

**ENVIRONMENTAL EDUCATION TO SUSTAINABILITY EDUCATION:  
EFFECTIVE AND INCLUSIVE STRATEGIES FOR TEACHING TO ALL  
ELEMENTARY STUDENTS**

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**ABSTRACT**

This critical review of the literature identifies effective strategies for teaching environmental education (EE) to elementary students. Over the years EE has grown in complexity and the range of politics expressed within the term alone tends to confuse its true definition. This does not excuse the classroom teacher from making an informed opinion when choosing options to teach EE. Whether by classroom infusion, a visit to a non-formal EE program, or a residential EE camp (outdoor school), each can be used to effectively communicate the basics of earth systems and the basic understanding of sustainability in a relevant, culturally appropriate, and active way.

Research suggests that infusion, traditional and non-traditional EE programs should be used together inter-disciplinary to support the principles of sustainability. This interdisciplinary teaching of EE concepts is essential. Students must be taught by using a variety of tools, most importantly, involving active learning, empowering learners to self-direct their studies, providing culturally accessible activities, and involving an outward expression of the children's learning.

EE faces some critical problems, first within the political realm, as it has become an issue connected to issues of capitalism, environmentalism, and activism. Realizing that Western civilization has created inherent non-sustainable language and philosophies within our culture is a first step to addressing those underlying problems of industrial society. At the same time the elementary educator is faced with many challenges, whether it be lack of administrative support, lack of funds for fieldwork, or lack of education on teaching EE.

Thus the question of effective elementary EE education is really a question of how we teach as educators are effected by our cultural values and that of what do we need to teach to achieve a sustainable lifestyle on this planet.

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## PREFACE:

“...however those being educated will have to do what the present generation has been unable or unwilling to do: stabilize world population, stabilize then reduce the emission of green house gasses which threaten to change the climate... protect biological diversity; reverse the destruction of forests everywhere, and conserve soils. They must learn how to use energy...with greater efficiency. They must learn how to run civilization on sunlight. They must rebuild economies to eliminate waste and pollution. They must learn how to manage renewable resources for the long term. They must being the work of repair...the damage done to the Earth in the past seven hundred years of industrialization. And the must do all of this while they reduce worsening social, ethnic, and racial inequities. **No generation has faced a more daunting agenda.**

A constituency able and willing to do these things must be educated into existence. That constituency must be smarter, better informed, more creative, and wiser than earlier generations. It must comprehend patterns and systems. It must be farsighted, yet practical. It must be able to tell the difference between ecological sense and nonsense. And it must be politically effective.” (Chiras ed. 1995 (Orr. 1995)

As all humans do, I began my life as a mass of rapidly differentiating cells, each cell constructed by the recycled bits of the entire earth. At birth, I was a small prune-faced infant, over-sensitive, and completely disequibrated in my new environment. For reasons, which I believe, are more complex than my mere genetics or my parent's guiding influence, I developed a deep and abiding relationship with the natural environment. Over the years I lived in many different biomes, from searing desert heat, the high mountain altitudes, and the rugged western coasts, to finally settle in the deep green coastal forests of the Northwest.

Through the encouragement of my mentors in high school, I began teaching my peers about my learned and intuitive knowledge of the San Jacinto Mountains and Coachella desert ecosystems. Later as a freshman in college, I enrolled in an Outdoor School elective course in Portland, Oregon. The experience of the inter-disciplinary approach of outdoor school combined with the experiential activities provided to the students made an indelible mark on my young person. At the time, I had no idea that a person could make a living at singing, science, hiking, and creating active learning experiences for children.

One year later, I began my first full-time internship in the San Bernardino Mountains as an intern Naturalist. I was given Van Matre's book "Earth Education: A New Beginning". It changed all my perspectives about what environmental education should be. Through that year as observed my mentor's model focused and self-aware intentions or observed those without that focused intention, I was able to first define the characteristics of effective environmental education

I want to thank my professors Elizabeth Diffendal, Jan Kido, and Sonja Wiedenhaupt for supporting me in the development of this thesis and supporting me in the MIT program. As well, I would like to thank all my family and friends, especially my Grandmother Luella Schulkey, an outdoors person and artist, my Mother, who let me wander the wilds, and my Father who taught me how to deal with adversity early in life. With that thanks I include my closest friend, Evangeline Rand, who took me home for the

holidays, and finally Sylvan Bonin and Russ McConnell, who have supported me the last seven years in many ways, all of whom I consider as close as family

“The Road goes ever on and on  
Down from the door where it began.  
Now far ahead the Road has gone,  
And I must follow, if I can.  
Pursuing it with eager feet,  
Until it joins some larger way,  
Where many paths and errands meet,  
And whither then? I cannot say.

The Road goes ever on and on  
Over rock and under tree,  
By caves where never sun has shone,  
By streams that never find the sea:  
Over snow by winter sown,  
And through the merry flowers of June,  
Over grass and over stone,  
And under mountains in the moon.

The Road goes ever on and on  
Under cloud and under star,  
Yet feet that wandering have gone  
Turn at last to home afar,  
Eyes that fire and sword have seen

And horror in the halls of stone  
Look at last on meadows green  
And trees and hills they long have  
known.

The Road goes ever on and on  
Out from the door where it began.  
Now far ahead the Road has gone,  
Let others follow it who can!  
Let them a journey new begin,  
But I at last with weary feet  
Will turn towards the lighted inn,  
My evening-rest and sleep to meet.

Still round the corner there may wait  
A new road or a secret gate.  
And though I oft have passed them by,  
A day will come at last when I  
Shall take the hidden paths that run  
West of the Moon, East of the Sun.”  
(Tolkien, 1956)

## I. INTRODUCTION

"Education is a social process ... Education is growth.... Education is, not a preparation for life; education is life itself." (Dewey, 2003)

Just as education is described by Dewey as the purpose of life, the physical environment of the planet Earth is responsible for the existence of human life as we know it today. Moreover, teachers and children are all oxygen-breathing organisms who share the planet's environment with many other species in a delicate balance.

Unlike other organisms on the planet, we use the basic elements of earth, water, air, and fire to create a great complexity of technologies. From the first rustic dwelling to the microcomputer chip, great advances were made to aid in our survival, while diverse cultures developed precisely in relation to their ecosystems. Yet, despite all of our advances, cultural fusions, and displacements, human survival is still intimately intertwined with the ecological balance that only this closed system provides (Suessman, 2000).

As of this year, 2003, the human species has gone from a population of five hundred million (in 1500 CE) to over eight billion. 85% of the greatest growth of happened in the last two hundred years (Goeckler et al., 2001, p.6-7). Because of the amount of consumption that is occurring on this planet due to the rising population, I suggest that environmental education (EE) is an essential experience that should be systematically included in K-12 education,

globally. In the next chapter on the history of environmental education I will further discuss how as early as 1970 specific efforts were made to create an effective system to educate adults and children about how our lifestyle choices as Americans are effecting the whole planet (see Figure I) and to encourage the practices of sustainable living.

The lands of the United States and its natural resources are being privatized while humans use harsh chemicals in all aspects of daily life and production. By our successful domination of the natural environment the increase of human population and human consumption of more and more land for settlement (See fig. II) the quality of human life has not increased universally despite the rise of industrialism and technology (Goeckler et al, 2001).

My main motivation in preparing this critical review of the literature is to survey what is currently understood about infusing Environmental Education (EE) experiences to the elementary school classroom and exploring the path toward sustainability education. Because I believe that EE can be taught in any environment to any type of child, I wish to support this through providing strategies to provide outdoor experiences in all types of environments, to provide sources to help evaluate existing curriculum that is respectful to multiple cultures, and to provide experiences that are constructed to be relevant to my future students.

The United States is a leader in the world in many ways. We make up less than 5% of the world population but as consumers the United States:

- Uses 25% of the world's oil
- Uses 27% of the world's aluminum
- Drives 1/3 of the world's cars,
- Uses 1/3 of the world's paper,
- Creates 2/3 of the world's toxic waste. (Goeckler et al. 2001)

**Figure I**

There are many controversial issues within a field with such a wide range of political, economic, and social implications. Among these issues are the private agendas of public and corporate businesses (Balter, 1993) and a lack of understanding of a humans "place" in the web of planetary life (Van Matre, 1990). However, some recent advocates suggest that with better-informed educators EE can move ahead to teaching sustainability, community ethics, and creating a unified goal.

“I think most of the leaders of our field are headed in the right direction, especially at the national level. Most understand that responsible environmental behavior is the ultimate goal of our field. They may place varying emphasis on how we work with students, teachers, and the public to achieve the goal; however, most have this goal in mind. The challenge is getting practitioners to follow the leaders. In the realm of K-12 education, successfully addressing this challenge is complicated by several factors. These include the lack of pre-service teacher education in EE, lack of state and local support for EE, and the infusion approach (echoed by Van Matre) championed by most environmental educators.” (Hungerford, 2002)

In response to this emotionally charged atmosphere, EE is undergoing a change of terms in some regard or is undergoing what some believe as an evolution.

“Sustainability is sustainable economic growth, balanced with nature or an ecosystems ability to meet human needs of the present without compromising the ability of future generations to their own needs” (Bonnet, 1999, p.314).

If you refer the different types of EE (known generally as environmental education) in figure II, there is a difference in the goals of each type; each merits a need for additional supplementation of information in the classroom and even in formal programs.

