

# **Environmental Education** **An Annotated Bibliography**

## **History & Goals of EE**

*Environmental Education and Training Partnership (EETAP). 1997.*

*Environmental education: As defined by the practitioners. NAAEE.*

There have been several forerunners and concurrent companions of environmental education including: resource-use education, progressive education, and resource management education.

The article includes several definitions of EE from the US Office of Education, Brennan (1970), Stapp (1969), Belgrade Charter (1975), Tblisi Declaration (1977), and Schmeider (1977).

Although these definitions stem from the 1970s, NAAEE holds that the effort to define EE continues. Why?

*National Environmental Education Advisory Council. 1996. Report assessing environmental education in the United States and the implementation of the National Environmental Education Act of 1990. Environmental Education Division, U.S. Environmental Protection Agency, Washington, DC, pp. 2-4.*

The NEEAC outlines four goal levels for EE: Ecological concepts, conceptual awareness, issue investigation and evaluation, and environmental action skills. Students need to be “thoroughly exposed to all four goal levels.”

In a 1994 survey of NEETF students from non-disadvantaged areas ranked concern for environment second (51%) behind AIDS (64%) as the problem they are most concerned about and want to improve. Students from disadvantaged areas cited less concern for the environment (43%) behind issues of crime, violence, and the economy. In WWF survey, environment also ranked high (Hart, 1994). In a Wall Street Journal poll- 80% of Americans call themselves environmentalists.

*Stapp, W. B. 1969. The concept of environmental education. Journal of Environmental Education 1(1): 30-31 (here: 33-35).*

“To an increasing extent citizens are being asked to make decisions that affect their environment.”

“Few programs (in conservation education) emphasize the role of the citizen in working, both individually and collectively, toward the solution of problems that affect our well being.”

The one-man-one vote Supreme Court decision forces us to consider urbanites in education programs.

*Stapp, W. B. 1998. Epilogue for: “The concept of environmental education.” In*

***Hungerford et al. (Eds.), Essential readings in environmental education, Stipes Publishing, Champaign, IL, p. 36.***

***Environmental Education and Training Partnership (EETAP). 1997. Evolution of environmental education: Historical development. NAAEE, 2 pp.***

Describes different types of education: Resource-use education, progressive education, resource management education, and population education.

Regarding ongoing definitional discussions- “It is disconcerting for those involved in the implementation of EE goals to hear again the question: ‘What is environmental education’...One would dare hope that this question could, at long last, be laid to rest...the field is quite definitely beyond the goal setting stage and into the business of implementation” (Hungerford 1983).

***Hug, J. 1977. Two hats. In Aldrich et al. (Eds.), The report of the North American regional seminar on environmental education for the real world. SMEAC Information Reference Center, Columbus, OH, p. 47.***

“It is not uncommon for dedicated environmental educators to be summarily dismissed as troublemakers-environmentalists.

“Environmental educators need to be as ‘value fair’ or ‘value free’ as they can working in this role.”

***Disinger, J. 1983. Environmental education’s definitional problem. ERIC/CSMEE, Columbus, OH, (here: pp. 17-29).***

Environmental education is first credited to Brennan at his 1964 address to the AAAS.

***Disinger, J. F. 1998. An epilogue: EE’s definitional problem: 1997 update. In Hungerford et al. (Eds.), Essential readings in environmental education, Stipes Publishing, Champaign, IL, pp. 29-31.***

NEEAC focus for EE (1996): protecting human health, advancing quality education, expanding employment opportunities, promoting sustainable development, and protecting America’s natural heritage.

“EE is ideally interdisciplinary...its practitioners typically approach it as if it were multidisciplinary...Thus, practitioners in EE typically continue to talk past one another, rather than with one another.”

“The 1996 Federal Register (from EPA) definition (of EE) explicitly calls for objectivity and non-advocacy.”

“The central question now becomes, can fostering a particular brand of behavior promote the development of critical independent thinking?”

No one has documented if teachers are preaching environmental behavior and advocacy rather than educating.

### **Grant Writing in EE**

*North American Association for Environmental Education (NAAEE). 1993. Grant funding for your environmental education program: Strategies and options. NAAEE, Troy, OH, SCAN.*

Scan several of the following websites:

EE-Link grants pages: <http://eelink.net/grants-eespecificresources.html>

<http://eelink.net/grants-generalinformation.html>

<http://eelink.net/grantsearch-multisitesearch.html>

Great Lakes Information Network (GLIN): <http://www.great-lakes.net/infocenter/news/funding.html>

EPA Grant Writing Tutorial:

<http://www.epa.gov/grtlakes/seahome/grants.html>

The Foundation Center: <http://fdncenter.org/pnd/rfp/index.html>

### **Cognitive & Affective Development**

*Engleson, D. C. and D. H. Yockers. 1994. A guide to curriculum planning in environmental education. Wisconsin Department of Public Instruction, Madison, Wisconsin, pp. 52-59.*

“Educational programs and curricula should be developed in response to three concerns: the physical, intellectual, moral, and ethical development needs of human beings; the need to fulfill social responsibilities; and the need to understand the content of the various disciplines.”

Jean Piaget’s research on cognitive development is the best known and most-cited. It sets 5 development stages in children

Developmental Stage	General Age Range	Characteristics
Sensorimotor	Birth-18 months	Preverbal, objects only exist when in the perceptual field of the child, practical basic knowledge develops
Preoperational	18 months to 7-8 yrs	Organized language begins, perceptually oriented, does not use logical thinking, directed by simple goals, lacks operational reversibility in thought and action
Concrete operations	7-8 yrs to 11-12 yrs	Thinking becomes concrete but not abstract, concept of reversibility develops, cannot isolate variables
Prepositional or formal operation	11-12 yrs to 14-15 yrs	Formal abstract thought begins, hypothetical-deductive reasoning based upon logic, unification of operations into a structured whole
Arilin’s 5 <sup>th</sup> Piagetian stage	14-15 yrs and up	Ability to perform controlled experimentation, ability to hypothesize variables, can use interpositional operations

“During brain growth periods, new facts and information can be learned when attached to the learning of appropriate new and higher level thinking skills.”

“During plateau periods, new facts and information can be learned by utilizing the skills initiated during previous brain growth periods, thus aiding in the maturation of these new skills before progressing to another new, higher skill level.”

Plateau periods can vary in length. Children construct knowledge. “The knowledge that is constructed, that which a learner learns, is dependent upon what the learner already knows and the learner’s cognitive self-esteem, the belief in one’s ability to learn.”

National Science Teachers Association (1991)- Taxonomy of Educational Objectives: Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation.

Moral Development (Piaget 1969)- Motor and Individual (Birth-2), Egocentric (2-6), Authoritarian (7-11), Consensus (12-older).

Moral Development (Kohlberg 1981)- Pre-congenital (7-10)  
(1.Punishment/Obedience, 2.Instrumental/Relativist), Conventional (10-13)  
(3.Interpersonal Concordance, 4.Law and Order), Post-conventional (13-adult)  
(6.Social Contract, 5.Universal Ethic Principal). Kohlberg’s subjects were all male. Gilligan modified and found that “as females develop morally, they tend to view life as an opportunity to create, cherish, and preserve interpersonal connections. Caduto finds, “Initially males and females tend to develop morally in a similar fashion, following the first three stages of Kohlberg’s model. But at this point, males tend to develop with the justice orientation described by Kohlberg in stages 4-6, and females with the caring relationship described by Gilligan.

***Bohlin, Roy M. 1998. The Affective Domain: A Model of Learner-Instruction Interactions. In Proceedings Selected Research and Development Presentation at the National Convention of the Association for Educational Communications and Technology (AECT) pp. 39-44.***

Bohlin develops a model presents a model for the affective domain representing several cognitive factors; attitudes, beliefs, values, anxiety, motivation, attributions, confidence, and interests.

Taxonomy of affective domain (Krathwohl 1956): Receiving, Responding, Valuing, Organization, and Characterization. See also Gephart and Ingle 1976 (page 40).

Variables in Model of Learner-Instruction Interactions

Anxiety, arousal, attitude, attributions, beliefs and opinions, confidence, expectancy of success, interests, motivating level, perceived relevance, satisfaction, self-efficacy, values.

See Figure 4, page 42 for Model

“The lack of a global vehicle to gain insight into the larger picture has represented a significant deficiency in making the affective domain accessible to practitioners and theorists.”

For further research: Validate the theoretical connections in the model with the research results, add prescriptions for specific variables based upon both research and best practice experience, and provide information about the best ID models for integrating inferences made from the use of this model.

***Braus, J. and D. Wood. 1993. Getting to know your students (Chapter 4) in Environmental Education in the Schools: Creating a Program that Works! Washington: North American Association for Environmental Education, Washington, D. C. pp.41-53.***

“I like teachers who disturb the inertia and schools that are colorful with diversity among the teachers. Inevitably, that also allows for color and diversity of expression among students- Sir Lawrence Lightfoot”

“It’s important to: match your goals and objectives to the student’s developmental level, make sure the content is relevant to the student’s needs, interests, and backgrounds, build on what the students are learning in other classes, include a component that deals with the development of an environmental ethic, integrate thinking skills that tie directly to the type of behavior you hope to promote.”

