THE DEVELOPMENT OF PERSONAL CONSTRUCTS USED IN
ENVIRONMENTAL EDUCATION AND BEHAVIOR

A Thesis in
Environmental Pollution Control
by
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ABSTRACT

The goal of environmental education is to develop environmental behavior or actions considerate of the environment and that maintain the integrity of natural systems. However, reaching this goal continues to be a challenge. Research reveals that influences on environmental behavior are vastly complex and correlate to the diversity of individual learners as well as the unique social, cultural, and contextual character of environmental issues. To improve the influence of environmental education on environmental behavior, there is a need to recognize learners as individuals and account for the personal elements that influence engagement. Based within a constructivist framework, learners form personal constructs that give unique meaning to environmental topics and convey a level of environmental sensitivity or interest in learning about the environment, feeling concern for it, and desiring to protect it. However, the development of such unique constructs is typically not taken into account in environmental education. To understand how to support the emergence and development of personal environmental constructs and what effect this may have on environmental sensitivity, an education pilot program was developed. This program was implemented in two 9th grade ecology classes and focused on developing an awareness of personal views, perspectives, and understandings students use to engage environmental issues.

Over a 14 week period, students were presented with diverse environmental perspectives and ideologies and encouraged to reflect on and express unique perspectives and understandings within different discussion formats. Focus group and written response data were collected and assessed for whether students developed an awareness of personal understandings and what affect if any this had on environmental sensitivity in comparison to a control class. Results suggest that student’s became more aware of personal understandings and perspectives, but outcomes were mixed as to how such awareness influenced levels of environmental sensitivity. This study further suggests that supporting the emergence and development of personal environmental constructs must be done in ways that allow social context but that are sensitive to social pressure and to the specific maturity level and unique context of learners. Furthermore, supporting such awareness must be done in ways that recognize students as continuously defining and redefining their relationship with nature and in turn, in ways that emphasize the process of critical thinking as opposed to the development of specific views and values that develop individually with time.
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CHAPTER 1
INTRODUCTION

1.1 The Personal Nature of Environmental Education

The destabilizing effect of our actions on the environment continues to drive the need for environmental education. Habitat destruction has accelerated the rate of species extinction 100 to 1000 times that of its natural rate (Baillie, Hilton-Taylor, Stuart, 2004), agricultural run off each spring creates anoxic dead zones in the Chesapeake Bay and hundreds of other sites making it now one of the most serious threats facing life in coastal oceans (Diaz & Rosenberg, 2008), and the excessive burning of fossil fuels continues to destabilize the global climate, unlike anything seen in human history. These issues and many others not only disrupt the integrity of natural systems but affect the life-giving capacities of the planet. They reflect the linkages between natural systems and the cause and effect of our behavior. While it may not be apparent at any one time or place, things in nature are connected and it is these connections make it imperative to look at our actions from a collective standpoint. Environmental education plays a needed role for developing an awareness of such connections, the effects our actions and the need for behavior change.

However, in attempting to encourage others to behave in a more environmentally conscientious way, it is easy to take for granted the diverse and personal paths that shape environmental concern and action. Even while I, as an environmental educator, have attempted to persuade others to be concerned, I have not given much thought to the influences and experiences that have shaped the perspectives and beliefs that I hold. Instead, knowing that I react in a concerned way from being informed, I have often
viewed environmental knowledge and awareness as the best approach to influencing behavioral change. However, past personal experiences have revealed this approach to be rather ineffective and have provoked me to realize the diverse basis for engagement with environmental topics. Serving as an AmeriCorps volunteer in Knoxville, Tennessee is one experience of many that has revealed to me how reactions to environmental education are diverse and unique.

In Knoxville, population growth and exploding development in the late 1990’s had caused serious water quality issues for a city that receives 70% of its drinking water as surface water. As a way to protect future water resources, an Adopt a Watershed program was developed to encourage awareness and appreciation for water quality issues in middle schools and high schools. This program was very hands-on and involved teaching students about water quality, assessing the health of local streams, and doing improvement projects. For me, this involved discussing watersheds with middle school and high school students and the impact of land uses on water chemistry and aquatic organisms. This further involved taking students outside to collect water and invertebrate samples, do visual assessments, and implementing projects such as planting riparian buffers or stream clean-ups.

However, despite these efforts and gains in water quality awareness, there was an overall sense of detachment. It was difficult to keep students on task and reactions were often of the “I don’t care” type to water pollution or finding more pollution tolerant fish or benthic macro invertebrates in streams. While some took to the program and activities enthusiastically, others seemed only partially engaged or not at all, the latter especially being the case for older students. Of course students have a way of disguising their
feelings and it is difficult to assess impacts in the long term, but the initial reactions seemed discouraging.

On one level it is easy to conclude that children just do not care or are too inexperienced to understand environmental concerns. However, at the same time, why should it be assumed that all students should engage environmental concerns the same or that students have the same level of sensitivity to the environment that I do? To the best of my recollection, I was not concerned with environmental issues when I was in my early teens. Nor do I feel the interests I have in environmental protection today are the outcome of outside guests at school having me measure the levels of nitrogen in streams. Instead, reflecting on the origins of my own concern, I am much more drawn to time spent outdoors while growing up.

Living in the outskirts of Bozeman, Montana, I spent almost every day outside often in edge-of-development forested areas climbing trees, building forts, carving wood, getting dirty, and often getting into trouble. I still possess a complete mental map of a stream that ran through the neighborhood. With neighborhood friends, we named different stream sections based on unique swimming characteristics and build floatation devices to float down the water. In one particular instance, I build a raft from wood and inner tubes and can recall being thrilled to see fish swim along in my shadow in the slower moving, deeper parts.

In addition to these activities, I feel my father also played a role. He displayed a waste-not type of attitude and though perhaps more motivated economically, he elevated the value I place on simple materials. He also encouraged my brothers and me to be outside and on many weekends in the summer, he would strap packs to our backs and
lead us to hidden mountain lakes to fish and camp. At times he would make subtle
comments on the beauty of nature. However, I can clearly remember not seeing his point
and instead recall complaining about having to drive all over “just to see another tree or
another mountain” instead of playing in one area.

Together, I feel these experiences have given me a personal basis for engagement
and reaction to environmental issues. In addition, other experiences later in life have
challenged and strengthened my personal understandings and views and further
developed a personal environmental ethic. As a result, I cannot expect other individuals
to have had the same types of experiences and interaction as I had. This is not to say that
environmental concern is always the result of these types of experiences or that my
experiences are somehow superior or dissimilar from others. Instead, it is to say that my
interactions and the interpretation of them are shaped by these influences in unique and
personal ways.

Students, who are often looked at in a collective, general, and inexperienced way,
also have different experiences and backgrounds they bring with them to learning
situations, even at a young age. These often informal and cumulative experiences either
directly or indirectly influence the way they value nature and react to environmental
concerns, creating a diverse and personal basis for engagement with environmental
topics. In turn, the reactions I was getting to environmental topics in AmeriCorps may
perhaps be the reactions I should have been expecting, namely a diverse reaction,
engagement, and impact from environmental education.

As a result, there is a need to consider how children are connecting and viewing
their surroundings and how these personal understandings and backgrounds can be taken
into account to further influence personal environmental concern and ultimately environmental behavior. To begin to understanding this, I developed an educational research program that was implemented in two 9th grade ecology classes. This program was conducted over a twelve week period and involved working with students, once a week, to present a variety of environmental perspectives and conceptions to challenge students to reflect, discuss, and develop an awareness of personal views and understandings as they relate to nature. By embracing the diversity of student experiences and trying to foster an awareness and enhancement of their personal perspectives and understandings, I wanted to learn whether students would demonstrate an increased sensitivity to environmental topics in ways that are pro-environmental and based on unique and personal understandings. Initial topics were on expression and the role of democracy, transitioning into environmental issues and discussions involving various points of view around issues and on our place in the natural world. Such discussions involved small groups, open class forums, and role playing activities. Accompanying classroom content, students participated in outdoor visits and individualized environmental improvement projects. I monitored student reactions and development using pre- and post-focus group discussions, written responses related to personal perspectives and understandings, and classroom observations and teacher interviews.
CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

In this literature review, I discuss the need for environmental education to refocus on the individual learner and on the personal basis for engagement and reaction to environmental issues. I argue that constructivism is a primary framework to allow for this, emphasizing the personal, social, cultural, and contextual constructs individuals use to engage and react to environmental issues. With this understanding, environmental education should support the development of unique and individual constructs students use to engage and react to environmental topics.

2.2 Behavioral Complexity

The aim of environmental education is to develop environmental care and concern and ultimately, to encourage behavioral change. To meet this goal, a traditional approach has followed the information deficit model; if students or the public are knowledgeable and aware of environmental issues and our collective reliance on the environment, attitudes will change and result in changes in behaviors (Kollmuss & Agyeman, 2002). In turn, environmental education programs, both indoor and outdoor, have focused on providing information and awareness with attitude and behavior change as the primary end goal (Hungerford & Volk 1990, Pooly 2000; Yerkes, & Haras 1999).

However, studies reveal that success in reaching this goal has been moderate at best. Even while environmental education may alter attitudes and increase reported knowledge (Bryant, & Hungerford, 1977; Driver & Johnson, 1984; Shepard, & Speelman, 1986) actual behaviors often do not match people’s expressed beliefs and

To begin to understand this disconnect, a variety of studies have focused on identifying the factors involved in environmental behavior. These studies reveal influencing behavior to be significantly complex. As displayed in Figure 1, Kollmuss and Agyeman have built upon past research to develop their model of pro-environmental behavior (2002). In this model, bigger arrows represent stronger influences and black boxes represent possible barriers to behavior. As reported, the biggest positive influence on behavior is when internal factors (e.g., motivation, values, emotion, personal priorities) act synergistically with external factors (e.g., social, cultural and/or economic contexts).
This model as with others (Ajzen et al., 1980; Hines et al., 1986-87; Hines, Hungerford & Tomera, 1990; Stern, 2000) points out that environmental behavior is exceedingly complex and makes the case that despite the logic behind knowledge and awareness affecting behavior change, such elements are only one factor of many internal and external that influence behavior. Kollmuss et al. even make the point that developing an environmental behavior model accounting for all behavioral influences is likely not be feasible or useful (2002, p256).

In turn, this suggests that while educational programs will have an influence on behavior, the degree will vary with the diversity and complexity of behavioral factors.
identified including personal needs, interests, and understandings as well as unique contexts and situations. This complexity of influences makes it difficult to predict how students will react to environmental issues. As a result, this suggests that there is a need to focus greater attention on the influences affecting the individual learner to improve the effectiveness of environmental education at fostering pro-environmental behavior. In particular, it is necessary to develop approaches to environmental education that account for the unique and personal aspects learners use to engage and react to environmental concerns. However, both past and current research efforts and curriculum do not seem to support this type of individualized attention.

2.3 Learners as Empty Vessels

The conventional focus on knowledge and awareness in environmental education extends from a research base traditionally dominated by empiricist and behaviorist foundations (Palmer, 1998). These types of approaches seek to emulate the natural sciences by searching for laws that govern social processes, like learning and behavior, and study observable aspects that can be broken down into specific parts, quantified, and statistically analyzed (Palmer, 1998; Robertson 1994; Robottom, 2004). While these approaches provide insight into the complicated process of learning, they also tend to view all learners as the same and isolate learning from its physical and social context; knowledge is viewed as something that is tangible and accumulated inductively and students represent empty vessels waiting to be filled with information (Nussbaum, 1989 as cited in Robertson 1994).

These understandings are consistent with curriculum mandates such as “No Child Left Behind” that focus on making sure all students have learned and performed at certain
benchmark levels before moving on to the next grade. In Pennsylvania this correlates to standards for environment and ecology in which by certain grades, children must be able to show standardized knowledge of certain environmental topics (22 Pa. Code, Ch. 4, Appendix B, 4.1). While the goal of ensuring that all students have a certain level of knowledge is one that most would agree with, such approaches also go against the idea of students having diverse characters and capabilities; educational output and learning experiences tend to get homogenized and little attention is given to the unique influences of location or social context (Gruenewald, 2003; Sobel 2004), not to mention the development of unique understandings, critical thinking, or an awareness of personal values.

2.4 A Constructivist Framework of Learning

Constructivism provides an alternative educational framework to account for the diversity of individual learners and the complexity of behavioral influences. Constructivism\(^1\) is a theory of learning that recognizes that students have experienced and thought about the world they live in and enter learning situations with a cluster of ideas, beliefs, values, and emotions (Snively, 1986 as cited in Robertson, 1994). This prior experience creates constructs or mental frameworks that influence the way new information is organized and made personally meaningful (Palmer, 1998, p109). Students are not empty vessels waiting to be filled with knowledge but rather are active participants in the learning process; learners generate meaning that is unique and personal and connected to prior understandings and physical and social contexts. As a result, a constructivist theory of learning provides a unique and personal basis for environmental

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\(^1\) This theory is also variously called structural-development theory, structural international theory, experiential learning, indigenous education and others by different authors and educators (Kahn and Kellert, 2002, p 94; Gruenewald, 2003).
education and in addition, further relates to the social and cultural basis of environmental issues.