The lack of standardized language in EE, as a movement and as a field of education has diffused the overall effectiveness of the idea. Thus, many educators are turning from environmental education to sustainability education. Others argue that a change of terms will only confuse these issues and that the language of EE in itself represents the non-sustainable Western traditions (Bowers, 2001). C.A. Bowers, a professor at Portland State University and educational theorist of note, argues that western philosophies, our understanding of time, and daily practices of living are inherently unsustainable, thus inherently sabotage our attempts at teaching the base values of EE. Yet, these terms and their focus will define the next hundred years and will

#### **State of U.S. Environment as of 2001**

1. More than half of all wetlands, 95% of all ancient forests, and 99 percent of native prairies has disappeared.
  2. More than 500 plant, animal, and other species <are> extinct, and more than 1,400 are listed as endangered or threatened.
  3. One out of every five citizens drinks water polluted with bacteria or toxic chemicals.
  4. More than 60,000 people die <each year> from heart and lung diseases caused by air pollution.
  5. More than 32 million Americans live in poverty, including one of every six American children.
- (Goeckler et al, 2001) Figure II

effect how generations of children perceive their social and environmental responsibilities.

Moreover, there is a great controversy over where environmental education should be infused in the curricula of public schools at all. S. Van Matre (2003) and H. Hungerford (2002) believe that the most effective EE experience happens when the student is removed from their home environment and placed in "nature" or a wilderness area and is superior to school infusion of EE program materials. In this case, infusion is defined as the inclusion of environmental education interdisciplinary into every aspect of the curriculum (Van Matre, 1990, p. 13-14). Currently EE, as it is more commonly practiced in public schools, is infused into specific traditional curriculum compartments such as Science (Fleer, 2001). Van Matre states "Supplemental and Infusion = Superficial and Ineffective. (p.13)." Yet, the separate and program based environmental/outdoor education experiences that Van Matre recommends are not universally available to all economic sectors of the United States.

Among public school educators and administrators infusion is a popular and cost-effective choice. Infusions of EE and sustainable practices occur in entire schools and have been adapted by states, often as a mandatory requirement. While recognizing that EE provided in a distant program center is extremely valuable and has certain benefits, such as the disequilibration of a child in a radically different environment others argue that EE must also be made available to introduce these valuable concepts as related to economic and political issues in the classroom (Simmons, D, 1998).

These two approaches to EE are both effective, even more so when practiced in tandem (Battersby, 1999). However, effective infusion methods are still needed inside elementary schools, especially for those schools that cannot afford to participate in professional programs. Since schools in Washington State, for example, require infusion, time must be spent creating and assessing

1) **Outdoor Education** (O.E.) is taken very literally. It can range from summer camp style activities (hiking, canoeing, backpacking, archery) to pioneer survival activities (fire making, Dutch oven cooking, tracking) to "science" activities (looking at things under a microscope, dissection, lectures, and dead things in jars) (Van Matre, 1990, p. 52).

2) **Environmental Education** (E.E.) "...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 the environment" (Hungerford, et al., 1980, p.44).

3) **Earth Education** (Ea.E.) was developed nearly side by side with, E.E., yet because it's narrow guidelines, requirement of outdoor space, and student centeredness, it is greatly overlooked. Ea.E. focuses on creating adventuresome, magical learning experiences, building complete educational programs with integrated components for senses and focuses on the "big picture" of ecological processes. (Van Matre, 1990,p.269-270)

4) **Sustainability Education:** Sustainability is sustainable economic growth, balanced with nature or an ecosystems ability to meet human needs of the present without compromising the ability of future generations to their own needs (Bonnet, 1999, p.314).

**(Figure II)**



program materials for best practice and effectiveness in K-12 classrooms.

Additionally, there are politically charged arguments between those who see EE as an anti-American effort to brainwash children, "scare them to death", and to promote a politically liberal agenda and those who believe EE is essential for human survival (Knickerbocker, 1997). This fear of political controversy has led many teachers to avoid conflict by ignoring EE mandates, to randomly use EE materials, and to actively avoid inquiries about environmental concerns brought up in the classroom. To this effect, children are left to interpret the human effects on the environment through their parent's opinions and what they absorb through media sources.

The overall problem of fear is that it silences what could be viable learning experiences. For example, the fear of lawsuits can prevent teachers from exploring outdoor activities with their children or even planning a class camp out. Fear of conflict can prevent a teacher from having students research the effects of logging in their hometown and how it affects the economy. Fear of being labeled a troublemaker or an activist can stop an educator from trying to start a recycling program at their school. Fear of losing their job can keep an urban teacher from teaching students about environmental justice issues in the classroom (Simmons, 1998).

In a capitalist economic system supported by consumerism, the resulting culture and related politics obscure the true need to examine EE materials for bias. With the rise of EE's popularity in the 1990's, corporations such as Shell Oil and Weyerhaeuser (timber) wanted to assure their consumers that they too, care about the environment. In this case, there is a definite disparity between the ideas of sustainability when compared to the idea of the stewardship of natural resources, also known as the commodification of natural resources (Bowers, 2003). In the case of many international corporations, it is used to distract public attention from their status as major polluters by philanthropically involving their corporations in unrelated ecological projects, through grant funding. Do they use these acts of environmental protection for damage control public relations and for corporate self-preservation (Balter, 1993)?

Additionally this popular trend in corporate sponsorships of environmental sustainability allowed companies to create well-funded interpretive EE materials that support their current usage of natural resources. Because these materials are produced by profit-making enterprises and by private public relations/advertising firms, environmental educators such as Van Matre (1990) have pronounced them biased toward corporate interests.

Just as corporations and other politicians promoted environmental education in the 1990s, dissenting voices noted biases in EE curricula toward Green or Environmentalist agenda (Van Matre, 1990; Balter, 1993). Environmentalist EE materials were accused of equal bias; of exaggerating the consequences of the unregulated use of limited natural resources, scaring children about said inflated consequences, and enforcing negative stereotypes of corporate and government institutions (Stables, 2001).

To add further confusion, there is a profusion of EE programs and lesson plans available as well as outdoor camps, educational camps, scouting activities, and science based activities, which are labeled as environmental education. It is difficult for an untrained educator to approach these materials and assess their efficacy or evaluate them for bias.

To this effect, Van Matre provides a touchstone in his book, *Earth Education*.

While he does market a series of EE curriculum that have been tried and tested since 1971, he also encourages educators to plan their own curriculum, completely exclusive from pre-made materials. However, this task requires creativity and motivation that some teachers do not yet possess due to a variety of different issues, such as lack of training, motivation, funding, or organizational support (Bookout, Moseley, & Reinke, 2002). Most professional national and international EE organizations such as UNESCO or NAAEE have developed specific guidelines for content in EE program materials featured in the Appendices. Most state EE professional organizations have made similar guidelines in an attempt to regulate the content being taught such as the draft EE Essential Academic Learning Requirements (EALR) guidelines here in Washington State.

Finally, as demonstrated in the *Washington State EE Assessment Draft* (2003), 23% of schools were not aware of the state mandated EE requirement. Undoubtedly this is related to the above issues (Summers, 2000). There is a lack of training for teachers in effective EE infusion (Alvarez et al, 2002; Bookout et al, 2002; Bord and Hicks, 2001). Finally, teacher's preconceived notions may limit their perception of their ability to teach EE in the classroom, nonetheless make the jump to teaching outside the classroom (Simmons, 1998).

Additionally, the traditional compartmentalized curriculum of the public school adds an additional barrier to integrating or infusing EE into the curriculum. Traditionally trained teachers are noted to find it particularly difficult to make these perceptual jumps after years of experienced practice of traditional public school teaching (Fleer, 2001). As well, educators have a difficult time making the perceptual jumps to create programs that incorporate the elements of effective EE (Simmons, 1998).

A child in the United States has 50% more of an impact on the environment, than a child born in an average developing country (1998). This further proves that American children especially need to spend time learning about earth science and environmental education. EE essentially is an effort to have children fully understand the sustainable systems of the Earth. The second element, which is the most controversial, is to relate American cultural values with the current environmental consequences of human development. The solutions to these problematic consequences are in the hands of today's adults and in their children, who will someday be tomorrow's adults. The focus of this critical review of the literature is on identifying strategies for effectively integrating EE and sustainability education into elementary school curriculum. Specifically:

- How can an elementary school teacher bring assets of a traditional sustainability & environmental education experiences into their classroom?
- What types of criteria should educators apply when preparing outdoor experiences on school grounds?
- How have elementary schools successfully integrated authentic EE activities in their curriculum?

As I observed in my readings there are numerous controversies about EE and how it should be taught. These range from mandatory district policies (Plevyak et al. 2001), to fear of controversy (Braus & Wood, 1994. p. 74), to apathetic disinterest (Mc Wayne & Ellis, 2003). Due to these and because current EE requirements vary from state to state, many researchers still believe that understanding how to teach effective environmental education and understanding how to evaluate that curriculum is essential.

This is because the definition of environmental education is easily transmuted to serve the needs of the administrator, teachers, or environmentalist. Even then, because of the nature of western thought and the general philosophy of the common American citizen, the words we use and the approaches we take are inspired by our cultural and personal definition of environmental education (Bowers, 2002). Thus, these controversies exist mainly due to these differing definitions of environmental education. These obscure the true need for a universal definition that might require a universal change not only within the foundations of our language, but a universal change within the post-modern western culture of non-sustainable living.

