2008

How an after school environmental science club can increase environmental knowledge: Awareness and sensitivity towards the environment for third and fourth grade students

Sandra Joyce Jones

HOW AN AFTER SCHOOL ENVIRONMENTAL SCIENCE CLUB CAN INCREASE ENVIRONMENTAL KNOWLEDGE, AWARENESS AND SENSITIVITY TOWARDS THE ENVIRONMENT FOR THIRD AND FOURTH GRADE STUDENTS

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Education:

Environmental Education

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by

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December 2008

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ABSTRACT

Many children today are disconnected from their environment. Little time is spent in the outdoors due to technology with all its games and entertainment. As a result, children are not familiar with their surrounding environment and what their responsibility is towards it. If children do not acquire a sense of environmental responsibility by the time they become adults, we may lose the resources we need and depend on to live. Children need to become knowledgeable and aware of their environment.

This paper reports the results of third and fourth grade students participating in an after school Environmental Science Club. Students were exposed to a variety of indoor and outdoor activities focused on the schoolyard habitat in order to increase their knowledge, awareness and sense of environmental responsibility.

This qualitative study shows that the after school Environmental Science Club did increase environmental knowledge and awareness of the schoolyard habitat. There was also an impact made on some of the students' attitudes as far as their responsibility towards their environment. The growth shown in this project was accomplished using environmental curriculum with constructivist and place-based education pedagogies.

ACKNOWLEDGMENTS

I am very grateful to Dr. Herbert Brunkhorst for his time, guidance, patience, support and encouragement which he has given me in regards to this master's project. I acknowledge and thank Dr. Joseph Jesunathadas for being my second reader. I also thank all other CSUSB professors and staff that assisted me in obtaining my goal.

I thank my husband, Royce, my daughter, Stacy, and family for their understanding, support, and for being my personal cheering section as I pursued my master's degree.

I also am thankful for Kathryn Schofield who has been an encouraging and supportive friend as we both worked towards our master degrees.

DEDICATION

This thesis is dedicated to my parents, George W. and Rosemary J. Boggess.

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CHAPTER ONE

INTRODUCTION

Children today suffer from being disconnected with the natural environment (Louv, 2006). Many young children have an aversion to the natural environment, finding it annoying, lacking in excitement, and of little use to them (Orr, 2004; Wells & Zeece, 2007). Their attention and focus are spent inside watching TV, playing games on the computer, or playing with a variety of other electronic devices. They have developed biophobia, which is the culturally acquired desire to immerse oneself with technology, human artifacts, and the view that nature is just a place to be used (Orr, 2004). As the world becomes more and more modernized with technology, children lose touch with the natural world and their role in it (Louv, 2006; O'Brian, 2007). As children become disconnected from their natural environment, and biophobia develops, the chance for bonding with and developing sensitivity for their environment disappears. Children need to see the natural world as a friendly, life giving and important place.

How can young children develop a bond or sensitivity for their environment if they are not taught what an

environment is, why it is important to take care of it and what they, at age eight and nine, can do to be environmentally responsible? If adults hope to see children develop a desire to protect their environment, then children need to be taught to love the natural surrounding world before being asked to heal its wounds (Sobel, 2005). Children are the future adults who will be deciding how to manage the natural environment. Orr (2004) writes that children love and bond with what they become familiar with. Exposing young children to the outside world and allowing them to become familiar with their environment through hands-on activities and positive outdoor experiences will build up their confidence for being outside and create that needed bond with their environment.

Engaging young children in successful hands-on environmental projects and activities increases their feelings of effectiveness, which promotes the likelihood of future action taking (Hungerford, 1996). In order for children to grow and take action as adults, they must develop an internal locus of control. An internal locus of control is the feeling of effectiveness in individuals that their efforts can make a difference in helping preserve and conserve our world (Hungerford, 1996). This

is an important factor in developing environmentally responsible behavior (Hungerford, 1996). Stapp et al (1969) acknowledges this concept in his statement that a combination of factual knowledge of the environment and motivating emotional concerns results in a tendency to act in environmentally responsible ways. Individuals are more likely to undertake an action if they feel they will successfully accomplish it (Hungerford, 1996).

Purpose and Significance of the Project

The purpose of this qualitative project was to see if after-school exposure to an Environmental Science Club can impact student attitudes toward the local environment

When our school where this study was carried out, became a program improvement school because student scores did not meet the Academic Performance Index (API), teachers were told when, how and what they were to teach. Pacing guides and scripted curriculum were enforced leaving little if any time for other subjects other than reading, writing, math and the state mandated program of ELL (English Language Learners) time. The subjects of social studies, science (environmental education), music, and art were not considered important subjects to incorporate in daily lessons. Children were not acquiring

knowledge and awareness of their environment. Lack of environmental knowledge and awareness will eventually cause children to lose touch with the natural world and their role in it (Louv, 2006). The after school Environmental Science Club was intended to allow these students to gain environmental knowledge and awareness thus keeping them in touch with the natural world and their role in it.

The third and fourth grade students attending the Environmental Science Club do so by choice. The Environmental Science Club has been meeting for over a year and has done several environmentally based activities using songs (some lyrics written by this author) and author created curriculum from Project Learning Tree, K-12, Project Wild, teacher's guide to "The Life Cycle of Butterflies", and children's literature on butterflies. In preparation for this study this author did some field work on the subject of habitats with the Environmental Science Club in the 2007/2008 school year. Painted lady butterflies were raised from larva. This field work set a baseline to be compared with the study for this project of increasing third and fourth grade students' knowledge and awareness of their school environment using a habitat theme.

Methodology Limitations

There was no control group. The club was limited to a small number of students (30), so there was not a large sampling of students. Some students were not able to attend every meeting. When students miss meetings, they miss out on learning experiences that would increase their environmental knowledge and awareness.

