develop skills to understand the bigger picture, look for feedback loops among issues, and consider impacts of interactions at different spatial and temporal scales, identified a greater number of components of a novel environmental issue and described more causal loops between them. Causal and cognitive mapping exercises suggest that students can learn these skills and apply them to novel situations. A growing number of EE programs will likely incorporate systems thinking in the future, as these skills are crucial to address many of today's complex environmental problems.[25]

Sustainability

As discussed in **Chapter 1**, sustainability has become a prominent topic globally and within EE. Although many definitions for sustainability exist, we use the term to refer to decision-making processes that seek to balance ecological, social, and economic perspectives in an attempt to meet the needs of present and future generations.[26] Environmental educators have worked to create opportunities for learners to use systems thinking to better understand issues and behaviors related to sustainability, to develop ethical frameworks for understanding how to incorporate the multiple facets of sustainability in their decisions, and to practice sustainable behaviors. As with systems thinking, the microcosm of the school can be an ideal setting for this practice; elementary schools through universities are using their built and natural environments as educational tools for sustainability.

The Association for the Advancement of Sustainability in High Education (AASHE), for example, encourages sustainable practices and educational opportunities at the university level by providing educators and administrators with resources as well as networking and professional development opportunities and by encouraging commitments from American college and university presidents to take actions to mitigate climate change.[27] In a tangible demonstration of sustainable design, the Adam Joseph Lewis Center for Environmental Studies at Oberlin College in Ohio was created to be one greenest buildings at any U.S. college or university. Its design and construction involved input and collaboration from more than 250 students and members of the Oberlin Township, and a university curriculum was specifically designed to foster these relationships and to examine sustainability issues in a real-world context.[28] Community-university-school partnerships help learners engage in real issues, help communities make change applying the energy of their youth, and allow agencies or university experts to provide resources and expertise.

The Adam Joseph Lewis Center for Environmental Studies at Oberlin College in Ohio was created to be one greenest buildings at any U.S. college or university.


Oberlin College, Oberlin, Ohio

The advantages of such sustainability-oriented programs are many. One benefit is that they allow students to work in their own environments and use experiential learning opportunities to better understand complexity in systems, which we have identified as one of the most essential skills for developing sustainable systems. These programs also help students develop specific skills and knowledge necessary to deal with environmental, economic, and social problems. Participants can become empowered by their impacts at the local level and use new skills to tackle other opportunities for transformation.

A very specific component of sustainability education focuses on Environmental Justice, or EJ, which brings to light the importance and challenges associated with appropriately addressing the social and economic components of the sustainability puzzle. The negative results that have emerged as humans tamper with global systems often inequitably impact the world's populations, economies, or environments. The poor are often disproportionately affected by the consequences of environmental mismanagement.[29] Educators focused on EJ address issues of inequities in the burdens and benefits related to the environment. EJ is often closely linked with environmental health (EH) issues such as indoor air pollution and water contamination.[30] These pressing global issues have influenced many environmental educators to illuminate these issues for those who suffer from them and those who have the capacity to make changes to the systems that contribute to the inequities.[31] This incorporation of EJ and EH concerns is an important and relatively new area of EE.

Environmental educators have often worked with the public and designed programs for anyone who is interested; however, only recently have their roles as facilitators been promoted in environmental and sustainable decision making processes.[33]

Public Participation in Resource and Environmental Management Decision Making

One way EE is becoming increasingly influential is by enhancing public participation in environmental decision making. Participation can take many forms.[32] In this section, we focus specifically on the gains to be made when EE practitioners engage in resource and environmental management contexts.

Environmental educators have often worked with the public and designed programs for anyone who is interested; however, only recently have their roles as facilitators been promoted in environmental and sustainable decision making processes.[33] In these settings, environmental educators work with a select group of stakeholders to promote shared learning, understanding, and decision making about specific environmental topics. Globally, there are many opportunities for citizens to participate in environmental decisions in their communities, states, regions, and nations. In some countries, these opportunities are legislated. For example, the public comment process associated with Environmental Impact Statements (EIS) is required by many national and state governments before the implementation of a new policy or development plan.[34] In the U.S. all major federal actions require an open comment process, which includes the opportunity for the public to receive information about the proposed action, access the EIS for that project, and provide comments to the sponsoring agency on the proposed action.[35] Though noble in its intent, many citizens feel overwhelmed by what they need to know and understand in order to make comments. Public meetings often suffer the same fate, where information may be provided in a way that is not accessible or understandable to members of the public, who then become frustrated when they feel their voices are not being heard or taken into account.

Environmental educators can create more meaningful environmental policy processes that allow stakeholders to learn from one another for the benefit of themselves and the natural resources they seek to manage. Environmental educators can facilitate participatory processes such that different voices and perspectives are heard, scientific and nonscientific information is more effectively integrated, and information is shared in ways that can be understood by all involved in a process. This type of process is often called social learning.[36] The Land Care movement in Australia and New Zealand is an excellent example of community members working with experts to explore solutions to resource challenges. As a leader in social learning facilitation, the Land Care movement works with community groups and government agencies toward more informed environmental decision making.[37]

Though there are many success stories like the Land Care movement, environmental educators face many challenges in their attempts to address complex environmental issues and facilitate meaningful communication. Greater involvement also often brings an increase in the number of viewpoints—and misconceptions—to the process. Bringing people together can also lead to conflict, as ideas and interests clash. Trained environmental educators, however, can overcome these potentially debilitating aspects of participation by using professional and creative conflict resolution strategies and applying social learning tools so that participation benefits both participants and the environment.[38]

Community forums are one method that can involve environmental educators in facilitating the sharing of information and getting citizens involved in local issues. Different from stakeholder processes in which members are meant to have equal voices, a forum is a facilitated meeting during which experts share their knowledge and perspectives on a particular issue.[39] Other opportunities for participation include land-use planning or zoning discussions. These issues allow citizens direct access to the decision making process, but require significant investments of time to develop trust and a healthy dialogue that reflects the needs and wants of the community. Many government agencies and nongovernmental organizations (NGOs) provide guides to inform citizens about how to become involved in local planning processes.[40]

Community forums are one method that can involve environmental educators in facilitating the sharing of information and getting citizens involved in local issues.

Santa Fe Springs-basin Working Group members listen to a presentation. Photo by O. Wells, Normandeau.

Environmental educators may also work in one of many natural resource agencies or NGOs that are now implementing adaptive management. Adaptive management is a general term for an approach where natural resource management ideas are applied, experimented with, monitored, and revised.[41] There are many

Social learning can enable community and stakeholder groups to make better, more informed decisions and build their capacities for more effective resource management.

terms used for similar ideas related to adaptive management, such as Collaborative Adaptive Management (CAM) and Adaptive Collaborative Management (ACM),[42] which specifically acknowledge the important role of stakeholders who work collaboratively and engage in social learning. These approaches have the benefit of revealing shared understandings where they exist, as well as revealing differences of perspectives about the system.[43] In addition, CAM requires that stakeholders learn about changes in their systems, synthesize new information, and take action to accommodate observed changes. Environmental educators can play a key role in these processes, facilitating communication among stakeholders, helping people to see situations in new ways and through a systems lens, and revealing stakeholders' misconceptions and assumptions that may be brought to the process. This social learning can enable communities and stakeholder groups to make better, more informed decisions and build their capacities for more effective resource management.[44]

The Center for International Forestry Research (CIFOR) based in Bogor, Indonesia, is a leader in participatory decision-making processes in tropical forests throughout the world. Their Future Scenarios mechanism[45] is part of a larger CAM program that was implemented in 11 countries: Cameroon, Ghana, Madagascar, Malawi, Zimbabwe, Indonesia, Kyrgyzstan, Philippines, Nepal, Bolivia, and Brazil. Facilitators of Future Scenarios engaged public decision makers with local land users and other stakeholders to illustrate, explore, and discuss ideal futures, potential pathways to those ideal futures, and realistic alternatives. Many of the workshops improved knowledge sharing and created viable, sustainable ideas, which are two critical goals for EE. Additionally, the workshops often improved government transparency and improved the capacity of government agents to gather data from local stakeholders with more participatory strategies.

There is a great opportunity for EE to continue and expand its involvement in participatory processes and public decision making. As facilitators and educators within EIS public processes, Community Forums, and adaptive management, environmental educators can improve communication among stakeholders and thus shape learning processes. These activities directly further EE's environmental literacy goals and have the potential to significantly impact both the EE field and the effectiveness of natural resource management well into the future.

Ensuring Appropriateness

Finally, for EE to excel in a participatory, sustainable and globalized world, it must endeavor to make curricula environmentally and culturally appropriate. In order for EE materials to achieve a mark of excellence, they must address different cultures, races, genders, social groups, and ages in a respectful and equitable way.[46] Training programs, conferences, and recruitment into academic programs can target underserved audiences and provide a long-term strategy for improving EE's relevance to these communities. It is often possible to tailor existing curricula to include this diversity and select environmental concepts specific to a particular location or culture. This does not always occur, however, and some EE materials are irrelevant to the context in which they are used. Nationally adopted curricula in Honduras, for example, was based on translated U.S. materials, which included information about grizzly bears and recycling, topics lacking relevance in that local environment where there were no bears or trash collection infrastructure.[47] Although there is certainly value in teaching about global concerns and the environmental challenges of other regions, it is important to ensure that students are able to make sense of new information, that it is relevant, and that it engages locally appropriate environmental behaviors.

Environmental educators must respond to the diverse needs of urban and other audiences by customizing EE opportunities to be relevant and culturally appropriate.

In North America, EE programs that draw on origins in nature study and outdoor education often lead to a focus on the environment as a place that is "wild" and "away" from where most people live. Yet the environment is what surrounds us regardless of where we live and a large and growing proportion of citizens live in urban settings. The environment that surrounds city residents looks very different from the notions conjured up by the photographs taken by Ansel Adams or the philosophy of John Muir. Environmental educators must respond to the diverse needs of urban (and other) audiences by customizing EE opportunities to be relevant and culturally appropriate for different geographic settings and cultural groups, while paying particular attention to environmental justice issues.[48] Environmental education should meet people where they are—not provide "one size fits all" opportunities. While there are many examples of EE programs where wilderness or nature study

Students from the Satellite Academy High School in the Bronx, NY interview farmers about sustainable food at the Union Square Greenmarket in Manhattan. Photo by A. Kudryavtsev

Environmental educators work to address issues, help the public make appropriate behavior changes, make programs accessible and relevant to all communities, and help people learn to think about systems and sustainability.

is the focus, there are also a growing number of examples of urban EE programs.[49] EECapacity, for example, is working to build a network of urban environmental educators who can share ideas and resources to address important urban contexts.[50]

Facing the Future

Environmental education takes many forms. It provides basic information about ecosystems and environmental issues as well opportunities to build skills and participate in the resolution of global and local environmental issues. As EE meets environmental, social, and economic challenges, educators work to address issues, help the public make appropriate behavior changes, make programs accessible and relevant to all communities, and help people learn to think about systems and sustainability.

Yet, environmental education faces many challenges. EE is not always a priority globally, nationally, or locally, and it can be left out of the policy arena or remain underfunded where policies do exist. Fortunately, EE is often able to persist on a shoestring budget and survive as a chameleon, able to change its approach to match the social, political, environmental, and educational needs of its times. This plasticity can, however, be perceived by some as demonstrating a lack of direction, drawing

Students from the Satellite Academy High School in the Bronx, NY monitor oysters in an oyster garden in the Bronx River. Photo by A. Kudryavtsev

criticism. Environmental education does not fit within traditional educational boundaries and can be left out of discipline-specific, standards-based curricula. The interdisciplinary nature of EE, however, can be an advantage because a variety of stakeholders and subject areas can implement EE and advocate for it. EE is often assumed to be only for school children and youth, when there is a host of instructional methods that engage adults in becoming environmentally literate as well. Environmental education continues to be interpreted by some as a subjective field irrelevant in certain circumstances, such as in urban areas or where poor or resource-dependent populations are striving to attain higher standards of living. This interpretation of EE may be largely the result of influence from conservation organizations or historical ties to nature study. But, as we have shown, EE can and should address much more than just natural resources in rural areas, through incorporating issues of environmental justice, health, and overall sustainability. Additionally, the common ground of concern for a quality environment can be an important starting point for programs that work to empower citizens and build civic capacity.

The future of EE will depend on its ability to implement effective programs that reach local audiences with culturally appropriate topics while also addressing important environmental problems. Associated with this, environmental educators must provide adequate communication and opportunities for collaboration that engage all ethnic and racial groups. This can be greatly enhanced through the use of emerging technology, which will allow EE to reach a larger audience and achieve the Tbilisi objectives[51] (**see detailed discussion in Chapter 1**) to develop people's awareness, knowledge, attitudes, skills, and participation.

It is essential that EE programs develop the critical-thinking, problem-solving, and decision-making skills of people who will address environmental issues for decades to come. There is great potential for environmental educators to innovate and implement strategies that will seek to meet these and new challenges.[52] Its history as a flexible, multidisciplinary field uniquely positions EE to promote educational strategies and develop programs that will address the pressing and emerging challenges we face today and in the future.

The future of EE will depend on its ability to implement effective programs that reach local audiences with culturally appropriate topics while also addressing important environmental problems.

References

1 Notes Pergams, O. R. W. and P. A. Zaradic. 2006. Is the love of nature in the US becoming love of electronic media? 16-year downtrend in national park visits explained by watching movies, playing video games, internet use and oil prices. *Journal of Environmental Management* 80(4): 367-393.

2 Louv, R. 2005. *Last Child in the Woods*. Chapel Hill, NC: Algonquin Books.

3 For more info, see: http://www.belizezoo.org/

4 British Forces Broadcasting Service, Section on Programmes and Presenters, Sharon Matola (2009), http://www.bfbs-radio.com/index.php

5 Television for the Environment, section on About TVE, What we do (2009), http://www.tve.org/network.html

6 Environmental Education Media Project, Section on Profile, History of EEMP (2004), http://www.eempc.org/profile.php

7 *National Science Board, Science and engineering indicators* 2008. Section 7: Public attitudes and understanding figure 7-2 (2008).