As demonstrated in the first section of this chapter, the human relationship with the planet is not commonly understood by adults or children of the world, nonetheless the United States (EETAP, 1998). The simple understanding that we are contained in a closed system is tremendously valuable to understand why we need to take a path towards sustainability, especially in the United States. It is important first, that I define the concepts/theories I will use as a filter and why these concepts are relevant to determine if curricula will effectively teach children EE in it is a relevant form:

- **Earth Systems Education** (Suessman, 2000) or **Earth Education** (Van Matre, 1990): The idea of earth education or earth systems education is teaching how the earth functions as a contained system. This foundational knowledge is essential before issues of sustainability are ever approached. If the children can understand the basic physical systems of the planet earth, such as how all energy on the planet comes from the sun and how air, water, earth, and fire come to be, they will later understand why earth systems will effect their lives, and further their education in the Sciences, as well as economics and geography.
- **Focus on Sustainability:** Sustainability education represents the ability for long-term life cycles and natural relationships to continue functioning due to the a conscious action of peoples changing values systems to promote non-commoditization of earths natural resources through community consciousness (Bowers, 1995). Alternatively, it can represent the understanding that every action we humans take in this closed system needs to be done with the closed system in mind. A sustainable farm for example would not use chemicals that can pollute the air, human waste reclaimed and recycled, and animal husbandry practiced so that grazing and farming would maintain rather than detract from fertility (Bijur & Wheeler, 2000).
- **Kinesthetic Emphasis:** Educational theorist, Howard Gardner defined what is now called the Kinesthetic or Bodily Intelligence and later defined an additional intelligence, the Naturalist Intelligence. Traditionally EE residential programs use activities in the outdoors to its benefit. Active games are played to symbolize concepts, children are encouraged to make scientific hypotheses while actively interacting with the natural environment, and there is a great sense of disequilibrium which opens a learner's mind to new information in the process of physical activity (Brooks & Brooks, 1993). EE works best with kinesthetic activities because it represents real contact and a new awareness of natural systems. From the western point of view, we live in a natural world of things that are useful to man. Through metaphorical activities earth systems concepts are transformed into a natural world that is interrelated in a great-connected web. This

is the key skill of the Naturalist Intelligence. EE should take place in an active environment because it needs the metaphorical example of the systems that our daily lives depend on (Gardner, 2000).

- **Issues of Environmental Justice & Multi-Cultural Sensitivity:**

“...the burden borne by low- income and racial minority communities is a special concern. A low-income community which is surrounded by multiple sources of air pollution, waste treatment facilities and landfills, and which has lead-based paint in the residences is clearly a community that faces higher than average potential environmental risks. A racial or cultural group whose children commonly have harmful levels of lead in their blood is also living with a greater environmental risk. In addition, because of factors affecting health status, such communities may be more likely than the general population to experience disease or death due to a given level of exposure. Poor nutrition, smoking, inadequate health care and stress can all contribute to an increased rate of health effects at a given pollutant level. Hence, to the extent these communities are subject to these factors. They are also more likely to actually experience harm due to these exposures.” (EPA, 1992)

“Within the United States, an understanding of Environmental Justice is arising. Many people do not think it is a coincidence that people of color and low-income people are forced to live in the most polluted areas of this country both urban and rural. Issues of environmental education are particularly urgent in the areas where children's health is affected. Children need to be aware of the racial and economic factors playing into what one EE activity calls the "NIMBY" scenario, literally "Not in My Back Yard.” (Cardenas, 1999)

Related to this are racial justice issues as the cultures of indigenous peoples of the world are often explored in EE materials and sometimes misrepresented. It is important to represent these cultures in an accurate and respectful manner. This may reflect the majority EE materials represent the work of educators that are mainly European American (Bowers, 1995; James & Lewis, 1995). Thus, these materials may need to be re-tooled so that children of other cultures can relate to them. It is even more important to discuss with children people of color who care about and represent EE. This is vital to the development of children of color's sense of self (Running Grass, 1995). It is important that we recognized other ways of knowledge exchange from non-western cultures to further this multicultural emphasis verse the regular western formats of educational expression (Bowers, 2003).

The rationale in undertaking this review is to help elementary educators understand how to look at their EE activities in a critical way and be able to use these criteria to create a relevant experience that links to the active interaction with the outdoors (Robertson & Krugly-Smolska, 1997). EE must link to teaching the related hierarchal relationships of earth science as this is an important element to construct a foundational macro-knowledge of before teaching the accessory micro-knowledge that traditional science curriculums tend to focus on (Brooks & Brooks, 1993). Teaching basic earth science provides a foundational understanding that supports the theories of physical, of environmental, and of the biological sciences.

As stated above, the educational community needs to explore the concepts of earth systems education, active learning (also known as experiential education), and multi-cultural issues as it is proven they can lead to relevant and successful environmental education experience. Within my analysis of the literature, there are certain strategies which are repeated that will help an educator develop a program that meets the developmental needs of students, develop community support, approach the subject matter in the most effective way, and overall reflect the developmental changes that have occurred in EE over the last twenty years.

This critical review of the literature will survey the effective practice of EE in public elementary school classrooms, explore four successful EE integration projects, and examine the elements of successful EE programming. This analysis will provide examples of four different elementary school programs that have answered the question of how to teach children about earth systems and environmental science in a relevant and meaningful way. These examples include anti-biased curriculum, involve active learning, and address multi-cultural issues, because these are necessary to create curriculum that is relevant and authentic. Finally, I will explore a selection of criteria for creating effective EE learning experiences to be used by the elementary educator in the classroom and school environment to empower, to inspire students, and to enhance their communities.

I am a naturalist and educator who has witnessed the positive effects of Environmental Education on thousands of urban and suburban children of all races. Thus involving environmental education (EE) techniques into the elementary school classroom is something I have intimate knowledge of. I believe it is a valuable tool to be able to effectively infuse EE and enhance a students understanding of sustainability and earth systems. With this in mind, I hope to help others understand the differing experiences and attitudes about elementary EE infusion.

Second, I would like to encourage educators and students by informing about successful elementary EE programs in various economic and cultural environments. I believe that professional EE program centers need to work in tandem with infused school curriculum so that our students can construct a holistic awareness of the planet's interconnected systems as well as how we can create a sustainable lifestyle in the United States (Bonnet, 1999; Van Matre, 1991; Gough, 2002; Hudson, 2001; Hammond & Collins, 1993; Shallcross, 2002). This is an effort to help others understand that true concern and personal effort can create a relevant and empowering EE experience for children (Hungerford & Volk, 2003, p.4).

Third, I would like to offer a selection of current guidelines for use in critically analyzing EE program planning materials to determine their quality and effectiveness in the classroom as well as to assess teacher generated materials. There are excessive amounts of different lesson plan curricula and EE activities available, thus it is important to have criteria available to evaluate and not assume the message of sustainability and environmental education manifests in learning by itself.

In this review, chapter two will provides an historical background for understanding the contemporary roots of environmental education. Chapter three provides a critical review of the literature related to the effective practice of environmental education. Finally, Chapter four ties together what I have derived as the elements of effective environmental education that is slowly transforming into the

practice of sustainability education.

“This we know... the earth does not belong to man, man belongs to earth. All things are connected, like blood which connects one family. Whatever befalls the earth befalls the children of the earth. Man did not weave the web of life - he is merely a strand in it. Whatever he does to the web, he does to himself.” (Chief Seattle, 1854)

## II. HISTORICAL BACKGROUND

To understand environmental education and all its accompanying concepts it is important to keep its' historical foundations in mind. For early humans environmental education happened through the very practice of living within an unpredictable ecosystem. A human's very survival depended upon how well they could utilize the resources of their ecosystem to provide food and shelter. At the time with the small size of human population pre-900 A.D. it was easy to move on to a new area when a resource had been depleted and humans moved seasonally due to this abundance of land (Davies, 1996).

Today, as mentioned in the introduction, our worlds' growing populations, privatization of natural resources, and strict national borders have hampered our ability to move on to unpopulated areas. Additionally, the environmental resources that we require are no longer in abundance. Educators and teachers need to understand that EE did not begin in 1990, nor was it the brainchild of Al Gore or Ralph Nader. It has been only within the last twenty years that responsibility for EE has become an integral part of elementary education.

“Clay Schoenfeld claims first usage of the term Environmental Education in 1966 (Cough, 1993:11). Schoenfeld also founded the Journal of Environmental Education in 1969. Environmental education, in certain countries, has now been on the curriculum map of schools for over three decades. However, the inculcation of environmental knowledge and the (intended or unintended) shaping of attitudes towards the environment as part of education, has always been taking place.” (Wolhunter, 2003).

However, to review EE programming I am considering the various media vehicles from which EE slowly developed from over the last century. Historically in the United States, media influences environmental choices as well as is generated by public interest about the environment. Our American media also represents our background in the western habits of non-sustainable living. Thus, I cite certain instances of media that reflect this history. Included with media analysis is what can be reviewed as the progenitor of youth specific environmental education curriculum and activities.

The history of the practice of EE as a formal discipline goes back to the birth of the 18th century naturalists, such as James Audubon. Howard Gardener recently defined the “Naturalist” as one of the multiple human intelligences. It refers to the ability to categorize and recognize patterns in our world. St. Hildegard Von Bingen, Carl Von Linnaeus, Sir Francis Culpepper, and St. Francis of Assisi are all examples of those early Naturalists of the western tradition (Gardner 2002). Even today, it is common in residential EE facilities and summer camps hear an educator called a Naturalist. The word itself is defined as:

- “a. An expert in or student of natural science; a natural philosopher, a scientist..
- b. (In early use only contextual, now specific.) An expert in or student of natural history; a person who has a special interest in or makes a special study of plants or animals; (in later use) esp. an amateur concerned more with observation than with experiment.
- 2.a. A person who studies natural, as opposed to supernatural or spiritual, things; a person who believes that only natural laws and forces operate in the world; an

adherent of or believer in philosophical naturalism.

b. Ethics. A person whose system of morality or religion is derived only from human reason and has no basis in revelation.

4. A person whose behavior follows his or her natural instincts.

6. A creative artist who aims at close representation of nature or reality; an adherent of artistic naturalism.” (Oxford English Dictionary, 2003)

In western society environmental education as a formal scientific practice, such as in biology, ornithology, or botany, was exclusive to the world of higher education. Naturalist education and herbalist education was more likely a skill learned from a relative or a practitioner of these arts. In indigenous societies of all cultures, this type of environmental education was shared through active experience and apprenticeship (Davies, 1996).

At the same time, educators must note that in general in students in the United States do not hear about the people of color who donated their knowledge to environmental work and those affected by environmental changes over the last 200 years of American history. However, the contributions of indigenous people to the current knowledge of our native environments were responsible for the survival of the colonial immigrants. For example, (Spring, 2001) the American story of Thanksgiving reflects how the native peoples of Northeastern America saved the lives of the starving Pilgrims through sharing their knowledge of their home ecosystem.