The young ones (18 months –7-8yrs): Do not introduce complicated issues or activities. Focus on environmental awareness activities that rely on the senses, helping students focus on their feelings about the environment, introducing limited content, and providing positive outdoor experiences for children. It’s also important to start introducing students to appropriate environmental behavior.

The beginning of logic (7-8 to 11-12): Can handle activities that deal with classifying, comparing, organizing, and explaining. It is a good time to focus on knowledge and attitudes, but students should continue to take part in awareness activities. They are unable to deal with complex moral issues.

An abstract thought (11-12 to 14-15): Can analyze events and understand probability, correlations, combinations, proportional reasoning, and other high-level thinking skills. Many students become idealists. Students are actively deciding for themselves what is “right” and “wrong”.

Higher thinking (14-15 and up): It is important for students to better define their roles as responsible citizens and begin to refine personal ethics. Students should be encouraged to attend and sponsor meetings, conduct research, write reports, analyze media, and so on.

“We believe there is no such thing as ‘values free’ education.”

“By incorporating an attitude component into your teaching, you can help your students better understand themselves and help them develop morally.”

“It’s appropriate for educators to act as role models and reward certain behaviors.”

“Children that are 4 or 5 can learn that littering is not acceptable behavior but that recycling is. In some societies littering is accepted behavior and needs to be addressed when children are older and can think about the pros and cons.”

For 11-15yrs “They learn that by relying on and cooperating with others, they can further their own goals.”

### **Mental Maps & Concept Maps in EE**

***Kaplan, S. 1982. On Knowing the Environment (Chapter 3) in Humanscape : Environments for People. Kaplan, S and R. Kaplan (eds.). Ulrich's Books Ann Arbor, Michigan. pp.54-58.***

“It (truth) is selective and hence incomplete; people disagree on matters of emphasis, thus denying the possibility of truth in any ultimate sense.”

“Knowing is being able to see it in your head, to think about it a lot, to imagine it, to wonder about it, to feel it.”

“At the same time, the human is faced with limited time to decide and limited capacity for holding information.”

“From any next representation one can make still further predictions, since these representations have their associations in turn. This step-by-step pattern of associations thus defines a quite complex structure and permits predictive sequences that can be indefinitely long.”

“The perception of environmental circumstances leads (by association) to possible next alternatives, and from them to possibilities still further down the road.”

“A model then, must be an abstraction. It necessarily leaves out information. And since there are choices of what to leave out and what to emphasize, there are many possible models... Indeed, having a model inside one’s head is a great help in coping with the environment.”

***Stewart, J., Kirk J. V. and R. Rowell. 1979. Concept maps: A tool for use in biology teaching. The American Biology Teacher 41(3): 171-175.***

“It might also be wise to ask only the students who have a good grasp of the subject to try and construct maps of it.”

“Having a concept map in front him as he interviewed children helped to keep his questions focused on the concepts and the relationships in which he was interested.”

***Bixler, R. D., Carlisle, C. L., Hammitt, W. F. and M. F. Floyd. 1994. Observed fears and discomforts among urban students on field trips to wildland areas. Journal of Environmental Education 26(1): 24-33.***

Repeated exposure leads to environmental competence.

Crompton and Sellar (1981)- length of exposure to natural environment may be the single most important variable in outdoor education program success.

For students with misconceptions, outdoor education experiences are corrective or remedial rather than formative. We may need to get wildlands exposure much earlier (have outdoor education with preschool, daycare/Head Start).

Fear of snakes (80%) was the most common fear, insects (79%), nonindigenous animals (73%), and getting lost (56%). Getting lost was not expected since children were led by an interpreter. Dirt and mud (48%), touching (35%), and water (23%).

***Kaplan, S. and R. Kaplan. 1981. The transfer of information. In: Cognition and Environment: Functioning in an uncertain world, Ann Arbor, MI, (here: 113-122)***

#### **Models to Foster Environmentally Responsible Behavior**

***Hungerford, H. R. and T. L. Volk. 1990. Changing learner behavior through environmental education. Journal of Environmental Education 21(3): 8-21.***

Study finds that issue awareness does not lead to behavior in the environmental dimension. Issues must be the focus of instruction beyond environmental sensitivity, ecological foundations, and issue awareness. Includes appendices on education Goal Levels, Action vignettes, and additional literature on theory, research reviews, and research studies to the model of citizenship behavior.

Variables leading to environmental behavior include: entry-level variables, ownership variables, and empowerment variables. These variables are hypothesized to act in a complex, but linear fashion (see Figure 3, p11).

An internal locus of control cannot be developed directly in a classroom most likely.

Harvey (1977)-superordinate goal of EE- "To aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of environment."

Subgoals are ecological foundations, conceptual awareness (issues and values), Investigation and Evaluation, and action skills (training and application).

To maximize opportunities for success: articulate and implement EE across grade

levels, cooperation among formal/nonformal education, and local and regional education resources cooperation.

Reinforcement strategies- no research showing how much, but it is needed.

Few effort to change behavior through media (there has been a focus on awareness). Most successes in EE are issue-specific.

“Typically, issue awareness does not lead to behavior in the environmental dimension.” “Issues must be the focus of instruction beyond environmental sensitivity, ecological foundations, and issue awareness.”

Appendices: A. EE Goals, B. Citizenship Action Vignettes, C. Additional Literature

***Hines, J. M., Hungerford, H. R. and A. N. Tomera. 1987. Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis. Journal of Environmental Education 18(2): 1-8.***

Study is meta-analysis of relative influence of variables determining environmental behavior. Knowledge of issues, knowledge of action strategies, locus of control, attitudes, verbal commitment, and an individual's sense of responsibility are predictors of environmental behavior.

Correlations:

- .299 between knowledge and Env. Behavior
- .347 between attitude and Env. Behavior
- .365 between locus of control and Env. Behavior
- .49 between verbal commitment and Env. Behavior
- .328 between personal responsibility knowledge and Env. Behavior

There are generally weak correlations between demographics and environmental behavior.

- .162 for income
- .185 for education level
- .151 for age
- .075 for gender

Classroom strategies to promote environmental behavior:

- Knowledge of environmental issues
- Discussion on alternative solutions to environmental problems
- Environmental problem-solving skills
- Values discussion
- Action-taking skills

Short-term exposure is ineffective in changing behavior (McCutcheon 1981, Partian 1979). Overall, behavior intervention strategies were effective.

Skills do not evolve naturally from knowledge (Romsey 1979 and Klinger 1980).

Knowledge and skill components and maybe personality (needs more research) components can be affected by educators.

### **EE for Environmental Problem Solving**

***Bardwell, L. V. and M. T. Tudor. 1994. Problem solving through a cognitive lens (Chapter 1) in Environmental Problem Solving: Theory, Practice and Possibilities in Environmental Education. Bardwell, L. V., Monroe, M. C. and M. T. Tudor (Eds). North American Association for Environmental Education, Troy, OH.***

“EE entails both teaching the science of an issue and helping learners bring to that understanding a recognition of social, political, and cultural factors.”

“Students must learn to identify their own values and priorities, and to respect those of others. Furthermore, because doing something about the problem is part of EE’s mission, they need skills, confidence, and motivation to take effective action.”

“With that interaction comes the increased need for the effective communication, leadership, and a process for working through conflicts and value differences.”

“From a cognitive perspective, humans have two basic information needs- to make sense of what is happening around them and to be able to explore and be involved in that world (Kaplan and Kaplan, 1982).”

“‘Humans can hold between three and seven working concepts in their head at once (Mandler, 1975).’ So, rather than retaining everything, we tend to chunk some information and selectively ignore the rest. These chunks of information are based on our experiences.”

“Rather than build a new cognitive map every time we encounter a novel situation, we first try to use the maps we already have.”

“If we feel confident, the incongruity may spark a curious exploration and intense learning. If that discomfort leads to confusion or embarrassment, it may elicit very different, less helpful reactions such as anger, frustration, denial, and helplessness.”

“In our haste to get to a solution, we define the problem inadequately or inaccurately.”

Stages of problem-solving: Exploring and defining the problem, searching for and identifying solutions, implementing an action and evaluating progress.

See Figure 1.2 Spatial depiction of problem-solving from Kaplan and Kaplan, 1982 (p10)

“Problem solving is process which continues even with one’s new solution, for with wicked problems, every solution brings with it a new set of problems.”

“The more adequate one’s understanding of the problem, the richer that space will be

and the more likely one will be to see patterns and possible paths instead of disjointed facts.”

Voss et al (1983)- problem-solving styles of political scientists and chemists. A linear approach to problem solving works for problems with right and wrong answers. “We need to encourage students to try a patterned approach, where they explore a problem. Move forward and backward or up and down between levels of the problem/solution spaces and struggle with different definitions and solutions.”

Educator goals: promote familiarity, structure, and flexibility

For Familiarity: problem solvers need imagery, competence and efficacy, and personal

commitment

For Structure: educators should limit information, choose appropriate problem level, and stay off solutions

For Flexibility: strategies for managing information such as working backwards from a solution to a problem definition and breaking problems into parts.

“Learners are going to be emotionally involved. They are going to want answers because they care. And, there is going to be conflict when they disagree.” Educators must guide this struggle for clarity.