8 For more info, see: http://www.nasa.gov/audience/foreducators/#.UeBpDVMVhZE

9 For more info, see: http://www.whoi.edu/page.do?pid=9545

10 For more info, see: http://www.estuaries.gov/estuaries101/EstuaryLive/Home.aspx

11 For more info, see: http://birds.audubon.org/christmas-bird-count

12 For resources and examples of citizen science programs, see: http://www.Citizen-Science.org

13 The types and number of field guide and other environmentally focused apps is large and expanding. Some examples include iBird (http://ibird.com/), Peterson Birds of North American (http://www.houghtonmiff-linbooks.com/peterson/), and Leafsnap (http://leafsnap.com/).

14 For example, see: http://www.eddmaps.org/

15 For more info, see: http://www.outdoorafro.com/

16 For more info on available EE-related courses, see: http://www4.uwsp.edu/natres/eetap/

17 Online learning opportunities offered through the EECapacity program. For more info, see: http://www.eecapacity.net/online-learning.html

18 For more info, see: http://www.pltalaska.org/index.htm

19 Heimlich, J. 2003. Environmental educators on the Web: Results of a national study of users and nonusers, *Journal of Environmental Education*, 34(3): 4-11.

20 For examples, see books by Donella Meadows (*Global Citizen, Beyond the Limits, Thinking in Systems*) & Peter Senge (*The Fifth Discipline: The Art and Practice of the Learning Organization*).

21 For a basic overview of systems thinking and its applications, see: Meadows, D. H. *Thinking in Systems: A Primer.* 2008. Chelsea Green Publishing: Vermont.

22 Hough, R. R. & B. A. Day. 2000. Addressing the social dimension: An application of systems thinking*,* in Day, B. & M. C. Monroe, Eds. *Environmental Education and Communication for a Sustainable World*. Washington DC: Academy for Education al Development, 33-37.

23 Capra, F. 2000. Ecoliteracy: A systems approach to education*, Ecoliteracy: Mapping the Terrain*, Berkeley CA: Learning in the Real World, pp 27-35.

24 Plate, R. R. 2006. Assessing the effectiveness of systems-oriented instruction for preparing students to understand complexity, PhD Dissertation, University of Florida, Gainesville FL.

25 A teacher's guide designed to enhance systems thinking in grades 9-12 is available at: http://www.fishwildlife.org/files/ConEd-Sustainable-Tomorrow-Systems-Thinking-Guidebook.pdf

26 This concept of sustainability, among others, is discussed in Kibert, C.J., Monroe, M.C., Peterson, A.L., Plate, R.R., and Thiele, L.P. 2012. *Working Toward Sustainability: Ethical Decision Making in a Technological World.* Wiley: Hoboken, NJ. See also the Brundtland Report (1987), published by the World Council on Economic Development (WCED) as *Our Common Future.*

27 For more info, *see*: http://www.aashe.org/

28 Cortese, A. D. 2003. The Critical Role of Higher Education in Creating a Sustainable Future, *Planning for Higher Education* 31(3): 15-22.

29 There are many information and training resources available on environmental justice, some of which are summarized in the Environmental Justice Curriculum Resource Guidebook, available at: http://www.ejrc.cau.edu/ejsylltoc.htm..

30 For more info, see: http://www.hsph.harvard.edu/cyprus/start.html

31 Agyeman, J. 2005. Where justice and sustainability meet: Alternatives for community and environment. *Environment* 47(6): 10-14.

32 For more info on a variety of forms of participation and EE, see: Reid, A., Jensen, B.B., Nikel, J. and Simovska, V. (Eds.) (2007) *Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability*. Springer: UK.

33 Monroe, M.C., E. Andrews, and K. Biedenweg. 2007. A framework for environmental education strategies, *Applied Environmental Education and Communication* 6(3-4): 205-216**.**

34 For more info, see: http://www.iaia.org/

35 For more info, see: http://www.epa.gov/oecaerth/basics/nepa.html

36 Keen, M., V. A. Brown & R. Dyball. 2005. *Social Learning in Environmental Management: Towards a Sustainable Future.* London: Earthscan and Wals, A. E. J. 2007. Social Learning Towards a Sustainable World: Principles, Perspectives, Praxis Wageningen: Wageningen Academic Publishers

37 For more info, see: http://www.landcareonline.com.au/

38 Monroe, M. C., R. Plate, and A. Oxarart. 2013. Intermediate Collaborative Adaptive Management Strategies Build stakeholder capacity. Ecology and Society 18(2): 24. http://www.ecologyandsociety.org/vol18/iss2/art24/ For examples of ways to overcome challenges, see: Kaner, S. 2007. *Facilitator's Guide to Participatory Decision-Making.* Gabriola Island BC: New Society Publishers.

39 Monroe, M. C., L. McDonell, A. Oxarart, R. Plate. 2009. Using community forums to enhance public engagement in environmental issues. *Journal of Education for Sustainable Development.* 3(2): 171-182 and resources from Results at http://www.results.org/skills_center/milestone_35/

40 For examples, see: http://northstar.sierraclub.org/land & http://ceres.ca.gov/planning/planning_guide/plan_index.html

41 For background info on adaptive management, see work by C. S. Holling, Adaptive environmental assessment and management (1978), C.J. Walters, Adaptive management of natural resources (1986), Kai N. Lee, Compass & Gyroscope: Integrating Science and Policy for the Environment (1993), Lance H. Gunderson & C.S. Holling, Panarchy: Understanding Transformations in Human and Natural Systems (2002) & Fikret Berkes, Johan Colding & Carl Folke, Navigating Social-Ecological Systems: Building Resilience for Complexity and Change (2003).

42 For more info and examples, see: http://www.adaptivemanagement.net/about/define-collaborative-adaptive-management and http://www.cifor.org/livesinforests/_ref/methods/acm/ and a special issue of Ecology and Society, 18(2) at http://www.ecologyandsociety.org/vol18/iss2/

43 For examples, see: Arun Agrawal, A. and C. C. Gibson. 1999. Enchantment & Disenchantment: The role of community in natural resource conservation. *World Development* 27(4): 629-649 and Melissa Leach, M., R. Mearns & I. Scoones. 1999. Environmental entitlements: Dynamics and institutions in community-based natural resource management. *World Development* 27(2): 225-247.

44 More description and examples of social learning available in: Keen, M., V. A. Brown & R. Dyball. 2005. *Social Learning in Environmental Management: Towards a Sustainable Future.* London: Earthscan & Wals, A. E. J. 2007. Social Learning Towards a Sustainable World: Principles, Perspectives, Praxis Wageningen: Wageningen Academic Publishers.

45 For more info, see: Wollenberg, L., D. Edmunds & L. Buck. 2000. Anticipating change: scenarios as a tool for adaptive forest management: A guide. CIFOR Indonesia: Center for International Forestry Research. http://www.cifor.org/online-library/browse/view-publication/publication/744.html

46 NAAEE, Environmental Education Materials: Guidelines for Excellence 6 (revised 2004).

47 Personal observation made by author Kelly Biedenweg.

48 A set of 22 lesson plans for urban EE is available at: http://urbanee.org/tag/curriculum/. A hyperlinked list of urban EE curricula and resources is available at: http://steinhardt.nyu.edu/wallerstein/resources/curriculum. "Wet in the City" is a project of Project WET http://www.wetcity.org/resources.htm.

49 For a literature review documenting some ideas related to Urban EE, see: http://urbanee.files.wordpress.com/2013/01/2012-uee-review.pdf.

50 EECapacity, the Expanding Capacity in Environmental Education Project, is funded by the U.S. Environmental Protection Agency. For more information, see: http://www.eecapacity.net/.

51 The Tbilisi Declaration (1977) was the product of the world's first intergovernmental conference on EE; it defines the guiding principles, objectives, and characteristics of EE. For the full document, see: http://unesdoc.unesco.org/images/0003/000327/032763eo.pdf.

52 Monroe, M. C., A. Oxarart, R. Plate. 2013. A role for environmental education in climate change for secondary science educators. *Applied Environmental Education and Communication*, 12(1): 4-18.

CHAPTER 4

Promoting Excellence in Environmental Education

Tools for Nonformal Educators

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These guidelines are designed to help educators create meaningful, high quality environmental education programs that nurture environmental literacy and empower program participants with the skills, knowledge, and inclinations to make well-informed choices and exercise the rights and responsibilities of members of a community.

Introduction

What does it mean to be environmentally literate? What makes great environmental education instructional materials so good? What should be kept in mind as new programs are developed at a nature center? Nonformal educators—those who teach at zoos, museums, and nature centers and in a variety of community settings—wrestle with these questions on a daily basis. They reach out to young and old and everyone in between. They teach people who come to their programs for a fun family day and those who come with a very specific education goal in mind. In the morning, a nonformal educator may be teaching kindergarten students and in the afternoon, leading an Elderhostel program. All of this means that nonformal educators are responsible for an enormous range of environmental education efforts.

Trying to help environmental educators meet these challenges and improve their practice is at the core of the National Project for Excellence in Environmental Education. As an initiative of the North American Association for Environmental Education (NAAEE),[1] the National Project for Excellence in Environmental Education[2] promotes the development of balanced, scientifically accurate, and comprehensive environmental materials and programs by establishing sets of guidelines. These guidelines are designed to help educators create meaningful, high quality environmental education programs that nurture environmental literacy and empower program participants with the skills, knowledge, and inclinations to make well-informed choices and exercise the rights and responsibilities of members of a community.

To date, the National Project for Excellence in Environmental Education has published five sets of guidelines, each of which is relevant to the work of nonformal environmental educators:

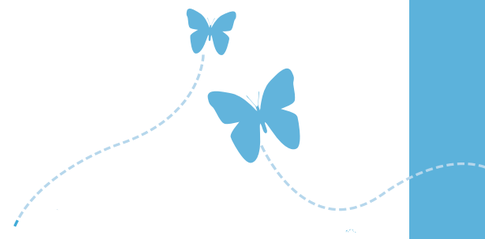
1. *Environmental Education Materials: Guidelines for Excellence.*[3] These guidelines describe a set of recommendations for developing and selecting environmental education instructional materials.

2. *Excellence in Environmental Education – Guidelines for Learning (K-12)*,[4] and its companion piece, *Excellence in Environmental Education – Guidelines for Learning (K-12) – Executive Summary & Self Assessment Tool.*[5] The *Guidelines for Learning* outline a comprehensive framework for environmental education that delineates the understandings and skills needed for environmental literacy.

3. *Guidelines for the Preparation and Professional Development of Environmental Educators.*[6] Created for those who design and deliver environmental education programs, these guidelines describe a set of competencies needed for those preparing to teach environmental education in a variety of job settings.

4. *Nonformal Environmental Education Programs: Guidelines for Excellence.*[7] This set of guidelines describes recommendations to be used in the development of comprehensive environmental education programs or to trigger improvements in existing ones.

5. *Early Childhood Environmental Education Programs: Guidelines for Excellence*[8] and its companion piece *Early Childhood Environmental Education Rating Scale.*[9] This set of guidelines outlines recommendations to be used in the development of comprehensive early childhood environmental education programs. The rating scale provides a formative evaluation tool for early childhood centers that wish to increase the effectiveness of their environmental education programs.



To date, the National Project for Excellence in Environmental Education has published five sets of guidelines, each of which is relevant to the work of nonformal environmental educators.

How Were the Guidelines Developed?

From the very beginning, there was a strong desire to ensure that each set of guidelines reflected a widely shared understanding of environmental education and environmental education practice.

As individuals and organizations volunteered to review the draft documents, distribution lists were created. Revisions to the drafts were made based on an analysis of comments from literally thousands of individuals and organizations.

For each publication, a 10- to 12-person writing team was formed, which was comprised of environmental education professionals from a variety of backgrounds and organizational affiliations. The writing teams took on the challenge of turning ideas about quality, gleaned from environmental education practice and research literature, into a detailed outlines. The outlines and successive drafts of the guidelines were circulated widely through a national process of review and comment. Short articles announcing the availability of each draft and inviting participation in the review process were published in newsletters. Presentations were made at state, regional, and national environmental education, formal education, and environmental meetings to publicize the effort and encourage participation. Any interested individual or organization wishing to participate in the process was encouraged to do so. Efforts to publicize the project and the availability of review drafts were made continuously throughout the development process. As individuals and organizations volunteered to review the draft documents, distribution lists were created. Each time new drafts were developed, they were sent to everyone on the distribution lists. Revisions to the drafts were made based on an analysis of comments from literally thousands of individuals and organizations. As comments were received, they were entered verbatim into a master database. General comments were listed together, and comments relating to specific sections of the draft (e.g., introduction, key characteristic, glossary) were grouped together. This allowed the writing team to consider each comment individually and within the context offered by the draft document. Changes were made in the successive drafts based on an analysis of these comments. Where conflicting views could not be reconciled, revisions were made, in most instances, to reflect the preponderance of opinions expressed. Review comments were used not only to test and revise the basic framework for the individual set of guidelines, but also to develop every detail of the final documents from overall structure to examples, and glossary terms to references. Although comments were received from individuals from over 30 countries, the vast majority of comments were from North America.

Quality Environmental Education Instructional Materials

First published in November 1996 and revised in 2009, *Environmental Education Materials: Guidelines for Excellence* provides a set of recommendations for developing and selecting environmental education instructional materials. These guidelines help developers of activity guides, lesson plans, and other instructional materials produce high-quality products, and offer educators a tool for evaluating the wide array of available environmental education materials.

The guidelines are organized around what reviewers agreed were six key characteristics of high-quality environmental education instructional materials: fairness and accuracy, depth, emphasis on skill building, action orientation, instructional soundness, and usability **(see Box #1).** For each of these characteristics, specific guidelines are listed that support the implementation of the key characteristics. Finally, each of the guidelines is accompanied by several indicators listed under the heading "What to Look For." These indicators suggest ways of gauging whether the materials being evaluated reflect the characteristics sought by the guidelines. These indicators are simply clusters of attributes that might help determine whether a guideline is embodied in the materials under review. These guidelines are also frequently used in the development of materials, by authors and advisory committees, to make sure the process is on track to result in effective and useful materials.