For the Europeans, Asians, and Africans who traveled to North America now available were completely new worlds of organisms to classify and be utilized in the service of mankind. Once again, this knowledge of taxonomy in the formal academic sense belonged only to those privileged enough to attend college. Yet, in this time of opportunity, many common people traveled the North American continent and began recording the natural history of the lands and making it accessible in print format to the western world. Currently taxonomy and formal scientific exercises is a mainstay in a selection of EE exercises designed for elementary children. However, as the scientists of the past had little problem categorizing different organisms, this alone did not allow for the parts of nature to be understood as a whole interconnected system (Van Matre, 1990).

In the 1900's, books and printed literature were the main forms of information available. Certain authors seemed to use the idea of the wild, natural world as a romantic counter to the rapid domesticating changes occurring due to the Industrial Revolution and settlement of the Americas.

"Herman Melville's epic novel *Moby Dick* (1851) and Henry David Thoreau's *Walden, or Life in the Woods* (1854) emphasized, respectively, the power and the tranquility of nature. A second generation of writers, perhaps sobered by the final settlement of the American West, wrote without fictional guise. John Burroughs published...experiential nature essays. John Muir, the Scottish prophet of the rugged outdoors, set down his observations in a series of books, beginning with *The Mountains of California* in 1894" (From Ecology to Environmentalism, 2003)



A self-taught naturalist himself, German immigrant John Muir became one of the most recognized conservationists of our time, helping convince the U.S. government to create the first National Parks and implement conservation policy. For the average immigrant the Farmer's Almanac's and farming guides further educated the common man of the cycles and systems of the environment that affected a farmer's livelihood. However even the most prosperous of American businessmen sometimes had no more than a fourth grade education. Thus, the oral language and the reading materials of the day came were second only to real life experience. This quasi-environmental education through popular media was the first step to a perception of nature as the "other"(or often of inexhaustible bounty), instead of a linked series of ecosystems that support life through a balance of interdependence.

For people raised in family farm economy, such realities were a constant and predictable result of a dependence on their ecosystems for basic subsistence. Yet, conservation did not become an issue until the first environmental consequences of the Industrial Revolution manifested themselves (Pepper, 1984). For example, during this time in Europe, environmental pollution had become part of the lifestyle of most urban dwellers. The river Thames, for example, was described as an oily flume of death, excrement, and stench. In the summer time, the combined fumes from the river and the smoke from the cooking stoves caused multiple deaths from smothering. Overall, it prevented anyone from the leaving their homes for the safety of their health.

"Some Victorian schemes had severe environmental impacts. The widespread introduction of the water closet with sewers discharging straight into the Thames turned the river into one vast open stinking sewer. The once thriving fishing industry died. Thousands of Londoners also died too of cholera as their water supply was now polluted. A particularly dry summer made the Thames unbearable - fumes from the river made work in the Houses of Parliament impossible and MP's at last decided action must be taken." (About the River Thames, 2003)

The story of the river Thames is a good example of the fact that world had relevant environmental conservation issues occurring at any period of history. It was the lack of environmental concern that precipitated the continuation of "no-consequences" or "consequences are worth the profit" ethic in world business today. An effective environmental educator allows children to explore the relationship between sustainability, conservation, and business interests, while keeping in mind the past impacts of economic practices on the environment and future implications.

The industrial revolution carried on unchecked, bringing with it an unregulated amount of new chemicals, gadgets, and patents, which came with intent to create capital and convenience for mankind. During this time period, because of the final settling of the United States "from sea to shinning sea" there was once again a resurgence of nostalgia for the naturalistic pursuits (Pepper, 1984, p.84-85). This is evident in the graphic art at the turn of the century; art nouveau emphasized organic aspects of natural symmetry. At the turn of the century, I cite the possibility the first identifiable EE materials came from scouting manuals, such as those of Boy Scouts, Girl Scouts, and Campfire's Indian Scouts.

Outdoor education organizations such as the Boy Scouts, Girl Scouts, Campfire, and even Hitler Youth, were organized to build good character through spending healthy time in nature. The idea of camping became a hobby instead of a necessity and icons such as the sportsman-hunter and a mythological romanticized version of the Native American were created (Pepper, 1984; Jean, 2003). Boy Scouts, Girl Scouts, and Campfire Girls all had an emphasis on Indian lore, skills, and even today use pseudo-native ceremonies in their processes (which is under criticism by some Native Americans and Educators alike). Most specifically, Campfire had a strict set of rituals, rewards, and activities that centered on the various skills of the noble Indian as described by a western European point of view (Sloan, 2003; Jean, 2003).

The founding of these outdoor focused organizations and their scouting handbooks encouraged activities in the natural environment, whether by creating shelters or doing science experiments (see Appendix for sample). These activities and the reward-based system of badges created a framework for future traditional EE represent some of the elements of effective EE. Among these effective elements featured are activity and inquiry-based learning, creating an outward expression of what a child has learned, community recognition of that experience, and some type of physical symbol of their achievement. At the same time, the scouting movement represented the first outdoor schools in the form of the summer camp.

Many of the sensory experiences of traditional EE derive from summer camp experiences, such as campfire, singing, skits, and communal dining. However, in best practice these activities have become infused with educational meaning and used as teaching tools for children. These elements of outward expression and activity serve as unique elements that make traditional EE in best practice such an effective method of information transmission. I believe these elements can be utilized in classroom to the same effect with the luxury of a nine-month timeline to create and empower students through active learning about earth's sustainable systems.

“At the end of World War II, communities boomed in size. In...the United States, the first housing contracts and prefabricated homes were built to keep up with the demand in these growing communities. This era marked the development of the American lifestyle which featured excess in usage of natural resources through product designs that were sturdy and used the ample amounts of energy created by the modern power plants technologies. Modern science was emphasized over naturalism.” (Pepper, 1984)

With the advent of television in the 1950s, nostalgia produced two types of media, the historical frontier themed “Cowboys and Indians” and the nature adventure theme. The main stereotype of Native Americans that still clings today is based on this image. The real irony is that during this era this media supported the practices of summer camps and scouting organizations who continued to use romanticized Indian themes to create ceremony in their programming, rewards systems, and in their storytelling (Clarke, 2003; Jean 2003). The nature adventure theme was used by Disney to create anthropomorphic animal adventures and provided visions of kindly loggers, hunters, and their small children who saved them from themselves. At this point, unless a child lived in a rural area, this was one of the few sources of environmental education. This and the active

involvement of teachers who taught naturalism and life science to their students (Clarke, 2003).

“By themselves, they’re arguably innocent frivolity. Alongside the more ‘serious’ nature, work they reinforce Disney’s extension of human standards across species lines...Millions of people saw these films. First released to theaters, many were later edited and serialized for broadcast on Disney’s long-running television show. Some were made available to schools, which undermined any non-instructional intent on the part of the filmmakers. Children were shown these movies as parts of a nature curriculum and usually accepted them as factual.” (2003)

In the late 1940’s through the 1960’s with the rise of the comfortable automobiles and the cheap price of gas, many families went out and experienced the many National Parks and Monuments of the United States. At this time the National Parks were still learning about their role in resource management so at that time you could for example attend a “bear-feeding” in Yellowstone National Park, where the bears were fed garbage while people watched from stadium seating. There were no “leave-no-trace” plans in effect, growth in park visitation happened so rapidly that some national parks were littered with garbage and human waste (NPS Orientation Video, 1998). Yet, between the 1940’s throughout the 1960’s very few things changed in the American awareness of the environment.

“The definition of wilderness as an immense natural storehouse, subject to human management, changed after the Second World War. Life on the battlefield, as well as the home front, curbed the country’s appetite for colossal federal projects. Moreover, the almost immediate demobilization of the armed forces in 1945 and 1946 resulted in an unprecedented national birthrate. Cheap home loans for veterans pushed suburban settlement far beyond the city skylines. As the middle class found itself living on the edges of open lands, political questions surfaced about the preservation of the landscape just over the back fence. The concept of **ecology**--which valued aesthetics and biology over efficiency and commerce--began to penetrate the public mind...The growth of the cities also made plain the evils of pollution. Media stories covered radioactive fallout and its effect on the food chain, dangerous impurities in urban water supplies, and the deterioration of city air. The subtle metaphor of a “web of life,” in which all creatures depended upon one another for their mutual perpetuation, gained common currency. Hence, the powerful reaction to Rachel Carson’s 1962 classic *Silent Spring*, a quietly shocking tale about the widespread pesticide poisoning of man and nature. Her book elicited a public outcry for direct government action to protect the wild; not for its future exploitation, but for its own innate value...Carson unwittingly launched the modern idea of environmentalism...Sensing the electoral advantage from such advocacy, Presidents Kennedy and Johnson added the environment to their speeches and legislative programs.” (From Ecology to Environmentalism, 2003)

As the above demonstrates, Rachel Carson’s study on the effects of DDT and

other chemicals on the ecosystem set off a wave of new research. Humans had spent the last seventy-five years learning to use and make chemicals. Many people had made an exceptional amount of money on the trade and many people were employed in their creation. With the rise of popular social consciousness and the large number of “baby-boomer” youth attending education institutions, *Silent Spring* recognized the glaring defects in the dominant industrial/economic order (Report Assessing Environmental Education, 1996).

“Love of the wilderness and fear of the "side-effect" of technological civilization have been called the Right and Left Hands of Environmentalism. Until those hands were joined, environmentalism was undefined and rarely potent. The hands came together in the 1960's, as did the consciousness-raising perspectives of so many other concerns.” (Swords, 2003)

Surprisingly, President Richard Nixon created the catalyst for the development of the first outdoor schools and the education of adults and youth about environmental education. During the Nixon presidency, the first usage of this term by the federal government occurred. However, while these legislative acts did not go as far to restrict usage of natural resources, demand clean energy research, or even go as far as to encourage fuel economy, they did lead to the founding of the Environmental Protection Agency.