2.5 The Constructed Nature of Environmental Issues

While we are often taught in terms of environmental science, the basis of engagement with environmental issues is strongly connected to unique social, cultural, and contextual elements. The presence of such elements is often made clear in court cases involving environmental issues. In 2008, the US Supreme Court ruled on a case concerning the Navy’s use of sonar. This case was brought by the Natural Resource Defense Council in response to impacts on marine mammals from naval war games. Of the judges siding with the plaintiffs, it was explained that “Sonar is linked to mass strandings of marine mammals, hemorrhaging around the brain and ears, acute spongiotic changes in the central nervous system and lesions in vital organs,” (Liptak, pg. A24, 2008). The plaintiffs also pointed out that underwater sonar can reach a decibel level as high as 2000 jet engines. However, in the official opinion, the chief justice wrote in favor of the defendants, describing that “….forcing the Navy to deploy an inadequately trained antisubmarine force jeopardizes the safety of the fleet” and that injuries to marine mammals are “outweighed by the public interest and the Navy’s interest in effective, realistic training of its sailors.” (Liptak, pg. A24, 2008). Both sides present a strong and logical argument. However, arguing and siding one way or the other is strongly linked to social and cultural considerations; how does the health and welfare of marine mammals compare to the strength of our navy? What rights should animals have and what relationship do we have with them? While some of these types of social and cultural considerations are collectively decided upon in laws such as the Clean Air Act and
Endangered Species Act, other understandings influencing our behavior in relation to nature are, to a large extent, individual.

As one author notes, an environmental issue is a human or social construct- it does not exist independently of human consciousness and it does not possess an independent ontological existence (Robbottom, 2004). Despite the science, whether or not an environmental issue exists at all is based on whether it is perceived as important by humans and if there are differences of perspective as they relate to nature. As a result, the basis of such issues is often a product of one’s social and cultural context, associated with deep elements from one’s own biography. As Gruenewald (2003) points out, “Geographical location, race, gender, class- permutations of these and other cultural locations mean social and ecological problems are often perceived and prioritized differently by different groups” (p. 6).

The presence and use of such elements as they relate to environmental issues are further made evident as contextual values in science. Contextual values are defined as norms, beliefs, and interests unrelated to the cognitive aims of science (Ashely, 2000) and can play a role in how scientific results are portrayed and understood. A strong example of this comes from the public debate by scientists as to whether or not or to what degree global warming is caused by human factors (Pepper, 1996 as cited in Ashely, 2000). As Pepper (1996) points out, surely objective scientific processes should arrive at greater consensus than is often the case with environmental issues. With environmental issues, where there are conflicting perspectives or perceptions of risk involved, value judgments will be made (Ashley, 2000) and together with other situational factors, further reveal the socially and culturally constructed nature of environmental issues.
2.6 Personal Basis for Engagement

The socially and culturally constructed nature of environmental issues suggests the presence of personal social, cultural, and contextual elements individuals used to engage and react to environmental issues. These elements develop mental frameworks or environmental constructs that influence personal connections to environmental issues and correlate to a constructivist framework of learning.

Further support for such constructs is suggested by the Biophila hypothesis and the development of environmental sensitivity. Environmental sensitivity is identified as an entry level variable to behavior in Hungerfords model of responsible environmental behavior (1990), and is defined as a predisposition to take an interest in learning about the environment, feeling concern for it, and acting to preserve it on the basis of formative experiences (Chawla, 2001). As a result, whether or not an interest in learning about the environment or feeling concern for it develops appears to stem from the diverse and cumulative nature of formative influences involved. Likewise, Biophilia hypothesis suggests that we all possess weak biological tendencies or genetic inclinations to affiliate with nature and natural processes based on an evolutionary advantage to do so (Kahn and Kellert, 2002). As Kellert describes, these inclinations can be defined as basic values of the natural world (2002, pg). However, as weak tendencies, their use and function are believed to be mediated by learning, culture, and experiences in which the content and intensity of natural world values varies greatly in individuals and groups (Lumsden & Wilson, 1983 as cited in Kellert, 2002).

These understandings further suggest the presence of personal constructs used to engage and react to environmental issues. While these constructs are personal and
unique, based on their use in engagement in environmental issues, they may generally be
defined as the elements of one’s relationship with nature including personal conceptions
of nature and connections to it. However, these results further reflect the individual and
diverse nature of the formation of constructs. As a result, encouraging and supporting
their emergence and development appears key to enhancing engagement and reaction to
environmental issues on a personal level.

2.7 The Emergence of Personal Constructs: Physical Interaction

Research on environmental sensitivity emphasizes informal learning and
formative influences at a young age and within one’s physical and social context as
playing a primary role. These studies reveal that childhood experiences in nature are by
far, one of the most influential elements affecting concern and commitment to the
environment later in life (Chawla, 2001). These experiences were typically accompanied
with family or friends and involved natural areas that were visited regularly such as a
garden, forest, or lakes or other areas that served to play in or that became a refuge from
indoor stress (Chawla 1999,).

In addition to this research, the importance of informal interaction with nature at a
young age has been emphasized by many other authors and educators as well. As
naturalist E.O. Wilson describes, “Hands on experience at the critical time, not systematic
knowledge, is what counts in the making of a naturalist. Better to be an untutored savage
for a while, not to know the names or anatomical detail. Better to spend long stretches of
time just searching and dreaming.” (as cited in Louv, 2005 p. 150). While there is not
one specific type of physical interaction that leads to engagement and reaction with
environmental issues, the cumulative affect nature has on childhood development itself suggests a basis for this development.

Climbing trees, building forts, investigating and crossing streams, observing insect and mammal behavior; these types of experiences are not only naturally engaging at a young age but can promote critical thinking, inquiry, problem solving, and other types of intellectual development (Kahn and Kellert, 2002, pg 124). Likewise, overcoming physical and mental challenges in nature, constructing and creating, testing and observing, accomplishment and failure; these interactions can correspond to the development of self-esteem, self confidence, determination and a capacity to cope with adversity and failure.

Furthermore, positive interactions in nature have been found to support emotional development and identity formation. This emotional connection has been suggested to be a crucial entry point to environmental education and as a basis for long term engagement (Issoi, 1989; Louv, 2005; Pooley 2000). As Aldo Leopold states “Conservation education will continue to fail until people develop a love, respect, and admiration for the land, and a high regard for its value” (1949, pg 261).

Nature is also found to play a role in identity formation. Adolescence is often marked with a sorting out of ideas and understandings that begins to define self. As teacher Cynthia Thomashow writes,

“Teens are embedded in the process of piecing together a lifetime of values, beliefs, experiences and behaviors. Elements are continually added and discarded during these (adolescent) years. Deep thought mingles with superficial whim, intense concentration mixes with daydreaming, resistance melts into acceptance. Teens gather, sift, and choose the elements of human culture and wild nature that will be woven
into an adult identity that will, hopefully, be coherent, pragmatic and ethical” (Thomashow, 260).

In formulating an awareness of self and sorting out personal feelings and emotions, unique locations in nature can provide a safe, stable, and familiar area to reflect, release tension, and be alone (Thomashow, 2002; Louv, 2005; Kellert, 2002).

From this brief overview, it is suggested that the influence of nature on development is akin to that of a family member, teacher, or friend and results in relational elements that form the basis of engagement and reaction to environmental issues.

2.8 The Role of Social Context

Berman argues that despite being viewed as uninterested, egocentric, or morally immature, children naturally desire to understand and to feel socially and culturally connected (1997). Children are driven to make cognitive and moral sense of their surroundings, of how society works, and of what their connections are to it (Berman, 1997). As a result, when parents, family, or other role models point out the value of nature or socialize children to interpret experiences in positive or meaningful ways, this is believed to have a strong effect on the values and perspectives children hold later on in life (Chawla, 2001). In addition is the influence of social identity and social network on the development of individual environmental views and values. As reported by Stet et al., the greater the association one has to an environmental identity, the stronger one’s commitment to it will be and the more likely one will be to behave according (2000). Likewise belonging to environmental organizations, participating in environmental volunteer opportunities, or interacting with environmental minded people have been found to have a stronger role influencing environmental behaviors than other variables such as sociodemography, political attitudes, and environmental knowledge and concern.
Together, social context plays a strong role in defining, reaffirming, and further committing one to views and values that then are used to engage environmental issues.

2.9 Defining and Re-Defining a Relationship with Nature

Together, these studies suggest that as children age and interact with their physical and social surroundings they actively define and redefine their relationship with nature. These social, cultural, and contextual elements serve as constructs children and adults use to engage with environmental issues. However, the strength and level of development and whether or not they convey a positive, negative or ambiguous relation to nature greatly depend upon the type of interactions and the opportunity to have them. This implies a wide array of ways in which young people might conceivably develop personal connections to the natural world and makes obvious the resulting diversity of engagement. In one study children in primary and secondary school were found to view the term environment in six qualitatively different ways (Loughland et al., 2002). Across all age groups in this study, the majority of children view the environment as an object they were not connected to while fewer viewed the environment in the opposite extreme, as something they are a part of. With misconceptions and knowledge gaps, as Loughland notes, if students are viewing the environment as something from which they are disconnected, they may not see the need to take responsibility (p195, 2002).

2.10 Re-focusing Environmental Education on the Individual

Environmental education should play a primary role in allowing for, supporting, and encouraging the development of personal and unique constructs used to engage and react to environmental concerns. However, at the same time, accounting for the broad,
diverse, and informal character of physical and social influence presents a primary challenge for environmental educators. Different commentators have stressed informal interaction with nature and the need to integrate disciplines emphasizing social and cultural forces. Place-based education, though not necessarily defined as environmental education, is one approach.

Place-based education focuses on using the local community and environment as a starting point to teach concepts in language arts, mathematics, and social studies and emphasizes hands-on, real-world learning experiences (Sobel, 2004). Recognizing the extensive influences from interactions in one’s locale, “place-based education resonates much stronger with the students because it complements the informal learning that is taking place” (Sobel, 1996). Taking this a step further, Gruenewald suggests the blending of place-based education with critical pedagogy to further account for social and cultural forces that influence engagement with environmental topics (2003). Critical pedagogy can be generally defined as a style of instruction that focuses on the perception of social, cultural, and political forces that can strongly influence and dominate life choices and ways of thinking. It is suggested that including the examination of social experiences and relationships emphasized in critical pedagogy would complement the greater ecological and physical context of place-based education (Gruenewald, 2003). Similarly, Cole calls for inclusion of epistemologies such as environmental justice and feminism to more thoroughly account for the broad influences that shape human interactions with nature (2007).

However, attempting to directly account for the diverse and unique physical and social influences ultimately makes the point that it is the learner who decides whether or
not the environment is a concern and to what degree. In particular, engagement or non-engagement with environmental issues and environmental behavior requires personal reasons for care and concern and personal justification for action, regardless of what our desires for children and the environment are. As a result, various authors (Loughland, 2004; Kahn, 2002; Robbotum, 2004; Payne, 2006) are suggestive of an educational orientation where students own experiences and relations to the environment are emphasized and integrated. Recognizing that learners, even at a young age, have a variety of prior experiences and understandings influencing the construction of meaning, it is necessary to make these experiences a starting point in the construction of new meanings and understandings (Loughland, 2002). While a variety of approaches may allow for this, a phenomenological approach to environmental education has been suggested.

As a research approach, phenomenology emphasizes how people experience, understand, and ascribe meaning to specific situations or phenomena (Marton & Booth, 1997 as cited in Payne, 2006.) However, as an educational approach, Payne describes how this could allow for an “investigation of the ways in which individuals understand their own unique environmental experiences to reveal how one practically lives and constructs personal environmental relations with various places and spaces” (2006, pg 28). Learners inquire, reflect on, and understand how they perceive, conceive, construct, compare, act and relate to nature (Payne, 2006). Challenging students with this type of engagement may provide a connection to the unique social, cultural, and contextual influences that form the basis of unique engagement and reaction to environmental issues. Furthermore, though such influences may not convey a strong reaction toward the
environment, it may be enough to simply provide opportunities for such development to promote positive engagement. Given the broad context of environmental interactions and the notion that we have a natural tendency to affiliate with nature and natural processes, there may be different levels of apathy but there is not likely to be a strong dislike for nature among young people. As a result, simply providing an opportunity to question and develop personal views and feelings as they relate to nature may be enough to result in a positive enhancement of constructs and improvement of environmental sensitivity and pro-environmental behavior.

However, despite this and the prior theoretical understandings in this chapter, there is a need for actual implementation work characterizing such approaches and analyzing what affect they may have on overall environmental sensitivity.

2.11 Project Description

To understand how to better support and enhance the unique and personal elements students use to engage environmental issues, I developed and evaluated an education research program described below. This program was implemented in a high school setting and assumed students to have different levels of prior interaction, understanding, and feelings for their natural surroundings. In turn, this program centered on embracing the diversity of students and challenging them to reflect on and develop an awareness of personal constructs they used to engage and respond to different environmental topics.

Over a 14 week period, this program used environmental issues, discussion sessions, and physical interaction with nature to display and emphasize contrasting views, ideologies, and feelings related to nature. Developing these understandings coincided
with encouraging reflection and awareness of personal interests and reasons that shape student environmental concerns.

With these goals in mind, a major part of this program involved developing and continually promoting an open and trusting classroom atmosphere. In part, this was done through the use of informal introduction discussions and team building exercises. During the initial class visits, I spent time getting to know the students by unstructured question and answer discussions and doing group activities that emphasize class diversity and working together to accomplish tasks.

Initial class topics were on diversity and democracy and were used to promote discussion and reflection. In general, these topics involved discussions on the benefit of diversity in nature and in the human population. This transitioned into the debatable nature of environmental issues and how there are a variety of different perspectives on nature regarding its treatment and use. To this end, examples were provided that showed the expression of different perspectives and how democracy is a way to capitalize on the benefit of different points of view and personalities.