Kunsmiller Creative Arts Academy 6th graders celebrate their student-produced Water Festival at Harvey Park Lake in Denver, CO. Photo by Molly O'Malley

Taken as a whole, these guidelines offer a way of judging the relative merit of different instructional materials and a set of ideas about what a well-rounded environmental education curriculum might be like. Given that nonformal environmental educators teach in a variety of settings with differing goals and constraints, it is not reasonable, perhaps, to expect that all environmental education materials will follow all of the guidelines. If used as a touchstone, however, the guidelines point out limitations that instructors can compensate for in the way they use instructional materials or make their own improvements.

These guidelines have been used in the curriculum development process by such diverse groups as Earth Force **(Box #2)**, USDA Forest Service,[10] and Johnson Controls.[11] The guidelines are also being used as a formative evaluation tool **(see Box #3)**.

BOX #1

Summary of the *Environmental Education Materials: Guidelines for Excellence*

Key Characteristic #1. **Fairness and accuracy***:* EE materials should be fair and accurate in describing environmental conditions, problems, and issues, and in reflecting the diversity of perspectives on them.

1.1 Factual accuracy
1.2 Balanced presentation of differing viewpoints and theories
1.3 Openness to inquiry
1.4 Reflection of diversity

Key Characteristic #2. Depth: EE materials should foster an understanding and appreciation of environmental concepts, conditions, and issues, as appropriate for different developmental levels.

2.1 Focus on concepts
2.2 Concepts in context
2.3 Attention to different scales

Key Characteristic #3. Emphasis on skills building: EE materials should build lifelong skills that enable learners to address environmental issues.

3.1 Critical and creative thinking
3.2 Applying skills to issues
3.3 Action skills

Key Characteristic #4. Action orientation: EE materials should promote civic responsibility, encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for action.

4.1 Sense of personal stake and responsibility
4.2 Self-efficacy

Key Characteristic #5. Instructional orientation: EE materials should rely on instructional techniques that create an effective learning environment.

5.1 Learner-centered instruction
5.2 Different ways of learning
5.3 Connection to learners' everyday lives
5.4 Expanded learning environment
5.5 Interdisciplinary
5.6 Goals and objectives
5.7 Appropriateness for specific learning settings
5.8 Assessment

Key Characteristic #6. Usability: EE materials should be well designed and easy to use.

6.1 Clarity and logic
6.2 Easy to use
6.3 Long lived
6.4 Adaptable
6.5 Accompanied by instruction and support
6.6 Make substantiated claims
6.7 Fit with state or local requirements

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BOX #2

Using the *Environmental Education Materials: Guidelines for Excellence* for Instructional Materials Development – KIC-NET (Keep It Clean - Neighborhood Environmental Trios): Triangulating Next Generation Science Standards, Clean Water Act Education & Outreach, and Stewardship of Urban Waters

Donny Roush, CMEE, Sr. Program Manager, Earth Force, Denver, CO

Denver Public Works contracts Earth Force to provide educational services, a Clean Water Act requirement of Denver's municipal separate stormwater sewer system permit (MS4). From an engineering standpoint, an MS4 is straightforward: collect precipitation from places where it can't soak into the ground, keep it clean, and move it downstream. Most U.S. municipalities of 100,000 or more have an MS4, with a nonconnected sanitary sewer system. (Some cities still have combined systems, however.) With little fanfare but lasting effect, the Clean Water Act amendments of 1980 began requiring MS4 permittees to conduct education as part of their management.

Since then, most MS4s have relied on traditional channels for public education and outreach—festival booths, brochures, badges on storm drains, and school assemblies. In Denver's case, Earth Force pioneered an in-school, service-learning component to this work beginning in 2004. The instructional strategy begins with a detailed environmental inventory and leads to a culminating service project. Youth learn by engineering solutions to neighborhood issues.

During the last year, we've evolved MS4 education efforts by combining community engagement and youth leadership alongside—and on equal footing—with more standard science content. With links to national education reform embodied in the Next Generation Science Standards (NGSS), Common Core State Standards, and the *Environmental Education Materials: Guidelines for Excellence,* we're developing and piloting a new MS4-compliant way to teach.

We call this new approach Keep It Clean – Neighborhood Environmental Trios (KIC-NET). A KIC-NET is a place where a school, park, and body of water are within 10 minutes' walk of each other. These three elements make a trio, as do their respective governmental entities: school district, public works agency, and parks and recreation department. Our pilot, funded by Denver Public Works and EPA's Urban Waters Federal Partnership, will have 10 KIC-NETs involving 750 students by 2014.

KIC-NET development falls into two categories: partnership building and toolkit creation. Within a trio, each partner is able to work toward its organizational goal—be it academic achievement, water quality improvement, or well-cared for and loved parks—while contributing to the overarching outcome of empowering youth to actively "Keep It Clean," whether "it" is the neighborhood, park, or closest stream or lake.

KIC-NET educators will be provided with toolkits. Each toolkit will have a tailored guide with water-centric, hyper-local lessons, supplemented by site-specific environmental histories, and a package of equipment and supplies, including items for water quality testing and macro-invertebrate sampling, and a copy of the *Environmental Education Materials: Guidelines for Excellence.* So far, we've selected a standard roster of 25 lessons to include in the toolkit. We're currently adapting, editing, and updating to make them coherent and complete, an integrated instructional unit. The guidelines continually remind us to assure the materials are designed to include fairness and accuracy, depth, emphasis on skills building, action orientation, instructional soundness, and usability. For example, regarding Key Characteristic #6, digital files for each activity are being built within Adobe Creative Suite and include numerous customizable fields for geographic references in the text and grade-level appropriate concepts.

By using the guidelines, we are embedding qualities that will allow us to scale up KIC-NET, from an intriguing pilot to a transferable model. Through KIC-NET, we can deliver next generation science education, engage youth, raise environmental literacy, and measure improvements in water quality.

For more information: Keep It Clean Denver (stormwater pollution prevention program for Denver Public Works): http://www.keepitcleandenver.org | Earth Force: http://www.earthforce.org

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BOX #3

Using the *Environmental Education Materials: Guidelines for Excellence* – A Formative Evaluation of Natural Inquirer and Investi-gator

Kris M. Irwin, Ph.D., Warnell School of Forestry & Natural Resources, University of Georgia, Athens, GA

Natural Inquirer and *Investi-gator* are two related educational journals designed for middle school and elementary school students, respectively. These free journals (www.naturalinquirer.org) are produced by the USDA Forest Service and the Cradle of Forestry in America Interpretive Association. All editions of these journals contain articles written from published research conducted by Forest Service scientists investigating natural resources as well as outdoor recreation behavior and management.

Students are guided through each article with a specific learning outcome in mind—to comprehend the scientific process. This is achieved by the layout of each article; students are introduced to the scientists who conducted the original research and then read about natural resource science research projects. The "FACTivity" provides an opportunity for students to experience and demonstrate their abilities to think and function like a scientist. A glossary is provided with each article to expand student's vocabulary, and a "Reflection Section" is part of the intentional learning design to get students to stop and think about what they just read.

The *Environmental Education Materials: Guidelines for Excellence* were used to conduct a formative evaluation of *Natural Inquirer* and *Investi-gator*. Forest Service staff involved in the production of these two journals contacted the Georgia Environmental Education Alliance, which formed a three-person review team to conduct the evaluation. The guidelines were selected as a credible evaluation tool with national prominence.

Prior to starting the review, Forest Service staff met with the review team to introduce the instructional intent and design of a typical article. A 5-point Likert-type scale was created and used to rate the 128 indicators, where 1 = poor, 3 = average, and 5 = excellent. Team members conducted independent reviews of four issues of *Natural Inquirer* and two issues of *Investi-gator*, and then came together to discuss and justify scores, which strengthened reliability. Mean summed scores and standard deviations were calculated. For all items with mean summed score of less than 3, the team provided a written justification for the score, adding value to the usefulness of the review.

Overall, both publications scored above average with four of the six characteristics having mean scores between 3.7 and 3.9. Skills and action characteristics scored below average and recommendations to improve these two areas will be provided in the final report. This evaluation of the online journals shows how the guidelines may be used to assess an education resource, and it demonstrates the value of the guidelines as independent evaluation criteria for nonformal education.

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A Framework for Environmental Literacy

Excellence in Environmental Education – Guidelines for Learning (K-12) (first published in 1999 and most recently revised in 2010) offers an instructional framework and vision for environmental education that promotes progress toward sustaining a healthy environment and quality of life. This publication provides guidance for fostering and gauging environmental literacy in kindergarten through twelfth grades.

Developed to provide students, parents, educators, administrators, policymakers, and the public with a set of common voluntary guidelines for environmental literacy, the K–12 learning guidelines provide explicit links between the standards-based school curriculum and environmental education. These guidelines also seek to support state and local environmental education efforts by defining environmental literacy outcomes at specific age levels. By setting expectations for what young people should know and be able to do by the end of fourth, eighth, and twelfth grade levels, they suggest an age-appropriate framework for effective and comprehensive environmental education programs that can be used in both formal and nonformal settings.

These guidelines provide a vision of environmental literacy that acknowledges that an informed, skilled, and active citizenry is critical to preventing and resolving current and future environmental problems. The guidelines offer a framework for environmental education efforts motivated by an examination of the relationship between the environment and quality of life, emphasizing the thinking and action skills central to environmental literacy. They rest on the idea that environmental literacy must be a goal of society and that environmental education must play an integral role throughout educational systems. These guidelines, therefore, aim at providing a series of tools designed to help educators develop effective, locally relevant environmental education programs leading to environmental literacy.

These guidelines provide a vision of environmental literacy that acknowledges that an informed, skilled, and active citizenry is critical to preventing and resolving current and future environmental problems.

Students share results from water quality tests as part of their presentation "Environmental Citizen." As 6th and 7th graders at Noel Community Arts School they studied Parkfield Lake, a Denver Park, across the street from their school. Photo by D. Rousch

Although these guidelines help address education reform issues in the formal classroom, the larger purpose was to provide a framework for comprehensive formal and nonformal programs leading to environmental literacy.

The guidelines are organized into four strands, each of which represents a broad aspect of environmental literacy: (1) questioning and analysis skills, (2) knowledge of environmental processes and systems, (3) skills for understanding and addressing environmental issues, and (4) personal and civic responsibility **(see Box #4)**. Individual guidelines and performance measures are suggested for each of three grade levels—fourth, eighth, and twelfth. These performance measures or indicators were designed to assist educators in developing age appropriate learner assessments.

BOX #4

Summary of the *Excellence in Environmental Education: Guidelines for Learning (K-12)*

Strand 1. Questioning, Analysis and Interpretation Skills

Strand 2. Knowledge of Environmental Processes and Systems

1.1 The earth as a physical system
1.2 The living environment
1.3 Humans and their societies
1.4 Environment and society

Strand 3. Skills for Understanding and Addressing Environmental Issues

3.1 Skills for analyzing and investigating environmental issues
3.2 Decision-making and citizenship skills

Strand 4. Personal and Civic Responsibility

El Paso Independent School District students learning about the Air Quality Index Photo by R. Baquera

Although these guidelines were developed, in part, to address education reform issues in the formal classroom, the larger purpose was to provide a framework for comprehensive formal and nonformal programs leading to environmental literacy. To this end, curriculum developers such as the El Paso Independent School District **(see Box #5)**, Will Steger Foundation,[12] Project Learning Tree, and Project WILD[13] use the guidelines in their efforts. In addition, the Kentucky Environmental Education Council **(see Box #6)** created tools to help teachers and nonformal educators see how environmental education, through the guidelines framework, addresses the new Common Core State Standards for English Language Arts and the Common Core State Standards for Mathematics.

BOX #5

Using Excellence in *Environmental Education: Guidelines for Learning (K-12)* to Design a Community-Wide Air Quality Curriculum in El Paso

Elaine Hampton, University of Texas at El Paso and The teachers of El Paso Independent School District[20]

The *Excellence in Environmental Education: Guidelines for Learning (K-12)* are elevating educational standards to a higher plateau through the call to personal and civic responsibility. In the El Paso, Texas community, the EPA-funded Border Environmental Education program created a partnership with University of Texas at El Paso and the El Paso Independent School District to write modules about air quality that will become part of the district's official curriculum. A required component of this program is social justice education. Together this partnership is creating a stimulating environment for border citizens to learn about relevant air quality issues along the United States-Mexico border and to take action to address air quality issues.

El Paso hosts commercial movement of an estimated 6 percent of the U.S. national economy at its three international bridges. In addition, it hosts the nation's heaviest southern thoroughfare, Interstate 10, as well as an oil refinery, a large military base, and the shared environment with its sister city in Mexico, Ciudad Juárez, home to about 1.2 million people and about 170 U.S. factories.

Twenty-five El Paso teachers have been working for three years to explore the issues in this environment and to implement lessons that strive to meet the high standards of the guidelines, particularly focusing on Strand #4's personal and civic action. Many of these approaches are on the way to being institutionalized:

- Elementary children taught younger children about the Air Quality Index (AQI) and have set in progress the implementation of AQI charts and daily ozone monitoring district-wide. They involved the physical education program to help avoid outdoor activities on ozone alert days.
- Military maneuvers on the military base left visible black particulate matter on the surfaces of the local school's playground. When the health significance of this was understood, a discussion with the military liaison resulted in changing the maneuvers away from the school.
- Schools that are near busy thoroughfares are examining ways to reduce congestion by implementing a walking school bus program where children, along with at least one adult walk to school together. They also are implementing ways to discourage idling in the pick-up locations and some have created idle-free school zones.
- Middle school students are creating animated public service announcements illustrating tips for how citizens can find ways at home and when driving to reduce energy consumption to help decrease global CO_2 levels. Teachers are planning to post these in the school's announcement systems.
- Asthma and other respiratory problems are common in the dry, desert environment of the Southwest and are exacerbated by air pollution. Children in several grade levels are studying asthma causes and asthma rates through surveys and interviews, as well as how to avoid the air quality problems that threaten health.
- High school students investigated air-quality related apps for their smart phones and are sharing this information and the apps with others.