“Signing the Act <EE Act of 1970>with fanfare on New Year's Day 1970, Nixon observed that he had "become further convinced that the 1970s absolutely must be the years when America pays its debt to the past by reclaiming the purity of its air, its waters, and our living environment. It is," he said, "literally now or never." (From Ecology to Environmentalism, 2003)

Already the Department of Forestry was managed by the Department of Agriculture and the National Parks system by the Bureau of Land Management, thus the Environmental Protection Agency (EPA) would have to stand alone and defend it's agenda as influenced by the president and the needs of the federal government to satisfy the people of the United States. The creation of the EPA was long overdue. Still Nixon continued the unprecedented attack on environmental pollution.

“Pressing the initiative in his State of the Union Address three weeks later, the President proclaimed the new decade a period of environmental transformation. Nixon also ordered a clean-up of federal facilities which had fouled air and water, sought legislation to end the dumping of wastes into the Great Lakes, proposed a tax on lead additives in gasoline, forwarded to Congress a plan to tighten safeguards on the sea borne transportation of oil, and approved a National Contingency Plan for the treatment of petroleum spills.” (From Ecology to Environmentalism, 2003)

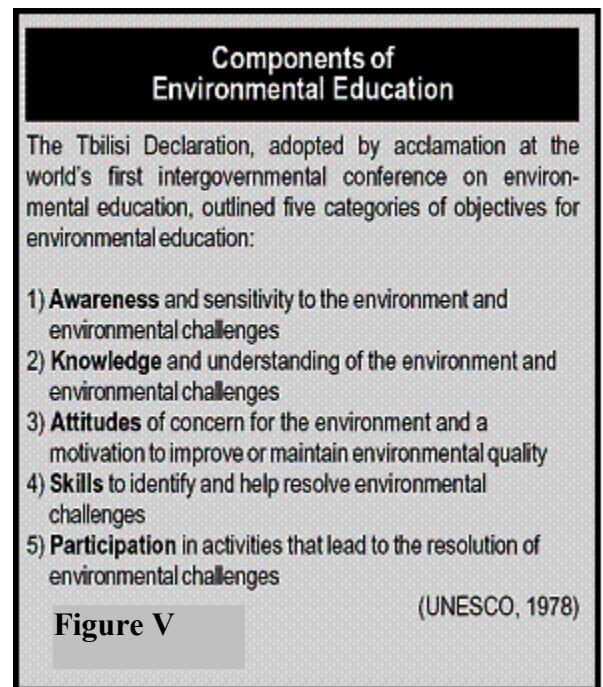
Internationally the most influential change in environmental education in the 1970's occurred in 1975 in Belgrade, Yugoslavia, which gave birth to the Tbilisi Declaration (Figure V).

“The most commonly accepted definition worldwide was developed in 1975 at a United Nations Educational, Scientific, and Cultural Organization (UNESCO) meeting...this definition and its guiding principles were accepted by the twelve federal agencies that participated in a 1993 interagency review of federal environmental education programs. A report of this interagency group states that “environmental education should increase public awareness and knowledge about environmental issues as well as provide the public with the skills necessary to make informed decisions and the motivation to take responsible actions (FCCSET, 1993).” (Report Assessing Environmental Education, 1996)

The first Earth Day in happened in April of 1970 and during this decade the regular practice of elementary outdoor education was born. By 1980, environmental education was described as the “development of implicit and explicit interconnections with science, technology, and the issues and problems of society” (Report Assessing Environmental Education, 1996). The EPA and celebration of Earth Day became directly intertwined over the 1980’s with the EPA funding celebration and supporting the first Outdoor Education programs across the United States (EPA, 2003).

“Definitional issues are inherent in a field this broad and encompassing. It is generally agreed that environmental education is a process that creates awareness and understanding of the relationship between humans and their many environments-natural, man-made, education is concerned with knowledge, values, and attitudes, and has as its aim responsible environmental behavior. (Report Assessing Environmental, 1996).”

The 1980’s represent a period where outdoor education transformed into the generally used term Environmental Education. Whether or not an actual transformation occurred in the programming focus is still an issue today. During this time in states such as Michigan, Pennsylvania, Connecticut, California, and Oregon, many Outdoor School programs were founded and were only available to a limited section of the United States population. During this foundational development the first Outdoor Education program materials were created. Van Matre wrote two books, Acclimatization (1972) and Acclimatizing (1974), both contained the foundational activities and basic principles later used for programs such as Project Wild and Project Wet (Van Matre, 1990). From these differing educational programs, a section of the United States youth graduated with a varied sense of urgency toward environmental issues. These students went on teach others throughout the 1990’s (EPA, 2003). Earth Day 1990 and the issuing of the Environmental Education Act of 1990 by President Clinton revitalized the EE field with a



new well-funded prosperity. Environmentally responsible behavior reached into popular culture throughout the West Coast.

“This Earth Day affirms a fundamental need a hope, perhaps even a growing demand that the activities of people can produce real bounty for our society without harming public health, without jeopardizing the productivity of the natural systems on inspiration nature provides. Earth Day this year comes with a special promise to Americans because - thanks to President Bush and the U.S. Congress - we are on the threshold of a new, long-overdue Clean Air Act, complete with the first-ever program from international to domestic. High among these new priorities is the need to reduce the excessive amount of pollution we generate in this country - to promote recycling, use less toxins in commerce, in our households, and in our places of work. Preventing regulations but actually producing far less pollution is the impetus for the next wave of environmental action. Pollution prevention is fast becoming the yardstick by which future progress on the environment will be measured. (Reilly/EPA, 1990).”

Another key publication of Van Matre was published in 1990, *Earth Education: A New Beginning*. Often overlooked because of its strongly critical voice, *Earth Education* was not entirely helpful to many educators because it criticized the “at least we are doing something” paradigm and contrasted it with stringent guidelines for effective practice of EE, while boldly suggesting that earth education was the next evolution of the field. Van Matre was the first to raise controversy about the general practice and process of EE and to suggest that there were more effective ways to approach teaching. His two most important insights were that first, educators tend to focus on individual parts of science without linking the concepts and activities to a theme or purpose and do not provide a foundational knowledge of earth systems and secondly, that a program must be purposefully constructed and contain specific focusing elements to be truly effective.

The 1990’s symbolized an unprecedented demand for change in certain regions of the United States. Recycling efforts became a part of many areas regular waste disposal service. Organic vegetables, fruits, and foods began to be produced on a large scale due to demand. The consumers wanted their meat and vegetables w/o hormones or pesticides. Even the United States Government went green through the “Greening of the Government” Act. It mandated clean vehicles, business practices, and resource conservation as a mandatory change to all offices around the world. The change was unprecedented (EPA, 2003).

For ten years outdoor education and environmental education were well funded through a variety of sources including the United States Government. EE became one of the main missions of the Peace Corps in their international work (Braus & Wood, 1994). Accordingly EE schools now exists in states such as Georgia, New York, Minnesota, Iowa, Illinois, Oklahoma, and Alaska, among many others. For ten years, through varied methods of effective EE practice, hundreds and thousands of children have attended these programs in the middle grades. I worked with over twenty-seven hundred children from the Los Angeles and Orange County areas and with over sixteen hundred children from Santa Cruz County during my career as an EE educator. Strangely to this date, there are no longitudinal studies to the effect of these ten years of EE. Such a study could answer the question if EE has made a cultural or ethical impact, or is it overshadowed by the

persuasive voice of the western consumer ethic that is so ingrained in our language, culture, and basic practices of living?

Is there a future for environmental education in its current practice? For the new century, some international EE theorists are replacing the term environmental education with sustainability education. In some way, this may be in response to the growing controversies over EE. Some think that this movement can be saved from controversy simply through a change of name and a change of defining terms. Yet for the coming century sustainability education is a further evolution and may strip away the dysfunctional elements of EE, which will be discussed in following chapter's analysis (Shallcross, 2002).

Above all EE is now an established field and the creation of programmatic material has gone beyond professional to commercial over the last thirty years. The EE outdoor schools and program centers represent an industry well grounded in many elementary school traditions and regional economies. Yet, EE professionals are looking for a change. How that change will happen depends upon the development of successful assessment and understanding the best way to actually reach children and help make life choices which support a sustainable lifestyle (Gough, 2003; Bijur & Wheeler, 2000; Hudson, 2001). We also must look at the adults responsible for these educative processes and hope to make a change in the process of teaching EE curricula in its best practice.

### **III. REVIEW OF THE LITERATURE**

As a strategy to help the reader visualize effective practice in action, I begin by demonstrating elements that theorists and researchers found to be effective strategies through exploring four successful EE programs. Many programs teach sustainable living ethics, others use urban environments to teach, and some reflect whole school efforts to universally integrate EE. These vignettes describe school programs that took the steps to infuse EE in its best practice into all aspects of their school operations as well as their educational work.

Overall, each of these award-winning programs shares an ideal support and focus. These schools have partnerships with outside agencies that supplement their staffing needs. With focus, these lead educators and administrators foster interest in the topics taught. All in all these examples represent how adults modeling the best practice in EE can change children's and their attendant adult's lives.

#### **1. Unified Effort in an Urban Environment**

“EEAW ANNUAL AWARDS 2003

For Outstanding Formal educators in a multicultural/economically challenged setting Whitman Elementary School's Environmental Education Team:

In the 1998-99 school year, Tacoma School District recognized Whitman Elementary School as an environmental magnet school for approximately 350 K-5 students. The administrators, teachers, students and parents who are supported through the work of Whitman's Environmental Education Team and the beneficial relationships between them, model the healthy diversity of a natural

ecosystem.

In spite of the fact that funding assigned to ‘model schools’ originally available through the district is no longer available, the school continues to recognize itself as an environmental magnet, which means that students who are interested in the environment may choose to attend. As the environmental education team works to implement these projects, they coordinate the efforts of teachers, staff, students, administration, volunteers, the PTA, Lincoln High School’s Horticulture Program, The Square Foot Nutrition Program sponsored by WSU Cooperative Extension, and Washington Forest Protection Association and Outdoors by design. The positive and diverse environment which these teachers create to celebrate learning inside the building is exemplary and in sharp contrast to the largely gravel and concrete schoolyard in this urban neighborhood.