Guidelines

1. ID processes of the tasks and make them visible
2. Situate abstract tasks in authentic contexts
3. Vary the diversity of situations

***Kronholm, M. and J. Ramsey. 1991. Issues and analysis: A teaching strategy for the real world. Science and Children October: 20-23.***

Knowledge (braking misconceptions) leads into investigation, which leads into a decision. The article is based on an extended case study of timber wolf reintroduction.

***De Young, R. and M. C. Monroe. 1996. Some fundamentals of engaging stories. Environmental Education Research 2(2): 171-187.***

“It is suggested that stories serve as a singularly effective replacement for direct experience.”

Direct experience can be expensive and difficult to coordinate, single interventions don’t give sufficient variability, direct experience may not always be positive, and direct experience is not always possible.

Stories simplify complex situations, a prerequisite to coping with enormous amounts of information. People often make up stories to explain what they have seen or experienced. Successful stories use action, mystery, imagery, and meaningful characters.

“Involuntary attention is based on interest” Directed attention is difficult to maintain. A story can be interesting, but if there are irrelevant details, recall is impaired.

Elements of an engaging story: Coherence, Problem Resolution, Mystery, Characterization, Concreteness, Imageability, Challenging Previous Knowledge, Other factors (well-formed text, etc).

### **EE for Environmental Problem Solving**

***Waterman, A. S. 1997. An overview of service-learning and the role of research and evaluation in service-learning programs (Chapter 1) in Service-learning: Applications from the Research. Waterman, A. S. (Ed.) Lawrence Erlbaum Associates, Publishers. Mahwah, NJ.***

Elements of service-learning: active participation, meeting actual community needs, integrated into the curriculum, use newly acquired skills, develop a sense of caring for others.

Service-learning is different from volunteer service (no explicit focus on educational aspects)

Outcomes: Enhancement in learning, promoting personal development, development of civic responsibility, benefits to the community.

“What is experienced through action will be remembered more vividly than what is merely read, or heard in a teacher’s class presentation.”

Service within versus service outside of the school environment, service as an element in academic courses versus service as a separate course in the curriculum, service learning as a curricular requirement versus service learning as a curricular option.

Reflection on experience is a critical part of service-learning

***Alliance for Service Learning in Education Reform. 1993. Standards of quality for school-based service-learning. Equity & Excellence in Education 26(2): 71-73***

“Children are raising each other with little stabilizing input from adults.” (Carnegie Corporation, 1992).

Again, reflection is a key component.

Standards:

Process- begin with clearly articulated goals, create concrete opportunities to learn and practice new skills, time for preparation and reflection, and students’ efforts are recognized

Participants- youth are involved in the planning

Outcomes and Benefits- meaningful contributions to the community, real, developmentally appropriate, tangible or visible outcome, and systematic evaluation.

Commitment and Capacity- receive institutional support. Skilled adult guidance, and pre-service and staff development.

***Boston, B. O. 1998/99. If the water is nasty, fix it. Educational Leadership Dec 1998-Jan 1999, pp. 66-69.***

The article is a discussion of a model, Earth Force in Denver.

Earth Force provides training and programs are integrated into existing curriculum. Teachers develop lesson plans for 1yr or 1/2yr.

Harris Poll: 7 in 10 kids in grades 4-12 are interested in learning more about environmental problems and what they can do about them, 6 in 10 kids bug their parents to recycle.

Brandeis University: 90% of all students involved in service learning thought that their peers should have the same experience.

Other programs: Nickelodeon's "The Big Help"- volunteer environmental initiative.

The model:

1. Students take a community environmental inventory
2. Students select their problem
3. Students move from researching the problem to investigating the policy environment in which the problem is embedded
4. Students ID options for influencing policy and practice
5. Students plan for and take action
6. Successfully completing a project often means "high fives" and builds with a period of sober reflection and assessment. Need a sense of closure.

### **EE for Environmental Affect**

***Knapp, C. E. What is environmental values and ethics education? (Chapter 4) in In Accord with Nature: Helping Students Form an Environmental Ethic Using Outdoor Experience and Reflection. Clearinghouse on Rural Education and Small Schools. Charleston, WV.***

Defines facts, beliefs, attitudes, values, and principles. Facts are pieces of information that have objective reality, a belief is a conviction of the reality of some phenomenon that can be challenged, attitudes are ideas used to evaluate something, and values are ideas about the worthiness of objects or activities that develop over a long period of time, and principles are rules used to order conflicting values.

"People can be very conscious of the rational bases on which they behave or barely conscious of the underlying reasons for their actions."

“An adult has thousands of beliefs, fewer attitudes, and only dozens of values.”  
(Caduto)

Movements in values education: values clarification, character education, citizenship education, and moral education.

Five E's of ethics education (Kevin Ryan): Teaching by example, explanation, and exhortation, creating an environment, and providing experience.

Value education strategies:

Inculcation- moralizing lectures, can take place where the school and community share common values.

Values clarification- choosing freely from alternatives, prizing and cherishing the choice, and acting in a repeated pattern.

Values analysis- analyze social issues

Moral development- moral dilemmas or values-problems discussions

Action learning- service learning

Confluent learning- Integration of cognitive and affective awareness techniques using the senses.

Behavioral changes from values education come from:

- The nurturing of certain behaviors in families, neighborhoods, and communities
- Teachers who serve as helpful guides rather than as authoritarians
- Groups that make decisions through consensus and help develop their own norms and codes of moral behavior
- Peer teaching, counseling, and support
- Responsible service and action strategies in the community

Reading: CA Child Development Project: results of values education K-4

Results: More spontaneous acts of helping, more concern toward others, more attention to the need of all parties, more committed to democratic values. All of these gains were achieved without sacrificing traditional academic goals.

“Controversy in public education results when people cannot agree on the meaning of knowledge.”

“The ‘Ethicizing’ Process”: select accurate information, select knowledge relative to the problem, use the knowledge to decide what should be done, why, and when, filter this knowledge through personal and societal beliefs, make a decision whether or not to act.

Some critics oppose values education in public schools. “They are concerned with the

inadequate treatment of scientific information, economics, and risk analysis.” Schools should not promote a particular point of view.

Questions for educators to ask: Would I want the same solution applied to me if roles were reversed? Would I want everyone in the world to employ this solution or follow this example? Is the rule applied similarly to other individuals or groups? How would I view the situation if I did not have a personal interest in it? What solution would be the best for the greatest number?

Assessment of values education: observations of behaviors and student interviews, work projects and products, teacher-made and other types of tests.

See page 86-89 for list of activities and indicators of understanding.

***Knapp, C. E. What activities can teachers use to help students develop an environmental ethic? (Chapter 5) in In Accord with Nature: Helping Students Form an Environmental Ethic Using Outdoor Experience and Reflection. Clearinghouse on Rural Education and Small Schools. Charleston, WV***

“Direct experience outside of the classroom is important, but students need to apply critical thinking to the process.”

Activities: encourage students to talk about their relationship with nature,

- take an environmental ethics quiz (example on p98),
- ask about environmental ethics issues in the newspaper (example on p100),
- discuss minus (should not), zero (being good is not being bad), and plus (positive action) ethics,
- use quotes to imagine nature
- give yourself a present- what is happening now?
- diagram nature’s jigsaw puzzle
- chain links- write on nature’s connections
- walking gently- record the ways you impact the earth
- keeping tabs on the season- keep a journal
- appreciating an object
- mask making
- symbols of thanks
- creating powerful questions
- picking questions
- awareness questions
- brainstorming “should” lists
- interviewing people in the community
- codes of behavior developed by special interest groups
- identifying characteristics of heroes, heroines, and mentors
- who is an environmentalist?
- Taking inventory
- Master planning
- Navajo chant
- Litter sculptures
- Create an image
- Letter from the planet earth
- Precious gifts
- Sacred places
- The value of trees
- Defending nature
- Counting riches
- Organizational muscle
- Collecting natural pets
- To hunt or not to hunt
- Purifying pollution
- Invent a game

- Role playing

**Sobel, D. 1995. *Beyond ecophobia: Reclaiming the heart in nature education.* Orion Autumn 14(4): 11-17.**

“In our zest for making children aware of and responsible for the world’s problems, we cut our children off from their roots.”

Too much weight on kids with other fears. We can end up discouraging and distancing children from the natural world.

“While children do seem to be spending less time physically in natural surroundings, they also seem to worry more about the disappearance of nature- in a global sense- than my generation did...As a boy, I was intimate with the fields and the woods behind my house, and protective of them. Yet, unlike these children, I had no sense of any ecological degradation beyond my small natural universe.” (Richard Louv, *Childhood’s Future*).

“While children are studying the rainforest, they are not studying the northern hardwood forest, or the overgrown meadow outside the classroom door.”

Children participate in activities such as viewing the earth from space and planning to save eagles, but they don’t seem to enjoy the process. Children chose pictures of legos, playing baseball and homes and seemed energetic about the discussions. Many global problems are beyond the students’ control.

“What’s important is that children have an opportunity to bond with the natural world, to learn to love it and feel comfortable in it, before being asked to heal its wounds.”

“Knowledge without love will not stick. But if love comes first, knowledge is sure to follow.”

From ages 7-11 is the critical period for bonding with the earth. Other periods are 3-7 and 11-15.

The central focus of neighborhood maps made by children is their “explorable landscape”. From 11-14, maps expand, but move out of the woods and into town. Early childhood is focused on the home, and as kids move outside, forts and dens show up.