Developing expression and discussion was done through the use of environmental issues with elements students were likely to relate to and engage and that correlated to physical and social influences on engagement with environmental topics. These included money and employment, human interactions with plants and animals, plant and animal destruction, and other similar elements. Along these lines, I took great care to fully develop all sides of issues including diverse viewpoints and perspectives, ideologies in relation to nature and society, and feelings and emotions, to allow for the greatest possible connection to diverse personal social and contextual influences. This followed
with expression and discussion of student perspectives and what actions should be taken in regards to these issues. I also utilized different forms of expression including: open class discussion, small group discussion followed by open class discussion, role playing activities, and written response explanations.

As a major part of the program, outdoor interaction was used in conjunction with environmental issues to allow for physical and less abstract connections with nature. These types of interactions meshed with materials being discussed in class but also took the form of environmental improvement projects. In regard to the latter, and based on diverse levels of engagement, students were given as much freedom as possible in developing and initiating their own types of projects relating to a particular theme. The theme in this project involved restoring a local stream bank and drew on the following project activities: removing invasive plants, stapling in coconut mesh and seeding with rye grass, developing a photo collage of the event, and producing a movie clip of the event.

Given the goal of developing a personal awareness of elements used to engage and react to environmental issues, the focus of data collection, as described in the methods section, was on measuring whether or not there was a personal awareness of understandings and perspectives and what effect, if any, this had on personal environmental sensitivity. The primary method of this data collection involved pre and post focus group discussions and written responses, but were further supplemented with in class observations and teacher interviews.
CHAPTER 3

EXPERIMENTAL METHODS

3.1 Introduction

The focus of this education research pilot program was to support and enhance awareness of the unique and personal constructs students use to engage and react to environmental concerns, and to analyze what affect this awareness may have on environmental sensitivity. In this section, an overview of the research sample, the program, and the methods used to assess awareness and changes in environment sensitivity activities is provided.

3.2 Research Sample

The study involved three, 9th grade Ecology classes at a small high school in central Pennsylvania. The first class contained 20 students, the second contained 18 students, and the control class contained 21 students. The area surrounding the school can best be characterized as rural Pennsylvania with many small towns spread out between farmland and forested areas. Town populations in this area contribute to an elementary and high school size of 360 students. This site was chosen for the study based on the proximity to the university and the receptiveness of the teacher to environmental programs. The Ecology teacher of these classes involves students in different outdoor and restoration activities such as trips to a local nature center, stream quality testing, and establishing a wetland area at the school. During the implementation of this study, both a head teacher and a student teacher were present.

3.3 Class Visit Description
The following is a time line of class visits followed by a class visit and visit overviews. A more detailed summary description of each class visit can be found in appendix 1.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>11-Sep</td>
<td>Introduction and Team Building</td>
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<tr>
<td>18-Sep</td>
<td>Pre Focus Groups</td>
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<tr>
<td>19-Sep</td>
<td>Pre Focus Groups</td>
</tr>
<tr>
<td>25-Sep</td>
<td>Diversity and Democracy. Discussion: Environmental Issues are social Issues.</td>
</tr>
<tr>
<td>5-Oct</td>
<td>Environmental Issue: Logging in Old Growth Forest. Student reaction and Discussion</td>
</tr>
<tr>
<td>9-Oct</td>
<td>Recap Issue and Perspectives. Student Discussion</td>
</tr>
<tr>
<td>16-Oct</td>
<td>Man above or a part of Nature: Issue Introduction and Outside excursion</td>
</tr>
<tr>
<td>23-Oct</td>
<td>Issues Presentation and Discussion</td>
</tr>
<tr>
<td>30-Oct</td>
<td>Context and Introduction to Spotted Owl Issue</td>
</tr>
<tr>
<td>4-Nov</td>
<td>Role Playing Activity: Spotted Owl Issue</td>
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<tr>
<td>13-Nov</td>
<td>Issue Analysis and Discussion</td>
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<tr>
<td>20-Nov</td>
<td>Project Introduction and Site Visit</td>
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<td>4-Dec</td>
<td>Preparation for Project</td>
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<tr>
<td>6-Dec</td>
<td>Project Implementation</td>
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<tr>
<td>11-Dec</td>
<td>Focus Group Discussions</td>
</tr>
<tr>
<td>13-Dec</td>
<td>Class Wrap Up</td>
</tr>
</tbody>
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3.4 **Data Collection**

Out of the three 9th grade Ecology classes I worked with, two received implementation of the program while the third class served as a control. This project was conducted over a 15 week period and during this time 13 class visits were used to implement the environmental program, with each session lasting 40 minutes. Data were collected through pre and post focus group discussions, pre and post written responses, post teacher interviews, and class notes and observations.

3.4.1 **Focus Group Questions**

The focus of the implemented program was to develop or enhance an awareness of personal constructs or mental frameworks from which students use to engage
environmental issues and environmental topics. As a result, focus group questions were created to reflect how the students value nature, what aspects of nature are of concern, the relationship students feel they have with nature, and what behaviors students personally felt should be taken to protect nature.

These questions consisted of the following:

1. In what ways, if any, do you appreciate or value nature?
   Probe: Are there certain things that you like to do outside or parts of nature that you find beautiful?

2. What sorts of concerns, if any, do you have about the environment?
   Probe: Some people are very concerned with global warming or population growth all over the world. Locally, others are concerned with litter or people abusing the local environment. What sorts of environmental issues bother you?

3. In your opinion, do you feel the condition of the environment is related to your health? Why or why not?

4. What sorts of concerns, if any, do you feel should have for plants and animals?
   Probe: What sort of actions, if any, do you feel we should take to protect nature?

The focus group discussions were conducted by Michelle Harrison, a graduate student in psychology. In addition to previous experience conducting focus groups, Michelle was also experienced in working with children from teaching outdoor education at summer camps. These discussions took place in a small room next to the classroom that contained a large rectangular table and storage shelves with books. Both pre and post discussions for each group lasted about 10 to 15 minutes. The number of students in a group was based on the number of students who returned permission forms. In the two classes where the program was implemented, there were two groups per class that ranged from 6 to 8 students per group. However, in the control class fewer forms were returned and only one group of 9 students was used.
3.4.2 Environmental Sensitivity Qualifier Question

A qualifier question was added to the post focus group session to further assess the effectiveness of this program at developing personal awareness of personal understandings but also assess what effect this program had on the student’s level of overall environmental sensitivity. Environmental sensitivity is defined as a predisposition to take an interest in learning about the environment, feeling concern for it, and acting to preserve it on the basis of formative experiences (Chawla, 2001). As a result, students were assumed to possess different levels of interest in learning about the environment, feeling concern for it, and a desire to act toward preserving it. Encouraging and supporting an awareness of personal elements used to engage environmental concerns is predicted to further develop overall environmental sensitivity. The qualifier question added to the post session focus groups include the following:

You talked about different environmental issues. Do you feel expressing your opinion has:
  a. Changed the way you look at nature?
  b. Made you more aware of how you personally view nature?

3.4.3 Written Response Question

Data were also collected using a written response question. This question was used to provide a different medium to express the same types of elements in the focus groups; namely personal views, values, and understandings as they relate to nature as well as the feelings and emotions attached to them. To do this, the question was meant to be broad and general but allow students to relay personal understandings and feelings. The written response question consisted of the following:

1. Do you personally feel it is necessary to be concerned with environmental issues? Please explain your answer anyway you like?
3.4.4 Classroom Notes and Observations

Following each program visit, time was spent reflecting on exactly what was done, student responses and reactions, and overall engagement in different activities. This involved going to an offsite location to reviewing notes taken during the class time and recording how the activities unfolded. These observations were used to further support other forms of collected data.

3.4.5 Teacher Interview and Analysis

Following program implementation and data collection, teacher interviews were used to further assess the goals of the program but also to gather data on how the results received may be correlated to outside influences. The following interview questions were used:

1. In your view, how should environmental education contribute to a students overall school education?

2. What challenges do you face when attempting to talk with students about environmental protection?
   Probe: What types of students do you feel tend to get involved in environmental activities over others?
   Probe: Do you feel there are barriers to students becoming more environmentally friendly?

3. How do you think the school district and/or the Administration feels about environmental education?
   Probe: How do you feel other teachers view environmental education?
   Probe: Do you feel supported by colleagues or administration when attempting to engage in class environmental activities?

4. My goal was to develop an awareness of how students personally view and value nature. The primary method for this was through discussion and expression. (Recap activities)
a. Do you feel these activities were effective in terms of improving personal awareness of views and values?
b. Do you feel these activities increase sensitivity or critical thinking in terms of?

5. What sorts of recommendations do you have?
   Probe: How would you engage the students more?
   Probe: In terms of doing environmental projects, what sort of recommendations would you have?

These interviews involved the two teachers present during the program, a head teacher and a student-teacher, and were conducted one on one. Each interview lasted approximately 10-12 minutes and responses were recorded and transcribed for analysis.
CHAPTER 4
RESULTS

4.1 Focus Group Discussions

The focus of this pilot program was on embracing the diversity of students and developing their personal awareness of views, values, and beliefs as they relate to nature as well as the feelings and emotions attached to them. These elements influence engagement and reaction to environmental issues and are based on personal experiences and unique situations. In this section, I discuss focus group data collected before and after the program. These focus group questions are specific to the expression of personal views and values and as a result, I am interested in how responses developed over time, whether students appeared more self aware of personal understandings and what affect this may have had on student environmental sensitivity.

4.1.1 Qualitative Data Analysis

Pre, Treatment Class 1, Focus Group 1

The discussion started with how the students value nature. Answers were not long and basically revealed the types of activities students like to do for fun outside. For example, students mentioned “I like to hunt,” “I like to ride four-wheelers,” “I like to plant flowers,” and “I like to walk outside.” This question was difficult to get students to reply to and responses did not seem to contain many characteristics that would indicate any particular strong personal feeling or connection with their natural surroundings. However, this question may have been too abstract to be easily answered without greater reflection time than the focus group structure provided. In addition, responding in ways
that may display feeling or affection may have also been difficult to express in a context among peers.

Responses were also short for the types of concerns students had for nature either locally or globally. Students cited water pollution, pollution from factories, and wasteful energy use. One response seemed slightly more elaborate than the others; “Mainly, like the car pollution because everyone drives cars and it’s just a major factor.”

The third question on how personal health is related to the condition of the environment mostly involved possible scenarios of how conditions could be harmful to humans. This included if the water is polluted, people won’t be able to use it or as one student mentioned, “Like if our air has bad quality, the air is going to make our health die.” While these responses did answer the question, they did not appear to cause a significant amount of personal reflection or connection with nature. However, this likely reflects the poorly constructed nature of the question and not the student’s lack of experiences with nature.

The fourth question related to necessary actions students felt should be taken to protect the environment. This involved only two answers on setting limits on the use of natural resources. One exchange included the following

Student: We have to set limits.  
Moderator: Ok limits, like about what  
Student: How much stuff we use  
Moderator: Ok, what kind of things  
Student: How much water we use daily and how much, like, natural resources and stuff that we consume.

Overall, these answers were short and appeared slightly general and impersonal. On the one hand, this likely suggests that students are not used to answering these types
of questions and giving their perspectives and opinions on nature. However, this may also have been the reaction to the unfamiliar format of focus groups. Reactions may also reflect a certain degree of social pressure. In one comment about enjoying nature by riding four-wheelers outside, another student remarked in a sarcastic tone “But riding four-wheelers hurts the environment.” This response would have been good to develop discussion further on but more importantly, suggests that there may have been some subtle peer pressure against showing more concern and appreciation for nature.

Pre, Treatment Class 1, Focus Group 2

The second group in the first class also mentioned similar responses to valuing nature; hunting, fishing, four-wheeling. However, a more elaborate response came from a 12th grade student who replied: “I like to hunt, I like to go out, I think it is nice to sit out in the woods, especially during hunting season and stuff. I just like being out there.” Other reasons involved going outside for the fresh air and to not be cooped up inside but were not very elaborate.

In response to concerns for the environment locally or globally, there were some general responses such “pollution” or “air pollution, don’t want to breath it.” However, two responses were more elaborate and personal. As a 12th grade student described, “I think littering cause it’s like you go out to the woods and you find like people’s candy wrappers and pop bottles and it’s like, they just like chuck them out of their car when they drive by and its just, any kind of animal, if its got food in it, like a plastic wrapper, they may eat that, choke on it and die.” Another response involved the local river: “In rivers and stuff like when we go swimming, we usually go floating down the river and there is a whole bunch of litter and stuff.” However, when the students were asked
further why these issues were a concern, answers did not necessarily come from concern for nature but rather for self-interest. In the example of trash in the forest, the moderator clarified “So concern for the welfare of the rest of the animals?” the student responded “Because they will all die off and we will have nothing to hunt.” Similarly, in response to pollution in the river, when the moderator asked why this bothered the student, the student replied “Just like, sometimes you cut your feet and stuff, it is disgusting.” As with the previous group, these responses may represent some social pressure against displaying emotional concerns for nature in which answers needed to be disguised in a way that is more acceptable such as hunting or personally getting hurt. However, in addition, this may also represent the abstract nature in describing more deeply, the basis for feelings and concern for nature.

It was challenging to get responses to the question of how personal health is related to the condition of the environment. Both of the two responses included possible environmental scenarios. This involved eating deer that may have eaten or drank something harmful, or if something affects our water we may be exposed to it. As with the other group, these responses did not seem to reflect personal interactions on a unique level. Other students who were present only replied that they agree with what was already said.

Questioning what types of actions should be taken to protect the environment, if any, included not littering, replanting trees so that animals will have a place to live, recycling and “Like clean up areas that are not suitable for plants and animals.” Other students again deferred to what these students had said.
Answers in this group mostly related to animal welfare and as with the previous group, difficulty responding may have resulted from the unfamiliar setting. However, it may be telling that the 12th grade students appeared particularly more responsive to these types of questions. This may suggest that such questions are more suitable to older students who are better able to relate to the question, likely from more experience and awareness of personal perspectives.