The positive impact of the EE team and its on-going projects is represented in the students’ enthusiasm for learning and teacher’s enjoyment of teaching. In a community where trees that have been planted near the school and benches have been frequently stolen, the EE team’s efforts reinforce their long-term vision and determination to improve the learning environment for students at the school, inside and out.

The walls of the school are decorated with students’ artwork reflective of their curiosity about the natural world around them. Teachers are being valued for their effort to secure funds from the community to fund the unfounded “environmental magnet” promise the school district has made to those students who choose Whitman for that reason. The EE team is creating community and remaining consistent in their efforts as the school building is changing all around them and portables are added to receive students shifted from another local school to their building. They are also having a positive impact on the future integration of science kits and ensuring that students will have a place to apply the knowledge and skills they gain to the environment right outside their door.” (EEAW 2003)

## **2. A School Garden for Change and Student Empowerment**

“The seasons are all changing,

All because of us.

Don't you think it's time?

That we all made a fuss?”

So rap the children from St Paulinus C of E Primary School in Crayford, Kent, who last week received the Millennium Marque from the Tidy Britain Group for their environmental work - the only school to be so honoured. The school is blessed with a little wooded area, and until about seven years ago, this was just used as a short cut to get to the playing field. A group of parents cleared away the rubbish from this overgrown and neglected corner of the grounds and marked out a proper pathway. That was the beginning of a sustainability project that has gone from strength to strength. On entering the school there is a wall covered with certificates - from Bexley in Bloom through to the prestigious Eco-Schools Award, evidence of the school's commitment towards green issues.

The grounds are not huge, but with the well-planned layout they give the impression that a small child could wander for hours round ponds and through



wooded secret gardens, or just sit and watch the birds and butterflies... aspect of the school is reviewed by the pupils for its environmental impact in order to identify targets for action and improvement.

A plan is then drawn up involving the children, educators, parents and local community, which is constantly monitored and evaluated. Different groups have responsibility for particular tasks: in the bird garden, where feeders of every shape and size are hung, the children in year six are responsible for watering the flowers, but the reception class fills the birdbath. This year reception has planted a hazel walk and bower, which, by the time they leave the school, will have grown into another established feature of the grounds.

Projects are designed with this aim in mind, and the children have a sense of shared ownership in the school. Many still visit after they have left, wanting not just to check on how their own work has matured, but to see what the new kids have been up to. They also often initiate sustainability projects in their secondary schools.

Environmental issues are integrated into the national curriculum, touching every subject. A regular science class feature is pond dipping - taking a jar of pond water and examining it and learning about the contents. The butterfly garden is planted and cared for by the children. On the wall are the descriptions and models of the different butterflies so that they can be easily identified. The pupils have carried out projects on waste recycling and have a policy of using both sides of the paper; the saving of energy is another high priority, with projects to design posters to remind each other to switch off the lights.

The use, recycling, and waste of water have found their way into math and geography. And the environment is used in all areas of literacy, even if it is just sitting in the garden listening to a story. The grounds are treated as another classroom, to be appreciated all year round not just in the summer. Outside of school hours are the Twitchers club and the Greenfingers club, the latter run by a parent whose children have now left St Paulinus - it isn't just the pupils who find it hard to leave. The school is very open and shares its grounds with the community and particularly with a nearby special needs school. With this in mind, the woodchip paths in the wood are wide enough to accommodate a wheelchair. Again it is the pupils' responsibility to maintain the paths, making sure they are accessible... The Eco-Schools project aims to bring up young people to act responsibly, and acknowledge what is happening in their environment - and in turn to influence their parents and peers. Bexley council wants to encourage positive citizens.

The impact across the whole school has been positive, with academic results giving as much pleasure to the parents as the green fingers give to the pupils... The eco- committee is made up of pupils, teachers, governors and parents, but the children have a major input and it is another way they can express their views and know that their ideas are valued and taken into account... The various projects have resulted in financial savings for the school as the managing of utilities has come under the eco- committee's eagle eye and a policy of environmental

purchasing has been agreed.” (Taylor, 2000)

### **3. A Program-based EE Experience for Urban Kids**

“ROCKY MOUNTAIN NATIONAL PARK - A group of fifth-graders stood on a stream bank Friday morning, mesmerized by the spawning brook trout that hovered on the gravelly bottom. "They're pretty," mused 11-year-old Jane Rothermel as she knelt to watch the fish with crimson bellies and white-tipped fins. "I like being up here." She was among 49 children from Johnson Elementary School, off South Federal Boulevard in south Denver, who visited Rocky Mountain National Park on Friday for an environmental education program.

Though the school children live just a short distance away, only a handful had ever been to the mountains or observed wildlife. "These are inner-city kids," said teacher Cindy Misenar. "They were really excited to come here simply because these guys have never seen a stream with fish in it. I don't think any of them have seen elk or deer outside of a zoo." Many of the kids were engrossed by the brook trout - the focus of one of the day's teaching units. They also learned about pine squirrels, ponderosa pines and the influence of the weather on the sub-alpine ecosystem.

The field trip was part of a program called "Wonders in Nature - Wonders in Neighborhoods," sponsored by the Colorado Division of Wildlife and the Denver Zoo, and designed to help youngsters understand and value the natural world. The national park is one of a number of program host sites; it provides rangers to teach the young visitors about the outdoors. And there was a lot to teach the kids who are more at home on city streets than on mountain trails... "There's no rails or nothing up here?" asked Juan Carrillo, 11, bundled against a brisk fall wind as he walked on a trail around Sprague Lake. To watch the spawning trout, the kids clustered on a bank where the stream flowed into the lake. They were surrounded by mountainsides draped with a quilt of pine and golden aspen and in the distance they saw peaks covered with fresh snow... The ranger invited the students to take the water's temperature - a chilly 42 degrees - and to jot this and other observations in their field journals. At another station, the kids learned about the trees that populate the sub-alpine forest. Ranger Chase Davies gave each student a "tree cookie" - an inch-thick slice from an evergreen trunk - and explained that each ring represents a year of growth. "Every line is how old it is. See all the little lines?" Carlos Tafoya, 12, said excitedly to a nearby friend. In a measuring exercise, Juan Carrillo learned that during his entire 11 years of life, his tree's trunk had grown less than 2 inches in diameter. "Touch, look, listen" Not all of the students seemed to fully grasp the concept Davies tried to teach: that a pine tree struggles mightily to grow in one of Colorado's high forests. But that's OK, she said, "I hope to get them to touch, to look and to listen," Davies said. "The bottom line is, it has to be a positive experience or they may never come back to the mountains. And that would be a crime." Mark De Gregorio, environmental-education specialist at the park, said a significant number of Colorado schoolchildren who visit the park have never spent any real time in the mountains. "As these kids get older, they are more and more removed from nature,"

DeGregorio said. "That's kind of scary." (Coleman, 1998)

#### **4. An Inner City Garden Movement**

"Magdalena Barajas carefully scooped a handful of soft soil from a new planter at Cohasset Street School in Van Nuys. She plopped a basil plant into the hole and gently patted the dirt. Although she knew neither the plant's name nor its use, she enjoyed the opportunity to do some gardening. "I find it fun," said the 10-year-old, as her classmates clamored to do some planting themselves.

Magdalena is learning about plant life through a pilot program called Gardens for Kids L.A., which is creating gardens at 28 elementary schools throughout Los Angeles, including 10 in the San Fernando Valley. In the program initiated by Mayor Richard Riordan, the city is spending \$100,000 to give children a hands-on gardening experience. Spearheaded by the city's Environmental Affairs Department, the program brings together organizations such as the Los Angeles Conservation Corps, which builds the planters; the UC Cooperative Extension's Common Ground Garden Program, which trains volunteer gardeners and helps schools recruit volunteers; and Gardens for Kids, which provides expertise in garden design. . .Cohasset Street School already has some small planters outside classrooms where students track the growth of such plants as snapdragons and needlepoint ivy and such vegetables as peppers and lettuce. Students have done experiments to determine why aphids prefer one plant over another. And they've learned that the food they eat originated in the ground, not the supermarket produce bin. Principal Cherie Spamer said one boy was shocked to see her pick a lettuce leaf and put it in her mouth. "I ate it and he just looked at me," she said. "This is what they need, instead of workbooks," Spamer said as she watched the children dig. "Of all the things they'll do this year, they'll really remember this." When it came time to plant, children huddled around teacher Ellen Swaggerty as if she were selling ice cream. "Most of our kids live in apartments, so this is a new experience for them," said Swaggerty, who doled out a variety of plants, including cucumber, strawberry and zucchini.

Delaine Easton, State Superintendent of Public Instruction, has called for a garden at every California school. Currently, California's public schools have about 1,600 gardens; Los Angeles Unified has about 200 gardens in its 915 Schools. Teachers say gardening helps students learn about math, science and nutrition in a more meaningful way. For example, a math class might pull weeds and then determine the ratio of the top growth to the roots, or a science class might take soil samples to determine its composition. "Without gardening, learning from a textbook doesn't have the same meaning or excitement," Korten said. Tending plants can even motivate students to read, write and communicate, she said, recalling a day when students who spoke several different languages were all working together on the gardening project. "It's a great way of bringing people together," she said."

(Stassel, 2000).

What makes these programs so effective? Within these stories, one can see how the inclusion of program elements can create a synthesis of EE that is both educational

and socially empowering. Through the reading, research, and through reviewing many real examples of EE programs recognized for best practice, I have identified two interconnected sets of these strategies for effective EE practice.

