

UNDERSTANDING URBAN TEACHERS'
PERSPECTIVES OF ENVIRONMENTAL
EDUCATION

By

JEANINE MARIE HUSS

Bachelor of Science
Oklahoma State University
Stillwater, OK
1995

Master of Science
Oklahoma State University
Stillwater, OK
1997

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
July, 2007

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Dissertation Approved:

Richard Bryant

Dissertation Adviser
Margaret Scott

Pamela Fry

Thomas Shriever

A. Gordon Emslie

Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Significance of this Study

Recent environmental education (EE) research revealed gaps between EE theory and EE practice (Elder, 2003; Fien, 1993; Grace & Sharp, 2000; Huckle, 1991; Robertson & Krugly-Smolka, 1997; Robottom, 1984, 1987; Wals, 1992). EE theorists propose environmental literacy as the goal of EE, and envision the development of environmental literacy as progression through a hierarchy of levels ranging from awareness (the lowest level) to personal and civic action (the highest level). Environmental educators, in contrast, view the goal of EE as increasing students' environmental awareness, knowledge and appreciation, and so tend to teach only the lowest levels of the environmental literacy hierarchy (Orr, 1994, p. 32). Environmental education must involve more than teaching of environmental problems and awareness. EE must be a "process that facilitates the challenging of dominant environmental attitudes and behaviour (sic.) patterns of individuals, groups and entire societies to bring about positive social transformation and the development of a new environmental ethic" (Spork, 1992, p. 147). In 1997, Robertson and Krugly-Smolka began characterizing this disparity between EE theory and practice by studying three educators' use of EE programs. This case study employed interviews and observations to examine how three educators'

individual beliefs about environmental education influenced their classroom practices. Robertson and Krugly-Smolka (1997) reported discrepancies between EE theory and practice as a major finding in their study and recommended further research focusing on teacher practices and their decision-making processes of how and what environmental education should be taught.

Inherent weaknesses in Robertson and Krugly-Smolka's (1997) study prompted further investigations. Use of only Canadian schools, one classroom teacher, one principal and an environmental club sponsor were significant limitations of their study. This study used two suburban schools and one rural school which posed a second limitation to Robertson and Krugly-Smolka's (1997) study. Despite these limitations, the study helped elucidate the mismatch between environmental education theory and practice. Robertson and Krugly-Smolka (1997) used the following research questions to guide their study:

1. What are these teachers' beliefs about the environment?
2. Do the teachers believe their views are represented in their environmental programmes (sic)?
3. What factors have the teachers found that contribute to the successful implementation of these beliefs into their programs or, conversely, what factors do they find inhibit their expression of these beliefs? (p. 313)

The present study used Robertson and Krugly-Smolka's 1997 study as a framework for a case study (Merriam, 1998) of three urban EE teachers who taught in the same school district but in three separate schools. This study focused on the teachers' environmental education beliefs and practices, adding both a deeper understanding of

teaching of EE and exploring a setting ignored by Robertson and Krugly-Smolka (1997). This multi-site descriptive case study examined three teachers' significant life experiences (in the classroom, community, and their childhood), brought to light their personal reasons for teaching EE, and explored their EE pedagogic practices and the constraints on those practices. This study contributed to an overall understanding of EE, which may lessen the gap between EE theorists' and researchers' recommendations and teachers' actual EE practices. In addition, details of the pedagogic EE practices of the three urban teachers in this study may assist and encourage other urban teachers who would like to teach EE but feel thwarted by contextual constraints.

Background of the Study

In determining three urban teachers' views of EE, I compiled descriptions from EE literature of how urban teachers use environmental education in their classrooms. As a former urban teacher, I understood many of the issues these teachers confronted daily. The following paragraphs address issues related to urban settings that constitute pertinent contextual factors for my study. These issues include (1) the ethnicity and cultural heritage of urban teachers as compared to their students; (2) resistance to change from administrators, other teachers, and students; (3) the educational philosophies of teachers and administrators; (4) social justice issues within the urban community; and (5) the myth regarding African-Americans' environmental attitudes. Finally, examples of successful urban EE efforts are described. An understanding of the importance of teaching environmental education, while also acknowledging contextual factors and constraints, is the first step toward lessening the gap between EE educators and theorists.

Teachers' Ethnicity and Cultural Background

Teachers, 87% of whom are white (Kauchak & Eggen, 2005), instruct their students in settings dissimilar to their own K-12 and preservice experiences. M. Cochran-Smith (2004) cites 2000 Census data stating 86% of all teachers are white and 40% of all students are minority. In many urban areas, the proportion of minority students may be as large as 90% (Darling-Hammon and Sclan, 1996).

Resistance

Educational settings enable resistance (Eisner, 1998; and Marzano, Waters, & McNulty, 2005). To explain this point, I will relate a personal story from my teaching background. I felt this resistance when my students and I planted a native flower garden in front of the school and made stained glass stepping stones for the garden. Administrators, fellow teachers, and even the head custodian challenged my ideas of constructivist teaching and environmental education. After writing a grant to make stepping stones with the 8th grade art classes and my 7th grade science classes, the principal informed us the stones could not be placed in the garden for fear of them being stolen or used to break windows in the building. The custodian threatened to turn off the water in my classroom after coming to unclog the leftover sand from a lab demonstrating erosion to students. He also insisted on me sweeping the sidewalk and front parking lot free of the mulch obtained from the city because he hated seeing the mess. Even though he thought this would discourage me, several of the Junior ROTC students and I willingly swept. Other teachers chose science textbooks with the most vocabulary words so their students could do busy work. I wanted books with more labs and ideas for experiments.

The other science teachers did not find working in the garden worthwhile and refused to spend time in it with their students. The Parent Teacher Association also discussed using the garden area, the year before it was built, as a place for students to eat lunch. Their vision of the area included a cemented area with a few picnic benches for students to eat lunch.

After consulting my department head, who knew of my desires for a garden as well as the arrival of the mulch, I forewarned the head secretary when the mulch would be arriving. The mulch arrived with the absence of the head secretary, which led to the dumping of the mulch behind the school. This angered the principal, who went to my department head about the garden. She took much of the blame to lessen the reprimand and explained the area would be the charge of the entire science department. Both her students and mine spent several class periods with small buckets and wheelbarrows moving the mulch to the garden area in the front. My department head transferred to another school and none of the other science teachers wanted to use the space.

After writing another grant for the garden, I purchased automatic water sprinklers that were to water the garden in the summer months. This fell through though, because construction workers at my school unhooked the hoses in the summer; large weeds resulted. The principal used a weed-eater to destroy the remaining plants. I wondered how other teachers I met in the district/state/nation successfully taught EE. Did they face similar constraints? How did these teachers overcome them?

Educational Philosophies

Including EE in the curricula prompts changes in the classroom (Orr, 1994; Archie, 2001). EE can be used to address current reform issues. Environmental education (EE) uses an integrated, constructivist approach to teaching, aligning with the National Council for the Accreditation of Teacher Education (NCATE) standards used by several colleges of education, as well as the *National Science Education Standards* (NSES) and the *Principles and Standards for School Mathematics*. The national science and math standards provide a framework for alignment in governing principles and theories in mathematics and science education in the United States. EE can be instrumental in both achieving standards and supporting pedagogical practices that promote student understanding (Lieberman & Hoody, 1998).

Secondly, EE fits the current pedagogies most commonly encouraged in science and mathematics classrooms. Environmental education naturally links with science education (Simmons, D. 1995; 1996b; Farmer 1998; Dillon 2002; Davis 2000; Gough 2002; Moore & Huber 2001). Constructivist learning presents challenges for newly hired teachers, who face additional constraints and preconceived notions of urban settings (Corbett, Wilson, & Williams, 2002; Wilson & Corbett, 2001; Kozol 2005). These constraints may limit the amount of environmental education taught until new teachers establish proper classroom management and teaching techniques.

Social Justice

Polluted environments and hazards in the workplace most often threaten urban and rural minority and poor populations. Urban children, often minority students, live in

the most degraded environments yet know the least about the environment (Bryant and Mohai & Bryant, 1992; Bullard, 1990). Urban schools with high minority student populations should be engaged in learning environmental education because they are most at-risk of environmental hazards and need to understand potential risks/hazards associated with environmental issues.

The Myth of Apathy

Kahn and Friedman (1996) interviewed African American parents in Houston to learn these parents' environmental beliefs. Parents spoke of the importance of animals, plants, and clean air in their community. Pollution of local air and water and the amount of garbage concerned parents the most. Parents favored conservation over technology to help fix environmental issues within their community. One parents from the study stated, "Nature is natural and with all this high tech we have going on now, it's not really guaranteed" (Kahn and Friedman, 1996, p. 8). Parents mentioned lack of transportation and/or safety issues as primary reasons for infrequent park visitations. Drug and environmental education received equally high rankings in importance from parents, asserting physical issues and aesthetic issues are of equal importance. Another parent said, "With drugs, we're nothing. Without the environment, we're nothing...With the drugs, you're not going to have a future and without any environment, we're not going to have a future" (Kahn and Friedman, 1996, p. 10).

Wals (1992) noted environmental education rarely occurred in the most at-risk settings, which promotes a narrowed agenda for environmental education because only those students with extended resources (typically suburban or private schools)

experienced EE. In order for environmental education to promote social change, those with fewer resources and those students directly affected by degraded environments should be included in the discussion. Children, in the study by Kahn and Friedman (1993), listed animals, plants, and parks as their top interests in nature. Even with their interests in nature, children still held naïve concepts about nature. Thirty-six percent of children understood air pollution, but did not recognize air pollution issues occurring locally. Another study showed students felt the burden of environmental problems, causing anxiety related to their ability to promote societal change (Cross, 1998). This anxiety led to feelings of hopelessness and helplessness for which Wals (1992) urged researchers to find counteracting stories.

Dispelling the myth of African Americans' non-concern for the environment also is important. Past reasons for this non-concern included the reasoning that hierarchy of needs must come first before concern of the environment. Others reasoned it could be because of cultural differences. Still others blamed it on "environmental deprivation" because of the large population of African Americans who live in urban environments. These reasons, however, do not match reality. African Americans show an equal concern for the overall environment and greater concern for local environments than Caucasians (Mohai & Bryant, 1998; Sheppard, 1995).

Successful Urban EE Efforts

Examples of urban EE programs include: counting raptors and using school grounds for learning. NEETF hired Roper Starch Worldwide to conduct a study focused on disadvantaged SES students and found them to have a higher concern for shortages of

good drinking water, lead poisoning, acid rain, and energy shortages than their higher SES counterparts. They are also more concerned about solving immediate environmental problems (NEETF, 1994). Malone and Tranter (2003) examine several schools in Australia, including an inner city school, to determine how children play in the environment based on their ages and developmental skills and based on their local environment. They found unsupportive neighborhoods led to limited environmental engagement and activity, which are needed for environmental cognition to develop. An article in *Science Activities* (Computer News, 2003), discussed the importance of urban children learning about their local environment. Deborah Mathies, the program director of “Raptors in the City”, wanted children to learn and appreciate wildlife in the city while practicing their computer skills to lessen the “digital divide” (p. 35). Once students understand issues concerning their local environment, they should be given opportunities to think and act critically using their new knowledge.

Theoretical Framework

In order to gain insight into how the teachers in this study thought about and taught environmental education, I wanted to develop a relationship with my subjects by observing, interviewing and spending time with them. By taking the epistemological stance of Constructionism, I ascertain certain types of knowledge and assumptions will be made, which include credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Constructionism allows the researcher and the subjects of the research to collaboratively create meaning in a social context through interaction. Therefore, knowledge in Constructionism is gained through consciously interacting with

the objects of study. This epistemology contrasts with that of objectivism, which suggests researchers extract knowledge from objects. Constructionism derived from a need to explain social and human realities at individual levels instead of natural realities generalized to whole populations. Constructionism balances objectivity and subjectivity by using intentionality to create a “relationship between the conscious subject and the object of the subject’s consciousness” (Crotty, 1998, p. 44).

Within the epistemology of Constructionism, several theoretical perspectives exist. Because I wanted to understand how an urban context affected the teaching of environmental education, I chose symbolic interactionism. Symbolic interactionism employs ethnography as part of the methodology of study. Because symbolic interactionism creates meaning from the participants, interviews and questioning techniques must remain flexible. Methods in this study included participant observations, interviews, document analysis and descriptive case studies.

Symbolic interactionism places the researcher in the shoes of the participant. It asks the researcher to understand the viewpoint of the participant by studying the language, symbolic tools, and communication of the participant. Symbolic interactionism does not critique a culture, but rather attempts to become “a fly on the wall” within the particular culture of study (Crotty, 1998, p.76).

Research Questions

The overarching question that drove this case study was, “What is the nature of the gap between environmental education theory and environmental education practice?”

To address this overarching question, the study sought answers to three specific research questions:

1. What are three urban teachers' personal environmental beliefs?
2. How do three urban teachers' environmental beliefs affect their understandings of environmental education?
3. How are three urban teachers' environmental education beliefs related to teaching EE in their classrooms?

Limitations of the Study

This qualitative study included only three teachers from a single school district. This design permits little, if any, generalizability. However, the study was not intended to produce generalizable results, but rather was intended to explore specific teachers' beliefs and practices as a way of gaining insight into the larger problem of the disconnect between EE theory and practice.

As a former teacher within an urban school district, I remember many of the challenges I faced every day in my classroom, school, and district. Memories of my personal experiences were potential sources of bias on my part. Although I expected the teachers participating in this study to encounter some of the same obstacles I did and to experience some of the same frustrations I experienced, I set aside, as much as possible, my own expectations and tried to see these teachers' classrooms through fresh eyes.

A final limitation of this study is due to the selection of participants. I met the teachers in my study at professional development meetings nine years ago during my teaching career. The stories of their classrooms appealed to my philosophy of teaching,

and I grew to admire these three teachers. This research project permitted me a chance to examine the pedagogy and curricula of these esteemed teachers, observing first-hand how they managed their students while incorporating environmental education. Nevertheless, for this study, I attempted to set aside my prior conceptions of the subjects and limit my data collection and interpretation to my experiences that occurred during the time period of this research.

Overview of Remaining Chapters

Chapter II presents a review of relevant research and develops a rationale for the study. Chapter III describes the methodology used for this study. Chapter IV provides a synthesis of the data collected from interviews, observations and artifacts. Finally, Chapter V presents an analysis and interpretation of the data collected.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Traditionally, American education emphasizes cognitive knowledge and skills, e.g., the “3 Rs.” In contrast, environmental education initially focused on addressing affective objectives, hoping to instill an aesthetic appreciation of the earth and a valuing of its resources. Krall (2004) painted a vivid picture of this aesthetic approach to environmental education in his description of a field trip with his students:

The view! My impatient students remind me. But wait! At my feet, hidden by the brown, frost-tipped alpine carpet, an arctic gentian. Prone, now, eye to eye, I stare into the delicate, pale-green bell; the salmon anthers, bulging into the pollen; the funnel-shaped corolla, flecked. My breath leaves me. How could I have overlooked anything so beautiful? I came for the view and found THE FLOWER.
(p. 3)

Pinar (2004) called environmental education a “curriculum stripped of the distractions...of videotape, audiotape, fancy books and buildings, values clarification and individualized instruction. Stripped of all the clothing we drape around us to keep us from seeing” (p. 3). This unadorned view of EE in the 1970s reflected the initial focus of teaching an appreciation of the environment by teaching outdoors.

However, EE's focus changed over time. Now EE challenges students and teachers to include and integrate content from academic disciplines and apply higher order thinking skills to understand environmental issues and to act upon this newfound knowledge. However, critical thinking by itself will not promote integration of EE in K-12 classrooms.

Today, creating space for environmental education in the curriculum involves more than making it an aesthetic addendum to the traditional curriculum. Understanding the role of EE in today's schools required a review of the literature related to the origin and evolution of the terms environment, environmental education, and environmental literacy. Secondly, because the present study explores three teachers' environmental education beliefs and practices, a review of literature related to teachers' understandings of these topics was also required. Finally, because of the urban context of this study, a review of relevant literature related to EE in urban settings was conducted.

The review of literature in this chapter was intended to lay a more complete foundation for understanding and addressing the overarching question that drove this study, "What is the nature of the gap between environmental education theory and environmental practice?" and for my three specific research questions:

1. What are three urban teachers' personal environmental beliefs?
2. How do three urban teachers' environmental beliefs affect their understandings of environmental education?
3. How are three urban teachers' environmental education beliefs related to teaching EE in their classrooms?

The Environment Defined

The evolution of environmental education in America relates closely to the development of the term environment. Prior to the early 1800s, early American definitions of the environment used the Judeo-Christian interpretation of the Book of Genesis that "man should have dominion over the fish, birds, and all living things." This represents an egocentric view of nature, placing nature at human's disposal. This belief encouraged westward expansion and development of the land as settlers moved west, resulting in clear-cutting forests and over-hunting of mammals and birds. This belief has also been criticized (Driver et al., 1999). As the amount of claimable land diminished, the cause for preservation of wilderness increased as noted by Driver et al. (1999) and Hendee, Stankey, and Lucas (1990). Two opposing views of the environment developed: preservationists and conservationists. Preservationists believed appreciation of the environment meant limited visits to pristine areas, keeping these areas in their "natural" state. Thoreau (1859) in *Walden*, Ansel Adams in his black and white nature photography, and John Muir, the founder of Sierra Club, all represented preservationists' beliefs of the environment who saw wilderness as places saved for spiritual connections with nature. With the advent of Transcendentalism in 1836 with Emerson's essay "Nature", nature became a place of reflection (Driver et al., 1999). Conservationists, in contrast, believed natural resources, such as timber and land used for grazing and watersheds, should be used to maximize efficiency, which benefits people and the economy. Conservationists, like Gifford Pinchot, the first person in charge of the US Forestry Service, saw the human benefits of converting forests to lumber. Pinchot's idea of conservation placed humans as managers of natural resources (Driver et al., 1996).

Yellowstone became the first national park in 1872; it was created for the benefit and enjoyment of people (Hendee, Stankey, and Lucas, 1990).

Dorceta Taylor (1996), an African American female researcher, criticized Transcendentalism's definition of the environment as narrow. The notion of the environment developed during this period revolved around the idea of "untrammelled wilderness" (Nash, 1967), which excluded urban settings. Untrammelled implied never touched by humans, land left in its original form. The untrammelled environment ignored connections between issues of class, gender, race, and social justice and the environment. De Grazia added a reason to expand the definition of wilderness, "Only if you give the city a pleasant and healthful outdoor environment, can you slacken the expensive, wasteful and self-destroying drive for the wilderness. Only the city can save the wilderness" (as cited in Hendee, Stankey, and Lucas, 1990, p. 22).

More modern definitions of the environment add inclusivity. Kaplan and Kaplan (1989) define nature as "parks, open spaces, meadows, abandoned fields, street trees, and backyard gardens which includes human-designed, trammelled land as well as natural, untrammelled land" (p. 2). Natural environments include urban, rural, and suburban areas (Kahn & Friedman 1993, 1996; Kaplan & Kaplan, 1989). Natural environments consist of designs containing "purely natural and man-made elements" (Kaplan & Kaplan, 1989, p. 3). The variety of definitions framing the term environment manifests the multiplicity of agendas subsumed under environmental education.

The Evolution of Environmental Education

Environmental education traces its origins to the “environment.” The focus of environmental education changed as environmental needs’ changed. Different definitions exist for environmental education allowing EE educators to adapt their own philosophy towards EE. Hungerford (1996) discussed implications of EE diversity. “...We are a field with an enormous diversity of goals (or standards). Some argue that this is good! Others, like myself, argue that without a modicum of standards for the field, EE is, in effect, all things to all people and therefore nothing in particular” (p. 14). Weilbacher (1994) worried about this lack of clarity and wanted EE to focus on teaching about the local environment using the outdoors. Farmer (1998) wanted EE to encourage a relevant and context-related curriculum for school subjects, which included personal and social understanding. Farmer liked the cooperative and collaborative nature of the North American Association for Environmental Education, NAAEE, because it focused on many environmental issues, as opposed to other environmental organizations, such as the World Wildlife Foundation (WWF) and their focus on wild animals.

Early ideas of environmental education, attributed to Rosseau and Pestalozzi during the 1700s, encouraged experiential nature education for students. They believed nature should be for “life, not the process of preparing for life” (as cited in Taylor, 1991, p. 39). Dewey, incorporated Rosseau’s and Pestalozzi’s ideas in defining pragmatism, focused on making students’ learning meaningful through experiences. Dewey wanted EE learned contextually:

The real remedy is to make nature study a study of nature, not of fragments made meaningless through complete removal from the situations in which they are

produced and in which they operate. When nature is treated as a whole, like the earth in its relations, its phenomena fall into their natural relations of sympathy and association with human life. (cited in Dennis & Knapp, 1997, p. 7)

Dewey's pragmatism promoted teaching social issues in education, such as the overuse of natural resources and the conservationist philosophy prominent during his time period. "Public education has a positive responsibility to shape those habits of thought and action which in turn shape organized conditions of social action" (as cited in Dennis & Knapp, 1997, p. 6). However, Disinger (2001) criticized conservation education's superficiality, because this perspective overlooked technological and/or industrial issues related to the environment.

Post World War II, resource managers provided environmental material and time to schools so children could learn how to use natural resources better, thus, the thought was, becoming better citizens. Environmental education during the late 1940s taught conservation of natural resources.

Before the 1960s, environmental education used nature observations for learning (Disinger, 2001). These observations provided ways to explain scientific principles while in an outdoor classroom context. Students primarily learned aesthetics and socialization skills associated with nature education. William Stapp, in the late 60s, prompted a new view of environmental education (Disinger, 2001). Post WWII brought new wealth to middle class Americans, allowing increased moves to the suburbs. Stapp (1969) worried about people's loss of interaction with nature:

In rural surroundings, direct daily contact with the basic natural resources was prevalent, especially within man's immediate environment. As man became

progressively urbanized, his intimate association and interaction with natural resources diminished, and with it his awareness of his dependency on them. Yet, it is imperative that man, wherever he lives, comprehend that his welfare is dependent upon the proper management and use of these resources. (p. 30)

Stapp (1969) surmised development of positive environmental attitudes encouraged problem-solving and led to finding workable solutions to environmental problems. EE must:

(1) provide factual information which will lead to understanding of the total biophysical environment; (2) develop a concern for environmental quality which will motivate citizens to work toward solutions to biophysical environmental problems; and (3) inform citizens as to how they can play an effective role in achieving the goals derived from their attitudes. (p.31)

Robert E. Roth, in 1973, refined Stapp's definition using Q-methodology (Roth, 1973). Roth's subjects (Ohio State University faculty) analyzed and organized 112 concepts of environmental education by topic and placed them in order of importance. Four major categories of environmental education resulted: biophysical, socio-cultural, environmental management, and change. The biophysical category discussed the interdependence of all living things on each other whereas the socio-cultural aspect dealt with issues addressing the relationship between humans and the environment as they are related to culture. The environmental management component discussed how humans will determine long range plans on environmental resources. These three concepts (biophysical, socio-cultural, and management) were arranged in a Venn diagram. The fourth category, change, encompassed all of the previous three categories in a circle and

dealt with how organisms and the environment are constantly changing in relation to biophysical, socio-cultural, and management factors. Although Roth's refinement identified four main areas of environmental education, Stapp's earlier definition is most often cited in literature today (Disinger, 2001).

Roth and Stapp's definitions paralleled both international and national goals of EE. The 1976 Belgrade Charter and 1977 United Nations Intergovernmental Conference in Tbilisi, Georgia, USSR established international goals for EE that became formally adopted by the United Nations.

The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (UNESCO, 1976, p. 3).

The national policies of EE established a governmental agency to research and protect the environment, the Environmental Protection Agency (EPA). Later, an Office of Environmental Education became part of the EPA. The EPA stresses the need for environmental knowledge, awareness, critical thinking skills and action.

Environmental education is a process that leads to responsible individual and group actions....Environmental education should enhance critical thinking, problem solving, and effective decision-making skills....Environmental education should engage and motivate individuals as well as enable them to weigh various sides of an environmental issue to make informed and responsible decisions (S. 3176, 1990).