For an environmental issue such as air quality, the guidelines have helped El Paso teachers think beyond individual lesson plans. By using the guidelines as a framework, teachers are explicitly discussing how they can work together to develop environmental literacy and how personal and civic responsibility can be woven into the curriculum.

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BOX #6

Using the NAAEE *Guidelines for Excellence* to Strengthen Implementation of the Kentucky Environmental Literacy Plan

Elizabeth Schmitz, Executive Director, Kentucky Environmental Education Council, Frankfort, KY

In 2010 the Kentucky Environmental Education Council (KEEC) convened an advisory committee to develop the Kentucky Environmental Literacy Plan (KELP). The committee included the Kentucky Association for Environmental Education (KAEE); the Kentucky University Partnership for Environmental Education (KUPEE); and other members representing a broad spectrum of environmental, science, social studies, arts, math, and English language arts (ELA) education. Teachers, curriculum and assessment specialists, and administrators from K-12 school districts and the Kentucky Department of Education (KDE) also helped write the plan.

Additionally, an Implementation Plan was developed that highlights low- and no-cost strategies that can be accomplished while funding for the implementation of more expensive KELP strategies is sought. One such strategy was the correlation of NAAEE's *Excellence in Environmental Education: Guidelines for Learning (K-12)* to the Kentucky Core Academic Standards (KCAS). Kentucky adopted the National Common Core Standards for English language arts and math in their entirety, so the alignment is beneficial for those individuals in any of the 46 states that have adopted the Common Core. This is especially relevant for nonformal educators who want to showcase how their programs support school curriculum. Additionally, correlations help educators understand more fully what children are learning at various age levels.

These correlations clearly convey that environmental education is a multidisciplinary subject. There has been a concerted effort to select those connections between environmental education and the standards that would be evident to teachers and administrators who are less familiar with the field of environment education and avoid stretching correlations beyond what seemed reasonable.. We have found that many of the ELA and math standards meet the goals of Strand #1, with limited connections in Strands #2 and #3. Next Generation Science Standards (NGSS) correlations are under development and should be published in late 2013. Strong connections to Strand #2 and several NGSS Crosscutting Concepts are indicated. The KELP, Implementation Plan, and correlations are all available on the KEEC Website, at http://www.keec.ky.gov/publications/.

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Preparation and Professional Development of Environmental Educators

Students from Denver's Whittier K-8 sample macroinvertebrates in Estes Park near the continental divide. Photo by E. Masse

Environmental educators work in a variety of settings, at a variety of jobs. They teach in public and private classrooms, and lead activities for children and adults at nonformal educational institutions such as nature centers, zoos, museums, and parks. They teach at universities in environmental studies, geography, natural resource, education, and science programs. They develop curriculum materials and administer national, state, and local programs. Regardless of the setting, *Guidelines for the Preparation and Professional Development of Environmental Educators* (first published in 2000 and revised in 2010) offers recommendations about the basic competencies that educators need in order to use instructional materials and other resources to be successful in their efforts and to help learners achieve environmental literacy.

The guidelines provide a mechanism for gauging the quality of pre-service and in-service preparation programs and the abilities of environmental educators working in the field. Instead of offering fixed rules, these guidelines suggest a broad vision—a goal to work toward and a guide for professional development. The guidelines are organized around six themes: environmental literacy, foundations of environmental education, professional responsibilities of the environmental educator, planning and implementing environmental education programs, fostering learning, and assessment and evaluation **(see Box #7)**. Each theme describes the competencies that should be included in environmental educators' pre-service and on-going professional development.

The guidelines are used as texts and reference materials in undergraduate and graduate education courses and as a template for designing environmental education courses. For example, the guidelines were used for the development of on-line master's degree courses in natural resources at the University of Wisconsin-Stevens Point. The guidelines are used by supervisors interested in creating staff development programs and as a self-assessment tool for anyone wishing to plot a personal professional development plan. For example, the Colorado Alliance for Environmental Education (CAEE) uses them to design training curricula for youth **(see Box #8)**.

BOX #7

Summary of the *Guidelines for the Preparation and Professional Development of Environmental Educators*

Theme #1. Environmental Literacy: Educators must be competent in the skills and understandings outlined in *Excellence in Environmental Education-Guidelines for Learning (K-12)*.

1.1 Questioning, analysis, and interpretation skills
1.2 Knowledge of environmental processes and systems
1.3 Skills for understanding and addressing environmental issues
1.4 Personal and civic responsibility

Theme #2. Foundations of environmental education: Educators must have a basic understanding of the goals, theory, practice, and history of the field of environmental education.

2.1 Fundamental characteristics and goals of environmental education
2.2 How environmental education is implemented
2.3 The evolution of the field

Theme #3. Professional responsibilities of the environmental educator: Educators must understand and accept the responsibilities associated with practicing environmental education.

3.1 Exemplary environmental education practice
3.2 Emphasis on education, not advocacy
3.3 Ongoing learning and professional development

Theme #4. Planning and implementing environmental education: Educators must combine the fundamentals of high-quality education with the unique features of environmental education to design and implement effective instruction.

4.1 Knowledge of learners
4.2 Knowledge of instructional methodologies
4.3 Planning for instruction
4.4 Knowledge of environmental education materials and resources
4.5 Technologies that assist learning
4.6 Settings for instruction
4.7 Curriculum planning

Theme #5. Fostering learning: Educators must enable learners to engage in open inquiry and investigation, especially when considering environmental issues that are controversial and require students to seriously reflect on their own and others' perspectives.

5.1 A climate for learning about and exploring the environment
5.2 An inclusive and collaborative learning environment
5.3 Flexible and responsive instruction

Theme #6. Assessment and evaluation: Environmental educators must possess the knowledge, abilities, and commitment to make assessment and evaluation integral to instruction and programs.

6.1 Learners outcomes
6.2 Assessment that is part of instruction
6.3 Improving instruction
6.4 Evaluating programs

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BOX #8

Using the Preparation and Professional Development Guidelines to Develop New Leaders in Environmental Education

Katie Navin, Executive Director, Colorado Alliance for Environmental Education, Golden, CO

Unlike many professions, there isn't always a clear pathway to becoming an environmental educator. Many youth and young adults may not even think of it as a possible career. However, many youth are interested in the environment and look for opportunities to get experience volunteering at nature centers, working summer camp jobs, and more. How can we develop those opportunities into career pathways, particularly for underrepresented individuals who may enter the environmental education field?

Beginning in 2009, the Colorado Alliance for Environmental Education (CAEE) (http://www.caee.org/) worked with the Greenway Foundation's South Platte River Environmental Education Program or SPREE (http://www.greenwayfoundation.org/web/) to combine youth employment opportunities with environmental education certification. SPREE hired a crew of River Rangers, all high school and college students, to lead summer programs, facilitate boat tours on the Cherry Creek, and serve as counselors alongside the organization's staff at the program's summer day camp. CAEE designed a 20-hour environmental education training curriculum that was built into the River Ranger's regular work schedule and helped the ranger's start a portfolio demonstrating their knowledge and skills in environmental education. The training curriculum was based on the *Guidelines for the Preparation and Professional Development of Environmental Educators*. The work experience is a critical part of the program, ensuring that participants are able to practice and reflect on the skills that they learn through the training. After completing both the training and work experience, youth have the opportunity to submit their portfolio for peer review and environmental education certification. Six youth have achieved the status of Certified Environmental Educator through the experience and many more have received certificates of participation for completing the training and work experience.

The program has grown to include additional groups and continues to be strengthened and modified to meet the unique needs of youth participants, particularly those who are underrepresented in the field of environmental education, and ensure that they have the knowledge and skills to obtain entry-level positions in the field. CAEE members have expressed interest in a similar training curriculum for volunteers who conduct environmental education in other venues.

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The guidelines have been the backbone of several state professional educator certificate programs.

Use of the guidelines has expanded to include the development of state professional educator certification programs **(see Box #9)**. Modeled after certification programs in professions such as forestry, wetland ecology, and urban planning, these state initiatives, targeted primarily to nonformal educators, aim to improve practice and increase professional credibility.[14]

Developing Comprehensive Environmental Education Programs

Although, much of environmental education takes place in schools, supporting the development of environmental literacy does not stop when individuals leave the school building. Environmental education also takes place in a variety of settings for youth and adults—such as at zoos, museums, and nature centers, at libraries, and in neighborhoods. Community-based groups, service organizations, religious groups **(see Box #10)**, Boys' and Girls' clubs, Elderhostel programs, sports organizations such as the NFL and NASCAR, and ecotourism operations may be involved in the development of environmental education programing.

BOX #9

The Utah Project for Excellence in Environmental Education

Andree Walker Bravo, Executive Director Utah Society for Environmental Education, Salt Lake City, UT

The environmental education guidelines from the National Project for Excellence in Environmental Education are integral to the work we do at the Utah Society for Environmental Education (www.usee.org). Though we rely on all of the guidelines quite heavily, the *Guidelines for the Preparation and Professional Development of Environmental Educators* serve as a cornerstone of our Utah Environmental Education Certification Program. Participants work through assignments and readings correlated to each indicator in the guidelines to demonstrate competency and mastery. Upon successful completion, they become certified environmental educators in Utah. The guidelines give us a strong, nationally recognized basis for our program, which provides credibility both in Utah and beyond.

In addition to using the preparation and professional development guidelines, we also rely heavily on the *Environmental Education Materials: Guidelines for Excellence* and *Nonformal Environmental Education Programs: Guidelines for Excellence.* As a non-advocacy organization, we avoid placing judgment on materials, programs, and resources disseminated by other groups or agencies. Occasionally, we have been confronted with materials that seem anti-environment and are asked to speak out or take a stand. The guidelines have been invaluable. We have been able to assess these materials (or programs) using nationally recognized criteria and provide credible feedback. It allows USEE to protect our non-advocacy perspective and also ensure high quality environmental education is taking place in Utah. We look to the guidelines as a structure and "safety net" of sorts for our entire organization.

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Learning about natural systems. Photo from US Fish and Wildlife Service

Nonformal Environmental Education Programs: Guidelines for Excellence (first published in 2004 and revised in 2010) points out six key characteristics of high quality nonformal environmental education programs, focusing on needs assessment, organizational needs and capacities, program scope and structure, program delivery resources, program quality and appropriateness, and evaluation **(see Box #11)**. Taken together, these guidelines provide a tool that can be used to ensure a firm foundation for new programs or to trigger improvements in existing ones. The term "environmental education program" is used in these guidelines to mean an integrated sequence of planned educational experiences and materials intended to reach a particular set of objectives. Programs, taken together, are the methods by which an organization's overall education goals are accomplished. Programs can be small or large and can range from one-time events to short-term programs or long-term, community capacity-building efforts.

Developing Programs for the Very Young: Early Childhood Environmental Education

Environmental education in early childhood is a holistic concept that encompasses experiences in the natural world that ultimately supports the development of understandings as well as emotions, dispositions, and skills. *Early Childhood Environmental Education Programs: Guidelines for Excellence* (NAAEE 2010) contains a set of recommendations for developing and administering high-quality environmental education programs for young children from birth to age eight, with a focus on ages three to six**.** The overall goal of these guidelines is to chart an appropriate and positive process whereby educators can start young children on their journeys toward becoming environmentally responsive youth and adults.

Bringing the environment into the early childhood classroom. Photo by S. W. Ridge

BOX #10

Earth Care Congregations: National Presbyterian Initiative Takes Root in Carolina[21]

William Seaman, Professor Emeritus, University of Florida
Jane Laping, University of North Carolina Charlotte
Katie Holmes, Environmental Ministries, Presbyterian Church (U.S.A.)

The national Earth Care Congregation program of the Presbyterian Church (U.S.A.) began in 2010, and certified 21 churches in 16 states in its first year, including three in North Carolina. Certification reflects an increased environmental literacy, commitment, and ability of the congregation to make informed choices concerning sustainability of natural resources. Emphasis is in four broad areas, namely, worship, education, outreach, and facilities. This purposefully makes for the engagement of most or all church committees in the activity. Each congregation has complete autonomy to undertake efforts that meet its identified needs and priorities and to build on strengths while creating new opportunities.

The Earth Care practices of the three North Carolina congregations were assessed, through review of their initial applications, to identify ways in which they reflect or incorporate fundamental practices of environmental education. These churches are First Presbyterian of Asheville, Davidson College Presbyterian of Davidson, and Montreat Presbyterian of Montreat.

The analysis concluded that the Earth Care process, content, and efforts highly conform to the *Guidelines for Excellence* of the North American Association for Environmental Education. Of the 65 indicators reviewed, 94 percent are embodied by one or more specific Earth Care practices of one or more congregations or the overall denomination. The assessment also indicated some items where future effort can be enhanced and ways that the guidelines assessment form could be adapted for use in planning and implementing Earth Care programs.

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BOX #11

Summary of *Nonformal Environmental Education Programs: Guidelines for Excellence*

Key Characteristic #1. Needs assessment: Nonformal environmental education programs are designed to address identified environmental, educational, and community needs and to produce responsive, responsible benefits that address those identified needs.

1.1 Environmental issue or condition
1.2 Inventory of existing programs and materials
1.3 Audience needs

Key Characteristic #2. Organizational needs and capacities: Nonformal environmental education programs support and complement their parent organization's mission, purpose, and goals.

2.1 Consistent with organizational priorities
2.2 Organization's need for the program identified
2.3 Organization's existing resources inventoried

Key Characteristic #3. Program scope and structure: Nonformal environmental education programs should be designed with well-articulated goals and objectives that state how the program will contribute to the development of environmental literacy.