Operational Definitions

Place-based education is the process of using the local community and environment as a starting point to teach concepts. For the purpose of this project, the community and environment will be the school site as the starting point to teach environmental knowledge and awareness. One community organization, The Living Desert, was involved in the process of increasing student's environmental literacy.

Constructivist pedagogy is a method of instruction which allows students to construct their own knowledge based on their prior knowledge. In this study, the lessons allow students to construct their own knowledge and awareness of the schoolyard habitat through teacher-led activities and inquiry.

Semantic differential is a type of scale used in a survey in which subjects (students) respond by choosing between adjective pairs in relation to a concept or object. This type of scale will be used in the pre and post survey for this project to gather data on student's knowledge, awareness, and attitude towards their schoolyard environment.

Organization of Project

The following pages are divided into four chapters. Chapter two is a review of the literature related to environmental education and how it is best delivered. Chapter three presents the methodology used in this project. Chapter four will discuss the project results. Chapter five presents the conclusions and recommendations of this project. Appendixes of songs and possible community organizations to draw on for support in lessons will follow and then references conclude this paper.

CHAPTER TWO

LITERATURE REVIEW

This review presents the definition of environmental education and its goals. A brief discussion on locus of control is presented and an explanation of environmental awareness and sensitivity are given. Research on placed-based education and constructivism will also be presented.

Definition of Environmental Education

The definition of Environmental Education has been subject to much discussion and frequently thought to be the study of nature, outdoor education and conservation education (Disinger, 2005). Although these concepts are a part of what Environmental Education encompasses, they are not the entire definition. Under the leadership of William Stapp, the first environmental education definition emerged from a graduate seminar, in 1969, at the University of Michigan's School of Natural Resources (Disinger, 2005). Stapp's (1969) definition of Environmental Education is, "Environmental Education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and

motivated to work toward their solutions" (Stapp et al., 1969, p. 30). The biophysical environment is everything humans come in contact with and affect, such as the air they breathe, the inefficient use and management of natural resources, the use of pesticides on the land, or any part of the environment that humans have interacted with resulting in an environmental problem (Stapp et al., 1969).

The definition given by Stapp et al (1969) encompasses the view of environmental education for this project. His definition is important, for it includes the three elements that all environmental education programs strive towards. That is to increase individuals' knowledge of the environment and the problems facing it, educate them on possible solutions to these problems, and instilling in the individuals the desire to take action in working towards these environmental solutions.

Goals of Environmental Education

The main goals of environmental education are to develop environmentally literate citizens and to promote responsible environmental behavior (Culen, 2005; Elder, 2003). The Tbilisi Declaration sets the framework, principles, and guidelines for environmental education

(The Tbilisi Declaration, 2005). The Tbilisi Declaration was the result of the world's first Intergovernmental Conference on Environmental Education, which convened in Tbilisi, Georgia (USSR) in October of 1977 (Tbilisi Declaration, 2005). This declaration is important because it represents the unanimous agreement, among the 265 delegates and 65 representatives and observers from around the world, that environmental education plays an important role in the preservation and improvement of the world's environment (Tbilisi Declaration, 2005). Environmental education also plays an important role in the sound and balanced development of the world's communities (Tbilisi Declaration, 2005).

The Tbilisi Declaration has five objectives, or goals, that are used as guidelines for developing environmentally literate and responsible individuals. The first goal towards environmentally responsible citizenship is becoming aware of, and acquiring sensitivity for, the whole environment and its problems (Elder, 2003; The Tbilisi Declaration, 2005). The second goal is acquiring knowledge, which involves students receiving a variety of environmental experiences to help them acquire a basic understanding of the environment and its associated problems (Elder, 2003; The Tbilisi Declaration, 2005). The

other goals to be obtained are attitudes, skills and participation (Elder, 2003; The Tbilisi Declaration, 2005). Attitudes refer to acquiring a set of values and feelings of concern for the environment, and becoming motivated to participate in environmental improvement and protection (The Tbilisi Declaration, 2005). Acquiring skills is the following goal where students or other groups and individuals acquire the ability to recognize and develop solutions to environmental problems (The Tbilisi Declaration, 2005). The last goal is participation which is taking action. Individuals or groups that obtain this level are actively involved, at all levels of civic participation, in working toward resolution of environmental problems. (Elder, 2003; The Tbilisi Declaration, 2005).

In 1980 Hungerford, Peyton, and Wilke developed a set of four instructional goals for Environmental Education that were derived from the Tbilisi Declaration (Culen, 2005). These goals for curriculum development are listed by levels. Goal Level I is The Ecological Foundations Level which seeks to provide learners with sufficient ecological knowledge so they can eventually make ecologically sound decisions with respect to environmental issues. Goal Level II is The Conceptual Awareness level:

Issues and Values which seeks to develop awareness of how individuals or group action may influence the outcome of an issue through investigation, evaluation, values clarification, decision making, and citizenship action. Goal Level III is the (Issue) Investigation and Evaluation Level. This level provides the knowledge and skills necessary for learners to investigate environmental issues and evaluate alternative solutions for solving these issues. Goal Level IV is Action Skills Level: Training and Application. This level seeks to guide the development of those skills necessary for learners to take positive environmental action for the purpose of achieving and/or maintaining a balance between quality of life and quality of the environment (Culen, 2005). These set of goals serve as a basis for curriculum development throughout the world (Culen, 2005). They represent a comprehensive model that incorporates knowledge, awareness, issues investigation/evaluation and citizenship action skills training (Culen, 2005).