Despite international and national policies with focuses on EE, newer global policies such as the World Commission on Environment and Development (WCED, 1987) and the Earth Summit and Agenda 21 (United Nations Conference on Education and Development, 1992) now threaten EE. The WCED, according to Huckle (1991), promoted sustainability by changing social policies, but kept the existing power structures intact, causing a conflict of interest. The Earth Summit held in Brazil in 1992, changed international goals of environmental education through policies recommended in Agenda 21. The policy of sustainable development, as promoted at the Earth Summit, permits countries' economic development using nature for the benefit of humans, an anthropocentric view. Nature just for humans' benefit, for example, is when humans plant and harvest trees solely for lumber and to earn profit.

Education is critical for promoting sustainable development and improving the capacity of people to address environmental and development issues. While basic education provides the underpinning for environmental and developmental education, the latter needs to be incorporated as an essential part of learning. Both formal and non-formal education are indispensable to changing people's attitudes. Both are also critical for achieving environmental and ethical awareness of the values, attitudes and behavior which will be necessary for sustainable development for the earth to succeed. To be effective, environment and development education should deal with the dynamics of the physical, biological, social, economic, and spiritual environment. Information regarding all of these aspects should be integrated into all disciplines (Sitarz, 1993, p. 293).

Sustainable development involves a moderate change for highly developed or developing nations. The policies in Agenda 21 allow for natural resource development (conservation), but may instill changes in consumptive behavior, but not to the extent required in a biocentric policy. A biocentric policy would only take into account nature's needs and exclude the needs (or proposed needs) of humans.

Early international policies, such as the Tbilisi Declaration, emphasized the need for global environmental education (UNESCO, 1980). The Tbilisi Declaration's framework is cited in contributing to quality EE materials like Project WILD (Western Regional Environmental Council, 1986), Project WET (Watercourse, 1995) and Project Learning Tree (American Forest Foundation, 1997). However, Kelsey (2003) critiques Tbilisi's definition as only theoretical because "educators have no formal role in international environmental policy or planning or implementation." Teachers need to be included in environmental education policy-making decisions for these policies to be implemented successfully in schools. Teachers, not politicians, know how to implement curricula into schools. Thus, the differences found between the theoretical perspective and the actual implementation of EE cause gaps to occur (Elder, 2003; Fien, 1993; Grace & Sharp, 2000; Huckle, 1991; Robertson & Krugly-Smolska, 1997; Robottom, 1985; Wals, 1992).

Americans' Environmental Knowledge and Public Schools

The previous section examined various organizations' definitions of environmental education and laid the foundation for addressing an understanding of how Americans view environmental education. John Chafee, one of the authors of the

National Environmental Education Act (NEEA), knows only too well the importance of environmental education. “The most important tool we have to deal with these assaults on our environment is education” (Chafee, 1995, p. 9). The NEEA wants environmental education integrated into schools and communities.

The environmental education-policy mission cannot be carried out by a few from the top down. It must come from the bottom up, through local communities, grade schools, high schools, and our colleges and universities. The best way to encourage environmental protection is to demonstrate how environmental degradation hurts each one of us. And that means education. This is our mission for the 21st century and beyond (Chafee, 1995, p. 10).

The National Environmental Education Act of 1990 (P.L. 101-619) established the Environmental Education Office within the Environmental Protection Agency. The EE Office provides training for EE professionals, grants in environmental education, student and teacher environmental internships and fellowships, awards for excellence in EE programs, and a federal task force and national advisory council which address EE concerns in the United States (National Environmental Education Advisory Council, 1996, p. 1).

Prior to the enactment of the National Environmental Education Act, the National Environmental Education Training Foundation (NEETF)/Roper Survey measured Americans’ environmental literacy rates over the course of several years, starting in 1992. This survey used seven years of data from 1992-1998 to calculate the base scores, which were then used as a comparison in the 1999 and 2000 surveys to look for improvement or decline in Americans’ “environmental intelligence quotient” (EQ). The surveys’

definition of environmental literacy consisted of basic knowledge of environmental issues within the United States. The 2000 NEETF/Roper Report Card showed 33% of people scored an average of 75% on a 12-question environmental knowledge test; only 11% of Americans received an “A” (90% or higher) on the test. This showed Americans’ lack of environmental knowledge. Suburban residents outscored their urban and rural counterparts. The Roper Survey showed 95% of American adults support environmental education, while adults reported 50% of local schools taught EE. The large public support for teaching environmental education in schools does not correspond to the amount of EE presently taught (NEETF, 2000).

Americans’ knowledge of the environment parallels the need for understanding environmental literacy. Using the hierarchical model of environmental literacy provides teachers and other environmental educators with basic guidelines for teaching EE. Environmental literacy is the primary goal of EE and will result in positive actions concerning the environment.

The Hierarchy Model of Environmental Literacy

Environmental education strives for an environmentally savvy or environmentally literate public (Elder, 2003; Environmental Education and Training Partnership (ETAP), 2000; Orr, 1994). Elder (2003) suggests daily usage of environmental literacy:

Environmental literacy is the capacity of an individual to act successfully in daily life on a broad understanding of how people and societies relate to each other and to natural systems, and how they might do so sustainably. This requires sufficient awareness, knowledge, skills, and attitudes to incorporate appropriate

environmental considerations into daily decisions about consumption, lifestyle, career and civics, to engage in individual and collective action (p. 15).

Environmental literacy consists of a hierarchical list of environmental goals people must master to become environmentally literate (Elder, 2003; EETAP, 2000; Hungerford, Peyton, & Wilke, 1980; Moseley, 2000; and Roth, 1991). First, people develop an awareness of how humans and the environment interact. Knowledge and understanding of natural and human processes comes after established awareness. The third step, attitude and appreciation towards the environment, requires people to develop affective as well as cognitive skills. Using this newly developed affective component, students learn problem solving and critical thinking skills to help the environment and the fifth and final step engages people in civic participation and collective action for the environment both individually and community-wide. Roth (1991) and Moseley (2000) use this hierarchy to propose levels of environmental literacy: nominal environmental literacy develops awareness and attitudes of environmental respect and limited knowledge; functional environmental literacy incorporates EE awareness and attitudes to build an understanding between social and ecological system interactions; and finally, people in operational environmental literacy act upon their deep understanding of environmental issues.

Malcom (1989) provides further evidence for the need for environmental literacy: Our future well-being, and that of other life forms as well, depends on people being both able and willing to develop their lifestyle, behaviour (sic) and involvement in governmental and other social processes in an informed, rational way. For this to happen, we need an approach to education which develops not

only awareness and understanding, but which also develops attitudes and high level skills for addressing social problems and working with others to bring about the necessary changes. (p. 48)

Elder (2003), EETAP (2000), and Orr (1994) push the need for environmental literacy beyond the K-12 classroom. These authors feel environmental literacy will keep humans from destroying themselves. “Life as we know it cannot be sustained unless greater environmental literacy informs all human endeavors” (Elder, 2003, p. 5).

Awareness of the environment is best developed through the sense of wonder and place qualities found in Carson and Sobel’s work (Hart, 1979; Sobel, 1993). Rachel Carson (1956) observed the sense of wonder children in her grandchildren while she explored nature with them.

A child’s world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. If I had influence with the good fairy who is supposed to preside over the christening of all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from the sources of our strength. (Carson, 1956, p. 54)

Devall (1985) and Heschel (1990, as cited in Orr, 1992) also worry about humans losing their sense of wonder. Devall states, “As some humans greatly increase their analytical ability and ability to dominate landscapes with vast construction projects, missile

systems, etc., they seem to lose some of their power of understanding, of thoughtfulness, and meditative dancing in the wonder of the cosmos” (Devall, 1985, p. 114).

Authors connect the sense of wonder to a sense of place (Nabhan & Trimble, 1994; Orr, 1994; Sobel, 1993). Nabhan and Trimble (1994) describe how children create imaginary play games that teach them an appreciation of their local area. Native Americans’ and ranchers’ children develop the skills of “reading the landscape” and understanding the local animals and plants. This requires teaching education out-of-doors, as well as in the local context, as Orr (1994) proposes. Jaquetta Hawkes (cited in Orr, 1994, p. 147) wanted people to develop a sense of place where “a patient and increasingly skillful love-making [persuades] the land to flourish.” Mumford (cited in Orr, 1994, p. 148) suggested citizenship connected people to their locality. “The aim was to ‘educate citizens, to give them the tools of action’ and to educate people ‘who will know in detail where they live and how they live...united by a common feeling for their landscape, their literature and language, and their local ways.” Dorceta Taylor (1996) agreed with the importance of learning in the local environment. Urban students, according to Taylor, worry about the inadequacy of local environmental understanding and the consequences. Urban students learn about rain forest, but not their local areas. “...Students learn a great deal from their immediate environments; consequently, an educational program that forces them to disconnect themselves from that environment will fail” (p. 3). Orr feared decreasing ecological intelligence or literacy (where people have an understanding of how nature works) resulted from not experiencing local environments (a sense of place) and a less stable culture.

Ecological intelligence and environmental literacy are surface features of Devall's (1985) and Leopold's (1987) term, ecological consciousness.

This process involves becoming more aware of the actuality of rocks, wolves, trees, and rivers--the cultivation of insight that everything is connected.

Cultivating ecological consciousness is a process of learning to appreciate silence and solitude and rediscovering how to listen. It is learning to be more receptive, trusting, holistic in perception, and is grounded in a vision of non-exploitive science and technology. (Devall, 1985, p. 8)

Leopold (1987) wanted people educated about the land, so they understood the interweaving between ecology and humans' need for consumption.

The time is coming when education which omits to picture man's infinitely delicate symbiosis with land will not be considered education...Does the educated citizen know he is only a cog in an ecological mechanism? That if he will work with that mechanism, his mental wealth and material wealth can expand indefinitely? But that if he refuses to work with that mechanism, it will ultimately grind him to dust? If education does not teach us these things, then what is education for? (Leopold, 1949, cited in Elder, 2003, p. 32).

Ecological consciousness might develop as an end result of achieving environmental literacy. Barry Commoner's (1971) four rules of ecology teach ecological consciousness. First, everything is connected to everything else, meaning humans and ecology are interwoven with Capitalism. Can we have nature without Capitalism? Or vice versa, Can we have Capitalism without nature? Secondly, everything must go somewhere referring to the law of conservation of matter, which states matter is neither

created nor destroyed. Both Schnaiberg (1980) and Meadows (1989) relate how humans must start considering waste and the cost of discarding trash. The Gross National Product (GNP) and consumer costs ignore the cost of waste in their figures. The third rule, nature knows best, reminds us humans only live on the earth, they are not her rulers. When humans manage/intervene with nature, nature wins, such as the case with kudzu and European Starlings. The final rule of no free lunch reminds us to consider our actions before we make decisions. We must think first of the impacts our actions might cause.

Students' abilities to develop ecological consciousness depend on addition and application of environmental education in schools and informal learning environments. This learning, should take place in a variety of indoor and outdoor settings, such as classrooms, museums, zoos, aquaria, public lands and parks. Students must learn critical thinking and problem solving skills to view an environmental issue from many perspectives. Elder (2003) explained challenges to teaching EE in schools. Because EE is both multidisciplinary and interdisciplinary, it requires teachers to think/plan holistically. EE uses applied knowledge and skills and is outcome-based, making behavioral changes the key. These are difficult items for teachers to test. This would limit paper/pencil tests and encourage more authentic assessment. Elder also explains EE can be controversial because it involves discussions of values, advocacy, and activism where the dominant perspective may be criticized. Finally, EE content and pedagogy constantly change to match new information and teaching strategies. EE encourages contextual and experience-based learning for relevant, real-world connections. If

teachers can overcome these challenges to teaching EE, students could develop environmental literacy and consciousness.

Incorporating diverse EE teaching/research strategies in schools such as Environment as an Integrating Context for Learning (EIC), Problem Based Learning (PBL), and Action Research also strengthen environmental literacy. EIC develops integrated units or school themes with the environment as a focus. Lieberman and Hoody's research (1998) correlated improvements in students' behavior, test scores, and attendance to EIC schools. Schools formerly not meeting their adequate yearly progress (AYP) showed vast improvements in test scores. Project Based Learning (PBL), advocated by Ayas and Zeniuk (2001) and Stepien, Gallagher, and Workman (1993), taught EE integrating several topics into the scope of a single project creating more relevant learning. Doyle & Krasny (2003), Hammond (1996-1997), Lewis (2004), Mordock & Krasny (2001), and Robottom (1987) used Participatory Action Research (PAR) to involve students and teachers as active research participants and subjects. This permitted teachers to reflect on their teaching practices and interact with EE researchers.

Environmental education goes beyond typical disciplines by discussing values and social issues within its context. Elder (2003) frames environmental education as:

education [which] goes beyond access to information to emphasize the acquisition of knowledge along with development of critical thinking and problem solving skills. In other words, environmental education helps create citizens who can take the data and information available to them, make sense of it, and come to a decision about a responsible course of action. (p. 64)

Values and social issues, as used in the EIC schools, use interdisciplinary studies and collaborative teaching to integrate disciplines. Problem-solving and group projects generate higher student interest. By combining both cooperative and individual learning, teachers also generate a learner-centered, constructivist approach to teaching. Lieberman and Hoody (1998) highlight the importance of cooperation and support from community members, parents, administrators, and students for successful EIC schools. EIC students can take their practical EE skills and knowledge and apply it as future citizens.

First Level of the Hierarchy: Environmental Awareness

Awareness, as defined by Elder (2003), is the first step in achieving environmental literacy. Students develop awareness of environmental issues through discussions held in classrooms or home environments (formal and informal education). A questionnaire and interviews of teachers and students by Battersby (1999) found underachieving students demonstrated awareness of environmental education; students felt the environment was important for them to learn. Students showed increased positive attitudes and achievement towards learning centered around the environment (p. 452). “There appeared to be a direct link between attitude and behaviour (sic.) in the eyes of the pupil (Battersby, p. 453).” He concluded environmental education would improve behavior and lessen student disengagement in school.

Second Level of the Hierarchy: Environmental Knowledge and Understanding

The second step in the hierarchy is knowledge. Disinger (2001) cites Sproull, a physicist, who used the example of citizens working on a zoning board committee as the

amount of environmental knowledge all people should know. Making informed decisions as citizens would include applying knowledge of biology, chemistry, and economics issues to these zoning boards. Sproull sees an increasing gap between those who can use quantitative knowledge to think and those who cannot. Orr's agenda (1994) promotes several factors all high school graduates should understand to participate as a citizen with an understanding of environmental issues. All graduates should understand the laws of thermodynamics, principles of ecology, carrying capacity, energetics, least cost and end-use analysis, limits of technology, appropriateness of scale, sustainable agriculture and forestry practices, steady-state economies, and environmental ethics. Overlapping knowledge of ecology, economics, and physics will result in a knowledgeable citizenry able to make informed, objective decisions.

Observations and experiences in wilderness taught Leopold. While working as a US Forest Service employee, Leopold shot wolves inflating the deer population for hunters. Leopold's philosophy towards predators changed after killing a wolf in the Gila Wilderness area. Leopold comments, "But after seeing the green fire [in the wolf's eyes] die, I sensed that neither the wolf nor the mountain agreed with such a view" (p. 130). In retrospect, Leopold found increased numbers of deer more adversely affected the mountain range than wolves on the deer population. The deer grazed until little vegetation remained, resulting in a full recovery only after several years. In contrast, the wolves culled the sick or weak deer and brought the deer population to a carrying capacity appropriate for the mountain. Leopold developed a high level of environmental knowledge, leading to environmental consciousness.

The Children's Environmental Attitude and Knowledge Scale (CHEAKS) created by Leeming, Porter, Dwyer, and Bracken (1995) tested both young (grades 1-3) and older students' (grades 4-7) environmental attitudes and knowledge. Their scale included a means of cross age-comparisons and could be used by teachers as a means of discovering students' knowledge both prior and following teaching environmental issues. Leeming, Porter, Dwyer, Cobern, and Oliver (1997) found more positive environmental attitudes in students grades 1-3 than those in grades 4-7; parents of the experimental group showed more positive behavior towards the environment than the control group. Urban Philadelphia students, tested on the School Morale Scale, measured students' attitudes towards school and an objective test measured their environmental knowledge (Strank, 1996). This study found student participants who cleaned one city block during an urban action project had significantly better school attitudes than the control group who learned of urban environmental problems, using textbooks and multimedia. Both groups learned the content equally well.

Besides the importance of positive school attitudes and knowledge, misconceptions and lack of knowledge should be addressed. A high number of ecological misconceptions in Munson's (1994) study called for more student experiences relating to ecology to dispel their misconceptions; presenting the information did not rid the misconceptions. New York students' lacked environmental knowledge in Hausbeck, Milbrath, and Enright (1992). This lack of knowledge resulted from the few environmental education requirements at the secondary level and because high achieving/college-bound students' exclusion of environmental science from their college requirements. NY students showed high levels of pessimism towards fixing

environmental problems, partially blamed from their narrow view of environmental information received from television, without understanding concepts behind the information. Student scores, separated into private and public schools, with subscores of city, suburban and rural populations found city public school students scored lowest in knowledge, awareness, and concern towards the environment. These students did show awareness of environmental issues, but lacked the knowledge to integrate societal problems and personal solutions into their schemata. In another study, students correctly identified over 1,000 corporate logos but less than ten plants and animals native to their region, showing a low level of knowledge as compared to consumerism (American Educator, 2001 as cited in Elder, 2003).

Third Level of the Hierarchy: Environmental Attitudes and Appreciation

With environmental awareness and knowledge, environmental attitudes of appreciation and concern may develop, which is an affective component of environmental literacy. Kahn and Friedman (1993; 1996; 1998) interviewed urban parents and kids probing them for their environmental attitudes. Children in this study had a low understanding for how pollution affected them locally, but when asked if they thought about the environment, animals, plants, types of pollution, garbage, and drugs/human violence were all mentioned. Children were asked questions which measured their moral values towards nature in their local bayou. Children answered it was morally wrong to throw trash in the bayou whether it was legitimized locally, or whether someone was not from the local area. Children gave reasons for throwing trash and why it was wrong. Children presented both anthropocentric and biocentric reasons

for not throwing down trash. The younger students gave more anthropocentric reasons for not polluting the bayou, which included protecting nature for people and keeping people from getting ill from environmental causes. As students' increased in age and grade level, biocentric reasons increased, including protecting nature for nature's sake and considering the rights and respect of animals. These children and parents, despite their impoverished, polluted community, presented an appreciation for nature and a want for its preservation.

Students needed positive attitudes towards the environment in order to encourage favorable actions toward the environment (Schindler, 1999). His survey assessed environmental attitudes of college students. A similar instrument, developed by Musser and Malkus (1994), measured environmental attitudes of elementary students, the Children's Attitudes Toward the Environment Scale (CATES). These researchers encouraged further research comparing urban, suburban, and rural student environmental attitudes.

Ma and Bateson's research (1999) found a strong correlation between positive attitudes towards science and the environment among students in grades 3 through 10. Students lacked understanding of social issues, such as careers, and their affects on the environment. This study showed students' held conflicting attitudes towards science and environmental issues and needed help resolving conflicts with natural resources. Students' attitudes typically reflected the attitudes of their parents, unless further educated to reflect their own personal environmental understandings. Tikka, Kuitunen, & Tynys (2000) found college students attitudes correlated with their major course of study. Engineer and business majors' less positive environmental attitudes and little interaction

in nature drastically differed from biology and forestry majors' positive attitudes and frequent interactions in the environment. Other majors showed mixed results of environmental knowledge and attitude. Preservice teachers possessed high positive environmental attitudes but little knowledge. Knowledge and activity level correlated well for those with an interest; forestry and biology majors received the highest scores. Tikka, Kuitunen, & Tynys (2000) hypothesized economics students' views' of the environment might be laissez-faire and materialistic, using technology as a fix for all the environmental problems. Like Hausbeck, Milbrath, & Enright (1992), Tikka, Kuitunen, & Tynys (2000) found knowledge and attitude did not always correspond (p. 17); however, this study found the most positive attitudes towards the environment in students who lived in the largest metropolitan areas. They proposed people living in crowded, urban areas became aware and developed "sympathetic attitudes toward nature and protection of the environment" (P. 18). Most awareness occurred in older students and students of farmers; students of business' parents showed the least environmental awareness.

Teachers and students in Cross' 1998 study needed attitudinal changes to teach sustainable development. Teachers felt students' anthropocentrism and their own worry of overburdening students hard to overcome. Teachers, according to Cross, required further learning to understand how sustainable education could be accomplished within the structural confines of their schools.

Fourth Level of the Hierarchy: Environmental Values and Ethics

Development of positive environmental attitudes must be accompanied by studying environmental values and ethics. Environmental ethics, defined by Chou and Roth (1995), are a person's moral and ethical obligation towards all living things (p. 37), which are based on a person's local environment. Professors in Taiwan and Ohio State both listed environmental ethics as their top priority in teaching environmental education (Chou & Roth, 1995). Researchers propose both neutral environmental ethics (Disinger 1998, 2001; Jickling, 2003; and Simmons, 1996a,) and a more slanted view which favors positive environmental ethics (Jickling, 2003; Knapp, 1999; and Orr, 1994). Some researchers in EE blur the line between environmental education and environmental advocacy. Orr criticizes objectivity in environmental issues, stating prevention of our planet's destruction cannot occur if the environment and life on earth are treated objectively (p. 137). Jickling (2003) encouraged educators to "value controversy" and "be courageous" pushing beyond the status quo of current environmental beliefs (p.25).

Cross (1998) found a change in values the most difficult barrier to overcome before teachers could teach sustainable development issues. Cross discussed the need for a balanced approach between promoting actions towards sustainability while not crushing students' hopes. Teachers should be aware of society's views on environmental issues:

Another powerful constraint on teachers who wish to broach environmental issues is the fact that they are controversial and often their resolution at anything beyond a trivial level involves a critique of society. The teaching profession is notoriously conservative and slow to respond to change; yet individual teachers' views, like those of the public, are ultimately sensitive to current social influences

and these may affect their personal outlook on life and therefore their teaching. (p. 41)

Changes in public values, according to Elder (2003), will be the only way to sustain the environmental movement; laws will not hold indefinitely without public support. Stephen Kellert and E.O. Wilson (1993, as cited in Orr, 1994) state “We cannot win this battle to save species and environments without forging an emotional bond between ourselves and nature as well--for we will not fight to save what we do not love.” Orr concurs, “...We may learn someday to value nature beyond the wildest dreams of present-day economists. At least we should hold the possibility, and doing so may even help us to mature a bit” (Orr, 1994, p. 77). Intrinsic values of nature are seen by people regardless of income level (Kaplan & Kaplan, 1989). “People with relatively little money are no less likely than the more affluent people to have a splash of colorful flowers in front of their homes” (p. 1).

Teaching environmental skills and action for the betterment of the environment is lacking in many classrooms (Hungerford, 1996). Malcom (1989) provided examples of skills learned from environmental action projects, such as: teamwork, communication, problem-solving, decision-making, creativity, adaptability, and conflict-resolution (p. 8). Rules and regulations teach a limited range of values and may not withstand the test of time. Elder (2003) states

...laws and regulations will never fully save us from ourselves, because now individuals must act on regulating themselves to change the environmental problems occurring in the 21st Century....Education is the only tool that treats the true cause, and not just the symptoms, of environmental degradation...Only

citizens who understand how systems work--a key learning objective of environmental education--can address them. (p. 33)

Disinger (2001) celebrates the recent importance of EE, “Teaching about the environment other than as a set of obstacles to be overcome and used has not historically received high priority because concern about the environment was not until recently a societal priority” (pp. 4-5). By making environmental education a priority, students must use their new knowledge and understanding of the environment to become responsible citizens. Elder (2003) and Leopold see “biological education” as a means of building citizens. Elder (2003) would like students advocating a position in support or defense of a cause as a means of developing citizenship skills.