**Pre, Treatment Class 2, Focus Group 1**

The first question was difficult to get responses to and mostly consisted of one word or short phrases: hunt, fish, camp, ride horses. There was not much elaboration even when probing responses for why. However, one individual elaborated more personally on bird watching: “I like to watch birds fly; I just think it is really cool to see how they can tilt one feather and have them move into different directions.”

Difficulty in getting responses was also true for the second question on types of concerns students have. Most responses were general and did not seem to contain much reflection: pollution, trash, acid rain, stream contamination. In fact, in probing for reasons why, one student responded with “I don’t know, just thought it sounded good.” While these responses did answer the question, as the later response suggests, they were not very elaborate and did not appear to come from a personal connection to nature.

Responses on how the health of the environment was connected to personal health reflected how we rely on the environment for different necessities such as water, oxygen, paper, and a place “to raise cows and deer.” However, other responses included how some plants create allergies that affected our health while and how we use the
environment to exercise in and knocking down trees would take something away in this regard.

Responses on what actions should be taken to protect nature included cleaning up trash in the woods and making sure the soil is fertile so we can use it. There was also some discussion on recent events that happen in the environment, namely the danger of using human waste as fertilizer and an E. coli breakout in bagged spinach.

Overall, responses by this group were general and did not seem to provide much personal reflection. As with the other groups this may have related to the unfamiliar format of the focus group questions. In addition, general and short answers may have resulted from the students perhaps feeling that this was more of a quiz than an informal discussion. At the end of asking more formal questions, the moderator mentioned that the questions were done and asked if there were other stories students had about nature. This appeared to be when students opened up more and some responses included swimming in the river, climb a big old tree in the winter and hide behind it when the wind is blowing, how “gross” the river gets after a rain storm, and how the environment can be used to get medicines and other things that you can’t get in a drug store. This suggests that starting with more informal discussion in the beginning would likely have allowed for students to open up more. However, as with other groups making the questions easier to relate to would likely also encourage more discussion.

**Pre, Treatment Class 2, Focus Group 2**

In this group, the initial question of valuing nature included different responses such as riding four-wheelers, snow boarding, and horseback riding, football, fishing, and going for long walks alone. “I don’t know” was a common response in probing for
reasons why. One student mentioned that he liked fishing to try and catch different kinds of fish while another student mentioned the enjoyment of walking because “the fact that you can do it with someone or alone.” These responses contained slightly more elaboration than the other groups but were still relatively general.

In discussion of personal concerns, locally or globally, most responses were short and general such as air pollution, water pollution, land pollution, smog, and how the ozone layer is “dying” because of all the high tech cars. However some elaboration on other topics was given. One student mentioned concern for different types of animal species dying off. When asked how that affect her personally she replied, “Yea, because when I have kids or whatever it’s going to be like, what happened to these animals and stuff and just every animal dies and stuff, that is a part missing from our world.” Cutting down trees was also a concern and was slightly more elaborate. As one student commented: “People are destroying like a lot of wood and stuff and building stores” which was followed by examples of places where wood was being cut down.

Short answers were also given to how the condition of the environment is related to their personal health. These included: no trees-no air, clean water, and that the pollution can cause a lot of acid rain. As with most other groups, while these responses do answer the question, they did not seem to reflect personal connections.

In response to whether or not we should take actions to protect the environment, different students mentioned various topics including putting air filters on cars and buildings, recycling, using ethanol gas, and composting. Though there were various answers, these seemed slightly general and did not contain much personal connection. However, in discussing pollution, one student did mention the dislike of burning trash; “I
think it stinks when ever you’re in town or something and you have like family over and it is like hot outside, but not hot enough to put on the air conditioner and you open the door and it stinks because people are burning garbage.” This response suggests greater personal connection than others.

Overall, this group was more talkative than the others and presented a mix of both general and more elaborate responses. The way students valued nature was similar to other groups, namely hunting, sports outside, and riding four-wheelers, as was the concern for cutting down trees. However, other responses were similar in that they were general without much explanation.

**Pre, Control Class**

In the control group, responses to values in nature were similar to the treatment classes including hunting and fishing and sports outside. The most mentioned response concerned hunting. As one student replied “Probably anything that has to do with hunting outside.” In questioning why, one student mentioned “Just sitting there, alone, feeling the blood rush when you see a deer.” However, in one exchange, a student expressed an interest in trees. However, he was called a tree hugger by other students which then prompted a followed up response “It gives off oxygen.” Similarly, when this student later made comments on fall colors and the way the trees look when snow falls on them but was also teased. This reflected social pressure behind responses in which while it was socially acceptable to hunt and play sports, valuing nature for more aesthetic or relational reasons did not seem acceptable.

Concerns for the environment, locally or globally, involved concern for the deer population; “There is no deer around here, hardly.” One response also included concern
about the water pollution in the local area which correlates to other groups and likely involves the local stream. However, the majority of responses were general such as oil spills and global warming while still others were sarcastic in tone such as “I’m concerned about droughts” “I’m concerned about floods” “I’m concerned about drowning.” It was later mentioned by the moderator how this reaction likely hampered other members from being more vocal.

Responses involving connections between personal health and the condition of the environment drew on scenarios that could have an impact on humans. For example, cutting trees would take away oxygen, water pollution would affect drinking water and the quality of fish we eat, and eating deer with diseases could affect us if we eat it. While these responses did answer the question, they did not necessarily provide the depth of personal conceptions and connections to nature, which was the goal here.

Suggested actions by this group to protect nature were short and involved cutting down less trees and having fewer cars to reduce air pollution. However, as with some of the other groups, responses were not elaborated on.

Overall, responses in the control class were similar to the treatment classes in that most were general and did not appear to reflect personal connections with personal examples or greater elaboration. However, it was apparent that this group was more boisterous than the others and as with some instances in the implemented classes, reflected degrees of peer pressure in relation to expressing environmental perspectives.

**Response Summary of Focus Groups**

Together, pre session results from all groups did contain some commonalities and response characteristics. Most all groups mentioned hunting, fishing, and riding four-
wheelers as something they value about nature or like to do outside. Similarly, most concerns in nature appeared general and involved air and water pollution, global warming, acid rain, and cutting trees based on the need for oxygen. Some of these may have come from common knowledge while others such as the relation between oxygen and trees appeared to be material the students recently covered in class. However, some responses in all groups did appear more personal and involved concern for deer, trash on the ground, and pollution in the local stream.

Many responses to the question of connections between personal health and the condition of the environment involved possible scenarios that could affect the health of humans but did not reveal much personal connection (despite the emphasis on ‘personal’ in the question). This likely represents the indirect and poorly constructed nature of the question than a lack of personal connections to nature.

Lastly, actions students suggested were diverse and beyond being general, did not necessarily reveal many commonalities. Different groups mentioned cutting down less trees, cleaning up trash, and not abusing resources.

Overall, it was difficult to generate discussion in these groups and may be due to a few possible explanations. It is possible that the focus group format may have been construed as a test of sorts. While it appeared that some groups were able to get comfortable as the discussion moved on, others appeared to open up more when the moderator mentioned that the questions were over and allowed the students to mention any stories they may have. In addition, the way questions were put may also have been too blunt and abstract. Discussing why the children like to do certain things outside or why they may feel concern about different elements in nature may require greater
personal reflection and introspection than these discussion groups may allow for.
Similarly, social pressure likely prevented some students from opening up or showing
concerns or appreciation for nature. Answers such as hunting or riding four-wheelers
may be more socially acceptable than expressing concern for animals or pollution in the
area. However, in addition and coinciding with these explanations, it is likely that these
students are not use to being asked for their perspective or opinion and in particular there
opinion on nature. Students likely have not thought about or have been asked how they
value nature, how nature influences their lives, and what environmental concerns bother
them despite perhaps learning about the importance of nature and environmental issues.

Post Program Focus Groups

Post, Treatment Class 1, Focus Group 1

Responses to how students value and appreciate nature in the post session
contained more of a personal feel than in the pre discussion. While as before there was
mention of hunting, fishing or sports outside, other responses included “Playing in the
streams” “Having picnics” “just sitting outside because it is quiet,” and enjoying winter
because “I think it smells cool.” One response included “Well, I think it would be really
boring living in the city because you couldn’t go out in the woods and do stupid stuff in
the woods.” This was followed up by another student who said that “There wouldn’t be
like the natural beauty of the country.” While these responses were relatively short as in
the pre session, they seemed to reflect more personal character and aesthetic appreciation
than the one or two word responses in the pre session.

Post responses on concerns for nature also seemed more personal. One example
included the comment “I think they’re trying to put too much stuff around here. Like too
many stores. Because they keep trying to cut down, like my Grandpas live in the middle of the woods and they keep trying to cut down around that. I think it is stupid.” Other responses included water pollution in the local area and erosion. One exchange included the following:

Student: “My place is getting eroded, like over the driveway.”
Moderator: “Your parent’s house?”
Student: “Yea, like around here in the woods, like the whole, where the crick used to be, the hurricane washed out the creek completely.”

Some responses were also general and included the world getting overpopulated and the need to have to cut down more trees to make room. Given the far reaching character of such responses, this may reflect information recently learned in class.

As in the pre discussion, response to how the condition of the environment affects the student’s personal health, followed possible scenarios, “If you don’t have good water, then you’ll get sick.” However, responses also reflected more local situations such as taking away farm land for industry and housing and how acid rain may hurt farming: “Like, if like we have acid rain around the farms and stuff then the plants will start dying. And that could hurt the farms really bad.” This response and others seemed to connect more locally.

In response to whether or not we should take actions to protect the environment, comments included not littering, preventing water from getting polluted, controlling over hunting and to “let nature alone to take its natural course.” In addition one student mentioned “And stop building things we don’t need like factories and stuff that we don’t really need.” In addition to the personal nature of this last response, the overall tone of responses in this question was of a more reflective and personal nature.
Overall, a primary difference in post responses appeared to be greater elaboration responses and more use of personal examples. However, other responses, while passionate, may more represent recently learned material from class. Examples such as taking away farm land for industry and to stop building factories we don’t need are likely outside of the range of student experiences though students are able to relate to these issues on a certain level.

**Post, Treatment Class 1, Focus Group 2**

Similar to the other group in this class, responses to how students value nature seemed more personal though not necessarily more detailed. Some examples include “I just like nature and stuff and like being outside and stuff,” “You can just hang out with family and stuff, you’re not in a confined space,” “I like watching the animals and checking out all the plants and stuff,” “I like the air because it is so nice to go outside because like if you’re mad, like at your mom or something, you can just go outside and take a walk and it is not all polluted and you’re not choking or something.” Other responses also included ones similar to the pre discussion such as hunting, snowboarding, and four-wheeling, but tended to be the minority. While these answers appear more personal, they also reveal difficulty in expressing feelings and understandings on nature, possibly reflecting the abstract nature of the question but also a lack of experience expressing perspectives.

This group however, as opposed to the pre discussion, was quiet in terms of concerns for nature. Only one verbalized concern was that of how we are endangering the number of species in the world and how “There won’t be as much to hunt, there will be like a limit on everything.” While this type of response relates to material learned in
this program, it seems that this student tried to make it more personal by relating it to personal experiences such as hunting. Likewise, though there were more responses in the pre session, these responses seemed more general such as pollution from factories and water pollution. As a result, not mentioning more responses may only represent greater reflection which may have been more the case here.

Similar to the pre discussion, responses to the question of how the condition of the environment affected their personal health revealed possible scenarios “Like hunting and fishing, like if you eat fish from a polluted stream, you could get sick.” However, one student also mentioned that “I think the environment has a lot to do with our emotions” and described a trip to New York City where she felt confined compared to her house in Pennsylvania which is out in the woods.

Actions taken to protect the environment were short and included putting filters or better filters on local smoke stacks “so that it doesn’t come out across town” and preventing litter, both of which appeared to relate more to personal experiences. However, there was also the mention of not using so many pesticides and herbicides that kills plants and animals which may correlate to materials more recently discussed in class.

Overall, responses did appear more personal in the post session than in the pre session and while others seemed to relate to recently learned materials, there appeared to be more of an attempt to personalize these aspects perhaps to show greater awareness.

**Post, Treatment Class 2, Focus Group 1**

Due to a recording malfunction, data were lost on the first question and on part of the second. However, once this was identified, a recap of answers was given. For
values, responses included the smell of winter, colors of the seasons, and more room outside which seemed to relate to the other class in being more aesthetic and personal.

In the later part of the second question related to concerns students have, students mostly talked about how the Game Commission is trying to control deer populations. “Yea, that is another thing, like the Game Commission is letting different animals out like mountain lions and coyotes.” Many stories followed about encounters with these types of animals that the students heard of.

Unlike the pre session, more personal examples and fewer scenarios were given as to how the condition of the environment affects personal health. One student commented on how swimming in the river caused him to become sick because it was polluted while another student also mentioned discomfort from being next to a stream polluted by sewage: “And some people’s sewage runs into the streams and it is real gross because you’ll be walking by….. right across the street in front of my neighbor’s house there is a pipe and then there is a stream that goes down and you can see stuff from people’s washers and toilets.” Other responses included water pollution from farms and how tires use to hold down plastic on farms enhanced the mosquito populations which appeared to relate to material recently learned in class.

Actions mentioned to protect the environment included two students who felt that the environment should be cleaned up and that police should patrol and “monitor the bank for litter and they should monitor the farms, like where they are putting the sewage, make sure they are not dumping it in streams.” However, another student protested the idea of have police patrol and instead suggested having someone who was not a police officer to patrol.
Despite the recording malfunction, responses in the post discussion contained more personal examples than in the pre session. However, at the same time, there appeared to be more mention of material recently learned in class such as tires and mosquitoes and pesticide use.