The Environmental Science Club's focus was on the first two goals of the Tbilisi Declaration which is fostering awareness and acquiring knowledge of the environment. The author created curriculums used in this project addressed Hungerford's, Peyton's and Wilke's first

instructional goal for environmental curriculum development. The first goal seeks to develop ecological foundations in young learners by providing them with sufficient knowledge so they can eventually make ecologically sound decisions concerning the environment. The activities are designed for third and fourth grade students to build familiarity with (knowledge/awareness) their environment and to provide them with the opportunity to connect/bond with their environment. Since children love and bond with what they become familiar with (Orr, 2004), it is important to present activities that engage children in experiencing their environment.

Locus of Control

Locus of control for reinforcement is a psychological construct that has its origins in the social learning theory proposed by Rotter (Smith-Sebasto, 1995). When a behavior is reinforced the expectancy that this behavior will be similarly reinforced in the future is strengthen (Beretvas, Suizzo, Durham, & Yarnell, 2008). Smith-Sebsto (1995) note Rotter's words that if an individual perceives that an event is contingent upon his/her own behavior or own relatively permanent characteristics, then they are said to have an internal locus of control. Smith-Sebasto

(1995) did a study to investigate whether undergraduate students' Locus of control for reinforcement for environmentally responsible behavior (ERB), perceived knowledge of and skill in using selected ERB, and self-report of performance of selected examples of ERB could be modified or altered by completing an Environmental studies course. The study compared the students enrolled in two history courses with the students enrolled in two environmental studies courses. The analyses of the data showed significant differences in all variables measured. Students completing an environmental studies course had a more internal locus of control for reinforcement for environmentally responsible behavior, a higher perception of their knowledge of and skill in using selected environmentally responsible behavior, and more frequent performance of selected environmentally responsible behaviors at the end of the course than at the beginning than did students enrolled in the history course (Smith-Sebasto, 1995).

This study was done with adults. An internal locus of control is considered an adult achievement. The third and fourth grade students attending the after school Environmental Science Club will be participating in activities that increase their knowledge and awareness

which is a building block to increasing environmentally responsible behavior and an internal locus of control.

Environmental Awareness and Sensitivity

Being environmentally aware and sensitive refers to an empathetic view of the environment, of its problems and issues (Volk, 2005, p. 142-143). It also involves respect for ecological stability and promotes the concept that people need to live in harmony with the natural environment. According to Volk (2005), researchers who have studied environmental sensitivity and awareness agree that environmentally sensitive individuals tend to participate in outdoor activities, in their youth, such as camping, hiking, fishing or even a stroll through a park. Although many schools are in urban settings, there are experiences that can increase environmental awareness and sensitivity (Volk, 2005). Volk (2005) suggested that learners should be permitted and encouraged to be involved in outdoor experiences on the school grounds.

At the elementary school level, the primary goal is to establish environmental awareness (Xuehua, 2004). There are experiences that can promote environmental awareness and sensitivity within the school grounds (Volk, 2005). Students can be a part of establishing a garden, spend

time observing the nature that is present or reclaim a rundown natural area (Volk, 2005). By actively engaging students in environmental activities, students will become aware of the many ecological concepts and principles such as living in harmony with the natural environment (Volk, 2005).

Hungerford (1996) reviewed studies on developing responsible environmental behavior. He compared the traditional way of developing responsible environmental behavior with the recent research on the subject. The traditional thought was if educators taught students about their environment they would become knowledgeable of it. It was assumed that such knowledge would automatically lead to an awareness or change of attitude (sensitivity) toward the environment which would lead that individual to some kind of action to improve the environment. This was a linear way of thinking. Research into responsible environmental behavior has not supported this linear progression as a way of establishing responsible environmental behavior.

Hungerford (1996) noticed a central theme emerging from his studies of the research on developing responsible environmental behavior. He found that if students are to become environmentally responsible citizens they must

first establish a bond or sensitivity towards their environment. Hungerford's (1996) studies, coupled with the Hines et al. model, revealed that there are probably three categories of variables that contribute to responsible environmental behavior.

The Hines et al model (Hungerford, 1996) was the result of a meta-analysis done on 128 studies that involved behavior research literature in environmental education. Before this research was done, a sound environmental education program that developed responsible environmental behavior was elusive. The illusiveness was due to the inability to track how to develop such responsible behavior in individuals. The main variables in the Hines et al Model are: entry level variables, ownership variables, empowerment variables (also referred to as locus of control) (Culen, 2005; Hungerford, 1996). Environmental sensitivity, awareness and acquiring knowledge take place at the entry level. In-depth knowledge and personal investment in environmental issues occurs at the ownership level. Knowledge of and skill in using environmental action strategies is at the empowerment level. It is at this level that an individual realizes and internalizes the belief that their actions and efforts can make a difference (locus of control)

toward solving an issue. When these first three variables are obtained, according to the Hines et al Model, then the last level, responsible citizenship behavior, is established (Culen, 2005; Hungerford, 1996). These variables are hypothesized to act in a more or less linear fashion to promote responsible environmental behavior (Hungerford, 1996).

This project's focus will be on activities that are at the entry level of the Hines et al Model. The activities will increase student's knowledge and awareness of the school environment and increase their sensitivity towards it.

Place-Based Education and Constructivism

Place-based education focuses on using a school's environment and community as a framework for students to construct their own learning (Elder, 2003). Place-based education involves students in hands-on activities that are real and not just from a textbook. Hands-on activities engage students in learning and constructing knowledge with the use of an extended inquiry process (Elder, 2003). The inquiry process is done by the teacher who asks open-ended questions in which the students have to discover and construct what they think the answer is. The

place-based education approach teaches about both the natural and built environments (Sobel, 2005). Teachers guide students using proven educational practices such as inquiry, investigation, and cooperative grouping (Elder, 2003). Using the local community as a starting point to teach concepts in environmental education can help students develop stronger bonds with their community (Sobel, 2005). It can also enhance students' sensitivity for the natural world and heightened their sense of stewardship toward their environment (Sobel, 2005).