Fifth Level of the Hierarchy: Environmental Action and Civic Participation

Armstrong (1985, as cited in Fien, 1993), stated,

...the real aim of environmental education is to generate action whereby children—both as children and adults—take responsibility for the shaping and the management of their own environments. Action is always the most difficult element to achieve, but if it is not there from the start in some way, one is left with education for education’s sake, nothing more (p. 71).

Mrazek (1993) also illuminates the need for action-oriented EE. He uses Soren Breiting as an example of someone who is promoting an action-based agenda in EE instead of focusing on changing behaviors. The power of action helped students understand their roles as citizens (Malcom, 1989).

Local action is people getting directly involved in improving their physical and social environment. Local action can have a powerful effect on the attitudes, abilities and understanding of those involved. This effect may reach far beyond any one local issue and be of benefit to our whole future environment. Local action does not have to be complicated. It can be as simple as a few neighbours (sic.) getting together to create a nature area in their backyards, of a school group recycling paper to save trees. A small beginning of ten leads to a more far-reaching commitment to become active and constructive community members.

(p. 1)

Malcom's (1989) four steps leading to successful environmental actions mimic the steps in environmental literacy. Malcom proposes students first develop an attitude towards action and then investigate what action to take. Thirdly, students should select the plan for action and implement the action. Following the implementation, an evaluation should occur to improve the plan. Students, in order to be motivated to take action, must understand, first, a problem exists, and second, a solution is possible. A heightened awareness of environmental issues needing change must be present in students. Elder (2003) emphasizes the importance and difficulty of achieving environmental action, "The single biggest barrier to environmentally responsible behavior is the difficulty in getting people to buy into the value of collective action" (p. 15).

Environmental Education: From Theory to Practice

Environmental education in practitioners' eyes can be viewed differently than the aforementioned research concerning environmental education. One important difference

between EE theory and practice stems from a teacher's personal environmental beliefs. Sometimes these beliefs carry over into their teaching, but other times teachers camouflage their true beliefs in what or how they teach. Huckle (1991) discusses the dilemma of teaching environmental education without the goal of critiquing current environmental issues.

Current practice fails to reveal the true causes of environmental programs and to educate pupils in ways which enable them to realize sustainable development. It is based on inadequate theory and practice yet receives increasing support from powerful elites who must manage the global ecological crisis in their own interests (p. 43).

Teachers' Beliefs about the Environment

Researchers defining environmental beliefs show commonalities in their ideas. Turner's (1988) four views of environmentalism including: the cornucopian, conservationist, preservationist, and deep ecology perspectives. The cornucopian perspective believes technology will prevent natural resource scarcities. This is the view held by most economists. The conservationist perspective supports sustainable growth while using resource management guidelines to limit use of natural resources. Park rangers and forestry personnel use this philosophy. The preservationist perspective supports a need for natural resources over the needs of humans as well as a decentralized socio-economic system, which can be witnessed by Sierra Club members. Finally, the deep ecology perspective provides intrinsic value to nature and non-human species. Kahn and Friedman (1993) categorized environmental beliefs into homocentric

(anthropomorphic) and biocentric views. Within each of these categories, several subcategories existed. Homocentric views included personal interests, aesthetics, health and welfare of humans, interpersonal reasons, avoiding punishments, and influencing others in a negative way. Biocentric views of nature centered on intrinsic worth, nature's rights, and relationships with nature. The variety of environmental values found within the term environmental beliefs explains how teachers may teach environmental education from multiple perspectives.

Fien (1993) defined three environmental perspectives according to how and what was taught using the words *in*, *about*, and *for* the environment (Fien, 1993). Education *in* the environment was defined as students' experiences in natural settings. This view focused primarily on ecological issues and technological fixes to environmental problems. Studies *in* the environment relate to early teaching of nature education in the 1900s. Secondly, students develop an appreciation for nature by experiencing it. *About* the environment focused on environmental knowledge and interactions between natural and social systems. This perspective relates to conservation education in the 1930s following the Great Depression and Dust Bowl. Conservation education promoted understanding of the environment, learning how to use natural resources for humans, and developing citizen support of conservation management practices (Driver et al., 1999). Last, education *for* the environment brings values and ideas for social change into the framework. Students use information and experiences gained from the environment to challenge common practices towards the environment. This view is most compatible with critical environmental education, incorporating preservationist and deep ecology perspectives. Education *for* the environment is found in *Education for the Australian*

Environment, which uses a critical approach to teach environmental education, as mentioned by Fien (1991). Two of the principles in this guide highlight the critical approach. EE should help students develop skills of environmental citizenship which promote education *for* the environment and an ecological approach [interdisciplinary] to the curriculum will teach students the interdependence between people and the environment. These multiple focuses on teaching environmental education help explain the multiple ways teachers incorporate environmental education into their classrooms.

Scott and Gough (2003) furthered the *in, about, for* ideas of Fien (1991) defining nine overlapping categories of how environmental educators might teach EE: 1) using nature for joy and fulfillment to develop positive attitudes and values towards the environment; 2) understanding nature to promote environmental knowledge; 3) using nature to teach skills; 4) using natural and built environments to teach conservation and sustainability; 5) advocating individual behavior changes to achieve conservation /sustainability by focusing on environmental problems and their solutions; 6) using positions of social change to achieve conservation/environment/sustainability goals; 7) using environmental, conservation or sustainability issues to promote social change by developing democratic citizenship skills; 8) using nature as a metaphor (cooperative social behavior) in how humans relate to nature; and 9) using the environment to promote environmental learning by researching different aspects of teaching and learning relating to environmental education. The first three categories use nature to promote positive environmental values, feelings, understanding and skills, which also correlate to lower levels of the environmental literacy hierarchy model. #4 and #5, as mentioned above, both incorporate ideas of conservation and encourage individual changes in behaviors.

Numbers 6 through 8 use a critical EE perspective, focusing on social justice issues which encourage students to develop citizenship skills and values to promote social change. Researchers' view of EE is found in the ninth category.

Environmental beliefs can be complex and overlapping. Tanner's (1980) study of 45 conservation group leaders found that significant life experiences played a role in becoming environmental educators. Chawla's (1998) summary of several significant life experience studies showed commonalities between Tanner's (1980) and Chawla's (1998) studies. She found the studies had positive experiences in natural areas and adult role models who encouraged students to experience nature. Gunderson (1989) as cited in Chawla (1998) interviewed twelve elementary school teachers and found experiences in the outdoors and former teachers influenced their love for teaching environmental education. Leopold (1987, 1949) proposed a unique perspective for ecologists and biologists to view the world. He wanted to make sure these scientists viewed nature in awe and wonder, like through a child's eyes. "We are not scientists. We disqualify ourselves at the outset by professing loyalty to and affection for a thing: wildlife...The definitions of science, written by, let us say, the National Academy, deal almost exclusively with the creation and exercise of power. But what about the creation and the exercise of wonder or respect for workmanship in nature?" (as cited in Orr, p. 21). Wals (1992) found students fit into three themes relating to how they view environmental issues: personalistic, technocratic, and politicized. The personalistic view allowed students to only find pollution as a concrete idea when it can be directly perceived when using one or more of the five senses. This view encouraged students to change their own behavior to lessen pollution. The personalistic view was most prevalent in the urban

schools. The technocratic approach included students who believed the environmental issues can be solved using science and technology. These students believed the environmental problems came from cultures that promoted consumption. The technocratic view was most dominant in all schools, regardless of the context. The third perspective, politicized, included students who saw pollution in a global scale. They understood politics affect people's choices, interests, and values in society as related to the environment. Most students with this perspective occurred in the suburban schools.

Robertson and Krugly-Smolka (1997) list six beliefs of environmental education which researchers promote which may cause teachers to promote several contradicting views of environmental education synonymously. The first view, utility, provides reasoning for conservation or preservation of animals and plants. Aesthetics, the second view, allows for a general appreciation of nature. Ecology, as the third view, provides a scientific view of looking at animals, plants, and energy systems. The fourth view, environmental ethics, focuses on humans' responsibility for themselves and other living creatures. Deep ecology provides a holistic perspective to understanding the relationship between humans and nature. Finally, socio-cultural criticism incorporates environmental justice to interpret people's beliefs and behavior concerning the environment. Wals (1992) study of students also found conflict worldviews allowed for reinterpretation of knowledge in a more socially just way.

Teachers' Beliefs and Understandings about Environmental Education

Richardson and Johnson (1980 as cited in Buethe & Smallwood, 1987) found teachers influence their students' environmental attitudes. "What they teach is

considerably influenced by what they know and feel” (Buethe & Smallwood, 1987). Middlestadt, Ledsky, and Sanchaek (1999) assessed teacher attitudes, beliefs, normative beliefs and behaviors to understand teachers’ perceptions of EE. They found teachers used environmental education as a creative way to teach basic reading, writing and math goals as well as improving student learning. Sixty-eight percent of teachers in their study showed a strong intent and positive attitude towards teaching EE. They also felt “the most important people to them” (Middlestadt, Ledsky, & Sanchaek, 1999) think they should teach EE, meaning administrators and colleagues. A regression analysis to predict intention from attitude and social norms showed intention could be predicted from combining attitude and normative scores.

Teachers’ Beliefs Represented in Their Environmental Education Pedagogic Practices

May (2000) found several teaching practices that promoted environmental education. He found EE teaching to be student-centered, as well as experiential and hands-on. These teachers and students involved in cooperative classrooms. Teachers used outside speakers to show diverse perspectives on the environment. He also found teachers built a sense of place in the classroom and a commitment to the community by empowering students to study and address local environmental issues. Teachers brought humor into the classroom and used both their personal time and energy to show their commitment towards the environment. Teachers who teach EE were seen as risk-takers. Teachers were able to teach EE because they had strong administrative support and adequate planning time. Teachers found local environments and local human and materials to teach EE. Teachers teaching EE had both flexible curriculums and schedules

to facilitate EE. Their classrooms and schools modeled responsible environmental behavior and allowed students to make choices and had students live with the consequences of those choices.

Teachers in Skamp and Bergmann's study (2001) also showed the importance of teacher beliefs. Teachers most enthusiastic about teaching outdoors used the learnscapes (places where people are encouraged to interact with the environment) most often. Other teachers used the learnscapes about 15% of the time they taught. Teachers also felt learnscapes encouraged community support of schools, because parents saw the learnscapes as opportunities to enhance learning.

Robertson and Krugly-Smolka (1997) proposed barrier levels that might fix the gaps found between environmental education theory and practice. First, at the practical level, time, materials, and schedules work against teaching EE. Secondly, at the conceptual level, EE provided conflicting ideas that might make teachers uncomfortable and thirdly, at the teacher responsibility level, teachers felt they cannot teach social and political agendas proposed by researchers in the field. Their study found teachers wanted to delve into the more controversial issues surrounding EE (economics, social, and political agendas) but they felt such controversial issues too difficult due to the following: issues were too controversial; teachers had limited teaching time; or teachers only focused on issues already politically acceptable, like recycling.

Elder (2003) showed how state support helps teachers promote environmental education.

Without state support for environmental literacy, administrators and teachers generally will not include it in the curriculum. But with a state mandate, they can

(and sometimes must) then begin to take steps towards building a comprehensive, cohesive environmental education program across all grade levels (p.71).

Fifteen states have standards for environmental education in their K-12 education guidelines, but this does not mean an end in pushing EE. Wisconsin teachers have standard and preservice mandates but 505 of teachers have not received EE training (Elder, 2003). Ham, Rellegert-Taylor, and Krumpke (1987-88) found an environmental education workshop for teachers reduced teachers feeling that EE could only be taught in science. The workshop setting also helped teachers locate resources and materials to teach environmental education and made them feel less inhibited about teaching EE.

“Better informed teachers means better informed students and a more environmentally literate society” (p. 42), state Buethe and Smallwood (1987). Elementary teachers, according to these authors, are in the best position to influence positive environmental attitudes in students but are the least informed. May (2000) found several factors which teachers identified as important for competency in teaching EE. Teachers wanted an ecological, social, and political knowledge base concerning the environment. In addition, teachers wanted to understand local cultures and subcultures. The NEETF (2000) surveys of adults find 95% of adults want EE to be taught in schools. This survey found that increase knowledge correlated with increased participation in positive environmental behaviors (p. V). Robertson and Krugly-Smolka (1997) found teachers wanted to teach EE but lacked the knowledge and skills theorists prescribe for them.

Robertson and Krugly-Smolka (1997) offer suggestions in how to lessen the mismatch between theory and practice: “1. align researchers to the immediate concerns of

teachers and their practices; 2. decide which theories can really be applied to the context of schools; and 3. show teachers how to implement environmental education in their classrooms” (p. 12). Other authors also provide suggestions for reducing these gaps. Hungerford, Peyton, and Wilke (1983) and Marcinkowski (1990) both propose using a hierarchical approach to environmental education to achieve similar goals for all educators. Bull et al (1998) and Robottom (1987) propose studying the context of where environmental education is taught to lessen the perceived gap. In addition, Wals (1992) states teachers lack an understanding of what their students know about the environment prior to their teaching these topics.

Elder (2003), Disinger (2001), NEETF (1994, 2000) encourage environmental literacy by making suggestions which would improve EE. NEETF would like environmental topics included both content standards and assessment for math, reading and science. They would like environmental literacy standards. Third, NEETF proposes open response questions in assessment to assess problem-solving abilities. This group supports the environment-based education (EIC) as a way to improve schools. They would like best practices EE materials as written and disseminated by partnerships between schools and communities to be distributed. In addition, NEETF would like EE analyzed from the state level regularly and a connection to be formed between environmental field experiences and community service projects. Elder would like the environment brought into education as well as education brought into environmental work. He would also like to find gaps where environmental education can be included in schools. His final suggestions in to look for leverage points which include ideas like: finding information flows like conferences and publications, understanding the rules and

constraints on public schools and who determines the rules, EE organizing itself better, changing the overall goals of education, and changing the paradigm in which the goals, power, rules, and structures are set (p.101).

Disinger's (2001) study discusses the finding of the Independent Commission on Environmental Education (ICEE), which made several recommendations in 1997 on how to improve environmental education. This commission wants educators to focus first on environmental knowledge before teaching political issues. In addition, textbooks need to be peer reviewed to eliminate bias, incomplete, or incorrect information. They would also like materials endorsed only after rigorous review. The ICEE proposes a capstone environmental education course as part of high schools and teacher training in natural science, economics, and mathematics to teach environmental education.

Impediments to teaching environmental education have been observed. Many researchers have pointed to the gaps between theory and practical application in environmental education research (Elder, 2003; Fien, 1993; Robertson & Krugly-Smolka, 1997; Robottom, 1985; Wals, 1992). Elder (2003) discusses several reasons for this gap: the purpose of education uses conservative values which allows for the dominant view to be used in schools; EE is interdisciplinary which makes it difficult to incorporate; EE needs better materials and training of teachers which it currently lacks; the wide range of values in EE makes it difficult to teach; EE as it is taught in science lacks the values needed to implement it; science teachers have little training in the environmental sciences; the interrelatedness between people and the biophysical world makes teaching EE complex; and finally education standards rarely address EE explicitly (p. 52).

Fien (1993) and Elder (2003) address the mismatch between teaching the dominant view in education and teaching EE from a more critical perspective. Typically, EE is taught from a factual viewpoint, with the omission of values. In addition, Fien (1993) states the action component is left out of much EE teaching to avoid conflict between the dominant views as prescribed and underlying within the context of schools.

The curriculum problem of education *for* the environment arises from the tensions between its socially critical orientation and the role that education plays as an agency for economic and cultural reproduction. Such tensions have produced a discrepancy between the affective and social participation objectives of many environmental education programs and an overemphasis on teaching environmental knowledge and skills without providing an explicit values-orientation when implementing programs. This discrepancy between theory and practice can be explained in terms of the relationship between ideology, education and society. (pp. 7-8)

Fien (1993) and Stevenson (1987) both point to the gap being apparent at a teacher and school level. Ideologies of teachers, Stevenson (1987) states, differ in respect to their environmental worldview and their pedagogical theories. Fien (1993) states the notion implied in the language of “critique and reproduction” does not help teachers buy into EE. In addition, teachers’ own theories of teaching and their personal motivations affect teaching EE in schools. Greenall concurs:

It [EE] has been subjected to incorporation within the existing hegemony in a neutralized form--the radical ‘action’ components having been deleted and the less controversial cognitive and skill ones retained, together with the name

‘environmental education.’ It is then claimed that the program is environmental education, although only some of the characteristic objectives of environmental education are included. (Greenall, 1981, p. 292, as cited in Fien, 1993)

Robertson and Krugly-Smolska also point to the gap for teachers: “...for teachers there is still a gap between many of the expectations of environmental education and what each is able, and willing to do within his or her teaching practice (p. 311).” In addition, other authors, like McCaw (1980) and Hooper (1988) want teachers to be more knowledgeable about environmental concepts to help improve their EE practice.

Environmental education, with an emphasis on outdoor education and learning points out Robottom (1985), challenges the existing patterns and organizational structures in school. Indeed, Greenall et al. (1993) and Simmons, (1991) and found teachers avoided teaching actions projects that might include controversial topics. Ham, Rellegert-Taylor, and Krumpe (1987-88) and Lucas (1980a, 1980b) both stressed the overwhelming science component in many environmental education action research hinders teachers’ implementation of such projects.

Robertson and Krugly-Smolska (1997) show the need for more research in environmental education to help fix the gap between theory and practice.

Environmental education theory, as it is now, is not sufficiently grounded in teachers’ experiences and in what they feel schools can do or what the school day is really like...Teachers and schools continue to work within the current conservative model and, as these schools have made clear, such a leap cannot be made easily. It must be approached incrementally for teachers, schools, and communities. (p. 318)

Ham and Sewing (1987-88) stress “it has been generally accepted that public schools should be instrumental in accomplishing the goals of environmental education” (p. 17). Despite this statement, many barriers have been noted towards teaching environmental education in the classroom (Cross, 1998; Disinger, 2001; Elder, 2003; Ham, Rellegert-Taylor, & Krumpe, 1987-88; Ham & Sewing, 1987-88; Middlestadt, Ledsky, & Sanchaek, 1999; and Sewing, 1986;). Sewing (1986, as cited in Ham, Rellegert-Taylor, & Krumpe, 1987-88) found four major categories for barriers: logistical, conceptual, educational, and attitudinal. Conceptual barriers include the lack of agreement between the content and breadth of EE. Logistical barriers are the lack of time, funding, resources, class size, etc., which limit EE. Educational barriers include the lack of confidence and knowledge to teach EE. Finally, attitudinal barriers include teachers’ attitudes towards teaching science and EE and how it relates to the amount teachers actually teach EE. Middlestadt, Ledsky, & Sanchaek (1999) also propose social constraints which may allow or prohibit teaching EE from principals, other teachers, parents, businesses, and community leaders. They also state teachers cited lack of natural environments as an important barrier to teaching EE.

Cross (1998) claims teachers worry about crushing students’ optimism:

A major dilemma in environmental education is the potential for frightening students and destroying hope....While education for social change is claimed as right, in this case the change required is so great that only the more optimistic teachers believed they could have an effect without destroying students’ hope for the future. Here indeed is one of the crucial tensions for environmental educators which urgently requires resolution. (p. 5)

Lousley (1999) and Wals (1992) support this worry. Lousley (1999) found student apathy towards schools and environmental education. Wals (1992) also found a similar apathy and burden placed on students and wanted students to be given an alternative action or story to help combat these feelings of helplessness.

In addition, Elder (2003) lists several barriers to better environmental literacy: hidden assumptions within the curriculum, weak infrastructures which do not allow for changes to be instituted easily, little funding for EE, separate subjects in schools which do not allow for EE to be integrated easily, lack of vertical K-12 articulation (scope and sequence), issue-driven EE instead of other EE materials, lack of preservice training and varied quality of EE materials.

Materials, as noted by Disinger (2001), Elder (2003), and Ham, Rellegert-Taylor, and Krumpke (1988), provided by sponsors, show only one side of an issue, which favors the sponsoring agency or company. They may lack scientific accuracy and be too glitzy. In addition, Ham, Rellegert-Taylor, and Krumpke (1988) state a lack of materials and knowledge of teaching methods increased instructional barriers to teaching EE. Elementary teachers in Sewing's (1986) study thought EE only fit science. In Ham, Rellegert-Taylor, and Krumpke's study (1987-1988), teachers felt science was an integral part of teaching EE. Teachers must be aware of bias to understand the larger truth about an organization. Awareness of bias in teachers is based on the assumption of preservice training. "Only 7% of all teachers' colleges require a practicum in environmental education at the secondary level, and only 9% at the elementary level. In addition, as of 1998, only four states included preservice environmental education training as a requirement for teacher certification" (Elder, 2003, p. 23). Ham and Sewing would like

to “indoctrinate students in teacher education programs into a multidisciplinary view of EE” (p. 23). In addition to the lack of training teachers, students also lack a connective, coherent environmental education experience in their K-12 schooling (Disinger, 2001; Elder, 2003).

Urban Environmental Education

Studies of environmental education in urban settings are sparse. However, the literature does provide a foundation for further studies. The National Environmental Education and Training Foundation (NEETF) in 1994 surveyed 2,139 disadvantaged youth to find out their concerns. Rockland (1995) reported students cited AIDS as their primary issue that affected them and environmental problems as second. In urban students, the environment ranked AIDS first, the economy second, and the environment eighth out of ten issues. Seventy-four percent of students said they learned about the environmental from television, with only 30% citing schools. Grades 4-5 had the most environmental knowledge, with high school students reporting the least knowledge. Urban students ranked the importance of clean drinking water, lead poisoning, acid rain and energy shortages higher than other students. Urban students show an overall concern for human health in relation to the environment and more concern for solving immediate environmental problems (p. 12-13).

Naess and Jickling (2000) and Taylor (1996) want environmental education to include local experiences, various cultural backgrounds, and interests of students will help create space for environmental learning. Naess and Jickling (2000) discuss urban settings and deep ecology, “We can do it in cities. You can do it along railways,

highways. Everywhere there is something that is essentially nature” (p.54). Taylor (1996) would like students to learn from their local environments and worries about learning which is disconnected from where students live. “An educational program that forces them to disconnect themselves from that [immediate] environment will fail” (Taylor, 1996, p.3). By teaching about local issues which interest students, later investigations can occur which incorporate other environments and experiences. Taylor (1996) would like a multicultural perspective of environmental education taught. Because environmental education arose from nature studies, a white middle-class perspective marginalizes other races, cultures, and genders. She would like the definition of the environment broadened to include urban environments. “...people of color insist that they, like other human beings, should be considered part of the environment. People of color also insist that their communities be included—be they reservations, agricultural fields, urban centers, or the rural hinterlands” (Taylor, 1996, p. 4).

Myers (1997) as cited in Chawla (1998) found minority students had less experience in nature. However, James (1993) as cited in Chawla (1998) interviewed minority environmental educators and found this group had similar experiences in the outdoors and adult role models which encouraged them to pursue environmental education within their careers. This group showed concern for community health and social justice issues, as well.

Kahn and Friedman (1998) interviewed 24 African American parents from Houston about their beliefs concerning environmental education. Parents discussed the importance of pets and plants in their lives, as well as parks and open spaces. The possibility of violence limited the amount of time children could play outside. Parents

kept children inside if worries over air pollution, water pollution, and violence overrode their concern for nature. Parents showed knowledge of local environmental problems and preferred a conservation solution over a technical solution to fixing environmental issues. Parents also showed a sense of frustration in how they as individuals could help solve environmental problems.

Wals' (1992) study of urban and suburban students focused on the need to contextualize environmental education. Urban and minority people are the most likely to be exposed to environmental pollutants (Bryant and Mohai, 1992 and Bullard, 1990). Jones (2002) study dispels the myth that African Americans do not care about the environment. His study found blacks to be more supportive of the environment in times of economic crises than whites. Mohai & Bryant (1998) found blacks and whites living in Detroit to have similar environmental concerns. Blacks in this study were more concerned than whites about pollution. In addition, blacks rated water and air pollution as higher concerns than their white counterparts. This study concluded little evidence of a race effect on concerns of environmental quality. Another study by Jones, Fly and Cordell (1999) found urban and rural residents of the Appalachian region to have similarly low levels of knowledge and action towards the environment. Their study prompts a closing of the urban-rural gap in attitudes and knowledge towards the environment. This shows the need for environmental education in an urban setting.