**Post, Treatment Class 2, Focus Group 2**

Responses to values in nature in the second group were similar to pre discussion responses, namely hunting, fishing, and riding four-wheelers. However, one response also mentioned “That it is better, that I wouldn’t want to live in a city where grass is concrete and trees are skyscrapers.” This last response, though more elaborate than in the pre discussion, seemed to match other group responses comparing city life to country life.

The types of concerns students had in the post session were more personal than in the pre discussion. One personal concern involved deer “I think they should have laws for bucks as they do does. People just shoot bucks.” This response was not surprising as this discussion session occurred after hunting season. However, other responses included concern for the river “Because they are starting to look like crap because of the dumping that goes in there. Can’t go near them, can’t go swimming, can’t go fish” which another student supported with “It is ugly. No more fish.” Trash was also highlighted “Like when you’re walking down the roads and you’re hunting and you see like beer cans all through the woods” while another student mentioned “There are so many bags on the road all the time.” In comparison to responses in the pre session such as smog, global warming, and the ozone layer, these responses appeared more personal.

Relaying how the condition of the environment relates to personal health involved possible scenarios. For example:
Student: “Over-population.”
Moderator: “What would that do, what do you mean by that?”
Student: “Well if we have more people then there is going to be more litter and more contaminants.”

Students further mentioned how water could be contaminated by bacteria “like Mexico” and described how they have an over-population problem. As with other response, these appear to relate to material recently learned in class on big cities.

In response to whether or not we should take actions to protect the environment, most comments involved laws to change hunting conditions; “They should have a limit on the amount of bucks that you’re able to shoot.” while, other comments included picking up litter and not throwing it out the window. These responses, though not as many as in the pre session, relate to elements students are more likely to encounter and likely reflect a more personal character.

Overall, students did mention more personal examples in the post session. While there were also answers that appeared to relate to classroom material, there were fewer general answers such as “air pollution”, “smog”, or others, in the pre session.

**Post, Control Class**

Post responses to values in nature were similar to pre discussions, namely hunting, fishing, and sports. Some unique responses include how one student enjoyed being outside simply because of “Not taking notes” while another unique response was “I like to play with my sister outside.” Other responses, as in the pre session, involved hunting. One student replied: “I like being able to shoot deer but there are no deer because the stupid game commission screwed it all up.” Other students mentioned how the game commission has killed all the deer and how we should not kill all the bucks.
Hunting related responses as mentioned before were not surprising given that this discussion came shortly after the end of hunting season.

Similarly, concerns about nature were also greatly related to deer hunting: “Not enough deer.” Responses to how this affected them included “We’ll all starve,” “No deer jerky,” and “We spend more days in the woods, it forces people to road hunt.” However, one more personal response involved the mention of water pollution “Oh yeah, like water pollution. The guy that lives down the road from me, he has like an apartment that pumps sewage into the river.” These responses appeared to relate to personal experiences. However they also appeared to be closely matched to pre discussion responses in which not enough deer and water pollution were primary concerns.

Only one reply was given to how the condition of the environment affects personal health and involved “If you eat bad meat you’re going to get sick.” As before, this question did not seem to cause a great deal of personal reflection or gauge an awareness of personal conceptions as they relate to nature. However, in addition, this group was more rowdy and difficult to maintain which made getting answers to these questions challenging.

In response to actions that should be taken to protect the environment, as in the pre discussion, this group mentioned that “We shouldn’t cut down as many trees.” However, students also emphasized litter and to “Catch the bad guys who litter.” Unlike the pre session, there were not any further actions mentioned.

Conclusions

As a primary result, overall differences between the treatment class, post session, and both the pre session and control group was greater mention of personal content. One
area this was seen was in the way students valued nature. While responses were not necessarily more elaborate or detailed, they appeared to be of a greater personal reflection. Some responses from different treatment groups include: “just sitting outside because it is quiet,” “I like watching the animals and checking out all the plants and stuff,” “Playing in the streams” and being outside to relieve stress. Examples of concerns for nature in the post implemented session were also more personal. This included different responses about cutting down trees in the area and disgust with sewage and dumping in the streams.

However, most groups including the control showed greater elaboration and passion about hunting conditions. However, it was further interesting to seen how some responses regarding how the condition of the environment and personal health were also more personal for some of the implemented classes. This included how swimming in a polluted stream and how the environment is related to emotional health. These types of responses contrast with pre session responses which were often general and short, consisting of one or two words or short phrases. While responses in the control group were more passionate and elaborate in relation to hunting, most other responses did not change much from the pre session and mostly remained general. The more personal nature of responses in the post discussion does suggest a stronger awareness of personal understandings and perspectives as they relate to nature as well as the feelings and emotions attached to them. Students appeared to have reflected more on personal relations with nature and ways they engage and react to environmental issues.

However, it was also apparent that some students had difficulty expressing perspectives and understandings in the post as in the pre session. This was seen in the
values section in which while responses did appear less general and more reflective, they were not necessarily more detailed. Likewise, some responses in the post and in particular, the implemented classes, used examples that seemed to represent material recently learned in class. Some commonalities in the treatment groups was mention of animal extinction, the construction of too many buildings and factories, comparison between city life and country life, and specific farming practices.

Difficulty developing responses, as with the pre discussions, may be due to the blunt and abstract nature of the questions as well as peer-group pressure. Both of these influences likely prevented students from describing detail in how one values nature. However, the use of recently learned material in responses, despite emphasizing the personal nature of the question, may coincide with a lack of personal exposure and interaction. While it seems students in the treatment classes did become more reflective and responsive to environmental topics and did mentioned local issues such as trash, hunting, and garbage in the stream, there were likely many other issues students had no personal experienced with. In some cases, students tried to personalize these examples. For instance one student mentioned concern about species extinction because “there will be less to hunt” while another mentioned concern for acid rain because “it could hurt farmers real bad.” As a result, this suggests that students may have used these understandings to further show real connection and concern despite not necessarily having direct interaction with such elements.

However, it is interesting to see the greater mention of this in the treatment classes as opposed to the control group. In a way, this may relate to the underlying premise of this study. Namely, developing a greater awareness of personal conceptions
and connections to nature, elements thought to be involved in the engagement and reaction to environmental topics, would influence learning about environmental topics and overall environmental sensitivity. As a result, it is possible that developing a greater awareness of these elements in the treatment group as opposed to the control group may correlate to greater sensitivity to the topics discussed in class.

On the other hand, a separate general explanation may be that responses relaying to recently learned material relate to the desire to answer questions correctly or in a positive, socially desirable way. As in the pre discussion, these students are not likely use to giving their opinions or perspectives as they relate to nature. Instead, they are more used to note taking and tests and as a result could be mentioning such responses to get the right answer. Furthermore, greater mention in the implemented as opposed to the control class may result from differences in class learning performance. Perhaps an indicator of this was the greater level of control and maturity in the focus group discussions of the two treatment classes versus the control.

4.2 Written Response Data Analysis

A written response question provided students a different medium to express personal opinions and understandings as they relate to nature. The students were asked:

Do you personally feel it is necessary to be concerned with environmental issues? Please explain your answer anyway you like.

Written responses were tracked on an individual level and allowed for an individual comparison between pre and post sessions to see how answers developed or remained consistent.
Data collection for the written response was implemented by the head teacher of the class. This was done to allow greater time on other parts of the program and prevent experimenter bias. However, both the number and structure of returned responses suggest that the data were collected differently between pre and post sessions. Namely, only about half of the students in all classes returned responses in the pre session and most all responses were short, ranging from three to four sentences. However, in the post session, all students returned responses and these responses were longer in both the implemented classes and control class. This suggests that instructions were different from pre and post sessions with the post session likely receiving greater emphasis. While it was the same for all classes, this may have affected the type of post session result. However, some understanding of how students react to this type of questioning and how the implemented program may have affected responses in comparison with the control group can be meaningfully assessed.

Pre Session Written Responses

Class 1, Treatment Group

In the first treatment class pre session, thirteen out of twenty students returned responses and all were short, consisting of one paragraph of three or four sentences. Most all responses indicated concern for environmental issues and most reasons were based on our need for natural resources for the future.

“Yes, because the environment and natural habitat is becoming more and more scarce. We all need the environment to survive.”

“Yes, because if we don’t conserve some of the land, our natural resources will be gone forever. We need trees for oxygen and if we cut all the trees down then there goes most of our oxygen supply.”
“Soon if we don’t take care of the environment, we will run out of many things that are essential for everyday living, like coal, gas, freshwater, oxygen, and other stuff. If we don’t take care of the environment, it is going to end up bad for us.”

“Like the future, we may not care now but when we are older and things are really expensive, we are gonna wish we cared and made some changes when we were younger.”

Other responses involved concern for plants and animals that include:

“The environment is wildlifes home. To take care of wildlife, we need to take good care of their home. For example, if we don’t take good care of our home, it will be dumpy and we don’t like to live in dumpy homes, so why should we let animals live in dumpy homes.”

“Yes, I do because if nobody cared about it then the environment wouldn’t look like we take care of it. I also think it’s important because the animals wouldn’t have nice surroundings. If no one cared then the plants would eventually die and the animals wouldn’t have energy or food then they would eventually die.”

Interestingly, a common response was a correlation between environmental issues and the appearance of the environment.

“as we get older if we aren’t (concerned) then the world will be a big dump and we can prevent that from happening.”

“we also want a clean environment so it looks nice and clean.”

“If everyone is concern about environmental issues then we can keep the environment nice, clean, and healthy.”

In addition, a separate commonality was the mentioning of cutting trees down and its impact on oxygen.

“If we us up all the trees there would be no more oxygen. It would produce fewer habitats for animals.”

“If we use up all the trees, there would be no oxygen.”

“We need trees for oxygen and if we cut all the trees down, then there goes most of our oxygen supply.”
“Our trees, even though we could still survive many years after all of them being cut down, provide the air quality necessary for our bodies.”

Overall, these responses appeared slightly general with concerns being based on natural resources and trees for oxygen.

**Class 2, Treatment Group**

Only nine out of eighteen students returned responses in the second class. These responses were also short, consisting of one paragraph of three to four sentences, and with most all students feeling it important to be concerned with environmental issues. Some reasons were similar to the first class, namely concern for resources and for the future.

“We need trees and water and all the living things in nature. Without water we wouldn’t be able to live. Without trees we wouldn’t be able to breath.”

“Yes, if we don’t when we’re adults, we still won’t because we were never taught when we were younger.”

However, this group also used less general and more personal examples as reasons for concern which mostly related to hunting. Some responses included:

“The reason I care is because it would make hunting bad and animals would die. I spend a lot of time in the woods so I am always concerned.”

“Yes, because I’m a hunter and without a good environment, the animals wouldn’t live. People should care about the place they live in.”

“A little. It all depends. Some things are more important than others. Like I’d be more concerned about the birds than about the pollution. And deer rather than the atmosphere.”

One response also contrasted with the others to say that, at present, it was not necessary to be concerned with environmental issues.
“Yes, hundreds of years from now except if someone is talking about their great, great grandchildren. I don’t think our planet is terribly polluted. But if there are big buildings letting off smoke everyday, there might be environmental issues.”

Overall, while some responses were similar to the previous class with the mention of natural resources, they were less detailed. However, other responses such as those related to hunting did appear to reflect a more personal basis for concern.

**Control Class**

Only eleven responses out of twenty one students were returned from the control class and, as with the other classes, these responses were short and mostly consisted of a paragraph of three or four sentences. Most students felt that we should be concerned with environmental issues and similar to the second class, gave more personal examples.

“I am a hunter and fisher so anything that hurts nature such as pollution can cause my life to change.”

“I like to hunt and you can’t have a bunch of litter under your tree-stand. If you litter, it is also killing off some of the things animals eat.”

“Yes, because the acid rock would not be good for the water and fish. It could kill fish and people who like to go fishing would not go anymore because there will be no more fish.”

“There might not be good water for the deer that we hunt. My pond could become polluted and no bass would be alive to catch.”

Other responses mentioned concern for the future of natural resources and for the welfare of animals:

“I think our survival has a lot to do with our environment. If we want to keep living and provide a good life for future generations, we should be more concerned with the environment than we are.”

“If we aren’t, then the soil would not be as rich. The air would be a lot dirtier than it is now.”
“Yes, because when wildlife starts to disappear, I would wonder where they went…...My pap’s apple and pear trees are loosing fruit and that is about the only time I see deer.”

Overall, most responses in the control group involved hunting and some mention of concern for natural resources which appeared to relate more with the second class than the first.

In general, some common responses from all these groups include concern for natural resources, concern for future conditions, and concern for animal welfare, especially deer. Responses in the first group were slightly more elaborate than the other two groups while in the control group and second treatment class, responses incorporated more personal examples, hunting in particular. Other common responses included concern for trees for oxygen and concern for the appearance of the environment. The example of trees and oxygen likely represents material emphasized in class and maybe from a younger grade level. However, concern for the appearance of the environment likely relates to both something emphasized in school but also something the students have interacted with outdoors. Many of these responses relate to focus group responses.

Post Session Written Responses

Class 1, Treatment Group

In the post session, all students in class one returned responses with the majority feeling it necessary to be concerned with environmental issues. However, responses were greater in length, usually two paragraphs of four to five sentences and while many responses were similar to the pre session, they were more elaborate and often contained
greater detail. As before, concern for the appearance of the environment and in
particular, trash, was mentioned as well as the relationship between trees and oxygen.