3.1 Goals and objectives for the program
3.2 Fit with goals and objectives of environmental education
3.3 Program format and delivery
3.4 Partnerships and collaboration

Key Characteristic #4. Program delivery resources: Nonformal environmental education programs require careful planning to ensure that well-trained staff, facilities, and support materials are available to accomplish program goals and objectives.

4.1 Assessment of resources needs
4.2 Quality instructional staff
4.3 Facilities management
4.4 Provision of support materials
4.5 Emergency planning

Key Characteristic #5. Program quality and appropriateness: Nonformal environmental education programs are built on a foundation of quality instructional materials and thorough planning.

5.1 Quality instructional materials and techniques
5.2 Field testing
5.3 Promotion, marketing, and dissemination
5.4 Sustainability

Key Characteristic #6. Evaluation: Nonformal environmental education programs define and measure results in order to improve current programs, ensure accountability, and maximize the effects of future efforts.

6.1 Determination of evaluation strategies
6.2 Effective evaluation techniques and criteria
6.3 Use of evaluation results

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The guidelines identify six key characteristics of high-quality early childhood environmental education programs, focusing on program philosophy, purpose, and development; developmentally appropriate practices; play and exploration; curriculum framework for environmental learning; places and space; and educator preparation **(see Box #12)**. The guidelines provide direction yet offer flexibility in shaping content, technique, and other aspects of program delivery.

Significant opportunities exist for using the guidelines for formative as well as summative program evaluation.

These guidelines can be used to offer a way of judging the relative merit of different programs, provide standards and benchmarks for new programs, and supply a set of ideas about a well-rounded early childhood environmental education program. As with the *Nonformal Guidelines*, significant opportunity exists for using the guidelines for summative evaluation (where determinations of the impact of practice is sought) as well as for formative evaluation (where keeping track of the program's progress over time is desired). Administrators, educators, or researchers wishing to improve programming may design and conduct evaluation utilizing the guidelines, whether on a formative or summative basis, or both. To assist in this process, the *Early Childhood Environmental Education Rating Scale: A Formative Evaluation Tool to Help Programs Improve Nature Education for Young Children* (ECEERS) was developed. The ECEERS, which has been validated by subject matter experts and assessed for reliability, guides evaluators, step-by-step, through a detailed analysis of their programs using a seven-point Likert-type scale for each of the 32 guidelines. Using the ECEERS as a collaborative formative evaluation tool facilitates the development of strategic plans for specific and relevant program improvement **(see Box #13)**.

Early environmental investigations. Photo by S. W. Ridge

Dissemination and Evaluation

In addition to developing the various *Guidelines for Excellence* publications, a major effort has been made to disseminate them to practitioners around North America. *Guidelines for Excellence* workshops are offered to ensure that organizations and environmental education professionals are able to use the guidelines

BOX #12

Summary of *Early Childhood Environmental Education Programs: Guidelines for Excellence*

Key Characteristic #1. Program Philosophy, Purpose, and Development

1.1 Focus on nature and the environment

1.2 Focus on education of young children

1.3 Culturally appropriate goals, objectives, and practices

1.4 Environmental literacy: board, staff, and providers

1.5 Health and safety

1.6 Ongoing evaluation and assessment

1.7 Partnerships

1.8 Interpersonal and intergenerational relationships

Key Characteristic #2. Developmentally Appropriate Practices

2.1 Based on research and theory

2.2 Authentic experiences

2.3 Child-directed and inquiry-based

2.4 The whole child

Key Characteristic #3. Play and Exploration

3.1 Use of natural world and natural materials

3.2 Play and the role of adults

Key Characteristic #4. Curriculum Framework for Environmental Learning

4.1 Social and emotional growth

4.2 Curiosity and questioning

4.3 Development of environmental understandings

4.4 Skills for understanding the environment

4.5 A personal sense of responsibility and caring

4.6 Physical health and development

Key Characteristic #5. Places and Spaces

5.1 Spaces and places to enhance development

5.2 Natural components

5.3 Comfortable for both children and adults

5.4 Maintenance and usability

5.5 Health, safety, and risk

5.6 Environmental sustainability

Key Characteristic #6. Educator Preparation

6.1 Foundations of early childhood environmental education

6.2 Professional responsibilities of the educator

6.3 Environmental literacy

6.4 Planning and implementing environmental education

6.5 Fostering learning

6.6 Assessment and evaluation

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BOX #13

Strengthening Early Childhood Environmental Education through Formative Evaluation

Yash Bhagwanji, Associate Professor, Florida Atlantic University, Boca Raton, FL

At Faith Lutheran Preschool in North Palm Beach, Assistant Director Pilar Tucker initiated an evaluation of the organization's preschool curriculum and program utilizing the *Early Childhood Environmental Education Rating Scale* (ECEERS). She took the lead in approaching select members of the school community. Following their agreement to be involved, an evaluation team was formed that consisted of Tucker, another school administrator, a school board member, a parent, two toddler teachers, and two preschool teachers. Copies of ECEERS and school handbooks, as well as the link to NAAEE's *Early Childhood Environmental Education Programs: Guidelines for Excellence*, were distributed to all team members and a date was set for the first meeting.

The first three key characteristics were discussed in detail and scores were determined based on consensus at the first meeting. A second meeting was organized to discuss the next three key characteristics, with a third meeting organized to complete the profiles and determine action plans. Having the guidelines on-hand for consultation was "very helpful in providing clarifications," according to Mrs. Tucker. The team determined that the program's strengths clustered around Key Characteristic #4: Curriculum Framework for Environmental Learning, and that the areas requiring the most improvement included Key Characteristic #1 (Program Philosophy, Purpose and Development) and Key Characteristic #6 (Educator Preparation).

The team decided to address the philosophy issue first since that constituted "the backbone of the program." At a school meeting, the philosophy was discussed and recommendations for changes were made and approved by the entire teaching staff. The new philosophy statement was then forwarded to the church council and the board of education for scrutiny and approval. The statement was unanimously approved by both bodies. The issue of educating the teachers to become more environmentally literate, on the other hand, was assigned to the school directors. The directors decided on two approaches: (a) utilize existing in-service training opportunities that would also count as hours in the Quality Counts program, a Palm Beach County initiative to improve the quality of children's developmental and educational services; and (b) develop an in-house curriculum that "integrates the natural environment into everyday lessons and how to use nature and the outdoors as a learning tool."

Included in the in-house curriculum was a three-hour workshop training session on "Growing up Wild" delivered by an education staff from the Florida Fish and Wildlife Commission. Each participating teacher and administrator also received the "Growing up Wild" curriculum guide. Mrs. Tucker reported that it has taken two years to change preschool practices (curriculum and teaching) from a focus on the "polar region" and other faraway places to local South Florida natural environments. The teachers are now more aware of being environmental educators, she said, and have planned lessons more suitable to the environments relevant in the area. Altogether, they "have learned more about [the] surrounding area wildlife, and will continue to provide more environmental education opportunities for the children."

By taking the time to review the early childhood guidelines and use the rating scale as a formative evaluation tool, the Faith Lutheran Preschool was able to identify specific areas of needed improvement. The process allowed them to re-visit the school philosophy and focus their environmental education professional development efforts.

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End-of-workshop evaluations have been positive and indicate that participants enjoy the workshops, find them useful, and plan to use the guidelines in their work.

effectively to improve environmental education practice and ultimately, environmental quality. Many of these workshops are conducted through the highly successful Guidelines Trainers' Bureau. The Guidelines Trainers' Bureau, established in 2004, is comprised of a cadre of environmental educators who, after participating in intensive professional development, facilitate *Guidelines for Excellence* workshops and make presentations in their own states and regions.[15] In addition to workshops, the *Guidelines for Excellence* are disseminated through EElinked[16] and through webinars.[17]

As dissemination efforts have developed, evaluations have been conducted. To help focus evaluation efforts, a project logic model was used to develop an evaluation plan.[18] End-of-workshop evaluations have been positive and indicate that participants enjoy the workshops, find them useful, and plan to use the guidelines in their work. Most workshop participants (91 percent) were able to describe at least one example of how they planned to use the guidelines in the near future. In addition, interviews conducted with a random sample of participants 4 to 6 months after participation in a workshop found that most had used the guidelines to inform their practice.

Final Thoughts

In developing the guidelines, an effort was made to tap into the collective wisdom of thousands of researchers and practitioners from around the world. The guidelines provide guidance—they have always been envisioned as living documents that are meant to be adapted to the myriad of settings where environmental education takes place. They are tools to be used to help us all improve what we do and, ultimately, to foster strong environmental literacy. The *Guidelines for Excellence* not only help practitioners avoid the waste of re-inventing the wheel, but they have served as a mechanism for professionalizing the field of environmental education. They are being used to improve instructional materials and programs and as the backbone of professional certification programs. As research-based documents, vetted by thousands of educators, they shield the field against external criticisms by providing valid, credible evidence of quality environmental education practice.

References

1 Information about the North American Association for Environmental Education (NAAEE) can be found at www.naaee/net.

2 General information about the National Project for Excellence for Environmental Education along with downloadable copies of each of publications and resources designed to help individuals use the guidelines is available at eelinked.net/n/guidelines.

3 North American Association for Environmental Education (NAAEE) 2009. Environmental Education Materials: Guidelines for Excellence 6 (revised), Washington, DC: NAAEE. 23 pages. Available for free download at http://eelinked.naaee.net/n/guidelines/posts/Environmental-Education-Materials-Guidelines-for-Excellence

4 North American Association for Environmental Education (NAAEE) 2010. Excellence in Environmental Education: Guidelines for Learning 4 (revised), Washington, DC: NAAEE. 121 pages. Available for free download at http://eelinked.naaee.net/n/guidelines/posts/Excellence-in-Environmental-Education-Guidelines-for-Learning-K-12

5 North American Association for Environmental Education (NAAEE) 2010. Excellence in Environmental Education – Guidelines for Learning (K-12) – Executive Summary & Self Assessment Tool 4 (revised), Washington, DC: NAAEE. 32 pages. Available for free download at http://eelinked.naaee.net/n/guidelines/posts/Executive-Summary-and-Self-Assessment-Tool

6 North American Association for Environmental Education (NAAEE) 2010. Guidelines for the Preparation and Professional Development of Environmental Educators 3 (revised), Washington, DC: NAAEE. 39 pages, Available for free download at http://eelinked.naaee.net/n/guidelines/posts/Guidelines-for-the-Preparation-amp-Professional-Development-of-Environmental-Educators

7 North American Association for Environmental Education (NAAEE) 2009. Nonformal Environmental Education Programs: Guidelines for Excellence 2 (revised), Washington, DC: NAAEE. 36 pages. Available for free download at http://eelinked.naaee.net/n/guidelines/posts/Nonformal-Environmental-Education-Programs-Guidelines-for-Excellence

8 North American Association for Environmental Education (NAAEE) 2010. Early Childhood Environmental Education Programs: Guidelines for Excellence, Washington, DC: NAAEE. 72 pages. Available for free download at http://eelinked.naaee.net/n/guidelines/posts/Early-Childhood-Environmental-Education-Programs-Guidelines-for-Excellence

9 Bhagwanji, Y. 2011. Early Childhood Environmental Education Rating Scale, Washington, DC: NAAEE. 82 pages, http://eelinked.naaee.net/n/guidelines/posts/Early-Childhood-Environmental-Education-Rating-Scale or http://www.naaee.net/publications

10 The USDA Forest Service Conservation Education program developed, in partnership with NAAEE, a series of curriculum

materials for use throughout the Job Corps network. These curriculum materials, developed using the guidelines, focus on topics such as climate change, sustainability, and green jobs. They are all downloadable at http://www.fs.usda.gov/wps/portal/fsinternet/!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gjAwhwtDDw9_AI8zPyhQoY6BdkOyoCAGixyPg!/?ss=119995&navtype=BROWSEBYSUBJECT&cid=STELPRDB5212438&navid=100000000000000&position=Feature*&ttype=detail&pname=Conservation%20Education-%20Home

11 Johnson Controls, an industry leader in automotive systems and facility environmental controls, created Sustainable Energy Education and Communications (SEEC). According to Johnson Controls, SEEC is a "10 module series of online lessons that show how employees can find financial, environmental and social benefits at work and at home. It shows them how saving energy and water, keeping indoor air clean and other sustainable strategies can save money, reduce emissions, and help them stay healthy…. The concept was developed in cooperation with the National Energy Foundation using the North American Association for Environmental Education (NAAEE)'s Environmental Education Materials: Guidelines for Excellence." More information about SEEC is available at http://www.Johnsoncontrols.com.

12 The Minnesota based Will Steger Foundation "educates, inspires and empowers people to engage in solutions to climate change." Their education curriculum materials were developed using the guidelines as an environmental education framework. More information is available at http://www.willstegerfoundation.org/programs/education.

13 A number of national level environmental education organizations use the guidelines as a framework in the development of their curriculum activity guides and often provide crosswalks between lesson activities and guidelines strands. Project Learning Tree (http://www.plt.org/naaee-excellence-in-ee---guidelines-for-learning) and Project WILD (http://www.projectwild.org/CorrelationstotheNationalScience-Standards.htm) provide two examples.

14 At last count, 11 states have professional environmental education certification programs in place with another 14 states in development. For more information about certification, visit http://www.naaee.net/programs/certification.

15 To learn more about members of the Guidelines Trainers' Bureau please visit http://eelinked.naaee.net/n/guidelines/topics/Guidelines-Trainers-Bureau

16 EELinked is a service of NAAEE. EELinked is a participant driven website that allows individuals and groups to upload content, comment on existing content, and search through postings. Networks can be created to help users access and share information focused on specific topics. Please visit http://eelinked.net.

17 A series of webinars have been offered and many of them have been recorded. For further information on how to access these webinars, please visit http://eelinked.naaee.net/n/guidelines/topics/Webinar-Series

18 A copy of the logic model and evaluation plan are reproduced and discussed in Ernst, J., Monroe, M. and Simmons, B. 2009. Evaluating Your Environmental Education Programs: A Workbook for Practitioners, Washington, D.C.: NAAEE. 172 pages.