Therefore, environmental education research in an urban setting is an important and formerly limited area of study. This review of literature shows a need to conduct further studies in urban and rural areas on environmental education. Limited knowledge of urban dwellers in regards to environmental concerns also shows how corporations

have been able to take advantage of the local residents' environment. Further EE research in urban settings will lessen the gap of EE knowledge of urban versus suburban residents.

CHAPTER III

METHODOLOGY

This chapter provides an overview of the research paradigm used in this study and presents a detailed description of the specific methods used to select participants and to collect and analyze data. The methods chosen were considered to be the most appropriate for addressing research questions of the study:

1. What are three urban teachers' personal environmental beliefs?
2. How do three urban teachers' environmental beliefs affect their understandings of environmental education?
3. How are three urban teachers' environmental education beliefs related to teaching EE in their classrooms?

Qualitative Research

Patton (1992) states, “the task for the qualitative researcher is to provide a framework within which people can respond in a way that represents accurately and thoroughly their points of view about the world...” (p. 21). Rossman and Rallis (2003) continue,

Qualitative researchers seek answers to questions in the real world. They gather what they see, hear, and read from people and places and from events and

activities.... Their purpose is to learn about some aspect of the social world and to generate new understandings that can then be used. (p. 4)

The researcher acts as an interpreter in a qualitative study. This person must first accumulate data, interpret it according to the researcher's chosen theoretical perspective, and make it useful for society. As such, the researcher is a learner amongst the participants in the research process. The purpose and process of qualitative research is interrelated.

The objective of research is to construct or test theories as well as impart knowledge for knowledge's sake. Research questions determine the outline of the study, making it qualitative or quantitative. Qualitative studies aim to improve some social circumstance through an in-depth understanding of a phenomenon that occurs in society. Qualitative research, according to Rossman and Rallis (2003) holds eight common characteristics. Qualitative research occurs in the natural world where the researcher uses his/her five senses to interpret and collect data. Secondly, the researcher, as a human, must interact with the data through interviews, observations, and artifacts. Qualitative research focuses closely on context because the lived world is "messy" (Rossman & Rallis, 2003, p.9). Fourth, the researcher must reflect on the data being collected and uses his/her personal worldview (*weltanschauung*) (Rossman & Rallis, 2003, p. 10) to shape the data. Qualitative researchers admit to their humanness and inability to be truly objective within their work as qualitative research is personal. This is explained through the reflexivity found in qualitative researcher between the researcher, the data, and their abilities to overlap. Seventh, qualitative research relies on a holistic view of research,

while eight, making constant comparisons of the data both holistically and as separate pieces of the puzzle.

Patton (1992) also provides pragmatic reasons for using qualitative methods. If the researcher's personal philosophy is humanistic, qualitative research allows for interpersonal relations to occur between the researcher and interviewees. An overview of the research questions helps discriminate whether quantitative or qualitative approaches are even applicable to the study, and thirdly, qualitative studies add substance to previous quantitative research studies.

Patton also gives advice on doing good qualitative research. He would like the description and data collected to be bias-free so the reader can make their own judgments and conclusions on the data presented. The researcher must practice observation skills and interpretations because in-person interviews allow the researcher to observe body language and other nuances transpiring during the interview process. Data gathered during informal discussions may also be of great import. John Lofland, (1971) cited in Patton (1992, p. 28), adds further advice to achieving quality qualitative studies. The researcher should become close enough to the data to achieve personal understanding. Lofland (1971, as cited in Patton, 1992, p.28) also advocates a clear picture of both activities and conversations, while providing rich descriptions of these events. Finally, direct quotations, both written and spoken, should be included in a qualitative study.

Qualitative research places the researcher in the natural setting of the study (Denzin & Lincoln, 2000; Stake 1995; Patton 1992). This type of research allows the researcher to apply his/her own interpretations of the phenomenon through observations, interviews, documents, field notes, photos and other artifacts. This interpretation comes

without “imposing preexisting expectations on the phenomena under study” (Mertens, 1998, p. 160). Emergent ideas and design allow the study to adapt from data collected from the field during qualitative research projects.

Qualitative studies use criteria that differ from quantitative studies. Qualitative studies rely heavily on the credibility and trustworthiness of the researcher, a variety of perspectives from different artifacts and data gathered, and voice. Because of their in-depth nature, the trustworthiness and authenticity of the researcher must be addressed since researchers may become active participants in their research. Trustworthiness of the researcher implies the words and actions of the subject will be used in the correct context. It also means the researcher’s experience in past qualitative research projects adds credence of ability. Authenticity of the researcher is shown in transcripts and triangulation of data. Qualitative research must show empathic neutrality by using the data in the context as it forms, looking at the issues from multiple perspectives and offering evidence both in favor of and opposing any conclusions from the author. Wispe (1986), as cited in Patton (1992), states empathy, as related to the German term *Verstehen*, describes both a cognitive and emotional understanding of the phenomena. *Verstehen* integrates human “conscience” into research by allowing researchers to understand the perspectives of those researched through the researchers’ personal use of emotions, cultural constructs, and values. By using multiple research techniques, qualitative researchers add consistency to their results. This consistency or dependability is used to show “whether the results are consistent with the data collected” (Merriam, 1997, p. 206).

In addition to dependability, a qualitative study strives, not for external validity or generalizability, but understanding of the particular. This allows the researcher to make “concrete universals” in which “the general lies within the particular” (Merriam, 1997, p. 210). This concrete universal allows the reader to make their own interpretation of the data as well as generalizations unique to their own situation through the use of thick, rich descriptions of the situation being studied. Qualitative researchers provide similarities and differences between their study and others for easy comparisons while using multiple situations to maximize diversity within the study.

Social Constructionism Research Paradigm

Social constructionism, the paradigm used to frame this study, seeks answers to how people construct their own reality (Patton, 1992). Patton (1992) states the main objectives to social reconstructionism include: 1. What are people’s personal beliefs, explanations, and worldviews? 2. How do people construct their own reality? and 3. What are the consequences of those they interact with based on these constructed realities? (p. 96). Social constructionism also implies an external view of reality, based on experiences and interactions with others. This implies a relativity where no fact is objective; it is merely based on the experience. Rather, ontologically speaking, reality is socially constructed in multiple ways. Epistemologically, according to Guba and Lincoln (1998), assumptions found in the paradigm social constructionism assert a certain view of the world, framing a study in truth based on consensus among subjects. In addition, facts, as such, are only relative to the situation; cause and effect only happens through inference; understanding phenomena must be done within context; and data obtained

through social constructionism is not generalizable, but rather adds another description which can lead towards agreement of thought.

Research Design

Case Study Approach

Following the ontological and epistemological views of social constructionism, I chose case study as the primary form of methodology in this study. Case studies provide in-depth understandings of a particular situation or phenomenon as well as meaning for those involved. “The interest is in process rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation. Insights gleaned from case studies can directly influence policy, practice, and future research” (Merriam, 1998, p. 19). Case studies differ from other qualitative studies because of their bounded nature. Yin (2003) shows the importance of defining the boundary; it should come from the topic and the research questions should be subsumed within the topic. This boundary allows for cases to be framed within the confines of a particular. Merriam (1998) shows the prevalence of case study research showing case studies have been used for over thirty years. Case studies are often used in education to provide a holistic view of a particular situation where variables are complex and cannot be easily separated. Merriam (1998) describes three characteristics of cases studies. First, studying the particular, allows for in-depth descriptions and representations of the event. Secondly, heuristic inquiry happens with a reconceptualizing (rethinking) the phenomena being studied when unexpected events or observations occur. This means the researcher must be willing to search his/her soul for insight and reflection into the data. In addition, Patton (1992)

highlights the necessity of field notes for building a case study and carrying out cross-case analysis of several cases.

The theoretical framework of the research guides the researcher and reader as to the type of data collected, the fieldwork included and the analysis of the data (Patton, 1992). This requires the researcher to be clear about their perspective, especially since there is no consensus in defining qualitative theoretical perspectives. This study used a case study with differentiation in a common setting to maximize variation in sampling while studying the particular setting (Glasser & Straus, 1967; Bryman & Burgess, 1994). The descriptive case of three teachers used in this study, conveniently chosen (refer to Data Collection section), provided for rich descriptions of pedagogical practices of urban environmental education teachers. The researcher's social constructive lens helped interpret how environmental education teaching occurred within this setting. The researcher used environmental education researchers' perspectives to compare how these three urban teachers practice environmental education.

I chose qualitative research to understand teachers' beliefs and practices because surveys and other forms of quantitative data would not lend themselves to a deeper understanding of what teachers believe about environmental education and how they actually practice it. Using observations, interviews, and artifacts, I witnessed first-hand how teachers use environmental education in their classrooms. The teachers provided narratives for deepening the understanding of teaching environmental education in urban settings. Using three teachers' stories (portraits) will add to the depth to the unique urban setting of EE teaching. Interviews and observations completed of the three teachers helped in determining themes related to their environmental education practices. Card

sorting separated the data into themes of both practice and teacher qualities. In addition to interviews and observations, artifacts such as school handbooks and district plans helped triangulate data. A follow-up group interview summarized teachers' views and environmental education experience.

Selection of Subjects

Teachers, with the help of one of the science curriculum specialists for the Salve School District, helped me contact teachers whom she felt taught environmental education. I also asked principals for participant recommendations when observing first-year internship teachers. Three recommended teachers subsequently agreed to participate in the study and seemed reasonably capable of explaining how environmental education is integrated into their curriculum.

Study Participants

Robin taught elementary school for 30 years before retiring from the classroom. She now serves as the Math and Science Coordinator at Derby Elementary School. Robin's salary is paid through Title I funding. Robin received her bachelor's degree in elementary education degree with a minor in science minor from a small regional state university. She also holds a master's degree in Education from a large state university.

Cheryl works as a 7th grade science teacher at Franklin Middle School. She has taught for 15 years at this school and 20 years total. Cheryl received a bachelor's degree in physical education from a major state university. She passed the state teacher certification exam for middle level science so she could teach science at a middle school.

The third participant, Victoria, teaches accelerated sixth grade science at Madame Curie Middle School. She has taught for 36 years. Victoria holds a bachelor’s degree in elementary education degree with a minor in psychology. After college, she worked as a social worker, but found that career did not fit her.

Table I summarizes basic information about each of the three subjects of this study, including number of years in the classroom and current teaching assignments.

TABLE I
SUMMARY OF THE PARTICIPANTS

The Participants	Robin Waters*	Cheryl Rivers*	Victoria Lake*
Teaching Experience	Taught for 30 years, now retired	Taught for 20 years, including 15 years at this school	Taught for 36 years
Current Teaching Assignment	Teaches small groups of students preK-5th grade or classes with teacher’s support	Teaches 7th grade science students	Teaches 6th grade science students
Professional Training and Background	Bachelor’s degree in elementary education with science minor from regional state university; Masters degree in education from major state university	Bachelor’s degree in physical education from major state university; passed certification test for middle school science	Bachelor’s degree in elementary education with a minor in psychology

*Pseudonyms replaced all names of schools, teachers, school district, and places.

School Settings

Derby Elementary School, where Robin teaches, embraces environmental education by using an environmental theme throughout the school. Murals of animals and plants are painted on every classroom door, the cafeteria and walls of the hallways.

All teachers, which include the cafeteria manager, custodian, and special education teacher, have fish tanks in their rooms. Some teachers house additional animals, such as lizards, birds, and frogs. The front entrance has a large 100-gallon aquarium full of fish and a glass aviary houses several birds, including a society finch, pigeons, and bearded dragon. A garden in the shape of Oklahoma and several other raised beds for flowers, vegetables, and herbs are found around the school grounds. A walking trail goes around the school grounds. A reconstructed wetland area with a gazebo, windmill, and viewing tower are found on site. A city park is about two blocks from the school; the principal obtained permission for students and teachers to use this area. The school is located on a hill within a neighborhood containing two story houses built in the late 1950s. Many of the students come from nearby Section 8 housing and apartments located near the neighborhood (Principal's interview).

Cheryl's school, Franklin Middle School, formerly made up with neighborhood students, has undergone a change in the school population with the advent of the No Child Left Behind Act of 2001 (PL 107-110) (Principal's Interview #1: Sept. 8; 8:00-9:00 a.m.). Some neighborhood students have transferred to other schools; students are bused across the city to attend this school with the No Child Left Behind (NCLB) policies of school choice (Cheryl interview). This school has a large fenced in area containing an arbor, gazebo, and built-pond. The school and neighborhood donate recycled paper to the bins outside the school. This money helps fund supplies for the garden area. This school is located in the center of the city in an early 1960s-built neighborhood with a community swimming pool and park nearby. The houses in the

neighborhood are well-kept two story houses. A small creek runs behind the school part of the year.

TABLE II
SUMMARY OF PARTICIPANTS' SCHOOLS

The Participants	Robin Waters*	Cheryl Rivers*	Victoria Lake*
The Schools	Derby* Elementary School	Franklin* Middle School	Curie* Middle School
Setting	Urban setting within the Salve* School District	Urban setting within the Salve* School District	Urban setting within the Salve* School District
Enrollment	284 Students enrolled in PreK-5th grade	749 Students enrolled (139 on her team) in 6th-8th grade	796 Students enrolled (137 in 6th grade accelerated program) in 6th-8th grade
Student Ethnicity	American Indian ...17% Asian0.4% African American ..34% Hispanic4% Caucasian.....44%	American Indian 6% Asian..... 1% African American . 27% Hispanic..... 10% Caucasian..... 56%	American Indian.....9% Asian 1% African American..22% Hispanic4% Caucasian64%
Special Needs	24% students have IEPs	21% students have IEPs	16% students have IEPs
Poverty Level	74% students on free or reduced lunch	30% students on free or reduced lunch	37% students on free or reduced lunch
Schoolwide Environmental Efforts	Recycles paper and aluminum	Recycles paper	Recycles paper and aluminum
Support for EE	Supportive principal	Supportive principal	Unsupportive principal
Prevalence of EE	Environmental-themed school	A few teachers use the garden area	Two teachers teach EE; administration sponsors 6th and 8th grade overnight field trips to Pristine Prairie*

*Pseudonyms replaced all names of schools, teachers, school district, and places.

Madame Curie Middle School, where Victoria teaches, changed its focus to attract more “neighborhood” students by making it a magnet school (Victoria interview). It is located in an affluent residential area built in the early 1950s. The school’s Parent Teacher Association, local community organizations, state and an Environmental Protection Agency grant funded the outdoor trail, pond and vegetation. The principal subsequently bulldozed the outdoor area, grant and community funded, when he feared it caused flooding into the school. Victoria has received several awards for her abilities to teach, including a National Science Foundation Teacher of the Year award.

Table II provides a summary of the participants’ schools, including the percent of students on free and reduced lunch and the ethnicity of the students attending each school. A cursory description of administrator support and types of environmental education activities are also included, with more detail to follow in Chapters IV and V.

Data Collection

Following Institutional Review Board (IRB) approval for the study and approval from the school district, I discussed with each of the teachers the scope of my project to also receive their official approval as deemed necessary from the IRB Office (see Appendix B). Over the course of a four-month period, I used semi-structured interviews using the same starting set of questions (see Appendix A) for all three teachers. I interviewed each of the teachers individually in their classrooms or schools. Two of the teachers, Robin and Victoria, met for a three-hour focus group interview at the end of the interviews and observations to gather data from multiple perspectives and clear any misunderstandings I might have had from my data collection. Cheryl’s formal interviews

happened in half hour chunks of time for a total of one and a half hours. In Cheryl's classroom, observations consisted of five hours of teaching and an interview of the principal. This was due to constraints in her environmental education teaching. I formally interviewed Victoria, at Madame Curie, twice for one hour each and observed her teaching nineteen hours, including a field trip with her magnet 6th graders to a local art museum. Robin, who told me at first her job title was "environmental educator (Interview #1 of Robin)," was corrected later by the principal who called her the "math and science coordinator (Interview with Robin's principal)." She spent much of her time doing environmental education activities with her students. I helped her collect paper and cans to recycle, helped reduce food waste at lunch to be composted for the garden, cleaned bird cages, and helped in the garden on several occasions. I also spent several hours on a special day at their school when they celebrated Native Americans and the Earth, as well as on Dr. Seuss' Birthday, when several volunteers came in and read books to the students. I interviewed Robin for one hour and then spent eighteen additional hours observing her and interviewing her as questions arose. During observation times, I also interviewed her principal and clarified some of the information told to me by Robin.

The first interview of each teacher lasted 30-60 minutes, during which I established rapport with the teacher using general getting-to-know-you questions designed to put the teacher more at ease before diving into the subject of environmental education. Following the initial interviews, I transcribed the interviews verbatim and coded the data by hand to reflect on the interviews and determine questions for subsequent interviews and observations. Following the first interview of all three teachers, I noticed all the teachers used animals in their classrooms and recycled at least

one form of waste. All three also used a garden area or outdoor classroom to teach EE. The three teachers, when asked why they teach environmental education, all discussed issues of caring--caring for the environment, caring for future generations, and being open-minded. By looking for common themes from the first interview, I adjusted my second interview questions to fit the new, emerging information.

Following observations and other interviews, additional questions emerged. All interviews were transcribed and coded like the first interview. I kept a researcher's notebook to catalogue potential biases and record on-going ideas and emergent themes as the interviews and observations occurred. Member checks from the teachers confirmed the authenticity of the data. A focus group, conducted at the end of the observations and interviews, gained additional information from the teachers for the research and allowed them to learn new EE ideas from each other. I left open the possibility of interviewing others in my study to add detail and understanding to the setting and topic of urban environmental education. I interviewed Robin's principal and Cheryl's principal. Both of these interviews happened spur of the moment. Robin wanted me to come in and meet her principal and the principal said she had a few minutes available for me to talk with her and ask questions. Cheryl's principal was able to talk with me when I visited the school to observe a first year teacher. He let me know what he had done to help EE at Franklin Middle School.

Topics for further clarification were asked during subsequent observations/interviews as well as the focus group. Interviews took place during planning times or before or after school so as not to interrupt the teaching process. Observations occurred from one to four class periods (typically the same time of day).

This helped the researcher understand the nature of the classroom during a few select class periods. Planning time, because it differed for the three teachers, gave me time to drive from school to school to observe a participant during another participant's planning time. This did make trips to the city more productive, because at least two teachers could be visited in one day. Following observations, I interviewed the teachers during their planning time to reflect on the observations, student interactions during the lesson, and issues relating to teaching the lesson. The researcher contacted the teachers and asked when environmental education activities might be taking place in their classrooms to ensure observations related to environmental education practices, not just general teaching behaviors. However, some observations of non-EE teaching were made to allow comparisons between EE and other teaching.

Field notes, written observations, and audiotaped interviews of the teacher were the primary tools of this qualitative study. Analysis of artifacts, such as the state education standards, the Salve School District Pacing Plan, each school's rules and motto, and other school documents helped triangulate the data. Constant comparison between observations, interviews, and artifacts helped themes emerge both within each school and across school sites.

Permission for this study occurred across three levels, the Institutional Review Board, *Salve Public Schools and the school principals. All three teachers provided verbal and written consent forms to study their classrooms (see Appendix B). All principals provided verbal support of this study following contact letter sent out by the researcher and Salve Public Schools' written permission to the IRB office and principals.

Data Analysis

The primary data for this study included field notes, taped interviews and observations, and artifacts collected from each school and teacher. The state achievement test scores, rules and mottos for each school, and the Salve School District Pacing Calendar all became artifacts for my study. Victoria also provided me with packets of information she used in class activities and on field trips showing how she incorporated environmental education into her science classroom. By interviewing and transcribing the interviews, observing each of the classrooms several times, and using the artifacts collected, I triangulated the data to look for comparisons between the three methods of gathering data. If discrepancies existed among the three forms of data, I noted this and thought of additional questions to ask for a clearer understanding.

The three research questions guided my data collection and analysis to understand the teachers and their environmental education beliefs and practices. I listened to each teacher describing the type of environmentalist they were and how they used environmental education in the classroom. Next, I asked for times to observe the teachers using environmental education in their schools. This helped me compare their descriptions of EE to actual practices. I looked especially for mismatches in each teacher's prescribed ideas and how they were carried through in the classroom. Themes emerged from data collection and reflection on observations and interviews. I noticed similarities between all three teachers early on, such as how all three used animals in the classroom and used this to ask further questions. All three teachers also used gardens or outdoor areas to teach about the environment.

CHAPTER IV

FINDINGS

This chapter presents data regarding three teachers' environmental education practices. The data were gathered from interviews, artifacts and observations of the teachers and their classrooms, as well as from interviews of two school administrators.

This chapter is organized around three research questions:

1. What are three urban teachers' personal environmental beliefs?
2. How do three urban teachers' environmental beliefs affect their understandings of environmental education?
3. How are the three urban teachers' environmental education beliefs related to teaching EE in their classrooms?

First, I will introduce each of the teachers' classrooms and schools followed by a general description of the teachers and an explanation of their personal beliefs of the environment and environmental education. Next, I will discuss observations of their environmental education practices. The teachers' beliefs and practices of the environment and environmental education will be compared to one another while showing emerging themes from the collected data.

Throughout this chapter:

- All names of teachers, administrators, and schools are pseudonyms;
- Information in brackets is the researcher's explanation or elaboration; and

- In quotations from oral interviews, italics are used to indicate words emphasized by the interviewees.

Cheryl Rivers

Cheryl's Classroom and School

Cheryl's classroom was set up with tables of two students each in a U-shape; three tables of three rows filled the middle of the outer U. These inner tables faced the front dry erase board and teacher's podium. Curtains decorated with pictures of insects acted as a valance over one window where four plants, including a spider fern and an ivy, sat in the windowsill. Seven other plants, including a palm, occupied other parts of the room. A small air conditioning unit, the central air conditioner and the PTA-purchased ceiling fans helped cool this room. Two partially open windows brought heat and humidity into the room. Students' dodecahedrons modeling body systems hung from the ceiling.

Cheryl displayed some posters all year, while changing posters in one area according to the topic currently being studied. Many of the posters on the back wall of the classroom, which stay up all year, represented environmental themes. A poster depicting a little girl in a wildflower patch displayed the caption, *THE EARTH IS A GARDEN AND WE ARE THE CARETAKERS*. Another poster showed several endangered animals and plants holding signs that read, *SAVE OUR EARTH, KEEP OUR WATER CLEAN, HELP US, LOVE OUR SWAMP, KEEP THE FOREST GREEN, and EXTINCTION IS FOREVER*. On the south side of the classroom, posters of Oklahoma animals and plants permanently hung. Next to the

Oklahoma posters, a section of posters changed according to the subjects taught; at the time of this observation, human body diagrams highlighted each body system.

The room contained several fish tanks, with guppies in the five 20, one 50 and one 100-gallon fish tanks located on cabinets and stands around the room. Two aquaria housed a snapping turtle and a colony of Madagascar hissing cockroaches, respectively. Cheryl used the guppies to create an ecosystem, an activity from *Bottle Biology* (Ingram, 1993), but she felt she no longer has time for this activity. The room also hosted a converted birdcage that now was home to a large white rat.

Wooden signs hanging behind Cheryl's desk read A TEACHER PLANTS THE SEEDS OF KNOWLEDGE and TEACHERS HAVE CLASS. Next to these signs a small shelf contained a hanging apple, a large rose rock and her college alumna license plate.