“If trash builds up because we as humans just don’t care, other living organisms out in the environment can start to die. Like if we just throw our garbage out into the environment, animals could eat it and choke or suffocate or something like that.”

“We should also be concerned about the trash pollutant. All over you see trash. There are also many dump sites in some places. We should keep the earth clean and beautiful. There is way too much trash being thrown on the land. The trash will destroy animal habitats just like it destroys ours.”

“If we don’t care about our environment then there will be trash everywhere and our environment would turn ugly and not as beautiful as it use to be. This would make our world dirty and disgusting.”

“Yes, I do feel that you should be concerned with environmental issues. One reason is if you don’t, it could be your death. Let’s say that the government wants to cut all the trees down. They wanna do this because of great paper demands. If you are not concerned, you could die. You could die because trees produce oxygen and if there are none left, you won’t be able to breath.”

However, additional common responses in this post session include concern for farming and soil, animal extinction, and to a smaller extent, affecting wildlife by constructing more buildings and factories.

“Also, another reason to be concerned about environmental issues is because of soil, plants, and crops. If chemicals and acids and such get into the soil, that effects the plans and crops growing in the soil. That could affect us by getting sick from the chemicals and bacteria in the food. Plants and crops need healthy soil to grow in.”

“If people just throw there trash on the ground, they are harming a lot of things and people in the environment. Farmers would get mad because you may be ruining there soil. They wouldn’t be able to grow anything.”

“We should care about the environment because the wildlife life there. We don’t want to destroy the homes of the animals. Destroying the homes of the animals could lead to the extinction of certain species of animals.
Not only would it destroy the animals, it could destroy certain plants that are very important to our ecosystem.”

“Yes, because if the animals aren’t protected and go extinct, we may never be able to get them back. And other animals like the white-tailed deer may go on the endangered list if people don’t watch how many deer they shoot during deer season.”

“We live in an environment. If we are not concerned about it, then eventually we will probably have no more resources or enough room for farming and living. Animals also rely on the environment. This is where they live and where they get food. If they don’t have these things then they may go extinct or become endangered. This is why I think it is important to be concerned about the environment.”

“The owls are another example. They need a lot of land to live and if people go around cutting trees down to make factories we don’t need, then the owls will go extinct.”

“If we don’t care about the environment, we might not have forests and some animals because of the logging and building of new cities.”

“If you destroy a forest, as an example, to build an apartment complex, all the animals that lived there will suddenly be homeless and wonder around and get in our way. How would you like it if someone bulldozed your house so they could make a new building?”

The majority of students maintained the same type of reasons from the pre session. However, in addition to maintaining previous responses, other students further expressed more divergent and critical views in the post session.

“Yes, I think we should be concerned about environmental issues. If we deplete all of our natural resources and trees, soil, water, gas, oil, and everything else we as a race will not last much longer. We need to make sure that we use our resources wisely overtime. When it comes to saving endangered species, I’m all for that. But when people’s jobs, lives, and futures are at stake, I think that’s just stupid to take the animals side. It is important to know how far to go when saving animals and when to stop.”

“I am neutral on the issues. Some I am with, others I am against. The rate of extinction should not be accelerated. We should not cut down pristine forests. We should not pollute the air. On the other hand, we shouldn’t stop the logging industry in some places. We should make people move
out of their homes for owls. I am neutral; I like to support being concerned and not being concerned.”

“I personally don’t feel it is necessary to be concerned with environmental issues. But I do think we just need to keep an eye out for any problems or if there is a problem, try to solve it where everybody benefits. I do recognize that the issues or concerns are more in other countries like Brazil and it rain forest disappearing rapidly. But I don’t see any major problems in our country yet. That is why I am not concerned.”

Overall, the majority of post session responses reveal greater elaboration and detail than in the pre session. While this result does suggest greater reflection and awareness of personal feelings and perspectives as they relate to environmental topics, some examples appeared to be material recently learned in class. Though the original idea of this question was developing personal understandings and perspectives, this question may have been too general and unrelated to student experiences. These students likely have limited past experiences with environmental issues and while they are likely concerned about the environment, they may not have many past interactions with environmental issues with which to mention on a more personal way. As a result, students may express this general concern by mentioning various environmental issues they are aware of.

Class 2, Treatment Group

All students returned responses in the post session and as with the other class, responses were greater in length, usually two paragraphs of four to five sentences. As before, the majority of students felt it is necessary to be concerned with environmental issues and most content was similar to the pre session but more elaborate. This included concern for trash and cutting trees and oxygen.
“I think more people should be out their cleaning up the environment. After all we should treat the environment like our home, clean and neat.”

“I feel that people need to be concerned with environmental issues because people are just not caring anymore. People all across our nation are throwing trash on the side of the roads, in the woods, in the streets, and on the school grounds. If we keep doing this, we are going to be overwhelmed with trash.”

“We need the environment to live. We use it in everyday life. So when someone knocks down a tree, that’s less oxygen. When someone wastes water that’s less to drink. Environment is very important. We don’t need to waste it.”

“I think that we should be concerned because if we litter or stuff, it will pollute our living area. Also if we cut down trees, we will destroy our oxygen supplies. Another reason is if we were careless we might have lots of trash and have a dirty country.”

However, more emphasis was also placed on concern for future resources and animal welfare, and in particular animal extinction.

“I feel it is important to be concerned about the environment because in 50 to 100 years, if we aren’t careful, we may run out of necessary things. People were considerate of us and what we need. So it is obvious we need to be concerned for the future generations.”

“I do think we should be concerned with environmental issues. If we run out of resources we could have a very hard time surviving. Another reason is that if we run out of animals, there will be no hunting.”

“Nature and our natural resources aren’t going to be around forever. Animals, trees, water, and other things like coal and oil are here now, but who’s to say that they will be here 30 maybe 40 years from now.”

“Landfills are getting out of hand. People really need to recycle. So many don’t, just because it’s more work and more time. If people pollute in the air/water species are going to die. Fish will die in the waters and eventually become extinct. Dry-land animals will also die away if not taken care of properly. Certain food will not be able to grown in certain areas. I feel it is very important to care about environmental issues.”

“If we run out of resources we could have a very hard time surviving. Another reason is that if we run out of animals, there will be no hunting. I don’t think people realize how important the environment is to us. If we
misuse our environment, a lot of animals could go extinct, including us. That is why we need to be concerned about the environment.”

“Yes, I am absolutely concerned about the environment and I think others should be too. The world’s population is increasing more and more everyday. People need food and water. We get them from the environment. We eat plants and animals, and so on but when populations rise, there begins to be nowhere for animals to regenerate and nowhere for the plants to grow. Pollution increases as populations increases. Pollution kills our animals and plants.”

“I definitely feel it is necessary to be concerned with environmental issues. Until humans can learn to adapt to mars, this is all we have. And we shouldn’t take it for granted. For example, in Oregon, trees are being cut down like crazy. This is lowering the population of a certain owl. And I’m sure many other animals have gone extinct because of this.”

While most responses were an elaboration of previous responses or followed a similar thread, one student also mentioned a more critical view that differed from his pre session perspective.

“Yes, it is important to be concerned with environmental issue. But not overly concerned. You should be concerned with pollution and over usage of the land. I don’t like people who are like ‘Oh my god, we have to preserve everything and make earth speckle with cleanliness.’ Earth is here for us to use it, but not to complain about using it.”

Together, a primary change in most individual post session responses for the second group was greater elaborateness and detail of responses. However, as with the previous group, most responses appeared general and likely result from a limited personal interaction with environmental issues. Included in this was greater mention of animal extinction, a topic covered during the program. While students were likely more sensitive to environmental topics in the post, this general question did not really provide a specific way to assess this. However, perspectives that reveal greater critical thinking, as with the first group, did appear to reflect greater awareness of personal understandings.
and feelings and perhaps suggests a stronger approach to assessing this awareness in the future.

**Control Class**

As with the other classes, post responses in the control group were longer, usually two paragraphs of four to five sentences and again, most all students felt that it was necessary to be concerned with environmental issues. Most reasons were an elaboration of those mentioned in the pre session. In particular, concern for future resources, hunting conditions, and animal welfare.

“We need to stop cutting down trees so people and animals can live. The people who cut down trees need to stop that so that deer can live and stop building stores. If you build stores than the deer will have no place to go and probably die with some other animals that hide in the stuff that people get rid of.”

“When I go hunting in a bad environment most likely I won’t kill anything. But if it’s good then maybe the deer or whatever I am hunting will be feeding.”

“Reasons why I agree is because we live on earth, we should at least be concerned and help our environment. It helps the world be a better place. Also, it gives homes to many animals. Beavers, bears, deer, fish, and many more. If people like to hunt, we need deer to hunt and by doing that we should help the environment to help animals live.”

In addition but to a lesser extent some students also mentioned farming and the use of pesticides.

“If freshwater was polluted by fertilizers and pesticides and we didn’t care, fish (and other aquatic animals) would die...If all the soil was damaged, there would be a dramatic shortage of produce. Inflation of produce would skyrocket, making us pay more for our food.”

“Yes because if we don’t, the world won’t be able to produce clean water and other things that become dirty. When we use pesticides and chemicals that are harmful to the environment, if we don’t use them wisely, it could hurt the environment. If we dump garbage directly into the stream, it
could kill the fish and other organisms that live in the water, therefore throw off that whole ecosystem.”

However, much more elaboration of responses involved concern for trash.

“We need to keep our roadways clean. Our roadways are one of the worst in the eastern areas I feel. If people can quit throwing trash out their window then we have that problem taken care of.”

“I think we should not throw trash out the windows or when you’re walking to play with your friends. Because it is getting a lot of trash and people are just letting it there. Pick it up and make our environment better.”

“Yes, because it is really bad. The environment is a place you go to get away from trash. If it gets covered in a lot of trash, things would die….We’re getting lazy with this. People are dumb when they’re in their cars and drive by throwing trash out their windows. Someone just did that out in front of my house the other day. So my dad and I went and picked the trash up. Trash is bad for the environment.”

“I personally feel it is necessary to be concerned with environmental issues. There is too much garbage in the rivers, floating around. Every time I go fishing, I lose a lure on a bike or something submerged underneath the water. There is too much trash in the rivers.”

Overall, most responses in the control did display greater elaboration as with the other classes. Furthermore, responses including aspects of farming and building stores appear to relate with other treatment classes and likely reflect material recently learned in class.

Conclusions

Overall, the major difference between pre and post session for the different classes appeared to be a greater elaboration and detail of responses. However, given that this included the control class, it is likely that such changes were more the result of
differences in post instruction than a greater awareness of personal perspectives and understandings.

However, in addition to differences in instruction, many responses also appeared general and seemed to represent material recently covered in class. This result likely coincides with the general nature of the question and the inability of students to fully relate to the types of environmental concerns on a personal level. While this program may have enhanced students’ awareness of personal perspectives and feelings related to nature, students have not likely experienced many different issues other than what they have read about or learned in class. This could be the reason that many responses mention material recently learned such as animal extinction, specific farming practices, and how building cities could hurt animal habitat. In comparison, other responses appeared more to result from personal experiences such as trash in the woods, concern for animals, hunting, and interacted with trees. As a result, emphasis should have been placed on topics students could more easily relate to as opposed to a question that is more ambiguous and outside the realm of personal experience.

This suggests the need to focus on a single specific and local environmental issue. Structuring a question in this way may allow better connection to the topic by not only connecting intellectually but also physically and culturally and would not overwhelm students with the multitude of current environmental issues. This then would likely correlate to better expression of personal understandings and perspectives as they relate to nature and in turn, allow for better assessment of personal understandings.

4.3 Qualifier Question
A qualifier question was used to directly discuss the affect the program had on personal awareness of views and perspectives as they relate to nature and to attempt to assess what affect if any this had on an increase in the level of engagement and interaction with environmental topics. This question asked:

Do you feel expressing your opinion has:
   a. Changed the way you look at nature?
   b. Made you more aware of how you personally view nature?

**Treatment Class 1, Focus Group 1**

Students in the first groups mentioned that expressing opinions and feelings about the environment did not alter the way the looked at nature. Beyond simply mentioning “no” other responses included:

“It probably would have changed if we lived in the middle of the city but we live in the middle of nowhere, we kind of know.”

“It has helped me become more aware of my opinion but I don’t think I’ve changed.”

However, all the students agreed that the program had made them more aware of their own feelings and perspectives about the environment. In one response, it was mentioned:

“Kind of because this time we are talking about it and last time we were just sort of like this, starring at it (the microphone).”

As a result, while students mentioned that the program made them more aware of personal perspectives, having these discussions did not necessarily alter these perspectives. A possible explanation for this could have been that the question was too blunt to assess subtle differences such as enhanced engagement and reaction to environmental issues.

**Treatment Class 1, Focus Group 2**
Responses to the question of whether the program changed perspectives of nature in the second group, as in the first, were that it did not:

“Not Really”

“Not really, I’ve always felt the same way.”

“Not really.”

However, in the follow up, instead of asking if the students became more aware of personal opinions, the students were asked whether the program made them more aware of environmental issues. Students all responded positively. When they were probed further for examples of how it made them more aware, two students mentioned an e-coli outbreak in bagged spinach, an event that was taking place in the news around this time.

While developing an awareness of environmental issues was not the goal of this program, it is interesting to see students mention issues outside of the class discussions which could suggest a greater sensitivity to environmental topics.

**Treatment Class 2, Focus Group 1**

The second class was a bit more expressive than the other. However, the question was also asked slightly different that in the other groups. They were asked

“So in talking about how you feel or your opinions, do you think that changed the way you looked at nature at all or made you more aware of how you feel about it?

All students replied “More aware” but did not mention changes in views or feelings.