19 Earth Force is a national non-profit youth organization that uses service learning and other educational strategies to empower youth to help solve local environmental problems. Learn more about Earth Force at www.earthforce.org.

20 The following teachers have been instrumental in writing the El Paso curriculum materials: Veronica Allen, Lorena Arriaga, Rosetta Baquera, Nancy Barraza, Lacey Bustamante, Francisco Casillas, Maribel Chavez, Dolores Contreras, Jeanette Cubillos-Dominguez, Sarah Escandon, Joann Estrada, Rita Farina, Jessica Favela-Casillas, Donna Gomez, Lizette Gutierrez, Ian Hanna, Adriana Herrera, Blanch Herrera, Ernesto Herrera, Sylvia Montoya, Katherine Mullane-Erlick, Teresa Pena, Eric Pichardo, Nate Selken, Tiffany Stringfield, John Thomas, and Theresa Turner

21 This vignette was adapted from an article describing the Earth Care Congregation programs and the use of the guidelines as an assessment tool. For the complete article, please go to http://resources.spaces3.com/24124f1a-7c6d-4c5c-8dff-1c2faa-b66a54.pdf

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CHAPTER 5

Environmental Action and Positive Youth Development

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Over time, as the contributions of each group of participating youth build upon those of earlier groups, these programs have made substantial improvements to natural and built environments.

Overview

Environmental education (EE) can provide opportunities for positive youth development, which refers to an asset-based and integrated approach to promoting young people's well-being. This chapter focuses on youth environmental action, a participatory form of EE in which learners analyze the causes of environmental problems and take action with others to generate and implement solutions. Specifically, the chapter describes how the practices of educators facilitating youth environmental action also contribute to positive outcomes for young people's physical, intellectual, psychological, and social development.

Introduction

The state of New York is home to various programs that support youth environmental action. In Buffalo, for instance, young people guided by staff of the Massachusetts Avenue Project's Growing Green Program[1] have transformed vacant residential lots into a vibrant urban farm where they grow, market, and distribute organic produce for communities, restaurants, and retail outlets in the city. Similarly, teens working with East New York Farms![2] in Brooklyn grow food for the community, manage a neighborhood farmers' market, and educate residents about healthy eating. Near Albany students at Farnsworth Middle School manage Butterfly Station.[3] There, they raise native plants and butterflies to release into the wild as part of an ongoing collaboration to restore the region's pine bush habitat. And in Lansing, middle school students in an after school program offered by Cornell Cooperative Extension of Tompkins County's Rural Youth Services[4] educate local residents through a "Green Homes" documentary that they produced, which explains ways to make homes more energy efficient and environmentally friendly. These are only a handful of examples in which youth—referring to adolescents who are in the period of life moving from childhood to adulthood[5]—have engaged in action to improve their local environments.

Over time, as the contributions of each group of participating youth build upon those of earlier groups, these programs have made substantial improvements to natural and built environments. While impressive, the tangible environmental changes resulting from such programs often are not the most important outcomes in the eyes of the educators facilitating them. Of greater value from an educational perspective are the ways in which *participating* in urban farming, habitat restoration, or environmental documentary production enables young people not only to learn about the environment but to learn about themselves and to develop their capacities.[6] It is important to note that in this chapter the definition of "participation" extends beyond simply taking part in a project to having a part or share in the project. This notion of "participation" relates to empowerment, ownership, a sense of being taken seriously, and being able to make an impact.[7]

This chapter focuses on youth environmental action, a participatory approach to environmental education in which youth and adults collectively design and implement projects to create positive environmental change. More specifically, the chapter discusses how youth environmental action can contribute to positive youth development (PYD). Positive youth development is an asset-based and integrated approach to promoting young people's well-being in physical (e.g., health habits), intellectual (e.g., critical thinking and decision-making skills), psychological (e.g., confidence in personal efficacy), and social (e.g., trust with others) realms. The first section expands on the meaning of PYD and then describes the educational approach of environmental action. Next, evidence that environmental action programs can result in PYD outcomes is reviewed. The final section covers the practices of educators who facilitate youth environmental action and the parallels apparent between their practices and PYD.

Understanding PYD can help environmental educators extend their impacts with youth by incorporating PYD principles in program planning, implementation, and evaluation. Furthermore, recognizing the link between PYD and EE can be useful for partnering with youth development organizations to design and implement programs that expand EE's reach. Indeed, several examples in this chapter come from youth development organizations that engage their participants in action to improve local environments, while concurrently advancing PYD goals.

Understanding PYD can help environmental educators extent the benefits of their programs with youth, as well as partner with youth development organizations to expand EE's reach.

Students in an after-school program produced an educational documentary about green homes featuring local residents. Photo courtesy Cornell Cooperative Extension of Tompkins County

A paradigm shift in the youth development field has occurred in recent decades from a problem-reduction orientation to a broader concept of positive youth development.

What Is Positive Youth Development?

A paradigm shift in the youth development field has occurred in recent decades from a problem-reduction orientation to a broader concept of positive youth development. What does this umbrella phrase—positive youth development or PYD—encompass?

This concept focuses on promoting youth's physical, intellectual, psychological, and social well-being. Whereas the problem-reduction approach viewed youth as recipients of services intended to decrease problems such as alcohol use, violence, or unintended pregnancy, PYD takes an assets-based approach[8] that values young people's strengths and potential. Positive youth development acknowledges that youth can be "problem-free" and still not be well prepared for adulthood. Thus, PYD takes a more comprehensive approach, helping youth to build competencies and successfully negotiate the salient developmental tasks of adolescence.[9]

Along with this paradigm shift from a focus on reducing problems to strengthening assets, the youth development field is moving from a silo approach that views youth development occurring in independent contexts (such as schools or organized youth programs) to a perspective that considers developmental experiences that occur throughout the daily lives young people, including interactions with peers, family, and nonfamilial adults.[10] From this perspective, PYD occurs not only in a school or specific youth program but also through the efforts of an entire community.

Assets That Promote Well-being

The process of PYD provides opportunities for youth to develop a variety of personal assets contributing to an individual's well-being. Researchers have used various frameworks[11] to describe these assets, called PYD outcomes. Although these frameworks vary in how they categorize specific items, they demonstrate consistency in general content. The National Research Council and Institute of Medicine's Committee on Community-Level Programs for Youth conducted one of the most comprehensive reviews to date and published those results in the report *Community Programs to Promote Youth Development*. They organized key assets that promote an individual's well-being into four categories as shown in **Table 1**. It is important to note that these assets will manifest differently in different cultures.[12]

TABLE 1. Assets That Promote Well-Being Identified by the Committee on Community-Level Programs for Youth (NRC 2002).

Physical development	• Good health habits • Good health risk management skills
Intellectual development	• Knowledge of essential life skills • Knowledge of essential vocational skills • School success • Rational habits of mind – critical thinking and reasoning skills • In-depth knowledge of more than one culture • Good decision-making skills • Knowledge of skills needed to navigate through multiple cultural contexts
Psychological and emotional development	• Good mental health including positive self-regard • Good emotional self-regulation skills • Good coping skills • Good conflict resolution skills • Mastery motivation and positive achievement motivation • Confidence in one's personal efficacy • "Planfulness" – planning for the future and future life events • Sense of personal autonomy/responsibility for self • Optimism coupled with realism • Coherent and positive personal and social identity • Prosocial and culturally sensitive values • Spirituality or a sense of a "larger" purpose in life • Strong moral character • A commitment to good use of time
Social development	• Connectedness – perceived good relationships and trust with parents, peers, and some other adults • Sense of social place/integration – being connected and valued by larger social networks • Attachment to prosocial/conventional institutions, such as school, church, nonschool youth programs • Ability to navigate in multiple cultural contexts • Commitment to civic engagement

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Increasingly occurring in youth development programs, community organizations, and science classes (Box 1), environmental action provides inspiring examples of adolescents and adults working in partnership to create local environmental change.

Characteristics of Settings That Promote Positive Youth Development

In addition to identifying PYD outcomes, the National Research Council report describes characteristics of settings (e.g., families, schools, neighborhoods, community programs) that maximize PYD. They present this as a provisional list, subject to further study, "of the processes or 'active ingredients' that community programs could use in designing programs likely to facilitate positive youth development."[13] Settings likely to contribute to PYD will have some of the following features:

- **Physical and psychological safety** (e.g., safe and health-promoting facilities; safe peer group interaction)
- **Appropriate structure** (e.g., clear and consistent expectations)
- **Supportive relationships** (e.g., warmth, connectedness, good communication, guidance)
- **Opportunities to belong** (e.g., meaningful inclusion, social engagement)
- **Positive social norms** (e.g., rules of behavior; values and morals)
- **Support for efficacy and mattering** (e.g., making a real difference in one's community, being taken seriously, responsibility granting, meaningful challenge)
- **Opportunities for skill building** (e.g., intentional learning experiences)
- **Integration of family, school, and community efforts** (e.g., coordination among family, school, and community)
- The implementation of these features will vary across programs because each program has different participants, goals, resources, and constraints; however, the more of these features that are present in a given setting, the more likely it is that PYD outcomes will result.[14]

With this overview of PYD in mind, let us now consider one approach to EE that has been shown to generate PYD outcomes for participants: youth environmental action.

What Is "Environmental Action"?

Increasingly occurring in youth development programs, community organizations, and science classes **(Box 1)**, environmental action provides inspiring examples of adolescents and adults working in partnership to create local environmental change in arenas such as food systems, community gardens, habitat restoration, water quality, air pollution, urban development, and environmental justice. Environmental action is one pedagogical approach that falls within the "democratic" paradigm of EE[15] and overlaps in some ways with other EE approaches, such as place-based education,[16] community-based education,[17] issues investigation,[18] environmental project-based learning,[19] and environmental service-learning.[20] Rather than focusing on instrumental aims to modify learners' lifestyle behaviors (e.g., consume less, recycle more), environmental action reflects a participatory approach in which learners develop the abilities to analyze the causes of environmental problems and take action with others to generate and implement solutions. Environmental action involves deliberate decisions, planning, implementation, and reflection by an individual or group with the intention to achieve a specific environmental outcome.[21] Examples include persuading local government officials to implement erosion control along a stream bank in response to water quality testing revealing high levels of sediment,[22] or reclaiming a city lot for a vegetable garden and growing produce for a local community kitchen in response to a community survey documenting limited local access to fresh produce.[23] Many EE approaches might contribute to PYD, for example, via science learning or mentoring relationships. However, environmental action is especially well suited to PYD because youth play significant decision making roles.

Rather than focusing on instrumental aims to modify learners' lifestyle behaviors (e.g., consume less, recycle more), environmental action reflects a participatory approach in which learners develop the abilities to analyze the causes of environmental problems and take action with others to generate and implement solutions.

A study in the United States (U.S.) documented youth environmental action occurring in the following five forms: [24]

- **physical environmental improvements** (e.g., restoring natural habitats);
- **community education** (e.g., organizing community festivals and information fairs; producing educational media like newsletters, brochures, or videos);
- **inquiry** (e.g., community assessments, surveys, and mapping; environmental monitoring; scientific experiments designed to inform or evaluate action);
- **public issue analysis and advocacy for policy change** (e.g., researching and analyzing the environmental impacts of on-site wastewater treatment regulations and presenting policy recommendations to a state legislative committee); and
- **products or services contributing to community development** (e.g., sustainably growing food for sale at a neighborhood farmers market).

Students from the Satellite Academy High School in the Bronx, learn about composting in a community garden. Photo by A. Kudryavtsev

Because environmental action involves young people's authentic participation in community issues, it can not only improve local environments but also help youth grow as citizens.

Any given project typically involves multiple forms of action. For example, a middle school teacher might guide students in research from which they conclude that habitat loss is the primary threat to an endangered butterfly species. The students then could choose to work with a local park to improve the physical environment by restoring native prairie habitat, and they also could organize an educational festival to teach younger children about these issues.

Researchers studying environmental action have identified several important characteristics that further define this educational approach. For instance, the action is intentional, or consciously undertaken with reference to motives and reasons, and ideally targeted at the root causes of a problem. It can contribute directly to solving that problem (people-environment relations) or indirectly influence others to do so (people-to-people relations).[25] Typically, environmental action involves ecological and/or social inquiry to inform and evaluate action in an iterative, cyclical process;[26] thus, both science and civic engagement are central in this approach.[27] Action involves young people's genuine participation[28] in the form of shared decision making with adults.[29] In other words, youth take part in making meaning of a particular environmental problem by defining it, analyzing its causes, and envisioning and enacting possible solutions.

Environmental Action and Civic Engagement

Because environmental action involves young people's authentic participation in community issues, it can not only improve local environments but also help youth grow as citizens.[30] This is an important educational aim, because, as Danish EE scholars Jensen and Schnack explain,

> *…environmental problems are structurally anchored in society and our ways of living. For this reason it is necessary to find solutions to these problems at both the societal and individual level. This is why the aim of environmental education must be to make present and future citizens capable of acting on a societal as well as a personal level.*[31]

BOX #1

Books, curricula, and websites on youth environmental action

Books

- Driskell, David. *Creating Better Cities with Children and Youth: A Manual for Participation*. London: Earthscan. 2002.
- Hart, Roger. *Children' Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care*. London: Earthscan. 1997.
- Urban Places Project. *The YouthPower Guide: How to Make Your Community Better*. Amherst, MA: University of Massachusetts Extension. 2000. http://annforsyth.net/wp-content/uploads/2012/05/YouthPower_20001.pdf

Programs and Curricula

- Earth Force http://www.earthforce.org/
- The Food Project http://thefoodproject.org/food-project-toolbox
- Garden Mosaics http://www.gardenmosaics.org
- Give Water a Hand http://www.uwex.edu/erc/gwah/
- Give Forests a Hand http://www.sfrc.ufl.edu/gfah/
- Health and Environment Activities Research Tool http://depts.washington.edu/ceeh/downloads/HEART_Manual.pdf
- Project Learning Tree's GreenWorks! http://www.plt.org/greenworks
- Project Wild's Science and Civics: Sustaining Wildlife http://www.projectwild.org/ScienceandCivics.htm

Stories of Youth Environmental Action

- President's Environmental Youth Awards http://www2.epa.gov/education/presidents-environmental-youth-award
- What Kids Can Do - Feature Stories - Science, Environment, and Technology http://www.whatkidscando.org/featurestories/index.html#science

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Interestingly, many practitioners' deem their efforts successful whether youth continue participating in environmental action or choose to engage as citizens in other ways.