Sobel (2005) gives a comprehensive review of place-based education. Sobel (2005) presents practical examples of schools and classrooms from urban, suburban and rural settings across the United States of America that have used the place-based education approach to learning. According to Sobel (2005), place-based education is more than just a way to integrate curriculum around a study of a place. It is also a way to promote stewardship and active involvement in civic life. Sobel (2005) stresses the importance of partnerships between the school and community businesses and organizations as a way to create among students an awareness of their environment. Schools and community partnering together make the learning experiences real-to-life. Through Sobel's

research (2005) he has noted that when children can relate to what is being taught they will be more engaged in the learning process. This insight corresponds with Orr's (2004) and Louv's (2006) thoughts on how children bond with their environment. That is when children are engaged in an activity they are not only acquiring knowledge but are becoming familiar with the content. When a child enjoys learning and experiencing a particular concept or place, such as the environment, a bond may form between that individual and the concept or place being presented.

Although the focus of the after school Environmental Science Club is to present author created environmental curriculum and not to integrate all curriculum areas, it is interesting to note one of Sobel's (2005) findings. Sobel (2005) found that many of the schools and classrooms he studied, that used the place-based education approach, had raised standardized test scores in all subject areas.

Powers (2004) did an extensive study on the use of four place-based education programs under the Place-Based Evaluation Collaborative (PEEC). The four programs were the CO-SEED Project, the Community Mapping Program, the Sustainable Schools Project and A Forest for Every Classroom Project. PEEC contracted a program-evaluation team to conduct individual program evaluations with each

of the four collaborating programs as well as to analyze program processes and outcomes across the programs. Powers (2004)notes the common themes among these programs are: enhanced community and school connections; increased understanding of and connection to the local place; increased understanding of ecological concepts; enhanced stewardship behavior; increased academic performance in students; improvement of the local environment; improvement of schoolyard habitat and its use as a teaching space; and increased civic participation. Data from all four program evaluations showed four areas of strengths in using the four place-based programs. First, the use of community partners provided teachers and students with a variety of viewpoints, access to resources, facilities, and financial support. Teachers and students also gained a broader base of skills and knowledge. A second strength noted was that the interviewees, including teachers, school staff, administrators, town mangers, and students, were impressed at the high quality of program staff. The staff provided participants with access to and knowledge of an array of community connections and materials. Third, the programs were so engaging that the likelihood of the programs continuing on the site, after the initial involvement of

the sponsoring organization was gone, was increased. The fourth strength of these four place-based programs was that they inspired and boosted confidence in teaching among new participants.

According to Powers (2004), students, teachers, and staff reported increases in the use of local places and resources which builds a sense of place or a bond for the student with their environment. Powers (2004) also notes that teachers who participated in the place-based programs reported that their instruction was more in-depth and that student's attitudes toward their schoolwork were more positive. Another finding from the use of the four programs in Powers' study (2004) was that place-based education affects student motivation for and engagement in learning.

Fisman (2005) did a study on the effects of an urban environmental program on children's awareness of their local biophysical environment. She examined changes in environmental awareness among third through fifth grade participants in a neighborhood-based program, Open Spaces as Learning Places, in New Haven, Connecticut. The program's goal was to have participants gain awareness of the ecological patterns and processes within their neighborhoods and an understanding that they are an

important part of that ecosystem. The program also aims to foster a sense of stewardship by allowing the children to wonder and discover, through exploration, the urban environment's natural and social history.

Fisman (2005) gathered data from two third-grade classes and two fifth grade classes. The schools were located in the same neighborhood but their socioeconomic and racial characteristics were very different. Two were predominantly Black and Latino and came from lower income families, whereas the other two school's population was a fairly even mix of Black, White, and Asian American students from higher income families. Data was gathered through questionnaires, mapping (drawing a picture of the neighborhood), and interviews.

The results of Fisman's study (2005) showed a significant increase in the participant's awareness and knowledge of their neighborhood environment. Over half of the student's maps showed special trees and an increase in detail of the natural and built environment. The questionnaire test (which measured students knowledge of their environment) scores also increased significantly after the program.

Fisman (2005) also noticed that the children's socio-economic status made a difference in how they

perceived and bonded with their local environment. Her study showed that lower income children saw their environment as a negative place, centering on violence. The majority of children in higher income neighborhoods perceived their environment as a positive place with some negative physical features. According to Fisman (2005), it seems that a lack of safety can be a barrier to children's ability to bond with a place. She suggests that place-based education is one way to overcome this barrier. Fisman (2005) came to a similar conclusion as Orr (2004) that if children do not feel ownership, or a bond (sense of place) with their environment, they will not have a desire to improve it.

Fisman's study is important because it reflects the middle to low socio-economic status of the participants involved in the after school Environmental Science Club. Students needed to see their environment as a friendly and worthwhile place in order to love and bond with it (Orr, 2004).

Constructivism is a philosophy about how an individual learns and gains knowledge as opposed to an educational theory (Brooks & Brooks, 1993). It is a philosophy of learning founded on the premise that, by reflecting on our own experiences, we construct our own

understanding of the world we live in (Brooks & Brooks, 1993).

There are several guiding principles of constructivism (Brooks & Brooks, 1993; Burns, Burniske, & Dimock, 1999). First, learners bring unique prior knowledge and beliefs to a learning situation. Second, knowledge is constructed uniquely and individually, in multiple ways, through a variety of authentic tools, resources, experiences and contexts. The learning process focuses on primary concepts, not isolated facts. Third, learning is both an active and reflective process. Fourth, learning is developmental meaning we make sense of our world by assimilating, accommodating or rejecting new information. Fifth, social interaction introduces multiple perspectives on learning. Sixth, learning is internally controlled and mediated by the learner (Brooks & Brooks, 1993; Burns, Burniske, & Dimock, 1999).