Cheryl worked as a 7th grade science teacher at Franklin Middle School. She had taught for 15 years at this school and 20 years total. This school, formerly made up of students from the surrounding neighborhood, had undergone a change in the school population with the advent of No Child Left Behind Act of 2001 (PL 107-110) (Principal's Interview #1: Sept. 8; 8:00-9:00 a.m.). Some neighborhood students transferred to other schools and have been replaced with students who are bused across the city as a result of the NCLB policy regarding school choice (Interview #1: February 14; 10-10:30 a.m.). This school had a large fenced in area containing an arbor, gazebo, and a pond constructed on school property. The school and neighborhood donated recycled paper to bins outside the school. This money helped fund supplies for the garden area. This school was located in the center of the city in a 1950s-era neighborhood with a community swimming pool and park nearby. The houses in the

neighborhood were well-kept two story houses. A small creek ran behind the school part of the year.

Cheryl expressed some frustration with her large class sizes, the lack of gardening equipment, and her inability/lack of interest in controlling her students once they left the classroom setting. Teaching indoors and using an authoritarian style for classroom management worked well in an enclosed space but did not transfer well to the out-of-doors.

Cheryl's Background

Cheryl attended a state university and majored in Physical Education (PE) in college. Fifteen of Cheryl's twenty years of teaching occurred at Franklin Middle School, but not synchronously because Cheryl took time off with the birth of her children. When she returned to teaching, science jobs outnumbered PE jobs, so she became a science teacher. (Interview #3: March 9; 10:00-10:30 a.m.)

Cheryl's interest in environmental education stemmed from her childhood experiences as a Girl Scout and family camping trips. As a child, she grew up in a community near the city where she now resides. Her passion for gardening started as a child, but continued with the numerous plants housed in her classroom and her interest in providing her students experiences in gardening.

My father was a gardener and once I went off to college, they moved to Topsy.

They (my parents) had a big ol' garden and I always tried to help them in the summers. It seems like I've always had a green thumb. I've always gardened at home! (Interview #2: March 2; 10:00-10:30 a.m.)

She did not consider herself a member of any environmental organization, but subscribed to several gardening magazines. Master Gardeners, typically retired people, volunteered through Cooperative Education to teach gardening skills and knowledge. Cheryl expressed interest in joining them, but the group meets during school hours.

One summer I tried to sign up for a [Master Gardeners'] gardening class, but I didn't sign up once I learned the Master Gardeners met on Wednesday during school. (Interview #2: March 2; 10:00-10:30 a.m.)

The Master Gardeners volunteer equipment, free labor and expertise to schools and organizations. Cheryl agreed additional adult helpers would benefit her gardening efforts. However, inclement weather or unplanned assemblies interfered with her gardening plans, and Cheryl's need for flexible planning prevented her from calling the Master Gardeners.

Yes, the Master Gardeners helped about ten years ago put in our pond. I would like the Master Gardeners' help since we could use a better adult to student ratio. They [her students] are in this open space and it's like...oh my God! If you don't have a specific task for them [in the garden], they just drift off. (Interview #2: March 2; 10:00-10:30 a.m.)

Cheryl's Beliefs about the Environment

When asked about her personal environmental beliefs, Cheryl said she considered herself a "tree hugger." When asked for refinement, Cheryl responded, "I'm kind of both a preservationist and a conservationist. I don't litter and don't like people to walk

through the flowerbeds. I think you should recycle as much as you can and don't burn wood" (Interview #1: Feb. 14; 10:00-10:30 a.m.).

Cheryl did not see herself as part of the problem or part of the solution. Recycling and gardening at Franklin Middle School primarily benefited Cheryl. "It's just that I don't have enough flower beds and gardens of my own, so I come up here and use theirs. I get the kids to plant for me and I water pretty much" (Interview #1: Feb. 14; 10:00-10:30 a.m.).

When asked about the place of humans in the natural world, Cheryl said I think it's side by side. Of course we are here [on Earth]. But I think it's a shame that we are destroying the rainforest. I understand that people must live, but is there not part of it [the Earth] that people can leave natural? It just seems like every time you hear something on the news it's just full speed ahead [people destroying habitat] with no limits and no requirements. (Interview #2: March 2; 10:00-10:30 a.m.)

Cheryl's separation of humans from nature suggested she had an egocentric view of the environment, which most closely resembled the Conservationist view. Conservationists, like foresters and wildlife managers, prefer managing the environment, believing that their actions will help (re)create nature.

Cheryl's definition of the environment placed humans in charge of other animals and plants. Cheryl held conflicting ideas and actions of her environmental beliefs. Cheryl discussed technology in the context of career possibilities for her students. Technology used as tools also was present in her ideas. However, technology was not discussed in terms of its environmental/health affects. Cheryl expanded by explaining

how technology might help conserve the environment, which followed her egocentric view of nature. She provided an example of how technology could help preserve the rain forest by using fake lumber instead of trees.

I think all that fake lumber they use now [made] from tires is great. That will keep fewer trees from being cut down. I think it's like plastic. It's man-made. I think it will help in that way. There are lots of endangered plants that are used for pharmaceuticals. They could use chemical instead. Technology is kind of overwhelming. You have to have a limit somewhere. (Interview #2: March 2; 10:00-10:30 a.m.)

Cheryl's Beliefs about Environmental Education

When asked about her beliefs about environmental education, specifically how she teaches the relationship between humans, plants and animals (nature), she explained:

Well, you talk about, you know, the water cycle, the carbon cycle, the oxygen cycle—all that preliminary and basic elementary environmental stuff. They *know* a lot of it, like food chains and food webs. All that is interesting to them. And we do the *Lorax* movie and then break up into discussion groups.... (Interview #2: March 2; 10:00-10:30 a.m.)

Cheryl did not believe in sharing her opinions or values within the context of environmental education. “Some of it [her personal beliefs] I try to carry over [into the classroom], but a lot of times you can't really give an opinion...you know, you can suggest things, but I don't *force* it on them” (Interview #2: March 2; 10:00-10:30 a.m.). Despite this unwillingness, students learned Cheryl's values towards plants, gardening,

and the rainforest. In particular, her students understood some of her personal values when they learned not to walk on the flowerbeds.

Every day when I'm leaving school, I see kids walking through the flowerbeds.

That *just burns me up!* I'm always jumping on them; the flowers are just tromped down to *nothing!* Of course, they aren't my students, because they know [better].

(Interview #2: March 2; 10:00-10:30 a.m.)

Cheryl also wanted students to learn respect for animals and plants (Interview #2: March 2; 10:00-10:30 a.m.). However, in Cheryl's view, not all animals and plants receive the same level of respect.

We find lots of grub worms and they [students] freak out! And so the best thing we've done is we take them out with our little trowels and we walk over to the pond and feed them to the fish. And they like that! Oooh!! Let me take that over to the pond! (Interview #2: March 2; 10:00-10:30 a.m.)

Classroom observations bore out Cheryl's comments. "Mrs. Rivers, can I feed this grub worm to the fish," asks one boy. A girl has others place grub worms on top of her long sleeve so she can feed the grubs to the fish. (Observation #1: April 15; 9:10:00-10:20 a.m. & 12:35-1:35 p.m.)

The last ten minutes of the class were devoted to bringing their chicks to their tables. They were expected to clean up any chick feces as it occurs. Some students seemed to know how to hold the chicks and others did not. A girl that showed me her chick treated it gently and knew how to hold the chick. Her peer at the same table did not hold the chick properly and didn't seem to know what to do. She, instead, made fun of her chick for the many feces it dropped. The chick was trying to walk around the

slippery table and not doing a very good job. Students, with permission from their parents; could take the chicks home at the end of today. They had to bring a shoebox to transport it home. In addition, Cheryl had told them what chicks eat, like grain or bread if they are desperate for food. (Observation #2: April 29; 9:00-10:30 a.m.)

Cheryl's Environmental Education Practices

Cheryl's environmental education practice revolved around three topics: recycling, gardening, and respect for all living things.

Recycling was the main emphasis for Cheryl's environmental education. Students from the special education classes helped pick up boxes of used paper in every classroom to take to the recycling bin located in the school's parking lot. The money obtained from recycling helped purchase plants and equipment for the outdoor classroom area. Cheryl said that during paper recycling competitions amongst the city schools, she encouraged students to bring in more paper. The principal agreed to set aside money made from recycling paper and magazines at the school to purchase supplies for the garden. Neighborhood residents also used the recycling bin and helped the school increase their profits.

...Through old science club money we bought big tubs with wheels on them. A special education student goes by and picks up the paper. Everybody has bins or boxes to [use for] recycling. Their [special education] students help me recycle and help me clean them up. I think that helps the *school* be aware of it. And then they [the recycling company] have contests for the school that recycles the most paper [measured in pounds]. We make an extra effort to recycle more for the

contests. We use that money [made from recycling] to buy soil amendments, fertilizer or to pay for somebody to till up the garden. Most of the plants we get from America the Beautiful. I write a little essay and they send the seeds *free!* I usually get fifty vegetables and fifty plants, which include flowers and herbs. Some of them [donated seeds] don't work, but we still have about 60% success rate! (Interview #1: Feb. 14; 10:00-10:30 a.m.)

As students entered the class, they visited with their friends until the bell rang. Cheryl then told them to sit down and get started on their "Science Starter." Students worked on this activity Mondays through Thursdays, but on Fridays students were given scrambled quotes that reflect educational goals or environmental themes. Sometimes, the quotes provoked a discussion in her students. Cheryl explained during her second interview the science starters made students think critically about the environment. Monday through Thursday, the questions dealt with a review of the material students were studying. On Fridays, Cheryl used a quote that she had scrambled. These quotes focused on environmental or goal-oriented material.

- Chapter 24 Review due
- Outside to garden
- Vocabulary due

State Objective 3.1- Characteristics of an organism result from inheritance and from interactions with the environment.

Figure 1. Class Information Posted on the Dry Erase Board (Observation #1: April 15; 9:10-10:10 a.m. & 12:35-1:35 p.m.)

During Observation #1 (April 15, 9:10-10:10 a.m. and 12:35-1:35 p.m.), the day's agenda and one of the state science standards were posted on the dry erase board (see Figure 1). Classroom sets of books with different themes sat on a shelf at the front of the room. On this day, students used the Prentice Hall series titled *Human Biology and Health: Genetics and Inheritance* (Padilla, 2005).

Cheryl provided the students with her general gardening rules on their first day to garden:

1. Be quiet in the hall—coming and going.
2. Stay with the group.
3. Do NOT ask to go back [inside].
4. No screaming, yelling or playing chase.
5. Be careful with the tools. (Observation #1: April 15; 9:10-10:10 a.m. & 12:35-1:35 p.m.)

Cheryl's current students differed from her former students with their limited experiences in gardening. Cheryl found many of them do not enjoy gardening. Students dig and plant seeds, but ten trowels were not enough to keep thirty-plus seventh graders occupied.

On garden days now, they [students] are not real excited. They say, "Oh, we have to go outside?" You know, there's a couple that are still open-minded and enjoy it, because maybe their parents or grandparents did it (gardened). But most of them are like, "Oh, I don't really want to go out there. It's too hot!" or "It's too cold!" You just explain what we are going to do before we go out there and we mainly just dig for a while. We mainly just dig in the dirt and then identify

weeds; what's not a weed and what to do with the stuff once it's thrown out of the garden. (Interview #2: March 2; 10:00-10:30 a.m.)

However, Cheryl did not think that students have changed their ideas about getting dirty. Students seemed happy as they helped plant seeds and ran around the garden area. It was hot outside, but they seemed content to sit under the gazebo and wait for Cheryl and a few others to finish the last of the gardening. "You see them on the playground at lunch. They are just, like, rolling in it. I don't think that's much different at all [between the old students and the more recent students]" (Interview #2: March 2; 10:00-10:30 a.m.).

A chain link fence enclosed the garden area on three sides with wooden stockade fence on the fourth side hiding neighboring homes. The garden area hosted a fish pond, a wooden gazebo and arbor with picnic tables underneath, and a sign proudly stating, "Franklin Middle School Garden." A concrete bench with a small concrete patio honored a former student who passed away in his early twenties. Planted flowers surrounded the gazebo, whereas small plots of vegetables surrounded the arbor. These vegetables, already bearing fruit in May, were not planted as seeds.

The square one, that's out south, is a science project. We bought the wood and parents came out and helped build the gazebo. That was when we had *good* parents. That was about ten years ago. The other one, we call the Arbor, because it only has two sides, was a Boy Scout project. The picnic tables underneath were another Boy Scout project. We had to buy all the wood for those projects.

(Interview #1: Feb. 14; 10:00-10:30 a.m.)

Cheryl used gardening to provide new experiences for her students. She also found students rarely spent time outside, either during school hours or at home.

“Sometimes we are out there [in the garden] because I’m tired of being inside, especially on beautiful days” (Interview #2: March 2; 10:00-10:30 a.m.). Other students, not in her class, asked Cheryl when they can go outside. Students with gardening experiences prior to Cheryl’s class received the information from older family members. Their naivety towards planting seeds was illustrated by how they reacted to the successes/failures of their seeds.

I don’t think they’ve ever dug up a garden or planted seeds or cared for anything in their lives. Maybe they had a guinea pig once, but they are real *surprised* [about how much the seeds grow]. Even when we plant bean seeds in the dirt, they are *shocked!* ‘It grew that much over the weekend? Oh my God! Why is it doing that?’ (Interview #2: March 2: 10:00-10:30 a.m.)

Cheryl also claimed to explain cycles in her gardening practices, but during observations, this dialogue did not occur. “When students throw weeds out of the garden, I ask them where it goes and what happens to it” (Interview #2: March 2; 10:00-10:30 a.m.). In addition, Cheryl asked direct questions of her students while gardening.

Cheryl asks the students, “What is a perennial?” One student replies, “Plants that come back every year.” In another class when asked this same question, students start to guess, “They live one year?” Cheryl replies, No. “They live more than one year?” Yes says Cheryl. (Excerpt from Observation #1 field notes: April 15; 9:10-10:10 a.m. & 12:35-1:35 p.m.)

Cheryl wrote a grant proposal to obtain free seeds from the America the Beautiful Fund, a national non-profit organization started in 1965 to encourage volunteer citizen efforts and to protect the natural and historic beauty of America [Interview # 1: Feb. 14; 10:00-10:30 a.m.]. Before the students left the classroom, Cheryl wrote on her clipboard the names of the student pairs and their two chosen seed packets. A map on the board showed students approximately where to plant the different types of seeds. This map helped Cheryl approximate where and what each group planted within their plot.

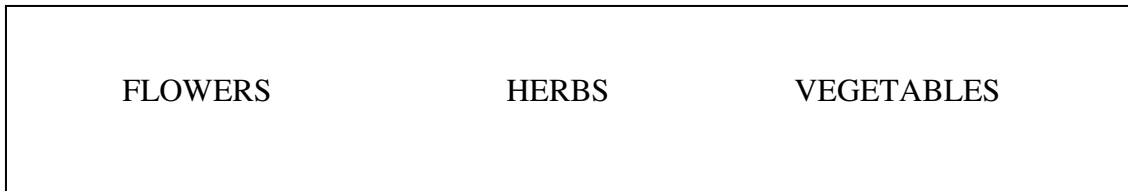


Figure 2. Layout of Cheryl's Garden Plot (Observation #3: May 20; 12:20-2:20 p.m.)

Students used their trowels to cut a path about two inches deep across the row, lightly sprinkled their seeds across the row and covered them with a touch of soil before stepping on the row with their tennis shoes. Each class used their own small, raised bed garden plot surrounded by railroad ties. Their limited experience in the garden showed when students were surprised by the results of their plantings. Students became upset if not all of their seeds survived. "You tell the kids that not all of them [the seeds] will live and they [whine and cry] OHHHHH! And they don't understand. They are so funny" (Interview #1: Feb. 14; 10:00-10:30 a.m.).

While gardening, students spent about ten minutes digging in the soil and planting seeds. During this short period, students learned some gardening skills, but higher levels of the environmental literacy hierarchical were ignored. The following example showed

a missed opportunity to teach students the difference between grub worms and earthworms.

Cheryl tells the students, “If you come across mealworms or grubs, put them in the pond.” A student asks her how they will know when they see a grub or mealworm. There is no reply. “Mrs. Rivers, I found a worm!” Cheryl replies, “Is it pink?” The student states, “Yes,” and is told to leave it there. Afterwards, they retreat to the gazebo and wait for Cheryl to pick them up. She helps a few students finish up and then walks around the garden looking at other plants.

During this time students are not supervised closely. (Observation #1: April 15; 9:10-10:10 a.m. & 12:35-1:35 p.m.)

All teachers have the opportunity to use the garden area, but only a few teachers use the space. Another teacher bought and planted tomato and corn plants, which were already producing fruit. Cheryl encouraged one of the five new science faculty members to start his classes gardening next year, but the success of her efforts was uncertain.

Any teacher can take their class out there. And that doesn't usually happen too much any more. But we (her class) are always out there. The new 6th grade teacher is interested in gardening and I'm going to try and bring him in.

(Interview #1: Feb. 14; 10:00-10:30 a.m.)

Although Cheryl stated her classes spend much time outside, in actuality her students visited the garden only twice this year. She planned to visit a third time but canceled because the weather was colder than usual (60° Fahrenheit) and the garden was muddy from rain received the previous night. (Observations #1, #2, & #3)

Cheryl incubated fertilized chicken eggs so students could learn about the developing chick embryo. There was a poster at the front of the classroom near the two incubators with photographs showing the daily development of a chick. The students quizzed Cheryl about the making of the poster. (A group of chicken eggs laid on the same day are stored in an incubator. Each day, one egg's shell is removed and the embryo is photographed to record the changes in growth and then discarded. The process continues until the remaining eggs begin to hatch.) Instead of explaining this to her students, Cheryl told her students "to think about it." (Observation #2: April 29; 9:00-10:30 a.m.)

A discrepancy existed between the behaviors of students indoors and outdoors. Inside, students sat quietly as Cheryl strictly monitored their behavior to keep them on task. Outside, Cheryl lacked the ability to control her students in the same manner (Observations #1 & #3). On this day

Cheryl opts for students to read an article in class instead. Students are learning about inheritance and reproduction, so the article deals with sexual attraction in animals. The students sit passively as one person reads a paragraph. In order to participate, a student must raise their hand and be called on by the present reader to take over the reading.

The chicks are peeping as students are reading the article aloud. The water filter in one fish tank also makes a waterfall-like sound. Students, distracted by the chicks, continuously look over to the cages to see their chicks. Several students start to scream as one of the chicks manages to slip through the wire cage. One of

the boys runs over to the counter and puts the chick back into its cage. (Excerpts from Observation #2 field notes: April 29; 9:10-10:30 a.m.)

During the last ten minutes of class, following the oral reading about animal pheromones and mating behavior and the drawing of their graphs, students removed their chicks from the wire cages and brought them back to their tables. Students were expected to clean up any feces their bird deposited on the table. Some students seemed more adept than others at holding the bird and being careful with it. One girl held her bird very gently and treated it well. She was calm around the bird. Her friend at the same table did not know how to hold her bird and became agitated when her chick defecated on the table several times, which she must then clean up. This girl's bird was trying desperately to walk around on the slippery wooden table, but its claws did not work well on the table's surface and caused the bird to walk as if it had a broken pelvis. When students returned their chicks to the cage, several girls screamed and ask Cheryl to remove a dead bird. Cheryl waited until the students left to remove the bird and threw it in the trash. She told me, as she threw away the dead chick, of another chick that tried to get out of its shell, but could not quite make it. The students heard chirping throughout class and Cheryl told them it was nothing. The chick, disposed of in the trashcan, chirped where Cheryl placed it.

Cheryl would like her students to keep an open mind (meaning open to new experiences). "I want them to learn every day, not just while you are in the classroom. Learn and be open and respectful at all times. I would like them to desire reading." (Interview #1: Feb. 14; 10:00-10:30 a.m.) This did not seem apparent in her classroom as several issues of respect arose during observations. The ignorance of raising chickens

in city limits, the correct disposal of dead birds, *Salmonella* issues and the preference of only good bugs and worms in the garden show further proof of her conservationist attitude towards the environment where humans rank first among other living creatures.

Cheryl sent home permission slips for her students to take a chick home to their house. Several students brought shoeboxes and the permission slips signed for the chance to take their bird (which is marked on the head with a magic marker) home. Cheryl told them bread or cereal would work for feeding them, but grain from the mill would be better. (Observation #2: April 29; 9:00-10:30 a.m.)

Cheryl watered the garden at least once a week during the summer months because she lived about a mile away from the school. She ate most of the harvested food, but students were invited to meet her at school on Wednesdays to share the crops. Vandalism by older neighborhood kids who jumped the fence and smashed the plants caused significant damage to the garden.

I'm up here three times a week in the summer. I'm usually gardening [not working in the pond]. The PTA [Parent Teacher Association] gives me \$100 so I can go over to Lowe's and buy tomato plants. The students are invited every summer to help harvest. I tell them I'm up here every Wednesday for sure. Every once in a while I'll have a kid or two come up. I have some that jump the fence and tear everything down. It's the neighborhood high school kids who don't go to school here. It's OK as long as they don't tear down the fence! (Interview #1: Feb. 14; 10:00-10:30 a.m.)

Students collected twenty-five leaves earlier this school year. They used a dichotomous key and labeled the leaves based on their type of venation and whether the

leaves were compound or single. Students labeled the location and the date found of each leaf. Cheryl taught the students how to press the leaves for their collection using the city's phone book. She also had to show the students' poison ivy in preparation of leaf collections and walking to the creek.

Yeah, we went through the thing [explanation] and there's some poison ivy down by the creek. The students say, 'I don't care. I'm not allergic.' And you're like, oh great! Parents really liked this project. It gave them something to do together. One year we did the leaf collection in the summer and winter so each student had two leaves for each season. It was a good comparison of the different seasons. If they wanted to do the seeds of the tree, that was for extra credit. (Interview #3: March 9; 10:00-10:30 a.m.)

In the fall, Cheryl takes her students out to the creek three or four times. Mainly, she uses the creek as a reward on Fridays if they have been well behaved during the week.

One day we went down to the creek and everybody collected leaches and crawdads and we graphed how many of each animal we found. Mostly, we just use the creek for a kind of reward type of thing. It allows the students to just get out of the classroom and talk about stuff on the way down there and the way back. (Interview #3: March 9; 10:00-10:30 a.m.)

The students unscrambled quotes on Fridays. Below (Figure 3) is an example of a quote I witnessed during one of my observations.

They [her students] often do sayings and a lot of times it's about the environment and the kids like it. There's one saying, 'You don't inherit the earth; your

children do.’ The students asked me what that meant. So we talked about how it’s not *your* environment or nature, but it’s your *kids*’. They were like, oh, *ok*. It’s just a quick five-minute thing. (Interview #2: March 2; 10:00-10:30 a.m.)

“After you achieve your goal, set another.”
---Anonymous

Figure 3. Unscrambled Quote from the Blackboard. (Observation #2: April 29; 9:00-10:30 a.m.)

Cheryl’s EE Contextual Factors

Franklin Middle School’s property backed up into a small stream that contains water part of the year. This allowed students to test water, collect soil samples, and look for aquatic macro- and microorganisms in the stream. The school also had an enclosed garden area with a gazebo and arbor. In addition, a large backyard lay between the school building and stream. Because the school was located in a neighborhood away from busy streets, the area was relatively quiet and protected.

Cheryl spoke often of people and circumstances that limited her teaching. “We are just revamping the curriculum for what the state wants us to do” (Interview #1: Feb. 14; 10:00-10:30 a.m.). When the school district added physical science in 8th grade for a high school credit, the school changed their previous model of integrated science teaching, which included life, physical and earth science.

All of our kids were in the classes for high school credit, so *why* have physical science all the way through? Because they are missing life and earth...we went to

life science in 6th grade, Earth science in 7th grade and physical science in 8th grade. (Interview #1: Feb. 14; 10:00-10:30 a.m.)

This meant that physical science is now in 6th, 7th and 8th grade, despite the fact that many students receive high school credit for physical science in 8th grade. Most students take the 8th grade physical science class, except for one class of students with poor previous records in science. The pacing calendar at the district level is meant to lessen gaps in learning for a highly mobile student population. Cheryl's school shares science kits, so the teachers switch between the four quarters what is taught.