“Children desire immersion, solitude, and interaction in a close, knowable world.”

Young children need to have an emotional empathy for the creatures of the natural world. The next need safe opportunities to explore, and finally, opportunities to work on problems in their community. 3-7: empathy, 7-11: exploration, 11-14: social action. There should be no tragedies before the 4<sup>th</sup> grade. In 5<sup>th</sup> or 6<sup>th</sup> grade local problems should be the focus.

“If we want children to flourish, to become truly empowered, let us allow them to

love the earth before we ask them to save it. Perhaps this is what Thoreau had in mind when he said, ‘the more slowly trees grow at first, the sounder they are at the core, and I think the same is true of human beings.’”

***Wilson, R. A. 1996. Starting Early: Environmental Education During the Early Childhood Years. ERIC Digest March 1996 pp.3-4.***

EE should begin in the early childhood years, so that children develop a sense respect and caring for the environment.

Americans spend more than 95% of their time indoors (Cohen, 1984).

Children growing up in urban areas tend to develop unfounded fears and feelings of disgust for natural objects (Bixler et al, 1994).

Guidelines, on-going EE, based on sense of wonder and joy, begin with simple experiences, provide frequent positive experiences outdoors (daily), focus on experiencing versus teaching, demonstrate personal interest in and enjoyment of the natural world.

“I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to know as to feel.” (Rachel Carson, 1956).  
The author ends with the need for mentorship for young children.

***Chawla, L. 1998. Significant life experiences revisited: A review of research on sources of environmental sensitivity. Journal of Environmental Education 29(3): 11-21.***

Study is review of research on significant life experiences of environmental educators and environmental professionals.

Other studies: Sia 1984 created an environmental sensitivity scale

Environmental sensitivity is a basic appreciation and concern for the environment, but not enough intensity to alter behavior (which would be an environmental ethic).

By itself, teaching or membership in an organization does not equal “informed and responsible activism” (Tanner, 1980). Tanner used open-ended surveys. 78% of environmental activists in Tanner’s study mentioned interaction with natural areas (p13).

Palmer 1995 expanded on Tanner- showed 91% of NEEA of the UK were influenced by the outdoors (of those 42% said childhood outdoors) and 59% said education. “The childhood experience in the outdoors is the single most important factor in developing personal concern for the environment.” (p29)

Chawla argues that her results do not necessarily support Palmer.

Between 1970 (Tanner) and 1980 (Palmer)- respondents began citing negative

experience in generating environmental concern (e.g. deforestation).

Younger cohorts (predominantly female)- were more influenced by secondary education and negative books (e.g. Carson's Silent Spring).

Older cohorts (predominantly male)- were more influenced by the outdoors and members of an organization and their work.

Peters-Grant (1986)- 88% said childhood natural areas were key for environmental sensitivity.

James (1993)- interviewed 50 minority EE educators- Outdoor exposure was important for 64%, job opportunities were important for 54%, mentors were important for 42%, community concern for 34%, and specific issues for 30%.

Sword used Peterson's (1982) questions to interview 17 EE educators from El Salvador. 88% cited outdoor experience, 41% environmental destruction, and 35% education.

Chawla (1995)- regardless of environmental field, same reasons are given for environmental commitment. Youth say natural areas and family, university students say education and friends, and adults say organizations and vocation. None of the above studies rule out that apathetic public may think differently.

Myers (1997)- interviewed college students. Both environmental and non-environmental majors cited similar sources of interest in the environment. Environmental majors cited more wilderness or family role models. Minority students differed little from non-minority- except that they were less likely to report positive childhood experiences. He found that positive childhood experience or feelings toward environmental destruction do not predict commitment to an environmental career. All students in the sample reported moderate to strong environmental concern.

Sivek (1989)- Environmental sensitivity is among the top three predictors of responsible behavior in members of Trout Unlimited, Duck unlimited, and the Wisconsin Trapper's Assoc. Outdoor experiences in groups of 1-5 are important (Scholl-Wilder, 1983).

Future research- Need to replicate Peterson's and Tanner's work, what are the antecedents of action, not just affect, more consistency in categories of analysis, must account for respondents with multiple significant events, and few studies are comparative. Sia 1984 presented a good method for differentiating passive organization members from active ones, Palmer's checklist was another.

#### **Evaluation of EE Resources/Programs**

*North American Association for Environmental Education (NAAEE). 1996.  
Environmental education materials: Guidelines for excellence.  
NAAEE, Troy, OH*

Objectives: foster clear awareness, provide opportunities to acquire knowledge,

values, attitudes, commitment, and skill, create new patterns of behavior

EE is good education and learner-centered. EE fosters skills and habits that people can use throughout their lives. EE builds the capacity of learners to work individually and cooperatively.

#### Fairness & Accuracy

Factual accuracy: sources referenced, language appropriate for education, information from primary sources, range of experts have reviewed the material

Attention to different scales

#### Emphasis on Skills Building

Critical and creative thinking

Applying skills to issues

Action skills

#### Action Orientation

Sense of personal stake and responsibility

Self-efficacy

#### Instructional Soundness

Learner-centered instruction

Different ways of learning

Connection to learners' everyday lives

Expanded learning environment

Balanced presentation: proponents of differing viewpoints, opinions identified, credible, areas of consensus  
Openness to inquiry  
Reflection of diversity

#### Depth

Awareness

Focus on Concepts

Concepts in Context

Interdisciplinary

Goals and objectives

Appropriateness for specific learning settings

Assessment

#### Usability

Clarity and logic

Easy to use

Long lived

Adaptable

Accompanied by instruction and support

Make substantiated claims

Fit with national, state, or local requirements

***Zint, M. and A. Crook. 1998. A needs assessment of fisheries education materials for youth. Fisheries 23(10): 24-34.***

Did an assessment of 51 k-12 fisheries education materials. Coverage of biodiversity and some concepts associated with building sustainable fisheries and promoting stewardship appear especially limited. Concepts under pollution and fishing received good coverage.

Of 47 biodiversity materials reviewed by the WWF in 1998, only 8 were aquatic/marine-oriented materials and none were focused on fisheries.

“There is little discussion of the value or need for fisheries management by watershed.”

Materials jump from a what's wrong to what you can do without explaining why you

should care.

“Generally, there is a lack of multicultural materials that provide a range of cultural perspectives on fish, fishing, and fisheries management”

Only three k-3 materials met the criteria and those were not complete. Most fall within the 4-8 grade range and only 26% or 13 were for 7-12 grades.

In terms of content 90% of the materials can boost awareness and understanding, 84% can promote positive attitudes, but only 67% describe opportunities for action. This may be because few are designed for high school students. 82% target formal educators and 37% target nonformal settings. Few materials recommend the use of local experts and mentors. Only a few resources encourage using the Internet or other cooperative learning techniques.

Recommendations: 1) results should be widely disseminated, 2) Guide should be updated every 3-4 yrs, 3) most materials are current but not leading-edge, 4) new materials should be developed to fill gaps, 5) Need to support existing fisheries education materials and efforts, 6) not enough partnerships.

#### **Evaluation of EE Resources/Programs (Cont.)**

*Leeming, F. C., Dwyer, W. O., Porter, B. E. and M. K. Cobern. 1993. Outcome research in environmental education: A critical review. Journal of Environmental Education 24(4): 8-21.*

Review of 34 environmental education studies published since 1974 that attempted to demonstrate changes in relevant knowledge, attitudes, or behaviors. Study evaluates both in-class and out-of-class programs.

#### **CALSSROOM INTERVENTIONS:**

Bryant and Hungerford (1979)- kindergarteners are capable of forming concepts concerning environmental issues and citizenship responsibility.

Fennessaey et al (1974)- gave EE to 3,4, and 8<sup>th</sup> graders- no significant difference in knowledge or attitude- no control, so no determination on effectiveness

Jaus (1984)- short and long-term impact on 3<sup>rd</sup> grade- no pretest was given and different amounts of EE given to control and treatment- after 5 days of 2-hr lessons, treatment increased 30% in attitude and control increased less than 2%.

Share (1975) exposed 5<sup>th</sup> graders for 2yrs- rated behavior during visit to a nature center. The treatment group acted significantly more responsibly than the control.

Jaus (1982)- Treated 5<sup>th</sup> graders to 40 minutes of EE for 15 consecutive days. Attitude increased by 22% over the control. When the control group was given EE, their attitude increased to almost the same level as the treatment.

Aird and Tomera (1977)- treated 6<sup>th</sup> graders for 2 weeks on water conservation.

Treatment group increased over the control and their own pretest scores.

\* Armstrong and Impara (1991)- model for experimental method

Birch and Schwaad (1983)- Treated 7<sup>th</sup> graders with water conservation EE. There were significant differences in both knowledge and attitude. No follow-up was done.

Ramsey and Hungerford (1989)- Treated four classes of 7<sup>th</sup> graders for 18 weeks in issues investigation and action training while the control received the standard science education. There were no significant differences at the pretest. Afterward, significant differences were seen for environment behavior, self-perceived knowledge of and skill using action skills. The groups did not differ among measures of environmental sensitivity.