Learning is an active, constructive and collaborative process, where people (children) construct knowledge from their experiences in the world (Kritzenberger, Winkler, & Herczeg, 2002). Through these experiences, each of us constructs our own rules and ideas, which we use to make sense of our experiences (Brooks & Brooks, 1993). The construction of knowledge from experiences in the world

seems to be especially important in childhood learning, as children need to learn through their senses and through physical situations where senses and physical activity are involved (Kritzenberger, Winkler, &I Herczeg, 2002).

In elementary classrooms, manipulative materials are needed to engage children in the learning experience and construction of knowledge (Kritzenberger et al., 2002). Allowing children to explore with their senses and to interact with others creates a physical experience for the learner to build and modify concepts (Kritzenberger, Winkler, Herczeg, 2002). Open-ended questions (inquiry) by the teacher may guide the students in their construction of knowledge.

Teachers need to provide a learning environment where students can search for meaning, understanding and develop responsibility (Brooks & Brooks). The teacher's primary role is that of a mediator of the student's environment rather than just a giver of information and manager of behavior (Brooks & Brooks). According to Burn's, et al. (1999), educators must maximize student's potential to construct new knowledge and provide multiple learning opportunities. A constructivist classroom's environment should include several different learning styles,

resources, experiences and contexts to create the greatest potential for learning (Burns et al., 1999).

A constructivist approach to learning seeks and values students' points of view (Brooks & Brooks, 1993). Awareness of students' points of view helps teachers develop meaningful and contextual lessons, or experiences, which challenge students (Brooks & Brooks).

Brooks & Brooks, (1993), Burns et al., (1999) and Kritzenberger et al., (2002), acknowledge that teachers can't address every learning style preference in every activity, but experiential learning activities can be structured to allow for a variety of approaches.

Summary

The literature important to the project was presented in Chapter two. The key points from this literature review that were important to this project are:

- Responsible environmental behavior is a problem among children.
- There is a lack of environmental science knowledge among children.
- Educators need to teach responsible environmental behavior which begins with hands-on activities for young students that will

allow them to construct and increase their knowledge, awareness and sensitivity towards the environment.

- Young learners in the primary grades can gain knowledge, awareness and sensitivity for the environment through hands-on activities that continually reinforce the concept of being environmentally responsible.
- Place-based education and constructivist pedagogies promote higher self esteem which increases the student's locus of control, or feelings that they can make a difference.

CHAPTER THREE

METHODOLOGY

The school site where the Environmental Science Club takes place is a Title One school with a population of approximately 740 students. The school is one of thirty-three schools in the district with a district student population of approximately 24,000. The population is primarily Hispanic. Approximately one-third of the school site student population is English Language Learner (ELL) students. Sixty-four percent of the student body takes part in the Federal Free and Reduced Lunch Program. The student body is middle to low socioeconomic classification similar to Fisman's study of third and fifth grade students on increasing their environmental knowledge and awareness.

The school site for this project is an urban program improvement school located in the lower desert region of Southern California. The program improvement classification has been in effect for two years. As a result, third and fourth grade students have not been receiving instruction in science, music, social studies or art. The after school Environmental Science Club incorporated environmental science, art and music through

the use of well known, author created environmental curriculum as a means to increase environmental knowledge and awareness of the schoolyard environment.

Design

The Environmental Science Club met for one hour, two times a week. The ultimate goal was to provide a combination of activities and positive outdoor experiences that increased third and fourth grade student knowledge and awareness of the school environment and instill a sense of place/bond with the environment. According to Ore (2004) children can be taught to love and bond with the places they can see, touch, smell, and experience.

Place-based education and constructivist pedagogies were used in presenting the hands-on activities and outdoor experiences. Activities were structured around the topic of habitat. In addition to author created activities this author added songs to enhance the lessons. The environmental songs followed popular children tunes but some of the lyrics were created by this author, some by other authors, and for some lyrics the author is unknown.

The activities correlated with the third and fourth grade science standards under life science and investigation and experimentation (Table 1). The life

science standards for third and fourth grade students are: adaptations of living organism, understanding that all living organisms need energy and matter to live and grow, and that organisms depend on one another and on their environment for survival (California State Board of Education). The investigation and experimentation standards for both grades involve using the scientific process of asking meaningful questions; conducting careful investigation; observing; collecting and analyzing data to develop a logical conclusion (California State Board of Education, 2007).

The Environmental Education Principles examine the interactions and interdependence of human societies and natural systems (Education and the Environment Initiative, 2003). There are five environmental principles but the Environmental Science Club activities correlated with principles 2 and 3 (Table 1). These two principles, from the Education and Environment Initiative (2003), are:

Principle 2

People Influence Natural Systems

Concept a. Students need to know that direct and in-direct changes to natural systems due to the growth of human populations and their consumption rates influence the

geographic extent, composition, biological diversity, and viability of natural systems.

Principle 3

Natural systems proceed through cycles that humans depend upon, benefit from and can alter.

Concept c. Students need to know that human practices can alter the cycles and processes that operate within natural systems.