"You have to do the *standards* before you can actually branch out on your own" (Interview #3: March 9; 10:00-10:30 a.m.). Cheryl continued, "I choose what I want to do first [district standards]...and then I do *whatever's left!* ...It's pretty typical; it's not like it's new. *They* [central office] know!"

District objectives and state science standards limited her teaching environmental education, because environmental education is not addressed in the standards as a separate course, but several places exist in the standards for other courses where EE can potentially be inserted or integrated.

Franklin Middle School formerly taught life science in 6th grade, earth science in 7th, and physical science in 8th. Most 8th grade students took AP Physical Science, because it gave them high school credit. Now, the school integrates earth, life, and physical sciences in 6th and 7th grades. This caused Cheryl to remove topics she enjoyed so she could teach a newly required kit-based physical science module. She felt the kit did not really improve her teaching.

I already have *plenty* of hands-on stuff to do. I don't go straight through the kit. I pick out what I want out of the Smithsonian kits. After this many years, I have my favorite labs that I think shows them better than anything. You still have to do the *standards* before you can actually branch out on your own. (Interview #3: March 9; 10:00-10:30 a.m.)

Cheryl projected the blame outwards for her lack of environmental education in her classroom. She gave up teaching several environmental education topics which included: *Global Learning and Observations to Benefit the Environment* (GLOBE Program, 2002), earth and space science, ecology, and water quality. Other topics took precedence to the above-mentioned topics. The GLOBE program is a worldwide hands-on, primary and secondary school-based education and science program funded by the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and the National Science Foundation. GLOBE lessons focused on soil, water, atmosphere (weather) and earth systems science. The GLOBE weather station was placed in the garden area.

We're not doing Earth and space science, sorry. We are not going to get to that. Next year I'm going to have to pickup earth science, so I'm going to have to give up something else. (Interview #3: March 9; 10:00-10:30 a.m.)

This contradicted her "giving up something else" since it should be taught. One of the Salve District Science standards states: students learn about global atmospheric patterns and clouds and their affect on local weather and climate. (Artifact data, Salve District Science Standards)

In years past, eco-columns, as described in *Bottle Biology* (Ingram, 1993), used guppies as indicators of the amount of oxygen present. Because of the changes in her curriculum, the fish now are just a fixture. “We used to do the eco-columns with *Bottle Biology*. I would raise the fish so we wouldn’t have to buy them and they are *still* here because I *didn’t do it* this year” (Interview #1: Feb. 14; 10:00-10:30 a.m.).

Cheryl attended Blue Thumb training, a program of the state water conservation districts that trains local volunteers to conduct water quality testing and send the data to district offices. The program provided a water testing kit for students to test local water supplies. Volunteering to test water shows her initiative to help with environmental problems, but this, too, has become an activity of the past.

We used to do the microinvertebrates and all that [water testing]. Once again, if you do all that, then where’s the stuff you are supposed to cover? (Interview #3: March 9; 10:00-10:30 a.m.)

Cheryl believed a change in her school’s student population resulted from the federal No Child Left Behind Act of 2001. Franklin Middle School’s high test scores encouraged students from schools on the failing list to change schools within the district.

Well, because we had high scores and their schools were plummeting so they got to choose the school where they want to go. They chose here [Franklin Middle School] and that brings ... [Franklin’s test scores] down. The neighborhood kids decided “I’m not going to this school” for whatever reason and so they move on to another school. (Interview #1: Feb. 14; 10:00-10:30 a.m.)

Cheryl believed this change in Franklin’s student population resulted in differences in the students’ attitudes towards gardening.

On garden days, they were all excited. Now, they are not real excited. There are just a few maybe, whose parents or grandparents gardened, but the rest are like, "...We really don't want to go out there." But it seems [to Cheryl] they [students] are trapped inside all the time and it's beneficial for them to get outside.

(Interview #2: Mar. 2; 10:00-10:30 a.m.)

Students are bused in more now and can't stay after school. Cheryl explained that her after-school science club was disbanded because of the busing schedule.

We used to have a science club. A *real active* science club. We used to have late nights. We would do major projects and fund raising. We used Blue Thumb to do creek restoration. We have a creek right out in the back of the school. We would take fishing trips over to Willham Park. You know, real fun stuff!

(Interview #1: Feb. 14; 10:00-10:30 a.m.)

Water testing at the creek had additional barriers. "During football season, all the football players are out there urinating in the creek. So when we get back from the creek, I say, 'Oh my goodness. Wash your hands *please*'" (Interview #2: Mar. 2; 10-10:30).

The construction of a small pond and erection of a chain-link fence caused conflict with one of the neighbors. The principal helped Cheryl by filing paperwork with the city and by making sure the pond was built correctly.

We have one older neighbor that keeps fighting us, like fifteen years. The first principal when I came here wanted to build a fence around our lot and the neighbors were used to driving their boats around back there and they got upset when they couldn't. Now, every winter, she'll take pictures and write letters and go to the school boards. She claims someone is going to drown. We [Franklin

Middle School] are like ARRRGHH! [The pond is] regulation; it's six inches deep. We've had the pond for six years. (Interview #1: Feb. 14; 10:00-10:30 a.m.)

Koi, purchased for \$12 each, lived in the pond first. However, an unexpected event caused them to switch to a different species. The koi lived through the winter outside, but "Last spring we had a crane come through and...[it] ate all the \$12 koi. We had people running out there trying to shoo the crane away. It was pretty funny. We bought goldfish after that" (Interview #1: Feb. 14; 10:00-10:30 a.m.).

Class size caused several barriers to teaching environmental education. Her smallest class was 32 students. Cheryl had two classes with 36 students. This made creek visitations, gardening, and labs difficult. The large number of students and tables in the room caused labs to be "berserk." "I go down to the creek by myself [with no other teachers]. It's difficult and the behavior of the students is getting worse" (Interview #3: March 9, 10:00-10:30 a.m.). Cheryl eliminated many labs and now prefers bookwork and handouts to accommodate her large classes. (Interview #2: Mar. 2; 10:00-10:30 a.m.)

Cheryl's large class sizes and changes in her student population caused her to do less environmental education. Her classroom was crowded with 16 rectangular tables and more than 30 students in every class. The classroom formerly served as the art room, which explained the presence of only one sink. Cheryl explained she thinks learning should be done hands-on and experientially. However, Cheryl found herself having students read aloud to each other more than she would like because discipline issues and larger classes caused her to pull back from experiential learning. Cheryl formerly used

classroom simulations from Project WILD (Western Regional Environmental Council, 1986), but “...not so much anymore. Thirty-six in a class, six of them are discipline problems—that’s what you drop” (Interview #2: Mar. 2; 10:00-10:30 a.m.).

During the upcoming summer, Cheryl’s room and storage area will be converted to a science lab, using district monies raised from the sale of school bonds. Even this presented new barriers, because the new lab will only fit 28 students at eight lab stations.

I’m still going to have more than that [28 students]. Somebody will have to be at a stool or a table. We are going to have lab tables and they are not going to be sitting on stools. Each table will have a double sink with a cabinet on either side.

(Interview #3: Mar. 9; 10:00-10:30 a.m.)

The renovation will also limit her room’s storage capacity because the architects will use the present storage area to enlarge the room.

Cheryl’s barriers to teaching environmental education seem to be mostly self-imposed. Although, her students’ behavior and large class sizes may limit the number and kinds of activities she can use, her principal’s support of the pond and garden area show his willingness to facilitate her interests in gardening and EE. The Salve district science plans and state science objectives both show potential places of including environmental education into her teaching, despite her comment, “You won’t find hardly anything environmental in it.” This lack of understanding of what defines environmental education might be part of her self-imposed barrier. Cheryl seemed to focus on obstacles to EE rather than on possible solutions. One such perceived obstacle was the school district’s required science objectives and the associated paperwork.

A lot of it [paper work] comes down from the [district] service center. It's just people trying to justify their jobs. You [the teacher] end up with it [paper work]. You do more [paperwork every year] and it goes up there [principal's office] and then it goes up there [Service Center]. (Interview #3: Mar. 9; 10:00-10:30 a.m.)

New science textbooks will be adopted this coming school year. Teachers attended meetings to hear from representatives of different textbook and kit publishers to help select the science materials. Cheryl did not choose to be her school's science chair despite her seniority. "I've already done that" (Interview #2: Mar. 2; 10:00-10:30 a.m.). She was the only science teacher not new to her building this year. "We are supposed to vote on it [science material]. Supposedly, it's [the textbook choices] already decided. You know how they invite you to preview all the books...supposedly they've [science department chairs] already picked the books" (Interview #2: Mar. 2; 10:00-10:30 a.m.).

Cheryl attended workshops last summer, "as a paid summer vacation," based on her interests, and not on what she teaches.

Last summer I went to three Advanced Placement workshops for life science. I spent three weeks in Texas; it was paid for. It was a nice vacation! They gave us all the AP books and AP environmental books. All the school stuff....just books and books. I can see what is required of them [students] in high school and pick things that would help. (Interview #3: Mar. 9; 10:00-10:30 a.m.)

Saving money for the garden and pond took diligence. Students used the paper recycling and fundraising to help defer the costs.

We had electricity put into the pond to help aerate it. As a science club project, we sold candy and then we finally got the recycle bins. After 8 or nine months,

we had enough money to buy the signs for the garden and we had labor donated [to help organize the above-ground garden plots] and it all came together.

(Interview #2: Mar. 2; 10:00-10:30 a.m.)

Summary

Cheryl's EE beliefs and practices correlated with her experiences as a child in her parents' garden. She liked the aesthetic qualities the flowerbed provided for the main entrance of the school and valued how her students learned not to walk on this area. She also enjoyed time spent outdoors. The garden seemed to be mostly a place for her to expand her home garden, while using school tools, seeds, water, and labor. While some of her students enjoyed being outside, others did not. The students never really see the fruits of their labor, which may have caused them to speak negatively when sent into the garden.

... Most of them are like, "Oh, I don't really want to go out there. It's too hot!" or "It's too cold!" You just explain what we are going to do before we go out there and we mainly just dig for a while. We mainly just dig in the dirt and then identify weeds, what's not a weed and what to do with the stuff once it's thrown out of the garden. (Interview #2: March 2; 10:00-10:30 a.m.)

Cheryl's concern about the requirements imposed by the district service center and her desire to please her principal and others in positions of authority kept her from teaching what and how she wanted. Despite her number of years of experience, Cheryl opted out of being department chairperson, even though she was the only science teacher not new to this building this year. She relied on textbook-based teaching because of her

larger class sizes and the concomitant classroom management issues. Many of the projects in the garden area showed her former devotion to the school, the outdoor area and EE, but her devotion to teaching has decreased, as evidenced by her negative attitudes.

Victoria Lake

The second teacher in the case study, Victoria, taught 6th grade at an accelerated middle school program within same urban school district as Cheryl. Because Victoria taught at a magnet school, her students must maintain high grade point averages to remain in the program. This required students to take their studies seriously and to behave appropriately. Students from all of the elementary schools in the Salve district may apply for admission to this program. Acceptance into the program was based on standardized test scores, grades, attendance, talents, extra-curricular activities and leadership potential.

Victoria's Classroom and School

Above the entrance to Victoria's classroom was yellow danger tape declaring, LEARNING ZONE-DO NOT CROSS. Other decorations lining the doorframe included a sticker that read, AS SEEN ON TV. Next to the door was a mirror which students and Victoria used. On the wall next to the classroom entrance were pictures of Victoria's family and friends, including photos taken by her son, who is an artist. The pictures were near Victoria's computer, which was used for taking attendance, writing e-mail and creating student packets.

Victoria's desk was located at the back of the room. She had a tall plant that sheltered some hand-made spiders and birds students created earlier in the year. On the front of her desk are several signs indicating her feelings toward the environment. One depicts a garbage can full of trash supporting a sign that reads, WILL WORK FOR FOOD. Another sticker has the three arrows shaped like a triangle that states, REDUCE, REUSE, RECYCLE. A third sticker depicts earth with a sign on it reading, NEED HELP.

On her desk and throughout her room Victoria displayed many of the awards she has won over her teaching career. Twice she received the Outstanding Science Teacher Award from the state science teachers association, once at the elementary level and once at secondary. She won the Outstanding Geology Teacher of the state for a curriculum she wrote on geothermal energy. In 2002, she won the Presidential Award for Excellence in Science Teaching, a prestigious national award presented at a White House ceremony in Washington, D.C. This year, she applied for the Disney Award and advanced to the top 100 finalists in the nation.

Behind Victoria's desk was a small storage space containing a microwave and a small refrigerator used by her teaching team. Stacks of colored and white paper Victoria purchased line the floor. Paper towels, stacked on top of a cabinet in this storage space can only be reached with a long stick. Another storage area, cleaned and organized by another teacher, was also located behind Victoria's desk. Over her many years of teaching and attending workshops, Victoria has collected curriculum packages, ideas, textbooks and materials to use with her students. On cabinets that line the same wall as the picture windows, student "reproductions" of a Van Gogh painting have been posted. These cabinets hold art supplies used in the classroom.

Victoria's room is quite colorful. A collage of butterflies was taped to the wall by a large picture window. She sometimes used integrated thematic instruction with her team of teachers and often used integration with the language arts teacher, who is her close friend. This fit her teaching philosophy well.

I'm a constructivist. I believe we learn knowledge from building on previously learned knowledge and that you have to gain insights into things by manipulation of ideas and things. I also am an inquiry teacher and use direct instruction some of the time, but basically I'm a constructivist. (Interview #1: Feb. 16; 12:45-1:45 p.m.)

Victoria's room was remodeled several years ago with district school bond money. Twelve movable lab tables with chairs fill the room. Victoria changed the arrangement of the tables in the classroom twice during this study.

Large picture windows made up most of one wall of Victoria's classroom. The opposite wall contained two sets of large wooden cabinets. Between two sets of cabinets a section of wall was dedicated to Albert Einstein. A large, laminated picture of Einstein as well as many other smaller pictures of him hung in this space. Three-dimensional models of flowers stood atop the set of cabinets to the left of the Einstein pictures. A collage of daisies and other flowers made of postcard images and magazine cutouts adorned these cabinet doors. A real stuffed iguana, a plastic model of the parts of the ear, and statuettes of three chimpanzees holding signs which read, SEE NO EVIL, HEAR NO EVIL, AND SPEAK NO EVIL, are also displayed on top of the left cabinets.

A large wasp nest sat on top of the cabinets to the right of the Einstein images. On these cabinet doors was a sign with Victoria's classroom rules printed on colored paper:

- a) bring supplies to class every day,
- b) be ready to work when the bell finishes its ring,
- c) respect people and property,
- d) follow teacher's directions, and
- e) work hard and have fun. (Observation #2: Apr. 20; 8:15-10:45 a.m.)

The front of the room contained a dry erase board. The left side of the board was covered with many posters and pictures of hot air balloons, sailboats, airplanes and the space shuttle. The right side of the board displayed student work and currently featured some student renditions of Van Gogh's "Starry Night."

Victoria's Background

Because Victoria kept changing her mind about a career, she completed 256 undergraduate credit hours before receiving her degree in elementary education with a minor in psychology from a midwestern state university. To repay a federal government loan, she decided to work in the field of education. One of her dreams was to work as a social worker in Chicago. She decided to try school counseling first to pay off her loans, but this required three years of teaching first. Because she hated school growing up, did not like her teachers and found school boring, she tried diligently to make school a better experience for her students. She took a teaching position in a small, "boon dock, redneck" town in a midwestern state. On one occasion she asked a local resident why the

town lacked ethnic diversity and was told, “We had a nigger once and we shot him before he could get into town.” (Interview #2: Apr. 29; 1:00-2:00 p.m.)

After teaching a few years, Victoria took her first school counseling job, but her principal wanted her to ‘rat on the teachers and kids.’

He would hide underneath windows [outside] ... and tape record their [teachers’] teaching. At the end of April, I resigned. It’s like you could say, “Take this job and shove it” and I did. I went back to teaching and never regretted it. (Interview #2: Apr. 29; 1:00-2:00 p.m.)

Victoria taught for 36 years, but not all in the Salve district. Her first year in the district, Victoria was hired with the stipulation that she would raise students’ low reading scores by two grade levels. If unsuccessful, she would be fired at the end of the year. She used environmental education and art to enhance students’ interest in reading. The students surpassed the district’s expectations and Victoria kept her job (Huss, 2004).

Victoria taught 6th grade science for the accelerated program of choice at Curie Middle School. The students in this program did not have to live in the neighborhood, but must apply and be accepted to the program. Once admitted, students must maintain high grades or they are dropped from the program and sent back to their regular schools the following year. As described above, students are admitted based on standardized test scores, grade point average, attendance, talents, activities and leadership potential. Students in 6th grade were enrolled in advanced language arts, math, science, world cultures and reading. Students were also required to take a foreign language, selected from French, Spanish, Russian, German and sometimes Chinese and Latin. Students

were allowed to choose one other elective. [Artifact data, *Curie Accelerated Program Information Guide.*]

Victoria's Beliefs about the Environment

Victoria believed the environment “is every place where all organisms live and depend on each other. Air, water, soil...any place there is. It doesn't have to be any place with life...but any place that can support life” (Interview #1: Feb. 16; 12:45-1:45 p.m.). Her main goal for her students was that they learn everything is dependent upon other things in the environment.

Everything, even the minutest little speck of dust is important in some way.

Changes in those organisms or the abiotic things can cause things to happen. We should have an appreciation for it and learn to thrive in it. Students also need to learn how other organisms and systems can learn to survive and thrive. Students need to learn to protect it [the environment]. (Interview #1: Feb. 16; 12:45-1:45 p.m.)

Although Victoria considered herself to be an activist both in and outside of the classroom, she did not find much time to devote to environmental causes. She used to be a member of both the Sierra Club and the Audubon Society. Although GLOBE-trained, Victoria used only a few GLOBE activities. Victoria donated her GLOBE equipment to an eighth grade teacher who uses it in her classes. Victoria was a facilitator for Project WILD (Western Regional Environmental Council, 1986) and Project Learning Tree (American Forest Foundation, 1997) teacher training. Every year, Victoria and one of her science teacher friends from a nearby high school, offer Project WILD and Project

Learning Tree (PLT) training at the local nature center in an overnight session so teachers receive twelve hours starting Friday night and ending Saturday afternoon. Victoria also helped teach WILD and PLT to elementary education majors at a local university. During this training, students chose lessons they would like to teach in their future classrooms and presented the lessons to the other participants. One female college student chose “Ethreasoning.”

She likes it because it makes students think about what they do. It makes them think about how THEY view nature and ...it gives them several choices to make. This activity allows for discussions. Other people might not like their ideas but they have to listen. Victoria nods her head and replies, “Right.” The student says she likes to argue and so would like this one. Victoria explains this activity should not be done early in the year before ground rules are set. Later in the year when they have the ground rules set and are able to hear other points of view this activity could be done. And you just might learn something from someone; you might learn you don’t agree with that point of view, but you just have to listen. Victoria tells a story then of how she changed her opinion on whales in captivity from a student. (Excerpts from Observation #1 field notes: Mar. 3; 10:00-12:00 p.m.)

Victoria’s Beliefs about Environmental Education

Victoria described environmental education as interdisciplinary and related to many other subjects. “It can be inquiry-base to help students form questions for them to seek the answers” (Interview #2: Apr. 29; 1:00-2:00 p.m.). Victoria also said EE can be

problem-based, “which is really the way to go” (Interview #2: Apr. 29; 1:00-2:00 p.m.). Environmental education fit was consistent with her constructivist philosophy.

Victoria’s primary EE message was respect for animals and plants. She did not like to divulge her opinion on environmental topics to students, but preferred students would reason through their own ideas. She explained that not sharing her opinions was difficult for her.

I’m still an activist in the classroom. I try to inspire them [students]. I don’t tell them, “You need to do this or that,” but I do try to provide a lot of opportunities where they have to think, analyze, and consider different points of view....*lots of different points of view. Students have to work out ways of dealing with different points of view in their projects. They do get my point of view quickly.* (Interview #1: Feb. 16; 12:45-1:45 p.m.)

An example of activism within her classroom took place earlier this school year when students researched and wrote letters opposing the construction of skateboard ramps and the allowance of motorized off-road vehicles in the local park that includes the zoo and a nature center. These letters, which expressed Victoria’s and her students’ views, were presented at a city planning meeting by an employee of the nature center.

Victoria used environmental education to teach students an appreciation of nature, as well as knowledge and skills concerning the environment. Her main EE goal was to promote in her students an ethic of caring for the earth. Even Victoria’s business cards conveyed her passion for the environment (Figure 4).

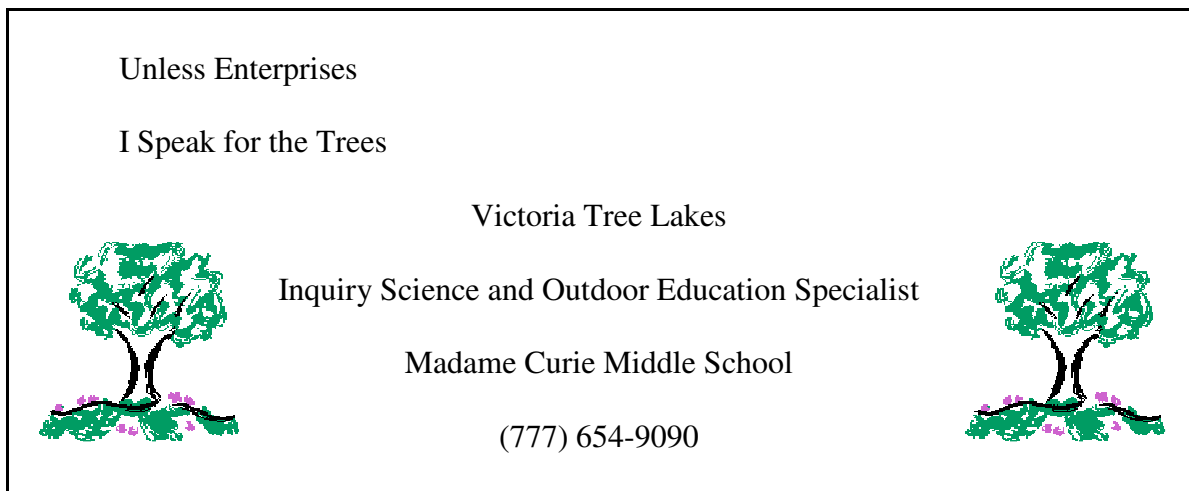


Figure 4. Victoria Lakes' Business Card Information (Artifact data)

We do Project WILD and a lot of relating things outdoors. We go *outdoors a lot*. We were outdoors this week. We are doing pendulums right now and we went out and did yo-yos. Now that is utilizing the outdoors, but it was *an absolutely gorgeous day*. We can teach them [students] to appreciate the outdoors. In every activity possible, I try to teach them concern and care. I do not want them to waste things. I want them to treat things with respect. (Interview #1: Feb. 16; 12:45-1:45 p.m.)

Victoria's Environmental Education Practices

Victoria's many years of teaching have provided her with vast experience and knowledge of sixth graders. She created much of what she does in class, drawing upon information from textbooks, kits, and workshops she has attended over her numerous years as a classroom teacher. One day, I observed the students learning about birds at different stations around the classroom. A packet of colored pages containing the information of the unit was to be turned in by each student at the end of this unit. The

unit, titled “Work of Wings,” integrated information about airplanes and the physics of flying with information about birds. Students volunteered to present their model clay birds created the previous week as a result of Project WILD’s “Adaptation Artistry” lesson (Western Regional Environmental Council, 1986). Each student needed to complete at least two of the bird stations. Victoria always provided her students with clear procedures to guide them in what she expects them to do:

Procedures:

1. 4-5 students per station at once,
2. Pick another station when it’s full, and
3. Leave the stations neat and straight like they were when you got there. Throw away trash and scraps. (Excerpts from Observation # 4 field notes: May 11; 11:15 a.m.-12:00 p.m. and 1:55-2:50 p.m.)

In addition to having the rules written on an overhead transparency, Victoria had the students repeat the rules aloud. She called on several students who each orally repeated one of the rules. She also wanted the students to start thinking like 7th graders. She would like them to focus on the quality of their work, not simply completing the assignment.