Other responses included:

“I felt bad because I used a paper plate yesterday. So I now use a normal plate and my mom can just wash it. Because I felt bad, I didn’t want to kill a tree.”
“It kind of made me want to start to recycle and watch how much water I use and stuff like that.”

Students also mentioned some of the topics discussed during this program, including the cutting of trees. One student mentioned

“And they just keep letting it go, more and more, well all they are thinking about it their money. I do understand both sides of it, like how they want money and stuff to support their families but in the long run, they are going to be harming there families because they are killing all the trees and they wont have nothing to breath.”

This level of personal reflection and the previous mentioned responses, do suggest a greater personal awareness of understandings and feelings as they relate to nature.

**Treatment Class 2, Focus Group 2**

In the last group, responses to whether having discussions changed personal views on nature were more mixed as opposed to the other groups. Responses included:

“No”

“Sort of”

“Yea”

When probing these responses further, students mentioned:

“If I see a piece of trash in the woods I pick it up.”

“It just made us think a little bit on what we are doing, like you drop one thing and it is like a whole chain of events happen after it.”

“Yea, you just think about it more.”

Though in this group it was not specifically asked whether the program made students more aware of opinions and perspectives, these answers do suggest that students gained greater awareness of personal feelings and perspectives. These responses further suggest
that such an understanding did influence sensitivity and engagement with environmental topics.

Conclusions

Overall, response to the qualifier question did indicate that the program made students more aware of their personal views and feelings as they relate to nature. However, what effect, if any, this may have had on the level of student environmental sensitivity is less clear. Some students indicated that the program did not alter or change the way they understand and view nature. Other students indicated that they were more talkative about these types of questions; that it caused them to think about the environment more and become more reflective of how things are connected. Together, while it is likely that students did become more engaged and reactive to environmental topics, these types of changes were likely rather subtle and this line of questions may have been too blunt to assess them.

However, the ability of students to think critically about environmental issues may suggest a better way to assess the development of personal feelings and perspectives as they relate to nature. By having a program focus on personal understandings, defending or arguing for certain perspectives is more suggestive of personal reflection. In turn, developing questions that focus on weighing both sides of issues may allow for better assessment of how students are developing personal views and perspectives as they relate to nature.

4.4 Classroom Notes and Observations
The following list of classroom observations was recorded directly after each class visit. These observations were used to help support focus group and written response data.

First class Visit: 9/11/06
The first few visits were an adjustment to working with the students and getting to know the classroom. The students enjoyed talking about themselves.

Second Class Visit: 9/25/06
After playing the video clips and asking the students which side they related to more, it was difficult getting students to respond.

Third Class Visit 10/5/06:
The students were a bit more reactive. In response to the road-less rule, there was a bit more discussion. This was likely sparked by contrasting money with the environment. Some students would shake their heads in disagreement with other student responses. Also, within the individual groups students appeared more aware of their opinions based on how they reacted to other member comments.

Fourth Class Visit 10/9/06:
Students were expressing their opinions and were identifying with how they felt. However, as with the previous class, it was mostly defended with information just learned. This does not mean that they were not engaging personal feelings and understandings to produce their reactions but that perhaps they were not dwelling long enough to become aware of why they feel and react as they do. They were reactionary instead of reflective. When asked why to a reaction may said “I don’t know.” It felt that many students were reacting to the money side of the issue and an effort should be made to focus on elements that are important to them to get engagement with personal emotion and understanding instead of trying to use provoking topics.

Fifth Class Visit 10/16/06
This topic was much too abstract and shows that much more focus needs to be on issues that they can relate to better. Discussing how we fit in and how there is a natural order and balance, for most students, did not connect well. However, two of the older students did seem more reflective. However, the students were riveted by the Tori Canyon video and a natural disaster that was affecting birds. When I went to shut if off one of the typically very disruptive students requested that we be allowed to finish watching. This was also commented on by the student teacher.

Sixth Class Visit 10/23/06
Questions and discussions were far too abstract. While it may have challenged their thinking it most likely was just confusing. In fact, the only person that this topic engaged was the student teacher who the next week came back with follow up ideas and invited me to church.
Seventh Class Visit 10/30/06

In reanalyzing the issue of our differences and similarities with nature, for the most part students were quiet and I felt like I need to continue talking. However, this also showed that they really had not thought about these questions before (develop a series of reasons why students may not have responded to questions). The silence was tough to deal with. Students did eventually answer but it was unclear whether they were thinking or not and while some did others may have just been board.

Eight Class Visit 11/06/08

Role playing was a good style of engagement. A big part of expression is taking a risk to express your own feelings. So having the student express emotion and feeling through role playing was a good way to remove the risk of doing this. Even though some of the students goofed off, there was a good portion that did engage the characters and even step out of the characters, as was confirmed by the student teacher. From the different class visits, what is becoming clear is that, at least for this group, key issues involve money, animals, and family strife. Furthermore, just like other approaches, there is no magical approach to getting students to become aware of personal views and values. While this approach is a good approach and while I feel the objective is strong and worth while, it will likely depend on many approaches.

Ninth Class Visit 11/13/08

In recapping the spotted owl issue, again there was too much talking on my side which is comfortable for me to do, and not enough expression on their side. It would have been good to have utilized different forms of expression, namely group discussions instead of class, paper write in’s, moving into different groups, or even just passing a material around to use for discussion. That would have encouraged them to think about the issues and form an opinion because they would have to act on it. However, some students were able to relate to cutting trees because their family had a saw mill and others could relate to the wildlife because they have been involved in fishing and hunting. In other words, the approach should have been to perhaps initiate a discussion of these elements to engage them and then move to discussing other topics. However, I also felt that it was difficult to define the question.

The big difference from this approach and other approaches to environmental education is that I am trying to have the students develop their own personal justification which will be related to their personal ability to express it. While this is a sound idea based on the literature, defining how to do it is not nor is its affect on environmental sensitivity been significantly researched beyond suggestion.

Furthermore, ecology and discussing cycles, ecosystems, and habitats, while very intriguing, does not allow one to connect or relate very well which is very important for developing relationships with nature and the elements there of.

Tenth Class Visit 11/20/08

In talking about the class projects and mentioning the idea of having them decide what they wanted to do, this seemed to work quite well. The students seemed more
enthusiastic about being able to pick to do either physical elements or making a photo collage or movie. It worked out well to not assume their interest but to allow them to pick it and there are approaches to make this happen. However, despite this, it did not feel that the students would have taken enough initiative to develop their own projects. Discussing possible ideas seemed the best approach.

Eleventh Class Visit 12/06/08
Project implementation: For the most part, the students seemed engaged in what they were doing and did not goof off very much. This could be do to the fact that they were able to select their projects but I’m not sure.

Twelfth Class Visit 12/13/08
Though students did show gratitude there was a feeling that the students were use to this transition from teacher to teacher. I also think and felt that throughout this program, it was difficult to get rapport with the students and that this may have affected how authentic and how genuine responses were.

4.5 Teacher Interviews

In this section, teacher interviews are summarized. During implementation of this pilot program, two teachers were present; a head teacher and a student teacher. However, for about half of the program, the head teacher was not present. These interviews were to get their opinion and perspective on the program and to get greater context on student responses. The following questions were asked:

1. In your view, how should environmental education contribute to a students overall school education?
2. What challenges do you face when attempting to talk with students about environmental protection?
   Probe: What types of students do you feel tend to get involved in environmental activities over others?
   Probe: Do you feel there are barriers to students becoming more environmentally friendly?
3. How do you think the school district and/or the Administration feels about environmental education?
   Probe: How do you feel other teachers view environmental education?
   Probe: Do you feel supported by colleagues or administration when attempting to engage in class environmental activities?
4. My goal was to develop an awareness of how students personally view and value nature. The primary method for this was through discussion and expression. (Recap activities)
a. Do you feel these activities were effective in terms of improving personal awareness of views and values?
b. Do you feel these activities increase sensitivity or critical thinking in terms of?

5. What sorts of recommendations would you have?
   Probe: How would you engage the students more?
   Probe: In terms of doing environmental projects, what sort of recommendations would you have?

**Response Summary:**

Teacher interviews revealed different perspectives related to environmental education and the implemented program. In response to the first question, the student teacher felt that environmental education should play an integral part of all education and serve to provide possible career opportunities. However, the head teacher spoke more to the approach environmental education should take. In particular, it was mentioned that with environmental education, one’s opinion can jump to the forefront and because there can be conflicts, education should just “try to give the students as much facts as possible to kind of let them decide from themselves their own opinions” and that enough facts and knowledge should be provided “so when they leave they can be good stewards of the environment.”

The second question produced similar answers but different angles. In response to possible barriers to environmental education, the head teacher felt that a barrier was the need to be cautious of different perspectives, that some of the students are involved in different issues and that it was important not to offend anyone. The student teacher also felt that there were barriers to what environmental topics you could talk about but because of the backgrounds of the students. “Lots of kids have grown up with, oh darn tree huggers, or other horrible rhetoric so that is definitely a challenge in a place like
this.” In particular it was felt that in the local area, there was a lot of bias against anything that sounds “democratic or leftist and environmental topics tend to do that.”

Both teachers felt that the administration and other teachers were supportive toward environmental education. However, the student teacher further mentioned that an issue was standard textbook topics were “so focused on that there is little time left over for other issues for things like art and environment and anything creative or engaging.”

In terms of the activities, both teachers felt they were good but that some were a bit abstract. One comment from the student teacher was the following: “I think the whole idea to some extent, it is, it is ambiguous and very difficult to define. And in this school, these kids have had perhaps only one class that would do something like that, at the most that would actually challenge them to do something that abstract and that personal. I think at many other places, it would have been much easier, that you picked a really hard place to do it.” The head teacher made the comment that “I thought that they were good activities but make sure that you have thought of every aspect, you know what I mean. And that is what I tell every student teacher, you have to, when you’re teaching a lesson, you have to think ahead of time of what the questions they are going to come up with or have in different situations.”

However, perhaps the biggest comment on the project and one that comes greatly to my embarrassment was that it would have been more effective to have focused on local issues instead of environmental issues in general or in different parts of the country. In discussing the activities, the head teacher politely made the following comment:
“And you talked about what, the spotted owl and logging and I think the students could relate to those but possibly trying to get something more local, a local issue that may have helped a little bit.”

The student teacher also commented “But if it is presented in a way that they understand it, they will be a lot more open, if you remember every time you talked about hunting it was a big hit, or every time you talked about deer populations, or where they understood it as plants that were there (in the local area) or as much as it could be related to that, they love it.”

Whether or not the activities caused the students to become more aware of how they view and value nature and what affect this had on their sensitivity to environmental issues, the teachers did not have much to say. The head teacher felt that it “did open their minds a bit, that there were bigger issues than what we have in Pennsylvania and that there are a lot of different factors that you have to take into account.” In particular, they felt that the program allowed for the students to see that “they may not always have the only opinion or the correct opinion and that it is important to see all sides before you formulate your own opinion.” Similarly, the student teacher explained “There were definitely kids who got it, who formed an opinion, who decided well this is what I think or realized, hey this is how I think about this.”

Both teachers believed the projects worked out very well and were a great match for the area. In particular, many students interact with the streams and prominent river in the area and could readily engage the topic both intellectually and physically. The only real issues, as the head teacher mentioned, was the time of year being in December, with
the ground being frozen, greatly preventing the ability of students to dig and lay down bank netting to hold the soil in place.
CHAPTER 5
DISCUSSION

5.1 Results Overview

The goal of the program described in this thesis was for students to reflect, question, and develop an awareness of personal perspectives, connections, and understandings they use to construct and give meaning to environmental topics and, to analyze what effect developing this awareness may have on environmental sensitivity. Environmental sensitivity is defined as interest in learning about the environment, feeling concern for it, and acting to preserve it on the basis of formative experiences (Chawla, 2004). As unique perspectives and understandings relate to formative influences, encouraging a personal awareness of these and supporting their development is predicted to enhance environmental sensitivity in unique and meaningful ways. Given the goals and content of this study, I collected data focused on whether or not students became more aware of personal perspectives and understandings and what effect, if any, this had on how they view or interact with nature.

Data from the focus group discussions suggest that students developed greater awareness of personal understandings, perspectives, and feelings as they relate to nature. Responses in the post sessions of the implemented classes were more personal and elaborate in comparison to the pre sessions and in comparison to the post control class. Likewise, students indicated in the qualifier question that they did become more aware of personal opinions and perspectives. However, results were mixed as to whether this awareness altered the ways students view nature and how it affected their overall environmental sensitivity. Some students indicated that expressing opinions and
perspectives caused them to think about the environment more and desire to behave more environmentally. However, others indicated that becoming more aware of personal understandings did not change the way they look at nature.

Beyond indoor interaction, encouraging individual connection with outdoor improvement projects appeared to work well. This project was structured to allow students as much freedom as possible in choosing an activity and resulted in a strong level of student engagement. While there was a need to assist in developing a theme and the types of practical activities available at the school, allowing students to be a part of the discussion and to choose activities of interest resulted in many students being on task during the event and naturally engaged. Some even brought in gloves and work clothes for the event while others developed strategies for documenting the project, even bringing in their own cameras to work with. It was also interesting to find that those students who tended to be more rowdy in class were also more engaged. This type of structure appears to naturally bridge personal motivation with action and, in this way, may allow activities to have greater personal impact than being forced to do a teacher driven project.