Hungerford and Tamra (1981)- Treated 3 8<sup>th</sup> grade classes- 1 trained in EE awareness, 1 in action, and 1 control. 1 in action scored higher in action behavior than awareness group. 2 months later, a letter was sent to parents regarding children's awareness and actions. The parents response was similar to the children's and the kids with action training continued the behavior.

Hungerford and Volk (1974)- Followed up with this group three years later. The trained students were still involved in more environmentally responsible behavior than their counterparts. However, the original behavior had eroded over time.

Howell and Wombrod (1974)- Treated high school students- saw no affect on attitude from using an environmental protection manual.

Hounshell and Liggett (1976) and Jaus (1978)- studied teachers as well

Horsley (1977)- Attitudes were not changed by intervention, but there was an increase in reported environmental behavior. There was still a need to demonstrate lasting affects and change in actual behavior.

In conclusion, there are no comparisons of intervention types or intervention across age groups.

#### OUT-OF-CLASS INTERVENTIONS

Howie (1974)- outdoor experience is good, but for knowledge, must be accompanied with classroom materials

Wendling and Wuensch (1985)- tested 5<sup>th</sup> graders. When hands-on, students learned more and students with a field trip learned more. The control class had decreased knowledge. They reanalyzed with race. Whites had more positive increase than non-whites, but the hands-on increased learning in non-whites more than whites. Combining hands-on with lecture eliminated racial differences.

Kostka (1976)- tested 6<sup>th</sup> graders- There was little change in deeper motivation and involvement after a trip to a natural area. Some held new appreciations.

Conclusion- no information on children below 5<sup>th</sup> grade- only Horsley (1977) included a direct measure of behavior. The size of the treatment groups were generally small with few clear positive results. No studies addressed EE strategies to get kids to encourage others (e.g. parents). The lower grades are neglected. Only 5 of 34 studies measured changes in environmentally relevant behavior.

**Simmons, D. A. 1991. *Are we meeting the goal of responsible environmental behavior? An examination of nature and environmental education center goals. Journal of Environmental Education 22(3): 16-21 (here: 311-318).***

Knowledge, problem-solving skills and psychological factors lead to environmentally responsible behavior. Simmons evaluation is based on 100 National Science for Youth Foundation attendees and 1,225 nature and EE centers throughout the US.

Goals were:

76% nature study

74.4% environmentally sound behavior

71.5% local natural history

Only 6.7% mentioned environmental activism as their primary goal

Centers were trying to avoid controversy by not discussing local environmental issue information. Centers are endorsing a model that links nature study simply with environmental behavior. Only 15% of the centers endorsed the full set of goals.

Further research: how do centers define environmental activism?

**Simmons, B. 1998. *Epilogue or some further thoughts on: "Are we meeting the goal of responsible environmental behavior? In Hungerford et al. (Eds.), Essential readings in environmental education, Stipes Publishing, Champaign, IL, p. 319.***

“All too often the basic substance of EE is doled out to learners in a series of unconnected activities or experiences.”

“While some curriculum materials address the examination of environmental issues, few provide an opportunity to develop the skills necessary to define issues, analyze their underpinnings, and evaluate action strategies... We need to start thinking about how comprehensive programs can be built using all of the resources available to the school... If the various providers of EE experiences and materials do not work collaboratively to construct a well conceived, sequential program, we will be left with a series of unrelated, piecemeal events in a child's life. These disjointed learning experiences cannot be expected to result in the development of an environmentally literate citizen.”

**Volk, T. L. and W. McBeth. 1998. *Environmental literacy in the United States. In Hungerford et al. (Eds.), Essential readings in environmental education, Stipes Publishing, Champaign, IL, pp. 75-88.***

Affective dimensions of environmental literacy are at a moderate level, ecological and socio-political knowledge are low, and both environmental issue knowledge and environmentally responsible behavior tend to be low.

Less than half of the studies reviewed measured environmentally responsible behavior, ecological knowledge, or socio-political knowledge. Most related to affect and environmental issues knowledge. Only 53% reported a measure of validity and 40% reported a reliability estimate. Kentucky, New York, Ohio, and Virginia represent 43% of the sample. See page 78/79 for summary of reviewed studies. 58% of the studies focused solely on attitudes and knowledge.

29 studies measured affective dimension: 48% reported positive changes, 38% reported no change, 14% reported mixed or questionable results

13 studies measured environmental issues knowledge: 85% reported positive impacts and 15% reported no change

9 studies measured responsible behavior: 78% (7) reported positive change, 11% no change, and 11% questionable results

8 studies measured ecological knowledge: 87.5% (7) reported positive change, 12.5% reported no change

6 studies measured socio-political knowledge: 100% reported positive change

5 studies measured cognitive skills: 100% reported positive change

Programs are most successful when they include socio-political knowledge and cognitive skills.

Some of the success may come from sustained exposure to programs. Residential camps and environmental studies courses showed positive impacts. The least affective methods seem to be workshops and supplemental instruction in the classroom.

“Instruction must be logically developed and meaningfully sequenced, and it must be focused on multiple components of environmental literacy.”

Recommendations: We know little on actual status of environmental literacy in US, there are sampling concerns, there are not definitive measures of literacy variables.

### **Developing and Disseminating EE Resources/Programs**

*Volk, T. L. 1993. Integration and curriculum design. In Wilke (Ed.), Environmental education teacher resource handbook, Corwin Press, pp. 45-76 (here: 125-144).*

Volk organizes basic information for curriculum design including, critical elements, planning, organizing a curriculum development team, identifying goals, developing scope, sequence, and organization.

The author sets guidelines for evaluating the existing curriculum, inventorying and evaluating available resources, preparing the curriculum, providing EE in-service, developing plans for implementation, and a comprehensive evaluation program.

Appendices include goal sheets for an EE curriculum inventory.

Critical education components: teach environmentally significant ecological concepts and their interrelations, provide opportunities to achieve some level of sensitivity, provide a curriculum that will provide in-depth knowledge of issues, provide curriculum to teach skills of issue analysis and investigation with time for application, provide curriculum to teach citizenship skills, and provide setting that will increase expectancy for reinforcement for acting in responsible ways.

Learners respond to role models of environmental sensitivity.

Differing beliefs and values are what drive issues.

***Mayer, V. J. and R. W. Fortner. 1987. Relative effectiveness of four modes of dissemination of curriculum materials. Journal of Environmental Education 19(1): 25-30.***

Evaluation of four dissemination models developed for Middle Schools in the Great Lakes region. Short, intensive workshops were more effective than longer workshops for teachers. It resulted in higher rate of usage and higher introduction to other schools. Simply giving materials to users resulted in no usage. Motives for longer and shorter workshops may differ (e.g. training credits and pay vs. interest).

***Brody, M. 1995. Development of a curriculum framework for water education for educators, scientists, and resource managers. Journal of Environmental Education 26(4): 18-29.***

Used Delphi survey of 268 people in natural resources research and management education. Result was 80-item curriculum framework.

Some teachers do not feel they have adequate knowledge on water. Water education knowledge is distinct from other education programs: it is interdisciplinary and integrated, there are regional differences on what educators and resource agency people consider important, and the most distinct differences occur in the Southwest.

### **Schoolyard Habitats**

***Environmental Education and Training Partnership (EETAP). 1998. Exploring environmental education in the schoolyard habitat. NAAEE, 2 pp.***

“Research has shown that children who do not play in natural habitats are unaware of and possibly do not care about plants and animals that live around them.”

This article provides web-based information and literature on schoolyard habitats.

**Rivkin, M. 1997. *The schoolyard habitat movement: What it is and why children need it. Early Childhood Education Journal 25(1): 61-64.***

Children don't walk to school or play in vacant lots. They spend much more time driving to school. Vacant lots are often no longer safe places to explore (pollution, crime, other hazards).

With the demise of the subsistence economy, children spend much less time at home. Hours spent in transportation reduces time in the outdoors.

Preschools have a tradition of having plants and animals and the outdoors for children- this is less constant when in a public school setting or daycare setting. NWF, Evergreen Foundation, and Project WILD have links and information for schoolyard habitat.

Dirt and sand must be for digging as well as planting- there must be features for a variety of developmental stages. Early childhood teachers need to affirm children's need for private spaces or hideaways. There is always the enduring value of waterplay.

**Mezo, M. 1998. *Creating schoolyard habitats. Wild Garden (Summer): 29-31.***

Plant trees mentioned in history books and in literature. In Oregon, the pond's recirculating stream is powered by a photovoltaic solar panel. The Rowe Middle School's habitat is the work of 400 students,

#### **Implementing EE – Formal and Non-formal settings**

**Ham, S. and D. R. Sewing. 1987-88. *Barriers to environmental education. Journal of Environmental Education 19(2): 17-24.***

Interviews with elementary teachers. Barriers included lack of time (most important), lack of instructional materials and lack of funding. Other barriers included exclusive focus on science and cognitive aspects of EE. Teachers had misgivings about teaching EE.

There are conceptual barriers (lack of consensus re the scope and content of EE), logistical barriers (perceived lack of time, funding, and resources), education barriers (teachers' misgivings about their own competence to teach EE), attitudinal barriers (elementary teachers have neutral or negative attitude toward science and teach very little).

Teachers were asked to define EE. Teachers stressed knowledge and awareness of environment (42.7%), wise use (34.8%), interdependence (33.7%), and problem solving (9% or 8 times). 62.6% felt science was appropriate place to teach EE, 36.3% said social studies, and 29.7% said throughout the curriculum.