Table 1. Correlation of Lessons to the 3rd and 4th Grade California State Science Standards and Environmental Education Principles

Lessons	Life Science Standard: Living things cause change in the environment and depend on one another and on their environment for survival.	Investigation and Experimentation Standard: Scientific process is made by asking meaningful questions and conducting careful investigations.	EE Principle 2: People Influence Natural Systems	EE Principle 3: Natural Systems Change Through Cycles or Can Be Altered by Humans
Project Learning Tree Lesson #46: Schoolyard Safari	Students identify signs of animals living in the schoolyard. They describe ways the schoolyard environment provides a suitable habitat for the animals living there.	Students observe, draw conclusions and construct knowledge about the schoolyard as a habitat.	Students explore the schoolyard habitat and notice signs of animals living there and changes made to the schoolyard environment caused by humans.	Students construct knowledge of how they may alter the schoolyard habitat by their actions.
Project Learning Tree Lesson #22: Trees as Habitats	Students describe ways animals and plants depend on trees for survival, and, in turn, influence the trees.	Students record any animals and plants they observe that live in or on the trees and any signs of life that is found near the trees.	Students inventory the plants and animals that live in, on, and around the trees on the schoolyard becoming aware of how they depend on the trees. Students construct knowledge that they influence the habitat in, on and around trees when they pull leaves off branches, break branches or pick the bark off the trees. Such actions alter the natural system of the tree. Students recognize that they benefit from the shade that trees give.	

Project Wild: Classroom Carrying Capacity	Students describe how exceeding the carrying capacity of a habitat can affect the behavior of animals and humans.	Students physically experience how it feels to be overcrowded for 15 minutes. Students relate this experience to how too many humans can affect the animal and plant life in the schoolyard.	Students experience how growth of human population can influence and alter the natural system of an area. Students begin to realize that too much growth of any population can alter a habitat.	
Lessons	Life Science Standard: Living things cause change in the environment and depend on one another and on their environment for survival.	Investigation and Experimentation Standard: Scientific process is made by asking meaningful questions and conducting careful investigations.	EE Principle 2: People Influence Natural Systems	EE Principle 3: Natural Systems Change Through Cycles or Can Be Altered by Humans
Living Desert Presentation	The presenter brought a display of local butterflies, beetles, and spiders. The presenter asked questions that sparked discussion among the students on how these creatures survive and how they can change their environment.	Through the process of inquiry and observing the display of insects, the students construct knowledge of how these living things depend on the environment and how they can change it.	Presenter discussed how direct and indirect changes to the environment, by humans, affect the natural system of local butterflies, beetles, and spiders. The presenter had several display cases of local butterflies, beetles and spiders for students to observe.	Presenter discussed how people benefit from butterflies, beetles, and spiders.

Project Wild: What's That, Habitat?	Students identify their own basic needs for food, water, shelter, and space. They generalize that the animals and plants on the schoolyard have similar basic needs.	Students use their skills of predicting and drawing logical conclusions.	Students learn that animals and humans have similar basic needs and that humans need to consider these needs when we change or alter a natural system.
Project Wild: Habitrekking	Students summarize evidence, collected by groups, about the nature of habitats. From this data they generalize that people and wildlife have similar basic needs, share environments, and are subject to the same or similar environmental issues.	Students cooperatively work in groups gathering and recording data by using the lesson's Habitrekking Evidence List. Students construct knowledge from their observations and data on how humans and animals share and need habitats.	Students generalize from data gathered or observed on the schoolyard that people and wildlife have similar basic needs, share environments, and are subject to the same or similar environmental issues.

Data Gathering

Students were given a pre and post written survey and a pre and post drawings instrument (Appendix B) to see what perceptions students had of their school habitat. The survey scale is designed for young students and elicits their response by choosing a single word or picture to describe what they know or how they feel towards a concept. The students had three choices to respond to a question. The choices were to circle the word "yes", to circle a "?" if they were not sure, or the word "No". The pre and the post surveys had six questions that were the same. Survey questions one through four measured environmental knowledge. Survey questions five and six measured a student's attitude towards their environment in terms of awareness and responsibility. Survey question number five was designed to measure increased awareness and question number six measured the student's sense of environmental responsibility. The post survey had one more question designed to measure a student's desire to continue learning and participating in activities that teach about the school and surrounding environment. A "yes" response to this last question on the post survey would indicate the beginning of bonding or sensitivity towards the environment.

To score the student surveys, tally marks were made on a master survey sheet. There was one master survey sheet for each of the three surveyed groups. The groups were; returning members, new fourth grade members and third grade members. One tally mark was given for each answer of "yes", "?", or "no" that a student marked. The tallies were totaled for the number of correct and incorrect responses. The correct and incorrect responses for each survey question were then divided by the number of students in each survey group. This gave a percentage for correct and incorrect responses for both the pre and post surveys which could be compared (Table 2). This comparison gave a percent of students, from each survey group, who increased in knowledge, awareness and environmental responsibility (Table 3). For example, there were five students in the returning member's group. On the pre survey, four students marked "yes" to question one, which was the correct answer; and one student marked "no" which was an incorrect answer. On Table 2 under pre survey, question 1, the score is 80% "yes" and 20% "no". On the post survey one student changed his response to "yes", giving a total of 100% under the "yes" response for question number one. This showed a 20% growth in knowledge since the correct response was "yes" which is presented in

Table 3. This procedure was done for each of the survey questions in each grouping of students. A student who circled the "?" for their response was scored as unsure.

The drawing instrument was designed to measure the student's awareness of the schoolyard habitat. The post drawings, when compared to the pre drawings, should show more detail such as vegetation (trees, flowers, bushes, grass), birds, and insects, which indicate an increase in awareness of their school habitat. Each student's post drawing was compared to their pre drawing. If the post drawing of a student showed an increase in vegetation, the amount of birds or insects drawn, then that student was scored as increasing in environmental awareness of the schoolyard habitat. Graph 1 displays this data. Each of the three groups was scored separately. For example, in the returning member's group of five students, no birds or insects were drawn in their pre drawing of the school yard habitat. The post drawing shows an increase in awareness because one student added a bird (or birds) and all five students added insects.