5.2 Result Discussion

Despite the ability of the program to cause awareness of perspectives and feelings toward the environment, in some instances it was difficult to get responses to data collection questions and in-class discussion topics. In other situations, student responses were general, without much reflection or reflected recently learned material. Various explanations may explain these outcomes and include the blunt and abstract nature of questions, pressure from peers, a lack of experience or expectation to express unique
understandings, and from the material being out of context and not relevant enough. With the objective of developing a personal awareness of conceptions of nature and connections to it, these explanations represent elements that are necessary to account for in future research and, potentially suggest the need to alter approaches that support the development of personal engagement with environmental topics.

Some questions and discussion topics may have been too blunt and abstract for students to develop much personal reflection and connection to. While most reactions were good to socially charged topics, discussions seemed to fall short for abstract topics in class such as how we are connected to the natural world or how we fit in to the balance of life. Similarly, data collection questions on how students value nature or why they may have certain environmental concerns may have been easy to respond too. This suggests the need for assessment questions and class topics to be shaped more indirect and easily answered ways. One possibility may be to relate values, concerns, and conceptions of nature specifically to animals, trees, and ideas of protection and conservation. Another may be to simply ask students how they define the term environment. As demonstrated by Loughland et.al (2002), students recognize the term environment and can more easily develop a response that reflects personal conceptions of nature and connections to it.

Alternatively, with the goal of developing awareness of personal perspectives and understandings, a possible assessment could be to structure questions to reflect different environmental perspectives in addition to the student’s own. Responses to focus group and written response questions that encompassed contrasting views were the most suggestive of reflection and awareness of personal perspectives, just by virtue of having
to defend ones thinking. As a result, this may allow for a better assessment of whether a response is personal and how responses developed with time.

Similarly, while developing an awareness of personal understandings did appear to attune students to environmental topics,, describing how this may have influenced engagement and developed environmental sensitivity may not be easily described. This likely affected assessment of changes in environmental sensitivity but in addition, while students were asked whether their view of nature had changed, assessing change with time could have been much stronger had assessment been done in a pre-post fashion. To better assess environmental sensitivity in future studies, a more encompassing approach may be to assess changes in the level of student engagement and reaction to environmental issues. Environmental sensitivity is defined as an interest in learning about the environment, feeling concern for it, and acting to preserve it on the basis of formative influences. Gauging students’ level of reaction to environmental issues may be an indirect way to reflect this development. In addition, the willingness to engage in environmentally minded projects may also reflect greater sensitivity. In this study, the focus of outdoor activities was more on connecting students to personal values and feelings as they relate to nature. However, gauging the willingness of students to engage in such activities in a pre post fashion may provide, in addition to greater personal connection, a read out on environmental sensitivity.

Beyond the abstract nature of some questions, responses would have also been stronger by using content that has as great a relation to the surrounding area as possible; a point well established in the literature review and one that should not have been overlooked in the actual implementation. As reported in the literature review, the unique
and personal elements individuals use to engage and react to environmental issues are likely the outcome of physical and social interactions in ones local area. While general environmental issues do allow connection with personal values and expression of personal views and feelings, this ability could have been enhanced by using more relevant content to this area. Similarly, despite assumptions of the level of 9th grade content from literature research, greater connection could have been made by further researching the unique social and cultural character of students in this particular study instead of 9th grade students in general. Obviously, this could have involved discussing student maturity with teachers in the school well ahead of implementation.

On the other hand, answers that seemed to lack personal reflection may also have resulted from a literal lack of words to express perspectives and a lack of experience in actually doing so. This seems to correlate to the typical class structure of this class and points raised in the literature review. From sitting in on regular class sessions and from teacher interviews, much of the educational approach indoors seemed to stress lecture and note taking. As mentioned in a teacher interview, “the most important thing to do is to just provide information so that students can decide for themselves their own views.” Similarly, the student teacher mentioned that, in regards to the program, in this school district, “these kids have had perhaps only one class that would do something like that, at the most that would actually challenge them to do something that abstract and that personal.” Based on this, it may be that students were not used to expressing their perspectives or being asked to do so. As a result, greater focus in future studies should be geared simply on improving the ability of students to express and describe their views and feelings on environmental topics, regardless of what they may be. Such a focus
would not only allow greater personal clarification of views and values but affect of
ability of students to then personally engage environmental issues in the future. However,
as experienced in this program, developing expression has its own challenges.

In attempting to provoke students to think for themselves and give opinions on
issues, there opens up a level of uncertainty in not knowing how students may respond
and react, which could lead to situations that are difficult to contain and that interfere
with expression and discussion. In a few cases in this study, while students appeared not
to have much to say or know what to say while in other situations it became rowdy and
out of control. More control and less risk are associated with the lecture and note taking
approach. However, at the same time, talking too much and not opening up to discussion
likely sacrifices genuine student engagement and reflection. In addition, this structure
may also create a habit of students searching for the right textbook answers when being
asked to make personal comments and not learning to think for themselves. This relates
to some of the general responses collected in this study and responses that seemed to
relate to recently learned material. To maintain important open classroom discussions,
this may simply suggest the need for approaches to allow for more class control during
discussions and equal say. There are already various approaches developed for this on
more of an adult setting (Uhl, 2004, p 207-210). Such approaches could in turn, be
adapted to younger age groups.

However, in addition to these aspects, responses were also likely hindered by the
effect of peer pressure. This was evident in different situations where some students
were labeled as tree-huggers or when students showed strong concern for ill treatment of
the environment, such as trash on the ground or hurting animals, but gave reasons that
seemed more socially acceptable, such as relating these issues to hunting or causing humans to get sick. As discussed in the literature review, social influence and hearing the perspectives of peers and role models is a strong and natural contributor to an individual’s own perspectives and viewpoints. However, for data collection focus groups may not provide a suitable context for relaying personal perspectives and concerns and suggests that perhaps a one on one interview may be more appropriate. In addition, more emphasis could be placed on written responses to allow students to elaborate in personal ways without much social pressure. This could include frequent journaling sessions that allow not only a list of personal responses but would reflect personal changes in individual understandings with time.

Overall, this analysis may simply reflect the fact that students, within different and possibly changing physical and social contexts, are still in the process of defining and re-defining their relationship with nature. While the elements of this relationship are crucial in regards to how students engage environmental topics, difficulty responding to questions may reflect students still identifying with conceptions of how to treat the environment and what our connections are to it. As a result, it is necessary to be sensitive to the more subtle changes taking place and to look at outcomes and data collection in ways that reflect this refining process. As one possibility, this could involve collecting data that represents reflection on environmental topics or on the ability of students to balance different environmental perspectives rather than on whether students have defined a set opinion or perspective.

A related and final outcome from this study may be the need to focus greater attention on thinking critically about environmental issues. In many focus group and
written responses as well as in class reactions, students naturally tended to focus on the more emotional aspects of issues that included human or animal suffering. From the literature review, feeling and emotion play a strong and necessary role in engagement with environmental topics. However, commitment motivated on such elements alone runs the risk of preventing a fuller connection to issues and information necessary to respond knowledgably. On the other hand, presenting knowledge and information alone does not provide the emotional connection necessary to motivate a response or the passion for long term engagement. Both sides of environmental issues were presented to the fullest capacity in this program with the goal of developing awareness of personal conceptions of nature. However, in addition to developing this awareness, it may be necessary to further focus the ability of students to think critically about environmental issues. In particular, it is necessary to emphasize the importance of assessing all sides of issues and to fully develop both the knowledge and emotion component of environmental concerns. As the development of ones relationship with nature is a continuing process beyond school, this would encourage a process of thinking that navigates through continuous influences and avoids possible misrepresentations or misguided connections. This outcome coincides well with earlier concerns about students not developing the ability to think for themselves and the need to view educational outcomes from a process orientated understanding. In addition, this nicely complements Gruenwalds call for a critical pedagogy of place (2003).

A critical pedagogy of place is an educational approach that bridges critical pedagogy and place-base education to deconstruct the social, cultural, and physical elements that influence unique meanings and understandings (Gruenewald, 2003). With
the theoretical understandings Gruenewald provides, this study helps account for the practical realities of this type of deconstruction and begins to understand how personal environmental constructs can be developed and enhanced. Additional research that incorporates the outcomes presented here would support this educational understanding and overall, improve our ability to influence learners environmentally in unique and meaningful ways.
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Appendix A

Class Activity Details

9/11/2006

**Idea: Getting familiar and team building:** Begin to initiate connections with the students and between the students. Develop an expressive atmosphere with an understanding that everyone is different.

A. Introduction and program description.
B. Research Description
C. Further Introduction
D. Team Building Activity (Helium Rod and Diversity Game)
E. Around the class for names and telling of something they enjoy doing.

9/18

A. Focus Groups
B. Trail Maintenance

9/19

A. Focus Groups
B. In Class lesson by Mr. Smith

9/25

**Idea: Diversity and Democracy:** Develop the concept that diversity is a good thing, getting different perspective is important but something that could cause controversy. Democracy allows us to take advantage of our differences. Developing the idea that environmental issues are social and political in nature but that it is ok to have different perspectives.

A. Greeting and Agenda
   a. Discussion on Diversity and Democracy and then Video Clips
B. Activity: Go around the room and give a quality or characteristic that you admire in a friend or relative
C. Benefits and difficulties with Diversity
   a. Intelligence and fresh ideas which allows us to adapt to changing future.
   b. Run the risk of conflict (melting pot, statue of liberty)
D. Democracy allows for our diversity
E. Environmental Issues are greatly based on our perspective and values
   a. Views and Values we hold affect our behavior.
      i. Amish and farming, cars and public transportation, recycling and conservation
   b. It is important to understand your own views and values.
F. Video Clips showing differing perspectives.
10/05

**Idea:** *Initial Value Question; cut or don’t cut.* Reinforce the idea that environmental issues are social issues. Develop student ability to express themselves by giving them a topic.

- Greetings and Agenda
- Recap on Diversity (mentioned civil rights) and how E issues are social and political in nature.
- Set up clip. Discuss roadless areas, Bill Clinton, and Bush
- Listen to Clip
- Group Discussions: Should logging be allowed in the roadless areas
- Further Discussion: Was the protester a goofball? What was Pennsylvania’s response.

10/09

**Idea:** *Issue analysis:* Develop the idea that people have different perspectives based on differences in values. These different perspectives affect everyone.

- Greetings and Agenda
- Recap issues with PowerPoint pictures.
- Recap Perspectives of the major players, including the two presidents.
- Activity: Go outside and look at trees that use to dominate forests.

10/16

**Idea:** *Background:* To lay a background and perspective for discussion of our place in nature by developing the big picture and establishing that there is balance and things function the way they do for a reason, to sustain life.

- Greetings and Agenda
- Discussion about perspective and seeing the big picture.
- Examples of a natural Balance (invasives, Lave Victoria, bees and pollination, seed dispersal…)
  - Discussion on examples and why nature is the way it is (to support life).
  - Question of what similarities and differences we have in nature.
- Video of earth picture, ‘Endangered Planet’;
- Activity: Go outside and either do charcoal drawings of area or look for ant piles.

10/23

**Idea:** *Value question; are we a part of nature.* Further establish that there is a natural order and that what we first thought was harmful or nothing, turned out to be very important and to have a purpose. Lastly, the idea was to give the students an opportunity to express themselves. The main question, are we a part of nature. Effort was made to pose the different ideologies behind this question.

- Greetings and Agenda
- Recap natural order
C. Example Videos showing connections in nature: Rachael Carson and DTT, E.O. Wilson and ant video
D. Discuss major perspectives
   a. Creation and nature is here to serve mankind
   b. We climbed down from the trees and evolved. We are a part of nature.

10/30

Idea: **Background for the next issue:** To initiate the next issue for expression and value awareness. There is the very loose connection that now, after we are finding out that the earth is more complex than we thought and that there were disasters, we started to do something about it with the enactment of the ESA. Context (like adding salt to water to establish a reactive environment to catalyze a reaction, in this case, an awareness of personal value) was to be based on an environmental issue, namely the ESA and the Spotted owl.

A. Greetings and Agenda (ask whether or not they like art vs. trail maintenance)
B. Again, pose question of whether or not we are a part of nature and to discuss whether or not we depend on nature for more than just material and physical needs.
C. Context leading into the ESA: Our effect on nature and the publics reaction
   a. Historical events focusing on the endangered species act and our impact on nature.
D. Introduce the spotted owl case. Showed video on owls

11/4

Idea: **Implementation of issue:** To further develop differing perspectives as a way to enhance the ability of students to formulate their own opinions.

A. Spotted owl case was given and the main issue, should logging be continued?
B. Role playing game was played

11/13

Idea: **Discussion of issue:** To allow the students to analyze the different perspectives, make a decision on their own perspectives, and express opinion in a diverse group. Lastly, to introduce the project ideas.

A. Recap Spotted owl issue
B. Summarize the different perspectives and student perspectives from last time
C. Class Discussion; agree or disagree with perspectives
D. Write down perspective
E. Give outcome of Issue
F. Begin talking about projects

(Thanksgiving Break)

11/20

Idea: **Project Options:** Discuss projects that students could do and give options and a chance for input. Though I listed the possible projects, I allowed the students to choose.
A.Greetings  
B. Discuss projects (power point)  
C. Give students many different options  
D. Activity: Walk down to the site and flag invasive

(Christmas Break)  
12/4  
**Idea:** Get people excited about projects. Solidify what students want to do as a project.  
   A. Greetings  
   B. Prep for project on Wednesday

12/06  
**Idea:** To the best of my ability, allow students to engage projects.  
   A. Project implementation

12/11  
**Idea:** Collect data on how students responses to the focus group questions changed.  
   A. Focus groups

12/12  
**Idea:** Give students ownership of the project by allowing them to choose pictures and edit film.  
   A. Worked with some students to do video and photo slide show

12/13  
**Idea:** Wrap up activity, by showing pictures and video.  
A. Showed class videos