Indeed, educators facilitating youth participation in local environmental action have described developing youth as citizens and change agents as a primary educational aim.[32] Interestingly, many practitioners' deem their efforts successful whether youth continue participating in environmental action or choose to engage as citizens in other ways, as explained by the director of a youth urban agriculture program:

> *I'm very passionate about creating opportunities for youth to really look at themselves and identify their own strengths. And then, I mean it's probably twofold, my other passion is food and really getting kids to look at where their food comes from and the importance of food in their lives and in the lives of the community as a whole… And so I think the rewards of my work come from seeing kids kind of get that piece but also learn about themselves and learn what their strengths are and seeing them use those strengths. Whether they're gonna garden or not or whether they go on to be farmers or not isn't so important to me. If they move forward and in a way where they're more confident and they really can see themselves as leaders then I feel like I've made a [difference].*[33]

The reflection of another educator sums up this sentiment:

> *There's a whole different dimension to it in terms of how you're helping shape their understanding of the world and their sense of being able to act in it and I think in some ways that is more important than the … projects that we get out of it at the end.*[34]

Given this emphasis on developing youth as citizens, another way to think about environmental action is as a form of "youth civic engagement." This refers to "young citizens developing civic skills and habits as they actively shape democratic society in collaboration with others."[35] Youth environmental action involves feedback loops by which youth contribute to environmental action, which in turn enables youth to develop civic skills and habits and a host of other PYD assets. As youth develop these assets, they become increasingly able to participate effectively in environmental or other community action (Figure 1). In this way, environmental action and PYD may reinforce each other.[36]

Several researchers have documented ways in which youth environmental action improves environmental management, neighborhood planning, and community development.[37] One excellent resource is Roger Hart's book *Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care*. Of course, not all environmental action projects succeed in creating the change intended. Indeed, poorly guided projects can lead youth to feel disempowered, overwhelmed by environmental problems, and incapable of making a difference.[38] Thus, it is essential that educators are able to (1) offer guidance to youth in designing a project that is feasible and (2) transform project failures into opportunities to reflect upon and learn about the challenges of creating societal change.

Having described the concepts of PYD and environmental action, we now turn to the relationships between them. First, what PYD *outcomes* result from young people's participation in environmental action? Second, what *practices* of environmental educators provide opportunities for PYD?

FIGURE 1. Youth participate in environmental action, which in turn provides opportunity for positive youth development. As youth develop assets they increase their capabilities to participate in action on environmental or other issues important to them.

Youth Environmental Action Contributes to Positive Youth Development

Researchers have documented PYD outcomes resulting from environmental action programs. For example, Hawaiian students working together to select, investigate, and act on a local environmental issue improved their critical thinking skills; reading, writing, and oral communication skills; familiarity with technology; self-confidence; and citizenship competence.[39] An evaluation of Earth Force, an environmental action program implemented in multiple locations across the U.S., found that participants learned to collaborate, conduct research, and express their views, while also developing increased confidence, efficacy, and understanding of diverse viewpoints.[40]

Young people's reports of developing assets that promote well-being through participation in environmental action are consistent with a growing body of evidence from other contexts that youth civic engagement contributes to positive developmental outcomes.

A study of nine youth environmental action projects in New York State **(Table 2)** involved group interviews with 46 youth.[41] When asked what they had learned through their specific programs, the young people enthusiastically described a variety of outcomes related to PYD,[42] as shown in **Table 3**. It is important to note that interviews were conducted with a subset of youth in each program, often those most actively engaged; thus, it cannot be assumed that the experience led to the development of assets for all participants. Nonetheless, young people's reports of developing assets that promote well-being through participation in environmental action are consistent with a growing body of evidence from other contexts that youth civic engagement contributes to positive developmental outcomes.[43] How does this come about? Specifically, what are educators doing in their facilitation of youth environmental action projects that creates opportunities for youth to develop intellectually, physically, psychologically, and/or socially? The answer to this question, which will be discussed next, suggests recommendations for EE practitioners who also are interested in fostering PYD.

Educator Practices That Promote Positive Youth Development

A study of youth environmental action in the U.S. involved interviews with 33 practitioners—people working in community-based organizations, nature centers, science museums, extension associations, and after-school programs as well as middle and high school teachers.[44] Each interview focused on the story of a specific action project, including how was it initiated; who was involved; what interactions occurred between youth, the educator, and other community members; in what ways the project was successful; and what challenges arose. From these stories, nine common themes in educators' practices emerged **(Table 4)**. No single individual's story includes all nine themes; rather, across this set of 33 stories, the many different strategies and techniques used by educators can be grouped into these overarching practices:

- creating safe spaces;
- building respectful, trusting relationships;
- providing structure;
- providing opportunities for meaningful contribution;
- bridging differences and creating opportunities for all learners to contribute;
- expanding horizons through novel experiences;
- supporting youth as they encounter new challenges;
- setting clear, rigorous expectations; and
- connecting youth with their community.

Many of these practices closely overlap with the attributes of PYD settings identified in the National Research Council report discussed earlier **(Table 4)**. That report describes these features as characteristics of an adolescent's *interaction* with the setting.[45] In the "setting" of environmental action, educators facilitate young people's interactions with physical and social environments. Thus, we might view the features of PYD settings as principles for educational practice. These practices can be realized through diverse tools and techniques, which educators can adapt to participants' capabilities and their own pedagogical styles.

We might view the features of PYD settings as principles for educational practice. These practices can be realized through diverse tools and techniques, which educators can adapt to participants' capabilities and their own pedagogical styles.

Illustration: PYD in practice

Perhaps the best way to understand these practices is through an educator's story. The following excerpt comes from a story about Caroline Youth Services (Caroline, New York), a youth development program taking place in a rural community after school and during summers (pers. comm). In this program, high school students are employed to guide middle school students in planning and implementing community events and service projects. One of these projects involved designing and building a perennial garden in front of the Caroline Town Hall. The story begins with the impetus for this project:

> *The project for the raised flower bed in front of the Town Hall, [the youth] designed it. The town board came to us with, 'We want this to change in front. How do you want to change it?' So that's how this project came up. And that's where it went through the [youth] group. We've been asked, 'How do we want to change it?'*

TABLE 2. Youth Environmental Action Projects Studied in New York State.

Name	Educational Setting (New York State)	Projects of Focus for this Study	Forms of Action	# Youth Interviewed
Program A	Youth development program, urban	Youth maintained a community garden plot and contributed data to a citizen science program on urban weed management.	. Physical improvements . Inquiry	7
East New York Farms!	Community development organization, urban	Youth employed as interns participated in agricultural and leadership training, growing food for the community, managing a farmers' market, and educating residents about healthy food.	. Physical improvements . Community education . Community development	3
Growing Green	Community development organization, urban	Youth employed during the growing season built, planted, maintained, and harvested gardens; marketed and sold their produce; developed business plans; and organized community outreach.	. Physical improvements . Community education . Community development	3
TRUCE Nutrition and Fitness Center	Youth development program, urban	Youth employed by the program documented through a neighborhood survey the lack of availability of fresh fruits and vegetables. To fill this need, youth reclaimed an abandoned, city-owned lot; developed a vegetable garden; and donated the produce to a community kitchen.	. Physical improvements . Inquiry	4
Caroline Youth Services	Youth development program, rural	High school students employed through the program guided middle school students in organizing community events and service projects. In a community beautification project, youth designed and installed raised garden beds in front of the town hall.	. Physical improvements . Community development	3
Lansing Youth Services	Youth development program, rural	Middle school students produced a "Green Homes" documentary featuring local residents.	. Community education	5
Pine Bush Project, Farnsworth Middle School	Middle school, suburban	Middle school science students conducted scientific inquiry in conjunction with ecological restoration. Students in an after-school and summer program managed a butterfly house, gardens for native plant propagation, and public outreach programs, including tours and day camps for younger children.	. Physical improvements . Community Education . Inquiry	5
Sustainability Initiatives, Lehman Alternative Community School	High school, small city	Students in a high school ecology class conducted individual and collective action projects in conjunction with course work. The projects included advocating for the school district to install a solar electric system, designing and building a raised garden bed at a home for adults with disabilities, assessing the quality of woods adjacent to the school for wildlife habitat, and developing and teaching a sustainability curriculum to elementary school students.	. Physical improvements . Community education . Inquiry . Advocacy	10

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TABLE 2. ***continued ...***

Roof Garden Project, School of the Future	High school, urban	High school science class and after school club designed and built a wheelchair accessible roof garden. Students also conducted scientific experiments on the effectiveness of green roof modules with varying design parameters (e.g., plant types, soil medium and depths) for controlling building temperature and reducing stormwater runoff.	. Physical improvements . Inquiry	6

TABLE 3. Positive Youth Development Outcomes Described by Young People Participating in Environmental Action Projects in New York State.

PYD Assets		Illustrative Quotes
Physical development	. Healthy habits (e.g., nutrition, fitness) . Health risk management	. …the most important thing that I've learned is how to eat healthy. Because before this McDonald's was my best friend and now I actually eat fruits and vegetables. (East New York Farms!)
Intellectual development	. Content knowledge (e.g., energy efficiency, plant science, earth science, butterfly metamorphosis) . Job preparation, value of hard work . Knowledge of vocational skills (e.g., video production, conducting scientific experiments, public speaking)	. I have learned that green homes doesn't mean that they're actually [the color] green. It means that they are environmentally friendly homes; it means that they're good to nature and that there are many different ways of making a green home, like [masonry] stoves and using different recycled material to build your house… (Lansing Youth Services)
Psychological and emotional development	. Mental health including positive self-regard (e.g., self-confidence, open-mindedness) . Emotional self-regulation (e.g., patience, persistence, paying attention) . Coping skills (e.g., adaptability) . Mastery and achievement motivation (e.g, initiative, intrinsic reward) . Confidence in personal efficacy (e.g., how to enact change) . "Planfulness" (e.g., vision, thinking ahead) . Sense of personal autonomy and responsibility . Optimism coupled with realism . Good use of time (e.g., balancing work load)	. I've gained self-confidence and my self-esteem is higher than what it used to be and I contribute my positive thinking and my constructive feedback. (TRUCE Nutrition and Fitness Center) . It teaches responsibility because…if you join this club you learn how to take care of plants and how to tend to a garden… (Pine Bush Project) . Learning how to balance a completely independent project; how to find time and balance it with a paper due tomorrow and not to get discouraged… (Lehman Alternative Community School)
Social development	. Connectedness (e.g., teamwork) . Ability to navigate in multiple cultural contexts (e.g., when to "talk street and [when to] talk correctly") . Commitment to civic engagement	. It changed me because I'm happy every time I walk down the street and I see one of Growing Green's gardens, I feel happy that I helped. (Growing Green) . Before I would have thought being a good community member is just like staying out of trouble, but now I realize that is kind of expected. If you actually want to be a good, good community member you have to be proactive and find things that you need to address. (Caroline Youth Services)

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TABLE 4. Practices of Educators Facilitating Youth Environmental Action Match Well with the Features of PYD Settings.

Practice Themes and Related Techniques	Features of PYD Settings (NRC 2002)
Creating safe spaces - Physical safety; calming environment of green space; inclusive, respectful social environments where youth can take risks and express themselves.	Physical and psychological safety
Providing structure - Providing process framework for youth decision making; guiding youth in decision making by helping youth consider options, assess feasibility; setting overall goals within which youth decide routes to achieve them.	Appropriate structure
Building respectful, trusting relationships - Focus on youth first, then project activities; sensitivity to what youth are going through in other parts of their lives; mentoring; open communication; keeping confidences; honesty, transparency, authenticity; team building activities; hanging out, recreating, sharing meals, having fun together.	Supportive relationships
Bridging differences and creating opportunities for all learners to contribute - Involving diverse youth and community members who would not usually interact; matching youths' interests and talents with specific project tasks; encouraging youth to play their strengths.	Opportunities to belong
Setting clear, rigorous expectations - Clarity about youth and adult roles; clear behavioral expectations; expectation of quality and professionalism in products of youths' work; physically rigorous activity; individual learning plans, self-evaluation, de-briefing sessions, reflection on individual and group performance.	Positive social norms
Providing opportunities for meaningful contribution - Sharing decision-making power; encouraging youth ownership; making a real difference in communities; valuing youth as experts; recognizing accomplishments; providing nested leadership opportunities.	Support for efficacy and mattering
Supporting youth as they encounter new challenges - Responsibility granting; encouragement and guidance in rising to new challenges; formal and informal training; scaffolding; emotional regulation; conflict management.	Opportunities for skill building
Connecting youth with their community – Facilitating service learning; drawing on local experts; garnering community support; participating in public forums; conducting media outreach; engaging community through the arts; using intergenerational programming.	Integration of family, school, and community efforts
Expanding horizons through novel experiences - Exposing youth to new experiences and ways of thinking about the world and their relationship to it through field trips, conferences, films, workshops (e.g., identity, diversity, social movements); encouraging reflection through dialogue, journaling.	