This was shocking to the authors given that 2/3 of the respondents had more than 10 years of teaching experience. One half reported attending one or more EE workshops,

but only 8.8% actually taught EE throughout the curriculum).

Logistical barriers-	Lack of time in school day	3.1
	Lack of prep time	4.0
	Lack of EE materials	4.8
	Lack of funding	6.0

59.3% said field trips were the major EE cost, and 46.3% said materials.

Education barriers-	Logistics more important	
	Lack of EE knowledge	6.5

The lack of knowledge may be linked to the misperception that teaching EE requires a science background.

Rank order of importance of non-traditional subject areas:

1. Self-conceptualization
2. Safety
5. Music
6. Art
7. Environmental Education
8. Computer
9. Sex
12. Career
15. Bilingual

The number one barrier seemed to be time. The authors recommend: integrating EE into other areas besides science, establish school district newsletters to share EE resources between teachers and schools, each district have an EE library of instructional materials for each grade level, goal of EE workshops to break down known barriers (target more than science teachers, stress methods and content, use class and schoolyard as sites, integrate cognitive and affective elements, and be motivational.

Replication of this study is needed for junior and senior high.

**Samuel, H. 1993. *Impediments to implementing environmental education. Journal of Environmental Education 25(1): 26-29.***

Used case study of environmental immersion high school in rural Canada.

Impediments: conceptual problems regarding EE, poorly defined school philosophy and goals, difference in coordination between individual efforts and departments, and hiatus between teacher and administrative perceptions.

For the concepts- awareness is apparent, but knowledge is scarce (awareness comes from media, but not knowledge). Training may not have been perceived as a necessity.

In developing a school philosophy, teachers want to participate in setting goals.

For coordination, there is no forum for teachers to discuss interdepartmental initiatives. Implementation requires awareness of how to manage change.

Planning ahead and teacher participation are imperative in implementing EE.

**Smith-Sebasto, N. J. and T. L. Smith. 1997. *Environmental education in Illinois and Wisconsin: A tale of two states. Journal of Environmental Education 28(4): 26-36.***

92% of EE respondents had not received preservice training (those who did all found it effective)

67% had fewer than 3 inservice EE courses (84% of those who did said it was effective)

81% had no inservice EE training

28% said they were infusing EE into the classroom

62% said their reason for not infusing was “not enough resources/funding”

59% said not enough prep time

44% said not enough knowledge

40% said not enough class time

87% disagreed that EE concepts were not appropriate for their grade level

71% disagreed that they were not interested in EE

90% agreed that it’s important to integrate EE into their subject

90% agreed teachers should help students develop values and feelings for the environment

89% reported spending less than 2hours/week on the environment

80% responded that they use problem solving/critical thinking, cooperative learning, observation, lecture, and audio-visual

87% placed value on action learning, but only 72% reported using it

98% of respondents (48) believed their teaching contributed to more environmentally literate citizens

#### **Implementing EE – Formal and Non-formal settings**

**Sussman, A. 1999. *A primer on education reform. EEducator (Spring): 14-16.***

The goals of EE and the Educate America Act are similar.

Teachers are not given the basic tools and learning opportunities generally associated with professional occupations.

Tests do now show what students know: standards-based assessment and alternative assessment

Reforming school structure: magnet schools, vouchers, etc. EE can be especially appropriate for magnet schools.

**Simmons, B. 1999. *Environmental education in the standards-based curriculum. Clearing: Environmental Education in the Pacific Northwest 104: 20-23.***

The article lists essential underpinnings for EE and guidelines for environmental literacy:

- Questioning and analysis skills
- Knowledge of environmental processes and systems
- Skills for understanding and addressing environmental issues
- Personal and civic responsibility

96% of US parents support teaching EE in the schools (Roper 1997).

***Flanagan, R. 1999. Education and the environment: Partners for change. EEducator (Spr): 4-13.***

The economy is demanding employees with more and flexible skills who can address complex problems.

The article summarizes the goals of the Educate America Act 2000 and offers several model EE projects.

- Hollywood Elementary School, Maryland: project-based EE
- Gove Elementary School, Florida: partnerships and new perspectives meet needs of diverse student body
- Komachin Elementary, Michigan: Starting from Scratch
- Clay County High School, Kentucky: A That's in it Together

Limited preparation and specifically preservice and intraining time for teachers constrains success. 9% of teacher colleges require elementary education teachers to take a practicum in environmental education. 7% require one for high school teachers.

Project WILD, WET, and Learning Tree provide trainings. They are being expanded under EETAP.

The article discusses the changing role of nonformal EE centers in providing resources and training for teachers in the context of education reform.

***Taylor, C. 1999. The ties that bind: Developing school-community partnerships. EEducator (Spr): 60-63.***

Technology expands horizons, but strains personal connections. The authors answer with school-community partnerships. WWF worked with the Chicago Wilderness Project. Blue Cross-Blue Shield provided horticulturists for "Adopt-a-School".

Keys to successful partnership:

- Mutually beneficial
- Involve all parties from the start
- Realistic goals
- Set key responsibilities

Communicate regularly and openly  
Be ready for the unexpected  
Seek involvement from education community  
Draw on the entire community  
Reward community participation

The key is relevance: models include Project Rio in Texas and New Mexico, Long Middle School in Mississippi is building a Center for Earth Studies with support from USDE, NASA, State of MS., and Smithsonian Inst.

Other models include ECO-ACT (Missouri Botanical Garden), “Secrets of Survival” in Tulsa OK, BioSITE at the Children’s Discovery Museum in San Jose.

***Lieberman, G. and L. Hoody. 1998. Closing the achievement gap: Using the environment as an integrating context for learning (excerpts from executive summary). State Education and Environment Roundtable, CA.***

Environment as an integrating context for learning (EIC)

Benefits of EIC: better performance on standardized measures, reduced discipline problems, increased engagement and enthusiasm for learning, greater pride and ownership in accomplishments.

Strategies of EIC: break down boundaries between disciplines, provide hands-on learning experiences, rely on team teaching, adapt to individual students, develop knowledge, understanding, and appreciation for the environment- community and natural surroundings.

Report based on 40 study schools, 400 student interviews, 250 teachers/admin interviews, and comparative surveys of other data. 14 study schools compared EIC students and others. All 14 found improvements in achievement from using EIC (see table 1 and 2 p3).

EIC expands cognitive abilities. 96% developed higher critical thinking skills. 98% increased ability to think creatively, 97% have greater proficiency in solving problems, and 89% have a better application of systems thinking.

EIC expands interpersonal skills: 98% have better ability to work in group settings, 94% have stronger communication skills, 93% act with greater civility toward others.

EIC revitalizes teaching: 95% of teachers had increased enthusiasm and commitment toward teaching, 94% had better working relationships with their students and colleagues, 95% had more opportunity to explore new subject material, 96% had frequent occasions to use innovative instructional strategies.

Guidance of administration to teachers is especially important as teachers develop and test new approaches to EIC.

### **Implementing EE – Formal and Non-formal settings**

**Wade, K. *EE teacher inservice education: The need for new perspectives. Journal of Environmental Education 27(2): 11-17.***

80% of EE inservice provided by Project Learning Tree and Project Wild.

State natural resource agencies provide most of resources for teacher inservice training. EE inservice is not a high priority for State Education Departments. EE inservice facilitators are more knowledgeable in environmental content than classroom pedagogy or the educational priorities of states and school districts.

EE attracts more science educators. Teachers are not treated as professional educators.

Recommendations: promote decentralized, local EE professional development; promote inter-disciplinary nature of EE; build bridges between EE and all sectors of formal education.

***Birman, B. F., Desimone, L., Porter, A. C. and M. S. Garet. 2000. Designing professional development that works. Educational Leadership 57(8): 28-33.***

Much of professional development offered to teachers does not meet challenges of reform movement (Corcoran 1995, Darling-Hammond 1995, Hiebert 1999, Lieberman 1996, Little 1993, Sparks and Loucks-Horsley 1989).

Instructional development must pay attention to: form, duration, participation, content focus, active learning, and coherence.

Activities of the reform type are more effective because they are longer, more content focus, active learning opportunities, and coherence.

Focus on breadth comes at the expense of depth.

Collective participation of many teachers and administrators in development increasing the likelihood of having the content implemented.

Content- avoid general teaching methods and focus on things like increasing understanding of how elementary students solve story problems.

Active learning- opportunities to teach and be observed teaching (time-intensive)

Median number of hours in a training activity for this study was 15 hours. Only 20% of the teachers participate in activities with collective participation. 79% participated in the traditional trainings. Only 5-6% reported active learning participation.

Recommendations: focus on specific content development, provide for active learning, greater duration, and collective participation.

A major challenge is cost. Have to serve fewer teachers or invest more resources.

#### **EE at the State Level**

**Ruskey, A. and R. Wilke. 1994. *Promoting environmental education: An action handbook for strengthening EE in your state and community.* National Association of Conservation Districts, League City, TX, pp. 2-9.**

Model EE programs: Arizona, Florida, and Wisconsin: also Calvert County MD, Custer County SD, Oakland CA, Pike County PA, and Southwestern MN.