Discussions and open journaling (KWL Charts [What I Know, What I Want to Know, and What I Learned]) were used to gather pre and post data on student knowledge and awareness of the schoolyard habitat as well. Through these

discussions, I was able to tell how students were perceiving and understanding a habitat. Through anecdotal evidence I noticed the beginning development of an internal locus of control towards the environment.

Summary

The after school Environmental Science Club was designed to impact third and fourth grade students in environmental knowledge and awareness of their urban school habitat. Place-based education principles and constructivist pedagogies were used to deliver the author created lessons for one month. The lessons correlated with some of the state science standards and environmental education principles. Environmentally educational songs were added to enhance the lessons and aid in increasing student's knowledge and awareness. The data gathering instruments used was a pre and post survey to measure knowledge, awareness and environmental responsibility, a drawing of the schoolyard habitat to measure awareness, and anecdotal evidence of discussions, open journaling and overheard conversations.

CHAPTER FOUR

RESULTS

At the first meeting 29 students were present. The data gathered for this analysis reflects 24 of these students. Five students and/or their parents did not sign the consent form to be a part of this project even though all 29 students attended and participated in the activities. The pre-data-gathering activities, the survey and the pre-drawings of the schoolyard habitat, took place during the first meeting. After the students participated in the two pre-data gathering activities, they were told that they would be learning about what a habitat is and about their schoolyard habitat in particular. A sharing/brainstorming session was then launched using a KWL chart. Students shared their thoughts and beliefs about what a habitat is and what they felt was involved with their school habitat. Students also shared what they wanted to learn about habitats while I recorded their responses (open journaling) on chart paper. Several correct facts were shared about habitats with only a couple misconceptions.

The 24 students involved in this research project were a combination of twelve third grade students, five

fourth grade students who attended the after school Environmental Science Club the previous school year (returning members), and seven fourth grade students who were new participants to the after school Environmental Science Club. The returning members were a part of the Environmental Science Club the previous school year where they participated in raising painted lady butterflies. They also created a small habitat on the school site for the painted lady butterflies to live. It is interesting to note the results of these five returning members when the results are compared with the other two groups shown in Table 2, Table 3, and the Schoolyard Habitat Graph. Even though these students had a school year of experience in learning about habitats and the habitat of the painted lady butterfly, many of them did not transfer that environmental knowledge of life to their schoolyard habitat.

The acquired environmental knowledge and awareness of the returning members was higher in most subject areas than the other two groups on both the pre and post surveys and the pre and post drawings of their schoolyard habitat. The returning members demonstrated more knowledge and awareness of habitats when brainstorming thoughts about what a habitat is during the open journaling of the KWL

chart. This group also showed, in the data from Graph 1, having a fair amount of awareness towards their schoolyard habitat in the area of vegetation and increasing the most in their awareness of animal life residing on the school grounds.

According to the data in Table 2, 60% of the returning members demonstrated knowledge of environmental awareness by answering correctly "yes" to question number five on the pre-survey (Table 2). Question number six of the pre-survey measured the student's sense of environmental responsibility. Again, 60% acknowledged that it is their responsibility to take care of the school and surrounding environment. On questions one through four on the pre survey, which measured the student's knowledge of habitats, revealed that the returning members had prior knowledge of habitats. On the post survey 100% of the students showed environmental awareness by answering "yes" to the post survey question number five which shows a 40% increase awareness (Table 3). Eighty percent answered "yes" to question number six acknowledging that it is their responsibility to take care of their school grounds and surrounding environment which is a 20% increase in sense of responsibility.

The returning members showed signs of bonding with their environment through their interactions with the creatures they observed and by choosing to continue being involved with the Environmental Science Club. During the school day these students, along with some of the other third and fourth grade students involved with this research project, would share with me their excitement of seeing a butterfly, a praying mantis or any bug or spider they saw. They would also express their disapproval of other students within the school who mistreat or kill these living creatures for the sport of it. These students also expressed concern over students who peel the bark off the schoolyard trees and/or break the branches. The returning fourth grade students showed a connection with their environment through their engaged behavior during the lessons, during the presentation from a community member on insects found in and around the school area, and through their excitement in the activities of observing and exploring life on their schoolyard. All the returning fourth graders demonstrated a desire to continue learning about their environment by marking "yes" under the last question on the post survey.

The other two groups, the third graders and the new fourth graders, showed growth in knowledge and awareness

of habitats in their schoolyard community. Both groups showed some uncertainty about their responsibility towards caring for their schoolyard or surrounding environment by circling the "?" on question number six of the post survey.

The results of the pre survey and pre mapping activity (Table 2, Table 3, and the graph of the schoolyard habitat) for the third and new fourth graders showed students were confused or unsure about what a habitat entails by their response of circling the "?" or an incorrect response on questions one through four. The pre drawings showed some vegetation but very little life other than a student or two. Five students between these two groups drew only buildings and/or the playground with equipment for their concept of their school habitat. The third and new fourth grade groups did not have much to contribute during the discussions of what they knew about their schoolyard habitat. Most of the comments were, "Where the school is" or that the schoolyard habitat was, "property".

The data on Tables 2 and 3 showed that an increase in knowledge and awareness, for both the third and new fourth grade students, was accomplished. More than half of these students responded "yes" to the post evaluation survey

question (Table 2) which indicates interest in continuing learning about the schoolyard and surrounding environment. The third grade students responded more favorably to the post evaluation survey question than the new fourth grade students. Awareness of the schoolyard habitat was also increased, especially in the area of animal life residing on the school grounds (Graph 1). One area of interest concerning the fourth grade group was survey question number six which measures their sense of environmental responsibility. This group showed a decrease in their sense of environmental responsibility. There was growth shown in knowledge and awareness, so I can only hypothesize that a longer period of time is needed for some of these students to understand the importance of being environmentally responsible and bonding with their environment.