This is about quality. You may get to one or two of the stations today. Make sure you do a good job. You should do a good job. You should all know how to get your work done on time now. You need to work on quality now. Staple your work to the bird sheet if there are sheets at the station. (Excerpts from Observation # 4 field notes: May 11; 11:15 a.m.-12:00 p.m. and 1:55-2:50 p.m.)

Providing and repeating written procedures as well as discussing the quality of their work encouraged students to do their best in class. Victoria also required students to

check in with her before completing some assignments, to make sure the quality was present before continued.

The students must come back to the stool where Victoria sat to have their pencil drawings approved before outlining the drawings with pastels and painting them with watercolors. We looked at a neighboring teacher's students' drawings of the same "Starry Night" picture, and her students' paintings lack the details and characteristics of the original Van Gogh work that were present in Victoria's students' pictures.

(Observation #2: April 20; 8:15-10:45 a.m.)

Student field trips all revolve around environmental education. At the beginning of the year, all 6th grade students in the community school and magnet school take a three-day and two-night trip to Pristine Prairie.

Curie Middle School students attend Pristine Prairie in 6th and 8th grades. In 7th grade, students tour the Children's Science Museum, the Memorial, and the Capitol. Pristine Prairie is a place where students learn about the American West and where teachers and students get to know each other away from the school environment. Students also have free-time activities that include swimming, go-kart driving, horseback riding, train riding, canoeing and many other activities.

Parents are encouraged to volunteer to chaperone or bring supplies for the outing. Parents also act as 'bunk parents' who stay in the cabins with a group of students.

(Artifact data, student field trip information packet)

Victoria wrote most of the curriculum the teachers used while on this extended field trip. Many of the lessons were modifications of Project WILD activities (Western Regional Environmental Council, 1986).

The icebreaker activity asks students to interview their bunkmates. Each person can only sign one blank line for each person's paper. The questions revolve around environmental education, such as: knows the name of the state bird, has gone fishing on a state river, knows why the bald eagle almost became extinct, knows what caused bison to become endangered, has ever seen a wild turkey or a turkey vulture, has recycled anything, and has filtered or treated water to live in the wilderness. [Artifact data, student field trip information packet]

Students participated in many activities during their time at Pristine Prairie. The activities are scheduled into half hour slots, with teachers' names for each station. At one station, the students did a simulation of how the population of buffalo changes over a ten-year period.

"Oh Bison" is a modification of "Oh Deer" in the Project WILD guide. Students in this simulation are asked to write down the four components of habitat and list some of the natural limiting factors for bison. "Habitat," "population," and "limiting factors" are underlined and in all capitals on the explanation paragraph. Following the simulation, students must graph how the population of buffalo changed according to its predators' population. [Artifact data, student field trip information packet]

Students in the accelerated program visited the local nature center for their second field trip. Much of her curriculum for the nature center also used ideas from Project WILD (Western Regional Environmental Council, 1986). Victoria told me she provides students with packets of materials to keep them on task and focused.

Interview with a Spider, from Project WILD has students research a species of spider and then interview a classmate about their type of spider. The language arts teacher taught the research part of the lesson at school before the field trip. She also included myths on spiders. Students wrote geometric poems on spiders. Victoria had students create their species of spider using the arts and crafts material provided. They had to make their spider the true colors and appearance, minus the size. (Interview #2: Apr. 29; 1:00-2:00 p.m.; Artifact: nature center field trip student information packet; and Observation #2: April 20; 8:15-10:45 a.m.)

The last field trip of the year, students went to a local art museum. Only the accelerated 6th graders participated in this trip. Victoria wrote the curriculum for the Pre-Columbian, Pioneer, Victorian, and Colonial gardens. The other teachers on her team each took different sections of the museum and grounds for the bases of their contributions to the field trip curriculum. The museum waived admission costs for teachers, students, and chaperones to encourage students and parents to return to the museum later. A special exhibit detailing Machu Picchu added extra interest to the trip.

The questions written for the gardens have students focus on the types of plants found in each garden and each garden's unique spatial arrangement. Students smelled the leaves of several plants in the Pre-Columbian garden. In the Pioneer garden, students viewed a vista and were asked to imagine and draw the vista Pioneers would have seen. This was to make students think about living before the time of electricity and cell phones. The Colonial Garden is split into four smaller subsections according to types of plants grown. Hedges surround each

subsection. Students drew the latticework in the Victorian garden and saw the numerous rose bushes in this area. [Excerpt from Observation #3 field notes: May 10; 8:30 a.m.-2:30 p.m.; and Artifact data: museum field trip student information packet]

Victoria proved her devotion to EE by volunteering as a facilitator for GLOBE, PLT, WILD, and WET. When asked why she would spend her time helping disseminate these EE curricula, Victoria replied, “I should be able to live what I preach, right?” This philosophy carried over into her classroom practices. For example, Victoria showed her commitment to conserving natural resources by requiring students to use both sides of the pages in their personal notebooks for writing and taking notes. When Victoria provides paper for an activity, each student receives one piece of paper and must erase and try to correct mistakes before she will provide another sheet of paper. Victoria used packets of paper for each student to finish his or her work. She often did not keep “extras” around for those who lose their packets. One trash bin houses paper scraps; another has three-hole punch holes. In an origami activity, students used the punch holes to decorate the origami birds they created.

Victoria's EE Contextual Factors

When asked if she faced any barriers to teaching environmental education, Victoria's voice became loud and angry. She felt her principal crushed her EE efforts when he bulldozed the outdoor trails and filled the pond.

You betcha! My principal filling in my pond. He bulldozed the whole tall grass prairie and turned it into sod. I say the administration is a very great barrier to my

doing any environmental education. Is that about as strong as I can tell you?

(Interview #1: Feb. 16; 12:45-1:45 p.m.)

The principal used the custodian as his “engineer” to look at reasons for the flooding of the school’s cafeteria. Victoria felt further injured when the principal bulldozed the area while she attended professional development in another state. She did not receive any warning or opportunity to fix the pond. Victoria bought a spare liner for the pond using grant money, which was not used to help the problem. Victoria and a teacher at another elementary school in the Salve district planned to write a grant for both schools to participate in comparative water studies using both their ponds. The principal, according to Victoria, promised to restore the pond many times, and still the outdoor area remains sod.

The principal did not like the tall grass prairie area and could see it from the window. He felt it was “too wild.” Victoria met with the other middle school and high school science teachers and planned a blueprint of a redesigned outdoor area. She decreased the size of the pond to help prevent flooding and placed a fenced area to hide the tall prairie grass. The high school science chair presented the plan to the Curie principal, but as of the time of this study nothing has happened.

Half the trees, the trail, the pond, the boulders are all gone. It’s just sickening.

He said, Victoria, I will get this done this year. Last summer, one of the Boy Scouts came to me and measured and drew out where things should be placed.

The art teacher drew up a nice architectural plan. We made the pond smaller and the place for the tall grass, prairie grass, with a fence around it. We were going to put pretty flowers to satisfy him where he can see the garden. An Eagle Scout

and his father, we gave it to the grounds committee and him [the principal], but he [the principal] never said anything about it. (Focus group: June 10; 5:00-8:00 p.m.)

Victoria saw the district's decreased funding field trips as further limiting her efforts to take students away from school to supplement her EE teaching. However, Victoria seemed to work around this barrier by applying for grants to help defray the cost of buses for field trips. She received a \$5000 Environmental Protection Agency grant to help create an outdoor classroom at her school. She used the money to buy boulders, a pond liner and water pump, trees, and classroom materials. With some of her grant funds associated with her Presidential Award, Victoria purchased additional plants and materials for the outdoor classroom. Four Boy Scouts earned their Eagle Scout Awards by helping Victoria create a trail, the pond and landscaping for the outdoor area. Another grant helped her earn \$400 to pay for buses to the local nature center. The grant resulted from a presentation Victoria made to the nature center board of directors highlighting the curriculum she created and planned to implement when her students visited the nature center. Board members followed-up by attending the field trip to witness first-hand how their grant helped the students. The title of the field trip curriculum was "Architecture in Man and Animals at the Nature Center: A Being There Experience with Hibernaculum of Man and Critters." (Interview #2: Apr. 29; 1:00-2:00 pm; and Artifact data: nature center field trip student information packet)

Victoria's ability to adapt the district's modular science kits also helped her teach environmental education. When Victoria used the paper technology kit, she had students make paper from recycled paper. Many Project WILD and Project Learning Tree (PLT)

lessons center on adapting to the environment, a key concept in another district science kit. Victoria integrated EE activities she enjoyed and valued whenever she can.

Parents helped support Victoria's EE efforts, too. Several parents commented about the absence of the outdoor trail and naturescape because their sons used the area to obtain their Eagle Scout Award. Parents volunteered for field trips, as witnessed during the Machu Picchu museum trip, where each group of students had at least one, and many had two, parent volunteers. Parents volunteered to be bunk leaders for each cabin of 6th graders for the Pristine Prairie overnight trip (teachers do not stay in the cabins with the students).

Earning awards and receiving grant money provided Victoria a degree of freedom in the classroom other teachers may not have. Her willingness to seek outside funds is consistent with her goals for her students. She saw education as a risk-taking endeavor for her students.

Don't be afraid to do something different. I have my certain parameters and you know I do that as a teacher. I put these parameters on because they have to learn something because their education is the primary thing, but then I want them to go beyond that and put something into it and observation is the main thing.

(Interview #2: Apr. 29; 1:00-2:00 p.m.)

Summary

Victoria's passion for teaching and her classroom management skills were prominent in the activities observed as part of this study. Despite her thirty-plus years of teaching, Victoria was still energetic about teaching and creating new experiences for her

students. Her greatest teaching skills included helping her students gain independence for their learning and managing students' behavior while they worked in small groups. For example, Victoria clearly communicated her expectations to her students orally and in writing. She also focused students on the quality of their work.

Victoria's ability to combine her passion for art and science was also obvious during many observations. At the end of an astronomy unit, Victoria had students try to reproduce Van Gogh's "A Starry Night." Victoria held high expectations for the quality of students' work and helped them achieve those expectations by providing formative feedback to each student as the assignment progressed. Because of Victoria's high expectations and her constant encouragement, several students who told her at the beginning of the school year they couldn't draw and were not artists have now discovered and developed artistic abilities they denied having.

In her classroom, Victoria acted on her beliefs about natural resource conservation. Students were required to conserve paper and reuse materials that would have been discarded in other classrooms. Finally, Victoria reinforced students' conservation practices by telling the class how proud she is of them for using all the class resources responsibly.

Robin Waters

The third teacher included in this study is a retired teacher who now works part time at her former elementary school. She is the Math and Science Coordinator at her school, and her salary is paid from Title I funding.

Robin's Classroom and School

Robin's office and storeroom are located in a prefabricated portable building behind Derby Elementary School and housed a variety of materials she used in her work. She had a three-dimensional model donated by the city showing how underground water pipes deliver water to students' homes. Robin also had an aerial photograph of some of the oil refineries in town. A large watershed table with plastic trees, houses, and cars can be used to teach students about the effects of heavy rainfalls and floods. Derby Elementary was situated on an old Native American site, and there were glass display cases contained several Native American artifacts, as well as an assortment of fossils. Near the fossils and artifacts were numerous environmental trade books and a variety of field guides. Robin's desk and computer were located in a smaller, adjoining room. Her desk held a large bag of birdseed and a stuffed toy bald eagle she received for being a facilitator for Project WILD. A stained glass turtle lamp sat on her computer desk, along with a frog imprint on a rock and a pot of moss with strings of crystals curved around two twigs. In front of the desk was a chair with a butterfly pillow and flower-shaped pillow serving as chair cushions. Macaw and parakeet magnets were attached to the air conditioning grate above her desk. Her zoo docent certificate was also displayed above her desk, and a metal wall hanging depicting three moose standing among trees hung on the wall nearby.

Across the room on the adjacent wall to the magnets hangs a Native American print of the "tree of life" which sat on top of a blue Earth. In the print, a Native American man release birds from his outstretched hands. Drawings of several types of animals found within the tree of life's bark included an elephant.

A large round school clock was on the wall near a picture of a large brown toad and butterfly beside a pond with cattails. A model of a bluebird and two white doves with roses, a bug inside a bar of soap and a beanie baby squirrel all sat on top of the small bookshelf in her office. One of the shelves held a large Ostrich egg and a smaller black egg. A picture of an elephant surrounded by other animals was framed and stood on another shelf.

Robin's Background

Robin graduated from a midwestern university with a degree in elementary education and a minor in science. She also has a master's degree in education. She taught mainly kindergarten and first grade for thirty years. Robin taught at an elementary school in another school district until it closed. She moved to Derby Elementary and retired there. The past seven years Robin has worked half-time as the Math and Science Coordinator at Derby. Her principal for the last seven years supported environmental education and helped Robin obtain grants to help create an environmentally themed school.

Derby Elementary School was located on the west side of the city, tucked behind a neighborhood of older, two-story homes. A city park was located less than one block from the school and the principal received permission from city officials to use the park during school hours. Several years ago, a builder decided the land where the school now stands would make a good housing development, so a natural wetland was filled and a gravel road laid to the property. When the contractor found how close the bedrock was to the surface of the soil, the land was sold to the school district. Initially, both a middle

school and elementary school were planned for the site, but only the elementary school was built.

A grant from the state fish and wildlife department helped restore the original wetland. As part of the grant, a dike was built along the low-lying side of the wetland. A windmill was constructed near the wetland along with a tower from which students and other visitors can view the forest canopy and the city beyond. A gazebo, providing a shady, sitting area, stood near the wetland, and the bridge leading to the gazebo crossed the water, allowing visitors a close-up view of the wetland. There was a private school adjacent to Derby Elementary School that also used the wetland environment for educational purposes.

Robin's Beliefs about the Environment

Robin viewed the environment as a place to live. "It's the area within where you live, which encompasses eventually the whole world" (Interview #1: Feb. 7; 2:00-3:00 p.m.). Robin volunteered for the state Water Watch program as well as for the local zoo. Most of her time outside of work was split between these two groups. Robin considered the Audubon Society and the Sierra Club as too radical for her.

I very strongly feel as an educator, I'm a retired educator, ABCs are very important but if we don't take care of our environment then there is really not much sense in teaching the kids the ABCs and 123s. That's my philosophy about the environment. We need to bring the two *together* [the environment and basic academic skills]. And that's kind of what we are doing here [at Derby Elementary]. (Interview #1: Feb. 7; 1:00-2:00 p.m.)

Robin's main goal was for her students to learn to respect life.

Robin's Beliefs about Environmental Education

Robin did not believe in influencing her students by telling them her opinions on the environment. She did, however, acknowledge it was hard to be neutral in her beliefs about the environment (Focus group: June 10; 5:00-8:00 p.m.). Because she taught pre-K through 5th grade students, Robin focused on students' learning an appreciation and respect for the environment. She did not think her students learned problem solving or critical thinking skills, but observations indicated otherwise.

Why don't we put the (sunflower) seeds where the grass is short, Robin asks a group of eight kindergarteners. One kid answers, 'It might get runned [sic] over. Another student guesses, 'It might get stepped on.' Robin explains that the short grass is where the mower comes which is why she wants them to throw the seeds in the tall grass. (Excerpts from field notes of Observation #7: May 5; 12:30-2:45 p.m.)

Robin also did not see herself as teaching the students to take action on the environment, but the principal described several ways Derby Elementary was service-oriented, and some of the examples were related to environmental issues. This year, the school was named the state Supreme Court School of the Year for their community service. Robin held recycle drives where any student who brought in a bag of paper and aluminum cans received a book donated by the zoo. The student government was involved in a project to raise enough money to adopt an eagle. The gifted students wrote

a book of poetry to earn money for tsunami victims. A group of Girl Scouts helped plant flowers in one of the beds at the entrance of the school.

Robin's Environmental Education Practices

As Math and Science Coordinator, Robin's main job was to help teachers set up and teach the science kits for all students. She also had a large outdoor garden area, which students helped plant and maintain. Students also helped with outdoor bird feeders, bat houses, and bluebird houses. Robin acquired grants and helped preserve the wetland by having people come out to control the cattail population.

One day, Robin took all the classes out to the wetland to catch tadpoles to take back to their classrooms for observation. Before allowing each student to catch three to four tadpoles, Robin provided an explanation of tadpoles, frogs, and toads.

Robin: How can you tell the difference between a frog and a toad?

Student 1: Toads are usually bigger than frogs.

Robin: That's not always true.

Student 2: Frogs have smooth skin and toads have bumpy skin.

Student 3: I went swimming on the pond with my cousins and found a frog in the water.

Robin: OK, frogs do need to be near water for all their lives. Did you know that it's not true that toads give you warts?

Students shake their heads yes or no.

Robin: Girls, it's also not true that if you kiss a frog he will turn into a prince.

Robin: Frogs are more active than toads.

(Excerpts from field notes of Observation # 3: April 18; 10:00 a.m.-12:30 p.m.)

Another day, students, in small groups of eight to ten, planted flowers and cabbages donated by the Master Gardeners and Bonnie's Farms. As a group of second grade students helped plant impatiens in some of the raised flowerbeds, the following interchange was observed:

Robin: What are these white things?

Student 1: Are those roots?

Robin: Yes, and what do roots do?

Student 2: Get water from the ground.

Robin: I would like you to pull apart some of the soil and roots. It gives the plant room to grow (she demonstrates on one plant). The roots say, 'Oh, It's too cramped in here. I need room to grow!'

Several students laugh....

Robin: You might see something that looks like an onion. It's a tulip bulb.

Please replant any you find. (Excerpts from field notes of Observation #4: May 4; 11:00 a.m.-2:00 p.m.)

During this study, a city-wide contest held by the local paper recycling company was underway and was advertised throughout the school (see Figure 4). The school that collected the greatest amount (weight) of paper and magazines will be given money for their school. Robin was observed standing by the recycling bin and a cart full of books on animals and coloring books donated by the zoo. She gave students their choice of book when they brought a plastic shopping bag full of paper, magazines or aluminum cans.

Student 1: Wow! Look at the books! Can I have one?

Robin: When you bring me paper and cans.

Student 2: Here's some (shows a bag full of plastic bottles).

Robin: Sweetheart. These are not cans or paper. We'll put it in here, but remember we only need cans and paper.

Robin: I think some of the newness is wearing off [she was doing the recycling event all week and this was Wednesday.] (Excerpts from field notes of Observation #1: Feb. 16; 8:00-9:30 a.m.)

Help your school win \$800.

Help the 3rd graders buy a bench with the money.

Help the world.

Help yourself.

Bring a grocery sack full of cans or scrap paper to school and win a prize

(while supplies last).

Figure 5. Recycling Poster Hanging Inside the Front Door of the School (Observation # 1: Feb. 16; 8:00-9:30 a.m.)

Robin used her lunch break to monitor waste in the school lunchroom. She collected the fruit and vegetable leftovers to compost outside by the gardens. As students came up to the trash bins and compost bucket, Robin helped them figure out what can be recycled or composted and what is trash. Students with extra, untouched milk or fruit put the food in a container of ice for other teachers or students to eat.

As kids come up to throw away their trash, Robin has them wait until she can help them sort their trash and compost. Some of the older kids seem to understand what to recycle, but the younger students need help every day. If the students rush up to the bins, sometimes Robin is unable to stop them before they throw everything into the trash bin. Robin explains on the days she is not at school, no one takes over the duty of recycling lunch waste. She finds this job very time-consuming and wishes she could help students learn well enough to recycle that she could do other things instead. Robin has two fourth graders who do help when their classes arrive in the cafeteria. We discuss options of encouraging these two students to train some of the younger students, as well as honoring them with an award at the end of the year. (Excerpts from field notes of Observation #2: March 2, 11:00 a.m.-1:00 p.m.)

Robin's EE Contextual Factors

Robin, because she was the Math and Science Coordinator at her school, faced unique barriers compared to the other two teachers in this study. She worked only part time and her salary was paid out of Title I money. After this year, the money must be used for after-school programs, so her job title will change to accommodate her new role.

The principal supported Robin by providing ideas for grant proposals and finding creative ways to keep Robin at the school. This year, Robin will be 62 years old, which will qualify her for Social Security. She was not sure if she would continue at Derby or just stay home. She thought Social Security might pay better than her current part-time job. However, she expressed her fear that students will not receive a replacement for her

who will teach environmental education, science, and math, so she committed herself to staying until a suitable replacement could be found.

An additional barrier to Robin might be her lack of a classroom. In some ways, she was at the mercy of the teachers, because she must fit her environmental activities to the teachers' schedules. In addition, she also took care of many of the animals at Derby, especially the fish, birds, and lizard in the school's entryway. This meant she had to come in during the summer, without pay, to clean and feed these animals.

Robin used the community and grants to overcome barriers she faced in teaching environmental education. She received a grant to restore the wetland that previously existed at their school site. The restored wetland provided a valuable educational resource for Derby Elementary as well as other schools and visitors.

A grant from Visteon helped build an outdoor paved track around a large field and basketball court for the students. Trees were planted in the back of the school that will be seen from new library windows to be installed with funds from another grant. Bluebird houses donated from the Salve Conservation District hang in the schoolyard. First graders helped Robin monitor these and keep other birds from building nests in the houses. Recycling paper helped earn the money needed to feed the birds as well as buying garden supplies. The goal of the spring paper recycling drive was to earn money to buy a bench for the front flower garden area.

The school received district money to buy each student eight books over the course of the school year. The students chose their own books. The library benefited from Robin's grants when it received a set of nature field guides. Each class also

acquired its own trail pack with field guides, magnifying lenses, and binoculars to use when they visit the trail or wetland area.

During my observations and interview sessions, I noticed many volunteers active in this school. To celebrate Dr. Suess' birthday, many people volunteered, including several doctors, television personalities, police officers, and firefighters. Volunteers for the Nature Festival included Native American educators, a person from the State Fish and Wildlife Department, two people from the U.S. Army Corps of Engineers and two people from the Master Gardeners. Robin explained that parents from their local Parents and Teachers Association paid for the murals painted around the building. Parents also provided live animals, including the many tropical fish, a bearded dragon lizard, and a duck.

While managing students' behavior in an outdoor setting might pose a problem for some teachers, it was not a problem for Robin. If Robin took more than a few students, she required the students' regular teacher to help. This prevented classroom management problems. One of the rules for going outside with Robin was that students must stay with her and could not reenter the building until she took them. This prevented students from wandering around the school unsupervised. If students went inside to use the bathroom (or for any other reason) they had to remain in the building and return to their regular classroom.

One girl starts wiggling around and says she needs to use the bathroom. Robin explains she is not allowed to go inside by herself and she will have to wait until everyone goes inside. Later, she tries balancing on the rocks that encircle the bushes in the middle of the garden area. She seems to have forgotten her need to

use the restroom. Once these first graders head inside, they stop at the restrooms to wash their hands and use the bathroom before reentering their classroom. The little girl had to be reminded to use the restroom. (Excerpts from field notes on Observation #4: May 4; 11:00 a.m.-2 p.m.)

If Robin took only a few students outside, she picked up the students and returned them to their classes. When teachers came out with her, they took charge of their classes after Robin's lesson was finished. This additional supervision helped prevent problems.

Summary

While some teachers may view difficult circumstances as obstacles that thwart their EE efforts, Robin met potential obstacles head-on and worked diligently to create solutions. Although she was nearly 62 years old, Robin exhibited great energy and dedication for a person who will soon be eligible to collect Social Security. She saw her role in the school as necessary and important. Even though Social Security might pay better than her current part-time job, Robin feared her replacement would not provide students with quality learning experiences in environmental education, science, and math, so she committed to staying in her position until a satisfactory replacement can be found. Robin believed education would not work without teaching about the environment, so she acquired grants, recruited volunteers, and devised other creative solutions to situations that threatened to interfere with EE at Derby Elementary.