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We can immediately appreciate that young people were provided with an *opportunity for meaningful contribution*; the impact of their efforts would extend to others in their community. The story continues:

> *The [youth] called all local businesses. A local landscaper came in and they said, 'Well here's the area, and this is our idea, what do we need to do?' They called the local mill, to get lumber. They called a greenhouse. They would practice the phone calls. It is just amazing. You know they can be on the phone with friends really easily, but get on a phone with an adult, it varies on who feels comfortable.*

Here it becomes clear that youth did not complete this project on their own; rather, they requested guidance from adults in the community. In this way, the project not only served the community, but also gave youth opportunity to *connect with the community* through direct interactions. Many youth have limited experience communicating in a professional way with adults; thus, the educator also *supported youth as they encountered challenges*, in this case the challenge of phoning and requesting assistance from a local expert. The educator described the next steps:

> *They got on the computer, they designed things. They showed different phases of the project. They had a display in the town hall. They looked at, environmentally, just what was going to work… We didn't want to use pressure treated wood. They figured out that the Larch would be really good, because it's not going to decay. We mixed soils and figured out, what is the pH, and how is this going to drain? And what's going to happen, is this going to be a problem because we have an artesian well? Just figuring out, you know, 'Is this far enough away?' 'Looks pretty good here.' And you know, 'I think we're fine. What do you think?' 'Well who should we ask?' So getting that awareness of you're going to change something here, how can you change it for the better?*

Here again the opportunity for meaningful contribution comes through. Neither youth nor adults are the sole decision makers; rather, at various steps in the project, youth and adults jointly determined how the project would proceed. This shared decision

Neither youth nor adults are the sole decision makers; rather, at various steps in the project, youth and adults jointly determined how the project would proceed. This shared decision making was an essential ingredient of the youth participation in environmental action.

The project was not solely about the tasks at hand but also about forming friendships and becoming a team.

making was an essential ingredient of the youth participation in environmental action. The educator added the following:

> *It was fun. It's not just all work. You get to play too. And work can be play. …that's why probably taking a longer time to do something and allowing them to become a group, a team, understand the dynamics… when you finally get to hammering 12 inch spikes, you can take turns, and you can let somebody take turns and not always the biggest kid is the one to hammer it in.*

Here the importance of allowing time for fun and *building respectful, trusting relationships* becomes apparent. The project was not solely about the tasks at hand but also about forming friendships and becoming a team.

> *Most challenging was probably walking two miles [from school to town hall] with the tools. For some walking can be a challenge. There were probably three kids that it was physically a challenge. The challenge was they agreed that we would stay together as we walked. The leader in the beginning and the end of the line would be the beginning and the end. And we would stay together. That was hard, because basically the walking happened in the summer, and it was pretty hot. Walking next to Route 79, nice shoulder. But, it's asphalt. And hot. And that I think for this project was hard, you know being patient. Some people just got to walk! Got to go! Got some speedies for sure. 'Hey! You're going to stay together!' That probably was the biggest challenge.*

The entrance to the Caroline Town Hall, as improved by local youth. Photo by T. Schusler

The agreement to stay together while walking illustrates *bridging differences*, while the educator's reminder held the youth accountable to their agreement and demonstrated the value of *setting clear, rigorous expectations*.

From this story of a community beautification project, we gain insight into how this educator used multiple practices promoting PYD. While each educator's story of environmental action differs, all illustrate some of the PYD practices listed in **Table 4**. Environmental educators who want to promote PYD through their programs would do well to implement as many of these practices as possible given their specific context.

Tensions in Shared Decision Making with Youth

Educators facilitating youth environmental action describe many rewards but also a key challenge. In encouraging young people's genuine participation, which involves sharing decision-making power, educators sometimes experience tensions, such as when stepping back to let youth lead and stepping in to keep a project on track, balancing youth freedom with adult-provided structure, integrating youth interests with curriculum or organizational goals, managing power dynamics, or communicating openly and transparently.[46] The following are examples:

> *There's a fine line to get yourself situated where you're allowing kids to take as much leadership as they want, encouraging what is needed yet not making decisions necessarily for them.*
>
> *The kids are the head of the project [but] I need it to be meaningful in terms of the class…*
>
> *…there's a huge power dynamic at play, me as a [professional], as an experienced person in this project, as a 42-year old, just carries a weight with it that a 12-year old kid in the neighborhood doesn't have. So how you balance that…*

Managing such tensions is complex because youth are limited in their capabilities to initiate and carry out a collective project without appropriate guidance and support. When youth hold sole responsibility, their work can stall or become disorganized, which can undermine their motivation and the success of the project.[47] This leaves educators with a paradox: taking over control diminishes youth participation, but giving youth too much control can take a project off track and jeopardize its environmental benefits. Educators must find a middle ground between being too directive and too *laissez faire*.[48]

In encouraging young people's genuine participation, which involves sharing decision-making power, educators sometimes experience tensions.

Several practices of educators facilitating youth environmental action parallel attributes of settings that promote PYD. These are: creating safe spaces, building relationships, providing structure, providing opportunities for meaningful contribution, bridging differences, expanding horizons, supporting youth, setting rigorous expectations, and connecting youth with community.

Summary

Environmental action is a form of EE in the democratic tradition that involves deliberate decision making, planning, implementation, and reflection to create positive environmental outcomes and can also result in other valued outcomes, including positive youth development. Environmental action can take the form of physical environmental improvements, education, scientific inquiry, advocacy, or products and services contributing to community development. It typically involves ecological and/or social inquiry to inform and evaluate action in an iterative process. Youth environmental action is characterized by shared decision making between youth and adults. Because young people genuinely participate in decision making and action for meaningful change in their communities, this approach to EE not only improves local environments but also develops youths' capacities as citizens. Other PYD outcomes—from improved eating habits, scientific knowledge, and job skills to patience, persistence and teamwork—have been documented in environmental action programs. As youth develop physical, intellectual, psychological, and social assets that promote well-being, they become more capable of participating effectively in environmental or other community action they deem important.

Several practices of educators facilitating youth environmental action parallel attributes of settings that promote PYD. These are creating safe spaces, building relationships, providing structure, providing opportunities for meaningful contribution, bridging differences, expanding horizons, supporting youth, setting rigorous expectations, and connecting youth with community. Understanding PYD can help environmental educators extend the benefits of their programs with youth, as well as partner with youth development organizations in programs that expand EE's reach while advancing youth development goals. Further research is needed to understand better the range of outcomes for participants, how these outcomes come about, and the synergies and tensions that arise in educational programs that simultaneously aim to achieve environmental and positive youth development goals.

References

1 http://mass-ave.org/

2 http://www.eastnewyorkfarms.org/

3 http://www.guilderlandschools.org/farnsworth/programs/pinebush/pinebushhome.cfm

4 http://ccetompkins.org/4h/rural-youth-services

5 National Research Council. *Community Programs to Promote Youth Development*. Washington, DC: The National Academies Press, 2002. Available online: http://www.nap.edu/openbook.php?record_id=10022

6 Schusler, T., Krasny, M., Peters, S., and Decker, J. "Developing Citizens and Communities through Youth Environmental Action," *Environmental Education Research*, 15, no. 1 (2009): 111-127.

7 Simovska, V. "The Changing Meanings of Participation in School-based Health Education and Health Promotion: the Participants' Voices." *Health Education Research*, 22, no. 6, (2007): 864-878.

8 The Assets-based Community Development Institute, Northwestern University, http://www.abcdinstitute.org/

9 National Research Council, *Community Programs*; _____. *Youth Development: Issues, Challenges and Directions*. Philadelphia: Public/Private Ventures, 2000. Available online: http://www.nationalserviceresources.org/files/r1608-youth-development.pdf

10 Ibid.

11 For example, the Search Institute's 40 Developmental Assets for Adolescents, http://www.search-institute.org/content/40-developmental-assets-adolescents-ages-12-18 and the "Six C's" - competence, confidence, connection, character, caring, and contribution - by Luke, J. L., J. Stein, C. Kessler, and Dierking, L. D. Making a Difference in the Lives of Youth: Mapping Success with the "Six Cs". *Curator,* 50, no. 4 (2007): 417-434.

12 National Research Council, *Community Programs*

13 Ibid., 87

14 Ibid.

15 Jensen, B. B. "Health Knowledge and Health Education in the Democratic Health-promoting School." *Health Education*, 100, no. 4 (2000): 146-153.; Schnack, K. "Participation, Education, and Democracy: Implications for Environmental Education, Health Education, and Education for Sustainable Development." Pages 181-196 in *Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability*, eds. A. Reid, B. B. Jensen, J. Nikel, and V. Simovska. Dordrecht: Springer, 2008.

16 Sobel, D. *Place-based Education: Connecting Classrooms and Communities*. Great Barrington, MA: The Orion Society, 2005.

17 _____. 2000. Educator's Guide to Program Development in Natural Resources: Education as a Community Resource. NSF/ATE/DUE #9813445. Northwest Center for Sustainable Resources, Chemeketa Community College, Salem, OR.

18 Hungerford, H. R., Litherland, R. A., Volk, T. L., Ramsey, J. M., and Peyton, R. B. *Investigating and Evaluating Environmental Issues and Action: Skills Development Program*. Champaign, IL: Stipes Publishing, 2003.

19 National Environmental Education Foundation, http://www.classroomearth.org/node/22510.

20 Pages 210-219 in Jacobson, S. K., McDuff, M. D., and Monroe, M. C. *Conservation Education and Outreach Techniques.* Oxford: Oxford University Press, 2006.

21 Emmons, K. M. "Perspectives on Environmental Action: Reflection and Revision through Practical Experience." *The Journal of Environmental Education,* 29, (1997): 34-44.

22 Tompkins, L. "A Case for Community-based Education: Students form Partnerships to Tackle Local Environmental Issues. *The Science Teacher,* 72, No. 4 (2005): 34-36.

23 Figueroa Jr., R. "TRUCE Carrie McCracken Community Garden Action Project." Garden Mosaics Action Projects Database, 2003. http://communitygardennews.org/gardenmosaics/pgs/data/actionread.aspx?garden=107

24 Schusler, T. M. *Youth-Adult Partnerships Creating Positive Environmental Change*. (Doctoral dissertation). Ithaca, NY: Cornell University, 2007.

25 Jensen, B. B. and Schnack, K. "The Action Competence Approach in Environmental Education." *Environmental Education Research,* 3, No. 2 (1997): 163-178.

26 Bishop, K. and Scott, W. "Deconstructing Action Competence: Developing a Case for a More Scientifically-attentive Environmental Education." *Public Understanding of Science*, 7 (1998) 225-236.; Hart, R. A. *Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care*. London: Earthscan, 1997.; McClaren, M. and Hammond, B. "Integrating Education and Action in Environmental Education." Pages 267-291 in eds. E. A. Johnson and M. J. Mappin, *Environmental Education and Advocacy: Changing Perspectives of Ecology and Education*. Cambridge: Cambridge University Press, 2005.; Stapp, W. B., Wals, A., and Stankorb, S. L. *Environmental Education for Empowerment: Action Research and Community Problem Solving*. Dubuque: Kendall Hunt, 1996.

27 Schusler, T. M. and M. E. Krasny. "Youth Participation in Local Environmental Action: an Avenue for Science and Civic learning?" Pages 268-284 in *Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability*, eds. A. Reid, B. B. Jensen, J. Nikel, and V. Simovska. Dordrecht: Springer, 2008.; Schusler, T. M. and Krasny, M. E. "Science and Democracy in Youth Environmental Action: Learning 'Good' Thinking." Pages XX-XX in Mueller, M. P. and Tippins, D. J., eds. *Eco-Justice, Citizen Science, and Youth Activism: Situated Tensions for Science Education*. Springer, Forthcoming.

28 Simovska, V. "Learning *in* and *as* Participation: a Case Study from Health-promoting Schools." Pages 61-80 in *Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability*, eds. A. Reid, B. B. Jensen, J. Nikel, & V. Simovska. Dordrecht: Springer, 2008.

29 Hart, *Children's Participation*

30 Hart, *Children's Participation*; Schusler et al., "Developing Citizens and Communities"

31 Jensen and Schnack, "The Action Competence Approach," 164

32 Schusler et al., "Developing Citizens and Communities"

33 Schusler, *Youth-Adult Partnerships*

34 Ibid.

35 Skelton, N., H. C. Boyte, and L. S. Leonard. *Youth Civic Engagement: Reflections on an Emerging Public Idea*. Minneapolis: Center for Democracy and Citizenship, Hubert H. Humphrey Institute of Public Affairs, University of Minnesota, 2002, 9.

36 Schusler et al., "Developing Citizens and Communities"

37 Adams, E. and Ingham, S. *Changing Places: Children's Participation in Environmental Planning*. London: The Children's Society, 1998.; Chawla, L. *Growing Up in an Urbanising World.* London: Earthscan, 2002.; Hart, *Children's Participation*

38 Jensen and Schnack, "The Action Competence Approach"

39 Volk, T. L. and M. J. Cheak. The Effects of an Environmental Education Program on Students, Parents, and Community." *Journal of Environmental Education,* 34, no. 4 (2003): 12-25.

40 Melchior, A. and L. N. Bailis. *Earth Force 2003-04 Program Evaluation*. Waltham: Center for Youth and Communities, Heller Graduate School, Brandeis University, 2004.

41 Schusler, *Youth-Adult Partnerships*

42 Schusler, *Youth-Adult Partnerships*; Schusler, T. M. and Krasny, M. E. "Environmental Action as Context for Youth Development." *Journal of Environmental Education*, 41, No. 4 (2010): 208-223.

43 Camino, L. and S. Zeldin. "From Periphery to Center: Pathways for Youth Civic Engagement in the Day-to-Day Life of Communities." *Applied Developmental Science*, 6 (2002): 213-220.; Balsano, A. B. "Youth Civic Engagement in the United States: Understanding and Addressing the Impact of Social Impediments on Positive Youth and Community Development." *Applied Developmental Science*, 9 (2005): 188-201.

44 Schusler, *Youth-Adult Partnerships*

45 National Research Council, *Community Programs*

46 Schusler, *Youth-Adult Partnerships*

47 Larson, R., Hansen, D., and Walker, K. "Everybody's Gotta Give: Development of Initiative and Teamwork within a Youth Program." In J. L. Mahoney, R. Larson, and J. S. Eccles (Eds.), *Organized Activities as Contexts of Development*. (pp. 159-183). Mahwah, NJ: Lawrence Erlbaum, 2005.

48 Douglas, H. "Action, BlastOff, Chaos: ABCs of Successful Youth Participation." *Children, Youth and Environments,* 16, No. 2 (2006): 347-365.; Larson et al., "Everybody's Gotta Give"

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