The first strategy is recommended by EE theorists and educators, Howard Hungerford and Trudy Volk. It refers to how a teacher prepares for these EE events. Effective EE does not just happen without careful pre-planning, pre-assessment, and the pre-assembling of a structured foundation. Within this preparation is a commitment to training educators and equipping them with useable tools (Hungerford & Volk, 2003). Pre-packaged curricula do not allow educators to make the most of their talents or address the diversity of needs within the elementary classroom (Bookout, Mosley, & Renike, 2002; Flack & May, 2001; Mc Keown-Ice, 2000; Summers, Kruger, & Childs, 2001). Training is the key to giving educators confidence in EE infusion or even just to teach in a curriculum unit with earth science. A good EE training program will address the elements of effective elementary EE practice and will support the educators in their attempt to share this valuable material.

Second, an educator must develop a support system within their school, their peer community, and the classroom community of parents and students. This may include attaining grant funding and/or fundraising for certain specific activities (Athman & Monroe, 2000). Third, in developing a support system the lesson planning must take into account what is relevant to the students involved. This means not only finding out what are obvious areas of student relevance, such as garbage on the schoolyard, but also the subconscious developmental needs of specific age groups (Hart, 1997).

Finally, an educator must be willing to integrate EE relevant concepts into other aspects of curriculum. Inter-disciplinary curriculum links create a broader understanding of how the world works on many different levels for students. Issues relevant to EE exist within civics, social studies, science, math, and economics. As well, student response on these related topics can be expressed through writing, visual art, dramatic art and even music (Athman & Monroe, 2000).

With the above in mind, I have also identified a series of strategies that reflect the elements of an effective EE program. Overall, effective and inclusive EE is a combination, involving the following concepts within the EE lesson plan. First, as proven in traditional EE programs, using Kinesthetic/Active activities, both inside and outside has a profound effect on children's learning (Simmons, 1998; Basile, 2000). Active practice of EE creates a metaphorical expression of earth systems concepts and provides physical examples of earth system concepts.

As in above, I mentioned that the EE experience must be relevant and address issues that are "on the minds" of students. This means students knowledge must be

**1. Prepare Early:** Teachers need to have a firm foundation in basic earth science concepts to create this type of environment. Training and serious study are both a part of best practice.

**2. Create a Support System:** Good curriculum materials, school and parent support, support from volunteers, and funding.

**3. Make it Relevant:** For young children foundational concepts related to their concerns, for middle level, outward expression of concern and for upper level, an internalization and philosophical discussion with option for relevant expressive activity.

**4. Cross Curriculum Boundaries:** EE is relevant in all aspects of common school subjects from Art to Zoology

actively pre-assessed, not assumed by the educator. This may involve open discussion to stimulate interest in the subject matter, which will provide another essential part of an effective curriculum, the motivation to learn through personal interest (Brooks & Brooks, 1993; Disinger, 2000).

At the same time within the idea of relevance comes the idea of developmental relevance (Hart, 1997). The curricula must reflect the developmental needs of a learner. For example, Hart, Co-Director of Children's Environments Research Group, writes that children in the third through sixth grades are strongly sympathetic to environmental concerns (Hammond & Collins, 1997). An educator needs to create an outward expression for them to process their learning. This outward expression could involve writing letters, picking up garbage, creating a garden space, or presenting research to a group of peers. At the same time the middle level learner needs more time spent in discussion about the philosophical aspects of environmental issues, researching, and building new internal constructs which relate directly to their development of a sense of self. Thus, outward and community service elements can be an aspect of a middle level to high school level learner, but they must not be the ultimate goal of the lesson (Hart, 1997, Hutchinson, 1991).

While keeping relevance in mind an EE educator must make program materials inclusive. Inclusive means that it involves all the students, despite their limitations. For example, some aspects of EE curriculum may be limiting culturally (Masumoto, 2003). There is a noted lack of EE educators of color in the United States and communities of color are markedly underserved in traditional EE. Children of color need EE experiences to be interpreted in ways that are culturally relevant, despite the perceived "naturalness" of their physical environment (Running Grass, 1995).

At the same time, EE needs to include children with different physical and mental needs. Special Education mainstreaming is a reality in classrooms across the nation. EE needs include these children. For many developmentally disabled children an activity-based EE experience can become a life changing experience. Physically disabled children, who include children of different levels of mobility and include children who are overweight, need to be included in EE activities. For some educators this means slowing down their physical speed to accommodate these children. I believe this models compassion for other students. This also means finding creative ways for mobility limited children to be a part of outdoor activities. This once again is best approached in the pre-planning period and supplemented with your support systems help (Athman & Monroe, 2000).

Next, is what I consider is the most important change in EE programming is the focusing EE programming on earth systems and sustainability education (Hammond & Collins, 1997). Earth systems education, as discussed in the introduction, provides a foundational understanding of how the earth systems work BEFORE considering what is unstable (Van Matre, 1991). There are several approaches to this in *Dr. Art's Guide to the Planet* (Suessman, 2000) and *Earth\_Education: A New Beginning* (Van Matre, 1991) Dr. Art Suessman not only provides an excellent workbook and curriculum program, he has also created an entire web site that interacts with his book. It features animation that demonstrates the water cycle or the rock cycle in clear and child-friendly visuals at <http://www.planetguide.net>.

By providing a basic understanding of earth systems, an EE educator provides a

grounded place for future inquiry on subjects that relate to sustainability and how natural cycles effect human populations. This basic understanding reflects a major deficit in most EE programming, despite its focus or bias. It reflects a physical and concrete reality of interrelated systems that is not commonly explored in public school science lessons (Braus & Wood, 1994).

Additionally within the process of teaching these foundational concepts of earth systems an educator needs to allow for student-based inquiry, provide opportunities to listen to questions, and allow students to research primary sources of information (Brooks & Brooks, 1993; Warren & Howe, 2003). This allows students to develop answers, support ideas, and present their data while actively learning to research and seek out information.

Through active inquiry, students become empowered. A feeling of empowerment allows children to create a developmentally appropriate expression of their feelings on the topic. Students need to feel that their efforts will have a marked effect on others in their community. Opportunities for outward expression range from creating newsletters, web pages, building bonds between school and community organizations, field trips, attendance of traditional EE programs, and many more options (Athman & Monroe, 2000; Hutchinson, 1991).

Teaching EE is a not a difficult task when an educator is prepared and takes a deliberate approach to the process. The benefits for student, educator, and community are great as demonstrated in the above sample stories of successful EE programs. It is important to note that these successful experiences have been equally successful in many different urban, suburban, and rural biomes. Thus, perceived limitations of place or the children involved can be transcended if an educator creates a good support system that is carefully developed with the above elements in mind.

**Effective and inclusive EE is a combination of practicing the following concepts:**

- 1. Kinesthetic/Active:** Involves activities, both inside and outside to create physical metaphorical expression of earth systems concepts.
- 2. Relevant:** Addresses issues that are “on the minds” of students.
- 3. Inclusive:** Culturally and Physically
- 4. Inter-disciplinary:** Infused into all aspects of curriculum
- 5. Empowering:** Allows children to create a developmentally appropriate expression of their feelings in their community
- 6. Focuses on Earth Systems and Sustainability Education:** A well constructed and focused understanding of how the earth systems work BEFORE what is unstable.
- 7. Allows Student-based Inquiry:** Provide questions and primary sources, allow students to develop answers, support ideas, and present their data.
- 8. Assesses the Student and Educators:** Effective EE pre-assesses the learner’s needs, level of understanding, and areas of interest. Then at the end of an EE experience, it again assesses its effect on the above areas.

During my reading of the professional literature, there was a repetition of issues, which are contested in EE. It is essential to understand the reasoning behind each view. I discuss these issues in the following section as a means to clarify the ideas that theorists are concentrating on when discussing the effective use of environmental education in the classroom curriculum.

Many school administrators feel that it is most cost effective to require that EE be infused into the regular classroom program. In Washington, there is a tentative set of curriculum requirements for EE that will soon be required of classroom educators, even though EE is currently required in all aspects of curriculum under a looser definition.

However, as mentioned before, many professional EE educators do not believe infusion is the best approach for EE. Through my assessment of the literature, I believe this stems from a number of studies. These point to the inadequate training most elementary educators have in the area of EE (Summers, 2000), the limitations of classroom teachers perceptions of effective EE practice vs. appropriate EE practice (Summers, Kruger, & Childs 2001), and the lack of an access to a "natural" environment (Simmons, 1998).

Traditional EE programs are provided in a number of ways across the globe. EE "program centers" such as those of California, provide environmental education to every fifth and six grade school child during the nine-month school year. A traditional EE program usually consists of a out of the classroom experience where children in fifth through eighth grade are sent to an overnight camp for a two to five day outdoor school experience. For many students this represents their entire EE experience for their school life. And even though such programming has been regularly occurring for the last fifteen years, there are hardly any longitudinal studies which research the actually effects of these programs on these children as young adults (Bowers, 2001). Questions such as "Do former students live more environmentally sound lives due to their program based EE experiences?" have yet to be answered empirically.

Some believe that due to the effective practices of certain EE program centers, this may be an adequate experience (Van Matre, 1990). However, there is universal inconsistency within the traditional EE programs in the quality of the EE experience they provide. Inadequacies in these programs are described with a wide range of criticism, from being too political, to being completely irrelevant, to teaching EE in its most effective form (Postma, 2002).

The skills and practices of an effective and successful EE program that can be used in the classroom are modeled in the real life examples on pages 27-31 (Hungerford, 2002). Though some professionals believe that EE is not truly effective in the classroom, concentrated efforts, such as in Tacoma's Whitman Elementary, combine a whole school effort to infuse EE into all aspects of curriculum.

This is completely in line with Hart writings. He argues that EE and sustainability need to become a part of a child's life and be something that they take home with them. To "take home" is an interesting phrase, as Hart also notes that children of fourth through 6<sup>th</sup> grade developmentally are "ripe for a community oriented outward expression of their understanding." As adolescents, they are more developmentally suited to explore their inward motivations and the philosophical aspects of EE (p. 28).