33 states had EE guidelines and 44 states had EE curriculum guides (EE Associates, INC 1993)

Most of the 19 EE state laws have a curriculum requirement focus. Every state features several inservice training opportunities. Preservice exists in only Arizona, PA, and WI. 9 states have EE trust funds, 36 states have grass-roots EE associations. To date, there is no nationwide tally on numbers of comprehensive local EE programs.

See Chespax from Calvert County MD and HLELC in Southwestern MN as models for Summit to the Sea. Also see Organizer's Toolbox in Part II.

#### **EE at the National Level**

**National Environmental Education Advisory Council. 1996. *Report assessing environmental education in the United States and the implementation of the National Environmental Education Act of 1990.* Environmental Education Division, U.S. environmental Protection Agency, Washington, DC, pp. 18-23, 32-33.**

National Environmental Education Act of 1990:

Established office of EE within EPA, grant to operate an EETAP, grants to support EE, internships for college students, national EE awards, national advisory council for EE.

Authorized \$65 mil for FY92-96. Only \$42.7 has been appropriated.

**Schmidt, K. F. 1996. *Green education under fire. Science 274(13) 1828-1830.* National Environmental Education Act of 1990. Public Law 101-619, Nov 16, 1990.**

“Children are being fed doomsday visions of the future and biased and incomplete scientific information.”

EE was far less political as “nature study” in the 1920s. Earth Day in 1970 brought in politics.

‘Kids need less petition-writing sessions and more biology and earth sciences.’

(Jonathan Adler, Competitive Enterprise Inst.)

Programs like Al Gore's GLOBE are being used to address these concerns. The NAAEE has issued guidelines.

### **Global/International EE**

**Filho, W. L. 1996. *An overview of current trends in European environmental education. Journal of Environmental Education 28(1): 6.***

The first International Workshop on EE was held in Nevada in 1970. As of this article, the most recent has been the Intergovernmental Conference on EE in England in 1995.

**Tilbury, D. 1994. *The international development of environmental education: A basis for a teacher education model? Environmental Education and Information 13(1): 1-20.***

The 1890s, 1950s, and 1970s have been major periods of concern for the environment in the west. They mark the end of sustained periods of economic expansion.

1968- Swedish delegation to UN first drew attention to the growing crises in the human environment.

1972- Stockholm Conf on Human Env.- Educ and training a "key supporting measure of this action plan" (Rec 19). As a response UNESCO-UNEP formed an International EE Programme (IEEP).

1975- Belgrade Charter- 64 nations participated "to review the trends and emerging issues in EE and formulate guidelines and recommendations for advancing the movement internationally." The Charter was the first International statement to outline objectives, concepts, and guiding principles for EE.

1977- Tbilisi- First International Conference on EE- developed out of the UNESCO Connect newsletter. The agenda included: ID of major environmental problems, role of education in facing environmental problems, current efforts in EE, strategies for development of EE at the national level, regional and international co-operation for development of EE. Tbilisi expanded the role for the IEEP.

1980- World Conservation Strategy- IUCN/UNEP/WWF- Launched in 32 countries to ID environmental problems globally.

1987- Tbilisi Plus Ten (Moscow)-

1988- European Community Resolution- Set EE as a priority to be taught in schools.

1992- Rio Earth Summit- Agenda 21 called for: the reorientation of education toward sustainable development, an increase in public awareness, and the promotion of training.

Other Reports- Limits to Growth (Meadows et al, 1972); Brandt Report (Indep.

Commission on International Development Issues, 1980); Global 2000 Report to the President (Barney, 1982); Brundtland Report (WCED, 1987); Caring for the Earth (IUCN/UNEP/WWF, 1991).

“Virtually no environmental problem addressed in 1972 has yet been solved. Today there is not one single area of this planet, no matter how remote, that is not untouched by pollution. Key issues deliberated at Stockholm- desertification, marine and freshwater pollution, the destruction of habitats and loss of wildlife- have moved from bad to worse. Under-development and crippling poverty (the greatest cause of environmental destruction) have in many cases worsened.” (UNESCO, 1992).

UNESCO defines the nature of EE on page 14.

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

Dec 1997- Conference on the 20<sup>th</sup> anniversary of the Tbilisi Declaration. EE is used in only 2 of the 29 statements of the Thessaloniki Declaration. Knapp says this is evidence that support for EE is decreasing in the international context. In 1994, the World Wildlife Fund found: 86% of teachers in US spend less than 1 hour or less on the environment each week. 82% were unaware of their district having an EE curriculum.

Many of the EE values and positions are driven by teachers, not students.

#### **EE for Urban & Multicultural Audiences**

***Peter, K. 1997-98. Multicultural environmental education. Green Teacher 54 (Win): 14-15.***

EE should be: antiracist (foster and embrace diversity), basic (the beginning point for every lesson), important for all students, pervasive, striving for social justice, a process, and critical pedagogy.

“What have poets and songwriters said about your topic?”- how do the arts encompass facts and personal reality?

You can risk alienating students with no depictions of people like themselves; who receive an unintended message that they do not fit in; or who simply do not understand the culture-specific terms, gestures and sounds you infuse into the lesson.

Cultural norms vary- in some societies, it is OK to litter, in some it is not OK to go without a bath for a day.

Something as simple as a food chain such as grass-cow-you, can alienate vegetarians or hindus who have a different world view.

Avoid gender-biased views- does a girl have the opportunity to identify with a strong, successful predator, can a boy see himself as a cautious prey species?

Educators seem obsessed with Native Americans. The most culturally debasing is that

Native American lifestyles are based on those of the distant past. What is happening now?

**Zachariah, M. 1997-98. *Ten guidelines for dialogues about intercultural issues. Green Teacher 54 (Winter): 16-18.***

If the population of the globe were 1,000: 584 Asians, 124 Africans, 95 Europeans, 84 Latin Americans, 55 former Soviets, 52 N. Americans, 6 Australians and New Zealanders

165 would speak Mandarin, 86 would speak English, 83 Hindi or Urdu, 64 Spanish, 58 Russian, 37 Arabic, and the other 507 would speak over 200 languages and thousands of dialects. There would be 329 Christians, 178 Muslims, 132 Hindus, 60 Buddhists, 45 atheists, 3 Jews and 253 people belonging to all the other numerous religions of the world.

Intercultural guidelines:

Coherent set of values, do not view cultures in faraway places as exotic (avoid ethnocentrism), all cultures are constantly changing, every culture has strengths and weaknesses-explore both, every culture has members who have thoughtful views-consider them, do problems in unfamiliar cultures exist in yours-avoid cultural arrogance- every culture can improve the way it treats its members, do not judge by skin color, human beings can achieve happiness in all cultures, assess both the costs and benefits of technology.

Listen and observe with sensitivity, be patient with yourself and others as you learn and unlearn, these guidelines do not guarantee unanimity of views.

**Taylor, D. E. 1996. *Making multicultural environmental education a reality. Race, Poverty & the Environment VI(2&3): 3-6.***

“Any attempt to teach EE without incorporating the students’ experiences will fail to be interesting or relevant to many of them.”

Other cultures have been excluded- students of color have had to divorce themselves from their surroundings and familiar experiences to learn about the environment.

The definition of environment is still heavily influenced by the transcendentalism and Romanticism of the late 1800s. Environment and environmentalism was defined as the antithesis to urban life, the antidote for what was wrong with civilization. No consideration of race, gender, class, or social justice.

Problems in urban environments must be mentioned and included in the environmental agenda. Wals Beringer and Stapp found that definitions of environment were broader among African American Detroit 8<sup>th</sup>-graders than the traditional conception.

Right now, more students of color are being educated in the environment in informal

or non-institutional settings. Programs exist in community centers, homes, churches, union halls, and environmental justice organizations.

Lessons on wildlife should bear in mind that urbanites are more familiar with mice and raccoons than bobcat. Many students may view wildlife as pests. Educators need to explain why so much time and money is spent on protecting wildlife and so little on homelessness.

**Habib, D. L. 1996. *Youth spirit raising: Urban environmental activists. Race, Poverty & the Environment VI(2&3): 11-13.***

“Many research participants were drawn to environmentalism as they sought community.”

“Young environmental activists can knowledgeably contribute to environmental curriculum development and program design.” Many students, except for those attending an environmental magnet, did not identify school classes as a source of their environmentalism.

There is a desire by students to be challenged and respected by teachers.

Youth can serve as advisors and work on committees in schools and organizations. It validates knowledge and promotes leadership skills among already active youth.

“Socio-ecological literacy grows from education that encourages investigation, reflection, dialogue, and making the connection between social and environmental issues.”

**Williams, E. and J. Agyeman. 1999. *Educating for a more livable urban environment. E-Educator (Spring): 26-30.***

“Education reform efforts encourage such strategies as service learning, project-based learning, and school-to-work programs.” For many urban students, relevance requires developing the knowledge and skills necessary to address immediate problems in the community. For the urban, local community needs come first.

Model: The Council on the Environment of NYC- students design improvement projects.

Model: Volunteer-led Investigations in Neighborhood Ecology (VINE). A program of NAAEE.

Principles for urban EE: Based in the local community, build a sense of community, builds understanding, use the local environment as a setting for learning, life-long process that emphasizes action.