Her care and concern for the environment and the students showed in everything she has done for the school. She has written many grants and secured donations to acquire extra funding for this high poverty school. Robin also has infected the entire

school with her ethic of caring for the environment; all teachers, the custodian, and the lunch ladies all have fish tanks and many have additional animals in their rooms. The Parent Teacher Association donated money to paint animal-themed murals above each teacher's door, in the lunchroom and in the hallways. The principal adopted this ethic into her hiring practices, making sure teachers who work at Derby were willing to take their classes outside. Even the school counselor often took advantage of the natural area, taking students outside to counsel. Their school received the Supreme Court School of the Year Award largely due to the many environmental activities as well as other student community service projects. The community rallied around this school by volunteering for activities such as Dr. Suess' birthday and the Native American Environmental Day.

Good classroom management practices also helped Robin be successful. She had rules for both teachers and students when outside. If Robin only took a small number of students, then the teacher stayed in the room with the other students, but if the teacher wanted the entire class to participate, then the teacher must also come to help monitor behavior outside. Once outside, students were not allowed to return to the building unless they were willing to stay inside.

Chapter V will address themes in common from the symbolic representations of the three teachers and provide the impetus for the study. The research questions and concluding remarks will also be addressed. Finally, suggestions for future studies will complete this project.

CHAPTER V

ANALYSIS, INTERPRETATION AND CONCLUSIONS

The data presented in Chapter IV were collected through interviews, observations, and examination of artifacts. In this chapter, symbolic interactionism (Crotty, 1998) provided the theoretical lens for analyzing the data. Through this lens, the researcher interpreted data by analyzing how participants interacted with objects and other people. Interpretations were derived by applying the participants' intentions and communicative symbols, such as language, to gain understanding of their unique ideas, emotions, and attitudes. These interpretations, based on the usefulness or meaning participants attributed to objects or persons, provided insight into the meaning participants assigned to components of the environment, environmental education, and their classroom practices in order to answer the research questions that guided this study:

1. What are three urban teachers' personal environmental beliefs?
2. How do three urban teachers' environmental beliefs affect their understandings of environmental education?
3. How are three teachers' environmental education beliefs related to teaching EE in their classrooms?

At the end of this chapter, a synthesis of the interpretations derived will address the study's overarching question: Where can environmental theory and environmental practice overlap?

Interpreting how each teacher interacted with objects and others within their personal context required me as the researcher to observe the “within” experiences of the teachers’ classrooms and ask why they taught certain concepts in their classrooms while also viewing the data and interpreting the data externally using observations, interviews, and artifacts. This dual perspective allowed me, at times, to identify and empathize with the participants and, at other times, to apply the detachment necessary to form unbiased and objective interpretations. I will now discuss themes within the three teachers’ EE teaching.

In seeking the answers to the research questions, several themes became apparent. All three of the teachers discussed their childhood experiences in nature as important experiences they wanted their students to have. Although the exact nature of these childhood experiences varied among the participants, they imparted to them, to varying degrees, a sense of the importance of respecting animals and plants in nature. One goal all the teachers had for their students dealt with developing an appreciation of nature. When trying to promote this appreciation, teachers felt it best not to voice their personal opinions in the classroom. The teachers preferred for the students to learn values indirectly from the experiences provided by the teacher and from interactions with their peers. Another theme that emerged was that the participants demonstrated various strategies for handling student behavior both indoors and outdoors. These strategies helped them control the students in the less constraining, outdoor learning environment. EE teaching occurred in a variety of settings and with different agendas. Recycling, another common theme amongst the three classrooms, illustrated how the teachers encouraged students to become active participants in their local communities. In the

following paragraphs, each of the themes will be expanded upon and discussed in more detail.

Themes Related to Research Question 1

In answering research question 1 concerning each teacher's personal environmental beliefs, it was learned all three teachers grew up learning about nature. Camping and Girl Scouts seemed to dominate the discussions, but the teachers also mentioned gardening with relatives and just playing outside. The two principals interviewed also mentioned the importance of learning outdoors.

Three Urban Teachers' Early Environmental Experiences

Chawla (1998) and Hart (1995) proposed environmental concern begins with children learning how they (themselves) connect to their surroundings. Parents or role models may help this idea by building on the appreciation children intuitively feel. "This interpretation of an empathetic perspective toward the environment primarily applies to early childhood or implies that an animistic relationship with the world, first felt in early childhood, remains people's initial entry into the sequence of variables that eventually lead to responsible environmental citizenship" (Hart, 1995, p. 3). Shuman and Ham (1997) also proposed a theoretical model that relates teachers' commitments to teaching EE with their significant life experiences.

Much environmental education literature cites the importance of childhood outdoor experiences in determining future careers and activism related to the environment (Tanner, 1980; Palmer, 1993; Chawla, 1998). The three teachers discussed

a variety of experiences within nature as children. Both Victoria and Cheryl participated in Girl Scouts while growing up. Robin and Cheryl both learned gardening from relatives. Cheryl related her experiences outdoors to gardening with her parents (Cheryl's Interview #2: March 2; 10:00-10:30 a.m.) Robin's grandmother was a gardener. She taught Robin more than just gardening, including names of birds and butterflies (Robin's Observation #1: February 16; 8-9:30 a.m.). Robin's principal also discussed experiences in nature as important in her childhood. During prospective interviews of teachers, Robin's principal screened candidates for their ability/likelihood to use the outdoors. The principal has helped promote an environmental agenda throughout the school (Refer to Robin's Interview #1: Feb. 7; 1:00-2:00 p.m.).

Learn To Be Open and Respectful at All Times

Childhood experiences helped teachers gain an appreciation for animals and plants. Respect, another common theme among the teachers, goes beyond simple appreciation and is fundamental to developing environmental literacy. Cheryl wanted her students to be open-minded and respectful both inside and outside the classroom (Cheryl's Interview #1: Feb. 14; 10:00-10:30 a.m.). Cheryl primarily wanted students to respect each other and her; Victoria wanted respect to carry over to resources, too. Victoria felt EE taught the students an ethic for caring for the earth. Victoria incorporated this idea into her classroom practices; she had students always use both sides of sheets of paper. Each student received a packet to cover the theme they were studying. Students rarely got extra packets. Victoria also taught her students how to cover their science fair boards so they may use them for several years (Victoria's

Interview #2: Apr. 29; 1:00-2:00 p.m.). Robin wanted students to respect their everyday surroundings. “Hopefully with the respect for life, we won’t have as much vandalism and things like that, that’s my main objective” (Robin’s Interview #1: Feb. 7; 1:00-2:00 p.m.).

Themes Related to Research Question 2

Because the teachers valued respect, they modeled respect for nature and practiced respect for their students. Consequently, out of respect for their students as autonomous individuals, the teachers desired to keep their own personal values out of the classroom. In reality, the practice of remaining neutral was difficult, if not impossible. The teachers’ personal beliefs and their thinking that personal beliefs should be left out of the classroom impacted how they understood environmental education. Thus, the teachers were more apt to not voice their own opinions about environmental issues within the classroom, although in reality, the teachers all conveyed their values to their students through their actions and words.

It’s Better Students Form Their Own Opinions But It’s Hard Not to Share Yours

Another constant theme throughout all three teachers was their desire to not share their own personal opinions with their students. Although this was common to all three teachers, the teachers all found it difficult to separate their values/beliefs from their teaching. This was not surprising. It is very difficult to keep an issue-driven EE curriculum free from subjectivity (Campbell & Robottom, 2004). Dillon (2002) noted:

Environmental education provides an opportunity to bring modern and challenging social and scientific issues into the classroom...Environmental education challenges not only the notion that science education should be value free but the notion that it is possible to identify whether utterances can be separated into 'scientific statements' or 'value statements' (p.1112-1113).

Andrew and Robottom (2001) argued "education itself is not neutral, but a value-laden, political act...Education has a strong capacity to influence the values that students hold in respect of an issue, or bring to bear in their explorations of an issue" (p. 778). They further argued that EE should encourage students to view environmental or ecological issues broadly, considering perspectives other than "the dominant anthropocentric view" (p. 779).

The three participants in this study faced the paradox of teaching a value-laden subject (EE) while trying to refrain from expressing their personal values. When Robin was asked if it was hard not to push her opinions onto her students, she replied she did want to push her opinions on her students and she tried not to mention her own beliefs (The Focus Group Interview, 5:00-7:00 pm). However, when reading *The Lorax* on Dr. Suess' birthday, students understood her explicit message for choosing this book. But Robin also had several implicit reasons that she shared with the class when she finished the story, which included the desirability of creating jobs which are not harmful to the environment and controlling the amount of pollution caused by factories. She also wanted students to consider the sustainability issue of cutting down all the trees and not replanting them. The idea of replanting two trees for every one chopped down was expressed in great detail (Robin's Observation #2: March 2, 11:00 a.m.-1:00 p.m.)

Victoria also tried to remain neutral in the classroom. She wanted her students to research an issue so they would understand all sides of an issue. She also felt that her students needed to understand the importance of their own personal morals and not try to convince others their morals were not right. Victoria felt compromise was an important concept for the students to learn (Victoria's Interview #2: Apr. 29; 1:00-2:00 p.m.). She also told the university students that one of her students had changed her mind. The girl explained that keeping a whale in the new aquarium would be damaging to the whale. Despite her initial shock and embarrassment over a student challenging her views in front of the entire class, Victoria soon realized the girl was well informed and ultimately agreed with her position (Victoria's Observation #1: 10:00-12:00 p.m.).

Cheryl also felt giving her opinion in class was forbidden. After I asked her if she taught the students some of her values (like not walking in the flower beds and recycling), she said, "Some of it I try to carry over, but a lot of times you can't really give an opinion. You can suggest things, but I don't *force* it on them" (Cheryl's Interview #1: Feb. 14; 10:00-10:30 a.m.). Observations of Cheryl's teaching practices never revealed any contradiction of this tenet.

Themes Related to Research Question 3

The three teachers' beliefs about the environment and about environmental education carried over into their teaching practices, both in how they disciplined their students and in the EE activities they chose. Three themes emerged pertaining to how the teachers' environmental education beliefs related to their EE teaching in the classrooms. First, classroom management, an issue discussed in few EE research articles, seemed to

be key in allowing EE to occur. Second, each of the teachers had several reasons as to why they felt it important to teach EE in the outdoors. Third, the teachers provided justification for and examples of how they encouraged students to take environmentally responsible action both in the present and in the future.

Facilitation of Student Learning in EE: Management is Key

Teaching EE, especially outdoors, requires fundamental student management skills. Effective outdoor learning does not happen unless students understand the teacher's rules and exhibit respect for the teacher and other students that is manifested in their behavior inside or outside the classroom. Researchers in EE rarely mention the need for good classroom management for learning in natural settings to occur. This may be one reason why many teachers do not teach EE, especially when management of students becomes more difficult in the outdoors.

The three teachers used a variety of classroom management techniques to facilitate their students' learning both indoors and outdoors. Cheryl, with her limited supply of garden tools, had students alternate pulling weeds and shoveling soil. The gazebo, used as a corral, helped keep the students in a small area while waiting for a few students to finish their work (Cheryl's Observation #1: 9:10-10:20 a.m.).

Robin limited the number of students she worked with at one time. If the teacher opted for the full class, the teacher must also attend the outdoor activity. Each class had the opportunity to sign up for planting with Robin during garden days. The best place for the sign up list, according to Robin, turned out to be the teacher's restroom (Robin's Observation #4: 11:00-2:00 p.m.).

Victoria's years of experience in the classroom in multiple grade levels showed in her classroom management. Victoria used humor and teasing to guide her students. ["Did I see contraband brought into my classroom? Put your books and notebooks in your locker!" (Victoria's Observation #2: 8:15-10:45 a.m.)] Victoria's students followed daily procedures. Students entered the room, read the overhead and began working. Victoria took roll after the students had been working for five to ten minutes. Afterwards, she explained the directions for the day and showed them an example of another student's drawing (Victoria's Observation #2: 8:15-10:45 a.m.). She also employed repetition to make sure her sixth graders remained on task and understood their duties (Victoria's Observation #4: 11:15-12:00 & 1:55-2:50 p.m.).

Use of the Outdoors

Each teacher used the outdoors for multiple purposes. Cheryl took her classes down to the stream in the fall, mostly as a reward for good behavior for the week. Students helped in the garden in the spring, preparing the soil and planting seeds for the summer harvest. Cheryl also kept students inside when their behavior warranted it. One boy threw a rock in the air when the class was outside. He was banned from garden activities. When the central office came to inspect her school, Cheryl did not keep her students inside, but took them outside as she had planned. Although she received some negative feedback from the principal and custodian about the mud the students tracked in, she continued taking her other classes outside to work in the garden.

Victoria used the outdoor classroom (prior to its destruction) to teach her students observation skills. The students drew pictures of things they observed around the outdoor

classroom. Victoria also used local sites, such as the art museum, nature center and an overnight location to provide students with experiences in nature, for prolonged time periods. The students compared different eras' gardens for both what was planted and the use of the plants. They also camped in cabins for a week while doing activities from Project WILD and Project Learning Tree adapted specifically to their state environment. Students learned to work together in teams and got to know their teachers on a more intimate level. The local nature center provided the setting for a themed unit on hibernaculums.

Robin used the outdoors to teach students ecological concepts. The students learned about different groups of animals, such as the frogs in her discussion and capture of tadpoles. Robin also taught the students how to plant flowers and vegetables. She explained the importance of plant roots and why they were planting the tulips and sunflowers close to the edge of the school's lawn. Students at Derby Elementary hiked and explored a nature trail at their school site, which also gave them experience in using field guides and classifying insects and leaves found on their hikes.

Conclusions

In attempting to answer the overarching question, "Where can environmental theory and environmental practice overlap?" it seemed clear the teachers in my study do not reach the top level in the environmental education hierarchy: action and civic participation. The teachers tended to operate at the lowest levels of the hierarchy, at the levels of awareness, appreciation, and knowledge of the environment. Although the hierarchy provides a useful model for the intended and desired EE curriculum, the

enacted EE curriculum may vary from it significantly. There are a number of reasons for this discrepancy.

Perhaps the most obvious impediments to implementing quality EE were related to the management of students and materials, especially when outdoors. Researchers in EE tend to focus on the ideal educational setting and have ignored the many challenges presented by the reality of the classroom. In particular, this study reminded us of the necessity of effective management for successful teaching and learning. This challenge may be one reason why many teachers do not teach EE, especially when management becomes more difficult in the outdoors.

Consistent with Smyth's (2006) findings, how the teachers in this study "perceive the needs for environmental education and how they respond are filtered, like anything else, through their own attitudes, experiences and capacity" (p. 257). The teachers in my study believed it was inappropriate, if not impermissible, to divulge their personal opinions about environmental issues to students. Because teachers felt compelled to avoid stating their personal views, value-laden topics such as air pollution and sustainable business practices might go unexamined during the year.

Winn (2004) deemed critical thinking to be the most important skill in education: Some educators and parents have tried to avoid the dilemma posed by critical thinking and by opening classrooms to controversy by creating a special area of curriculum called 'controversial issues'—as though these matters could be isolated and handled gingerly in a guarded and sanitized arena. Quite frankly, this is educational nonsense, for those issues that we call controversial are not only inherent in any vital curriculum, they are its very heart and soul. These issues

reflect the most important values of a society, and they crop up most frequently in areas undergoing the most significant kinds of change. Indeed, these issues are the foci that make the curriculum meaningful and keep it alive. That is, they are most relevant to citizens and students...Whatever the course of study—in science, social science, or the humanities—it is the differences in viewpoints that offer the most fertile ground for discussion, for learning how to sort and balance the facts and how to think critically about our stay on this planet. (p. 497).

By attempting to avoid disclosing their personal opinions about environmental issues, the teachers in this study may have missed opportunities to develop their students' critical thinking skills and to engage their students in levels four and five of the environmental literacy hierarchy: environmental values and ethics, and environmental action and civic participation.

Another possible reason for the incongruence between EE theory and practice identified in this study was the magnitude of the effect of individual differences among teachers on how they implement EE in their classrooms. The teachers within my study used their personal environmental experiences and beliefs to guide their EE teaching and activities within the classroom. Cheryl's utilitarian approach fit her Conservationist attitude and use of the garden as "extra space" for her personal garden at her house. Victoria's desire for students to enjoy school and connect art and science fit her Preservationist attitude of leaving the earth untrammled, in order to preserve its intrinsic beauty. Robin's nurturing the earth fit her Deep Ecology worldview. Robin taught many lessons about the earth and environment, both indoors and outdoors. Her ethic of care permeated the school and students respected the animals within the school borders

because of this ethic of care. Just as her grandmother taught her many lessons outdoors, she taught her students lessons not only of appreciation and knowledge of the environment, but also of appreciation of life. Although EE researchers recognize that teachers' individual experiences and beliefs effect their teaching practices, the researchers tend to underestimate the degree to which this is true and expect all teachers to implement EE in the same way with the same results.

I believe environmental education can be taught in a variety of ways to cover a variety of circumstances. I observed three teachers teaching EE in different ways with different purposes. Smyth (2006) said education needs to match its shareholders, in this study, urban students.

The deprived populations of burgeoning cities, and ecological refugees in many circumstances, are rapidly growing educational targets. This variety underlines the futility of treating environmental education as uniform: it must be as variable as the people and environments that it addresses, and we have far to go in developing the requisite repertoire of methods and approaches. (p. 256)

I feel educators must be able to share some of their personal beliefs with their students, but in such a way that allows for discussion to occur. The teachers must be able to discuss important matters and allow students to determine the best route to improving the environment.

Two of the teachers in this study considered themselves to be constructivists in how they approached teaching and learning, allowing students to solve problems and think for themselves. However, the view of most teachers, essentialism, does not allow for real world issues such as social justice and environmental protection to be addressed

in the classroom. Environmental education, like multicultural education, aims to produce positive action within the citizenry. Both disciplines seek to train students to think critically and look at situations from many perspectives. This similarity between disciplines allows for meaningful education related to social and environmental justice issues.

Within an urban setting, environmental justice issues are prominent (Van Liere & Dunlap, 1980; Bullard, 1992; Taylor, 1992; Edwards, 1992). Dorceta Taylor (1996) warned, however, that how EE is taught can contribute to the problem. According to Taylor, limited curricula exist that incorporate a minority or urban perspective of the environment and address social issues as well. Taylor proposed that by opening both the context of place and people to address EE, more people of diversity will participate. Yencken, Fien, and Sykes (2000) showed many diverse cultures share similar positive attitudes towards the environment, but lacked an in-depth understanding of environmental issues and did not understand how they, as individuals, could make a difference or see how institutions might stifle the ability to make a difference. Agyeman (2000) also stated cultural competency cannot be achieved without an understanding of how culture and equality are related as well as the relationship between culture and values. By understanding values and equality within different cultures, only then will a framework exist which allows for a positive, culturally diverse environment.

Cultural competency cannot occur without experience in nature. “Contact with natural areas has emerged as one of the most significant influences in all the studies reviewed, and free encounters with the natural world are becoming inaccessible to more

and more young people in an increasingly urbanized world” (Chawla, 1998, p. 17). This is why studying urban teachers’ EE practices is vital.

Future Research Ideas

In interviewing and observing the teachers in this study, I felt little tension about the NCLB pressures that may cause other teachers to avoid EE and teach only the content over which students will be tested. I had the opportunity to work in some low SES and high ELL schools, who are building outdoor classrooms and incorporating environmental education into their elementary schools. Because these schools are classified as “underperforming schools” on the state tests, I would like to study further how state testing under the aegis of NCLB affects teachers’ capacity to teach EE. The teachers in this study all had tenure, perhaps lessening pressure concerning state-mandated test results. Victoria mentioned her magnet program scored the highest in the district on a reading test, which rewarded the teachers at the magnet school with extra pay. Does the pressure of raising test scores alter or eliminate EE? Are teachers looking for easy ways to raise test scores without thinking ahead to helping all students become effective citizens by teaching interdisciplinary subjects, such as EE?

Within the urban setting, I would also like to see how schools use their outdoor spaces to their students’ advantage. What topics are taught outdoors when students might have limited experience with natural environments? How often are these outdoor classrooms used? Do only certain teachers use the spaces?

Within the context of urban EE, I would also like to gauge attitudes of both teachers and students towards EE. Do urban teachers/students show a greater propensity

for ecophobia than their suburban/rural counterparts? What knowledge and practical experiences from the environment do urban children gain? What purpose does EE serve in an underperforming school? Outdoor classrooms and gardens often allow students who do not excel in the classroom to excel outside. What changes (do students make) when they go outside as compared to in the classroom?

The implementation of EE offers numerous research opportunities for the future. In particular, EE in urban and underserved schools raises many interesting and important questions. As global climate change and other environmental issues gain international attention and increased influence on political and economic policy, effective EE becomes an essential part of a socially responsible curriculum, especially for those students who will be most directly affected by the decisions affecting the future of their environments on local and global scales.

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APPENDICES

APPENDIX A

Structured Interview Questions

Sample interview questions:

Worldviews

1. How could you be an agent of social change in your classroom? Examples?
2. How do teacher's worldviews on EE affect their teaching?
3. Can teachers act as agents of change for their students/classroom/school?

Beliefs of teaching & EE

4. How do you perceive your role in society?
5. How do you interact with the students (teacher discourse)?
6. Describe your students' ideas about the environment. Do they have fatalistic views?

Teaching of EE

7. What is your philosophy of teaching?
8. How does this philosophy affect your teaching of the environment?
9. What are common misconceptions students seem to have about the environment?
10. How did these teachers become interested in teaching EE?
11. How have early experiences of nature influenced EE teaching?
12. What issues influence(d) teaching of EE in the classroom?
13. How/What EE topics are addressed? Why?
14. What EE issues are most important to you? What issues are most important for your students to understand?
15. Give examples of how EE is incorporated into your classroom.
16. Do teacher's backgrounds affect what they teach/how they teach EE?
17. How do teachers relate EE to their students?
18. How well do you need to understand a topic before you teach it?
19. How much freedom to choose your curriculum do you have within your own classroom?
20. Are there certain structures within this school which prevent students from learning?
21. Would you like your students to become life long learners or more proficient at test-taking?
22. What are forbidden topics at this school?
23. What limits/constrains the teacher's ability to teach EE within the classroom?
How have these teachers worked to overcome these barriers?
24. How did you teach EE at your former schools?

APPENDIX B

Institutional Review Board Approval

Oklahoma State University Institutional Review Board

Date: Thursday, February 17, 2005
IRB Application No ED0560
Proposal Title: Understanding Urban Teachers' Perspectives of Environmental Education:
What They Add to the Discussion
Reviewed and Processed as: Expedited

Status Recommended by Reviewer(s): Approved Protocol Expires: 2/16/2006

Principal
Investigator(s)

Jeanine Huss
245 Willard
Stillwater, OK 74078

Richard Bryant
229 Willard
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 415 Whitehurst (phone: 405-744-5700, emct@okstate.edu).

Sincerely,


Sue C. Jacobs, Chair
Institutional Review Board

VITA

Jeanine Marie Huss

Candidate for the Degree of

Doctor of Philosophy

Dissertation: ENVIRONMENTAL EDUCATION PERSPECTIVES AND PRACTICES
OF THREE URBAN TEACHERS

Major Field: Environmental Science

Biographical:

Personal Data: Born in Cedar Falls, Iowa on January 5, 1972 to the parents of Joanne and Robert Huss.

Education: Graduated from Stillwater High School, Stillwater, OK in May 1990; received a Bachelor of Science degree in Secondary Education/Science from Oklahoma State University in May 1995; received a Master of Science degree in Secondary Education/Science from Oklahoma State University in December 1997. Completed the requirements for the Philosophy of Science degree with a major in Environmental Science at Oklahoma State University in May 2007.

Experience: Taught 7th grade integrated science for four years at Foster Middle School in Tulsa, Oklahoma; worked as a graduate assistant holding numerous job titles for the College of Education for four years, including co-teaching the Preservice Elementary Science Courses.

Professional Membership: Oklahoma Association for Environmental Education, North American Association for Environmental Education, Association for the Education of Teachers of Science, National Science Teachers Association, and the National Association of Research in Science Teaching.