The practice of Elementary EE infusion still has weak areas that need to be addressed. In this case, I refer to lack of teacher education (Fleer, 2001; Robertson & Krugly-Smolkska, 1997; Summers, 2000,2001), political polarizations (Postma 2002) and the persistence's of belief systems within educators (and administrators) that prevent the expression of EE in its most effective forms (Bookout, Moseley, & Reinke, 2002; Simmons, 1998; Stables, 2002).

Those theorists who believe in traditional program-based EE, often focus on the

education events happening within a natural setting, as some would call nature, wilderness, or the wilds. However there are successful EE programs happening in all environments (Simmons, 2001; Doyle & Krasny). As demonstrated in the prior section EE can be practiced in any environment, whether in an urban garden, an abandoned lot, a city park, an agricultural area, a creek, or a logging tract.

Classroom educators however are either limited to an environment such as an urban school with little or no playground space or limited in their ideologies about leaving the classroom to teach in the outdoors. Some might call it fear, but overall there is an inherent limitation in taking children outside due to fear and the overwhelming disequilibrium an educator will have to go through to function in that new environment (Fleer, 2001). Nonetheless, for curriculum to be relevant to students it needs to be grounded in a sensory experience in a setting where the natural environment can be observed (Van Matre, 1990).

Additionally, cultural diversity is an often-overlooked element in any educational program (Running Grass, 1995). EE provides an opportunity for children of all cultures to explore EE on an ethical level. There is a lack of people of color in environmental education. Does this reflect the lack of role models, lack of EE made available to people of color, or the majority of American EE materials being written by the dominant culture?

Sub-disciplines such as environmental justice reflect how culture and economics can affect the ecological health of any environment people live in (James & Lewis, 1995). Children of all backgrounds deserve equal access to EE experiences. Living within an urban environment does not limit that experience (Bowers, 2001). However, lack of funding, teacher education, and the perceived limitations of those urban environments can limit the support system for educators who wish to effectively teach EE (Simmons, 1998; Robertson & Krugly-Smolka, 1997).

With the controversies in mind there are many evaluation tools provided by your state, the NAEE, and educators to evaluate EE curricula (See Appendix). These provide a filter for an educator to critically analyze programmatic materials or even their own curriculum designs. The criteria I have provided in Appendix 1 contain selected criteria to provide an excellent way to determine if your program will meet academic requirements, still maintain effortless integration into existing curriculum, and while still teaching relevant concepts to students.

Integration of EE into the entire elementary school or even just the elementary school classroom has been achieved in many places in the United States and around the world. These integrations are not exclusive to one specific area, cultural background, or economic class. However, these issues do affect the general availability and distribution of resources. Thus, one has to realize that these programs are successful, first because specific individuals took the initiative to transcend their limitations. These projects had to persevere through adversity while gathering supporters, people had to apply for funding, and to take the time to structure their programs with relevant academic skills.

Moreover, it is the elements of effective EE, such as preparation and training, developing a support system, creating relevant learning experiences, and infusing EE into all aspects of the curriculum that make EE programs work best. Effective programs must include a Kinesthetic or active element and be relevant to the physical, developmental, and emotional needs of the learners. It must also allow for student based inquiry, provide



a foundational understanding of how earth systems work BEFORE exploring what is unstable, and overall empower students to create a developmentally appropriate expression of their feelings about the subject matter.



#### IV. CONCLUSION

These examples of effective curriculum reflect a continuing progression of thinking about “best practice” in environmental education for elementary education professionals. Reaching the goal will require first that all teachers be trained in environmental education as a requirement for a teaching certificate or be provided adequate training as practicing teachers. Yet, it is difficult for educators, statesmen, and community members to come to consensus about how EE should best be accomplished.

At this point in time, the inequity of training, the lack of funding, the lack of the perceived importance of EE, and the political stigmas of EE all need to be addressed by educators. Realizing that the past of Western civilization has created inherent non-sustainable language and philosophies within United States culture is a first step to addressing those underground problems of industrial society (Bowers, 2003). Sustainability is a topic that is relevant in all aspects of elementary education and is essential for the economic survival of this country and the ecological survival of the human species. For EE to make the transition into Sustainability Education, means that on some essential level a real and unbiased understanding of the basic planetary ecology is needed as foundation across the populace of the planet.

Additionally, the sheer amount of program materials available can be overwhelming for an untrained elementary educator to approach and assess. All curriculums must be assessed for internal biases and its actual component activities, earth systems education, sustainability methods, and cultural appropriateness. Despite what post-modern critics deem a contradiction between liberalism and the practice of EE, controversial politics, and a collective ignorance of effective practice, EE is here to stay (Postma, 2002). Yet, I and other educators of my generation are responsible for improving upon our elders, refining, and refocusing towards the goal of sustainability education as the main expression of EE. The exchange of terms may be a useful tool to create useful programming towards the EE goals of the United Nation’s Tsbili Declaration (UNESCO, 1978).

Thus as educators we need to improve our professional competence through training with an emphasis on learning basic earth science concepts and sustainability. We need to engineer a support system, which consists of excellent curriculum materials, school and parent support, support from volunteers, and funding as needed. Finally, we need to not be afraid to cross curriculum boundaries. EE and Sustainability are, as David Orr, contributing editor of *Conservation Biology* and Oberlin College Professor, put it, “a daunting task” for this new generation (Chiras Ed., 1995). However, inter-related concepts allow for a fuller understanding of how something as small as a pack of Lunchables (a heavily packaged mass-produced processed food item) can have a global impact.

Overall, effective and inclusive environmental education is a combination of the following concepts. It needs to be:

1. Kinesthetic/Active: Involves activities, both inside and outside to create physical metaphorical expression of earth systems concepts.
2. Relevant: Addresses issues that are “on the minds” of students.
3. Inclusive: Culturally and Physically
4. Interdisciplinary: Infused into all aspects of curriculum, Art to Zoology.
5. Empowering: Allows children to create a developmentally appropriate

expression of their feelings within their community.

6. Focus on Earth Systems and Sustainability Education: Students must learn how the earth systems work BEFORE what is unstable. Then students will begin to explore how EE is about economics and research the concept of Sustainability.

7. Allows Student-based Inquiry: Provide questions and primary sources, allow students to develop answers, support ideas, and present their data.

8. Assesses the Student and Educators: Effective EE pre-assesses the learner's needs, level of understanding, and areas of interest. Then at the end of an EE experience, it again assesses its effect on the above areas.

As many emerging fields there remain many dilemmas due to areas where I found the needed research was limited at this time.

- ✧ If EE is to become integrated into public school lesson plans, what type of actions will it take to educate and fully transcend the accompanying controversies of EE as a whole?
- ✧ Does EE really reflect our “national culture” and should it be an agent of non-conformity or conformity to traditional socio-cultural beliefs?
- ✧ What roles do race and economics play in the availability/teaching of EE to children?
- ✧ What are the longitudinal effects on attitudes, knowledge, and behavior of adults who have experienced EE in its many forms as children?

I observed throughout in my review of the literature, the transition from informal recreation based outdoor education to formal program based EE. The field has transformed in accord with the growing evidence of the human impact on the Earth's natural resources. Even in the early expressions, EE was steeped in a range of political and social beliefs. In its past interpretations to children through scouting manuals, agricultural training programs, and through mass media via naturalistic books and movies, EE has advocated the aesthetic appreciation of the natural world and activity-based experience. It is only in the last century that EE became a serious academic field with in science and it is only in this century, we came to realize the effects of the growing ignorance, commodification, and physical disassociation the modern human has of the basic sustainable systems of nature.

Many writers of this century have tried to express the value of natural systems, whether by romanticizing them or by presenting textbook facts. Yet, these works express the naturalist intelligence, the ability to recognize relevant patterns in a connected system. The naturalist's role may be to serve as a witness and interpreter of nature messages and then to translate for those who do not notice.

In the Western world early EE was an expression of love for the beauty of the wilds and an underlying respect for the value of natural resources. With the advent of Scouting, an entire new paradigm was created, merit based activities that required children (and their adult leaders) to experience their natural environment as tool for building good character. However, these practices also represented a growing detachment from the natural world and a growing commodification of natural resources that been a cultural practice of humanity since the infancy of Western civilization.

Today EE has grown in complexity and remains a political issue for the global capitalist economy and the peoples affected by the commodification of their local natural resources. This does not excuse the classroom teacher from making an informed opinion when choosing options to teach EE. Whether by classroom infusion, a visit to a non-formal EE program, or a residential EE camp (outdoor school), several approaches can be used to effectively communicate the basics of earth systems and the basic understanding of sustainability in a relevant, culturally appropriate, and active way. Infusion, traditional and non-traditional EE programs should be used together in interdisciplinary programs to support the principles of sustainability. This interdisciplinary (Brooks and Brooks, 1993) teaching of EE concepts is essential. Students must be taught by using a variety of strategies, most importantly those that involve active learning, empower learners to self-direct their studies, provide culturally accessible activities, and involve an outward expression of that learning experience.

Overall, education for sustainability is about a commitment to analyzing the needs of the human community with our basic dependence on the Earth's cycles and systems. The thrift and economy emphasized in sustainability education prepares the learner for future job skills, future career fields, and will begin the mental transition of today's youth toward functioning in a sustainable economy. This economic focus is the additional element that redefines environmental education. It is what will move EE out of the woods and into the human created environment. This means that nationally there must be a collective change in values and in life choices in regards to sustainability. This of course is best implemented through effective environmental education taught in its best practice in a supportive environment.

"We have overwhelmed the natural systems from which we emerged and created the dangerous illusion that we no longer depend on a healthy environment. As a result, humanity now faces a challenge that rivals any in its history: restoring balance with nature while expanding economic opportunities for the billions of people whose basic needs--for food and clean water, for example--are still not being met.-1998 State of the World." (Worldwatch Institute, 1998)

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