#### **EE for Adults**

***Project Learning Tree. Date unknown. Adult learning. In PLT Facilitator Manual, Washington DC, 1 p.***

Adult education should be: realistic and important, immediately useful, relevant to personal and professional needs, ego-involved, overcome fear of external judgement, individualization, adults need to be the origin of their own learning, avoid perceived attacks, adults will reject prescriptions for their learning, two levels of motivation, motivation is produced by the learner, demonstrate respect, trust, and concern for the learner.

***Project WILD. Date unknown. Understanding the adult learner. In PWILD Facilitator Manual, Bethesda, MD, 1 p.***

Adults approach learning with an extensive past history, adults solve problems with no “correct” answers, they are task-oriented, they are goal-oriented, they learn best when learning interfaces with past experience,.

Learning activities occur when it is time to change behavior in order to maintain an equilibrium or “goodness of fit” between one’s life structure and one’s experience of self.

***Kaplan, S. 2000. Human nature and environmentally responsible behavior. Journal of Social Issues 56(3): 491-508.***

### **Wrap-up**

*Jamason, B., McCrea, E., and T. Spence. 1997. Goals and priorities for the field of environmental education. In NAAEE, Environmental education in the United States --- past, present, and future (Final Working Draft), Troy, OH, pp. 75-78.*

*National Environmental Education Advisory Council. 1996. Report assessing environmental education in the United States and the implementation of the National Environmental Education Act of 1990. Environmental Education Division, U.S. Environmental Protection Agency, Washington, DC, pp. 24-27.*

*Bissell, S., Hilliard, M., Hollums, D. and K. McGlaufflin. 1997. Nine guiding principles: Professional responsibilities of environmental educators. In NAAEE, Environmental education in the United States --- past,*

*present, and future (Final Working Draft), Troy, OH, pp.69-71.*

*Disinger, J. F. 1998. Tensions in environmental education: Yesterday, today and tomorrow. In Hungerford et al. (Eds.), Essential readings in environmental education, Stipes Publishing, Champaign, IL, pp. 1-11.*

### **Books**

*Garling, Tommy and Gary W. Evans. Environment, Cognition, and Action: an Integrated Approach. Oxford University Press, New York. 1991.*

*Kaplan, Stephen and Rachel Kaplan. Cognition and the Environment: Functioning in an Uncertain World. Praeger Publishers, New York. 1982.*

Familiarity is powerful, but something does not have to be experienced first-hand to become familiar. A knowledge summary of what is common across experiences is more important than the details.

“Human beings like settings where predictions are possible but not trivial.”

“Many potential problems were solved by shipping them somewhere else.”

“Environmental change is slow enough that we become habituated.”- but we do not become habituated enough to adapt to environmental change.

Because of reliance on past experience, we cannot just give people information. “It is not that people are disinterested in information, but rather that they may feel they already have the information they need.”

Watt 1974- “Titanic effect”- the idea of running out of resources is unthinkable so we continue onward. People are resistant to facts they don’t know what to do with.

There needs to be a focus on information leading to model building (must be a portable model that one can take in one’s head). As the problem becomes worse, more people become open to new models.

Create distinct units. The units must be connected with itself and pre-existing knowledge.

\* “The information people will be most eager to get is the information that answers their questions.”

Berlyne 1954 & 1966- People remember the answers to their questions.

Three concepts presented at one time is the maximum capacity for people to comprehend. Overloading is coercive. Allowing recipients to control the pace of knowledge transfer can avoid overload.

Bartlett 1932- In successive transfers of information, details drop out, some details are exaggerated creating landmarks, and the story became more coherent, making more sense to the readers.

Call on the material people care about- it is vivid. Information should be concrete so that it can be imagined (Rosch 1978). Abstract information can have little impact (Nisbett 1976). People trust visual presentations (Posner 1978).

*Sinha, Amita. Readings in Environmental Psychology: Landscape Perception. Academic Press, London. 1995.*

Bernaldez- younger children prefer safer environs (prairie) and older children prefer more challenging environs (swamp and woods).

Fishwick- Past experience influence one's sense of place

Herzog- Clarity and freshness matters. Stagnant creeks are not liked. Mountain waterscapes were the most preferred. Spaciousness was also preferred.

Hull- Sense of scenic beauty, to some extent, is learned, but there are core similarities.

Zube- Children 6-8 years old have similar preferences to 9-11 year olds. However, preferences do differ between young children, young adults, and the elderly. Young children are less affected by the presence of human influence than young adults. Young adults prefer complexity. Young children have a strong attachment to water.

*Kaplan, Rachel and Stephen Kaplan. The Experience of Nature: A Psychological Perspective. Cambridge University Press, Cambridge. 1989.*

Ch 1

“Nature is important in itself rather than for some extrinsic reason”

“Human functioning depends on information”- previous experience stores information, and visual information evokes stored information. People strive to evaluate information, sorting the good from the bad.

“The presence of water is highly likely in a made-to-order preferred landscape”

Looking at expert appraisal versus personal preference of non-experts, there is not a large difference in categorization leading to decisions. People's response to a two-dimensional image is similar to their response to the actual setting.

Categorization criteria: function, age, type of architecture, and vegetation.

In Kaplan 1975- the size of open space and tidiness were not factors in landscape preference.

The major categories of landscapes are content and spatial configuration. People

cluster human-influenced scenes together. Roads and cars do not appear as distinct categories. Residential is also not a distinct category- people classified residences more distinctly in relation with the environment of the home.

On the spectrum of spatial definition, people prefer something that is more open with more spatial definition (not wide open or dense forest). This offers more opportunity for acquiring and storing knowledge.

## Ch 2

Landscape preference: nature with spatial definition was the most preferred (e.g. open forest or parkland). In general, landscapes with the clearest human influence ranked lowest (e.g. industry). The Kaplans lay out two categories of human need- understanding (dependent on prior experience) and exploration (also affected by prior experience). Preferences are greater when comprehension is facilitated.

	<b>Understanding</b>	<b>Exploration</b>
<b>Immediate</b>	Coherence	Complexity
<b>Inferred, predicted</b>	Legibility	Mystery

From p 53- elements of landscape preference

Coherence comes from repeated and uniform features, Legibility comes from space that is easy to understand and remember (identifiable and interpretable), Mystery extends from the promise that one could learn more, and Complexity stems from the intricacies and diversity of the environment. Complexity is not a powerful tool in exploring the natural environment according to the Kaplans.

\*The most powerful scenes reflect mystery and mystery is the most consistent predictor of preference (e.g. the desire to explore).

## Ch 3

“Familiarity accounts for differences in preference- familiarity is a product of experience.” Urban, rural, or suburban background is not a clear predictor of preference. The Kaplans do provide a caveat, “An undesirable situation is not made less distasteful by its familiarity.” In addition, the landscape does not have to be available to be appreciated.

Gallagher 1977- renters preferred unmanaged landscapes, and homeowners preferred more manicured scenes. The concern for order in nature is less of a concern at upper socioeconomic levels.

Kaplan 1977- Locals have lower preference for their landscape than tourists in the Upper Michigan Peninsula.

Kaplan 1984- In nature hikers, preference for the landscape did not change as familiarity increased throughout the day. In swamp environments, preference actually decreased.

The role of culture and ethnicity is still unclear. For age, the youngest groups preferred savanna. Fifteen-yr olds had lower preferences for natural landscapes overall. Many students preferred settings suggesting activity. "The vast preference differences between these young teens and the people who are involved in teaching about the environment must be recognized if environmental education is to achieve its goals."

Buhyoff 1979- uninformed groups preferred photos of trees with beetle damage because the different color of trees appeared prettier. The informed group preferred the healthy forest.

Keyes- interpretive signs increased preference for scenes.  
Anderson- environmental professionals had higher preference ratings than the public for natural scenes. However, mystery accounted for only 7% of the preference for the professionals, versus 39% for students and 42% for residents.

Driver and Brown 1978- People are described as seeking more passive and affiliative experiences at the "urban" end of the spectrum. Similar benefits and experiences are sought in both wild and urban nature.

#### Ch 4

R. Kaplan 1974- When asked what would teenage participants improve about yourself after an Outward Bound experience- one half said they should not change anything. The control group wanted to change their physical characteristics. Kaplan also found that "Getting to know" could happen quickly (e.g. overcoming fears and woodsmanship skills).

Swamps were the most confusing feature to students. Weather and bugs were the greatest source of worry. Fear of getting lost decreased the most. Peace and quiet and no hurry were the greatest sources of comfort. "When needed knowledge is missing, its importance can loom large." The intensity of the Outward Bound experience was more important than its duration.

#### Ch 5

Talbot and Kaplan 1986- People could perceive size in urban natural spaces, but there was no difference in preference for the different sizes. Features can enhance the perception of size. "Some residents considered the adjacent open space too large to feel comfortable." There is a preference for more knowable areas. "People need green open places to go to; when they are close they use them. But if the green areas are more than three minutes away, the distance overwhelms the need." "When asked why natural areas are important to them, residents often indicate that they enjoy them or that they appreciate the beauty of nature."

Kaplan 1983- Found that satisfaction with the community was related to gardens. Those who gardened had a higher level of satisfaction with the community. However, is this satisfaction a community satisfaction or individual satisfaction?

Fried 1982 & 1984- “For lower social class positions, the satisfaction with physical setting is even more powerful in explaining life satisfaction than is the case as social status rise.”