After the lessons and activities were presented ~~the~~ all the participating students were referred back to the KWL chart and asked what they had learned about their schoolyard habitat. The answers were quite involved. The students listed every creature they saw (spiders, butterflies, praying mantis', dragon flies, bugs, birds) and where it lived. They mentioned trees, grass and bushes, and that all students and teachers share the same

schoolyard habitat. This knowledge and awareness is reflected in the data of Graph 1.

In all three groups, more than half demonstrated that they had made some connection with the environment by choosing to continue learning more about their schoolyard habitat and surrounding environment. This is just the beginning towards developing a bond with the place they live and obtaining a sense of environmental responsibility.

Anecdotal evidence suggests some students may be developing an internal locus of control towards the environment. Students have been overheard to say, "That praying mantis lives here so we shouldn't kill it." Or some students have been heard telling other students, "Why did you do that! He (referring to an insect) lives hear". Other students have commented that, "It's not nice to pull the leaves or bark off the trees." My favorite moment of realizing some students have begun to develop an internal locus of control happened at recess on the field. A couple of students, not involved with the after school Environmental Science Club, were pulling the small branches and leave off a fairly young tree on the field. A group of three Environmental Science club members came and got me. I walked over to the students who were pulling on

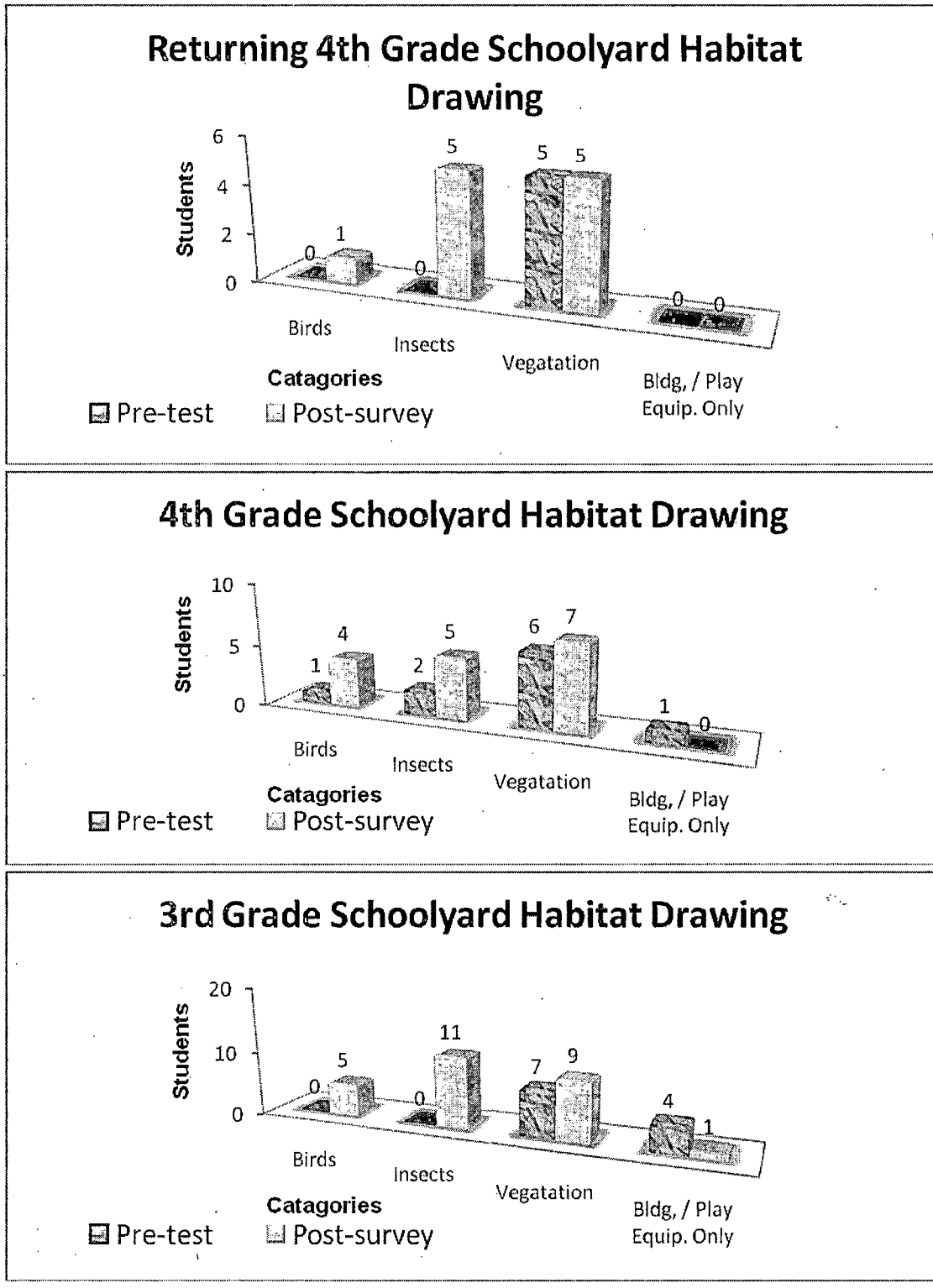
the tree followed by the three that told on them. I proceeded to explain why they should not pull the branches and leaves off this tree or any tree. Before I got very far into my explanation, one of the three club members said, in a respectful tone, "You really shouldn't pull the branches or leaves off that tree because it might be some creature's habitat". This incident plus the other conversations mentioned suggest the beginning of an internal locus of control towards the environment. These students are taking action towards protecting the environment and standing up for what they believe. They feel they can make a difference by voicing their concerns and seeking help to stop an environmental injustice.

Table 2. Pre and Post Survey Data on Environmental Knowledge and Awareness

Survey Questions – Returning members now 4th Graders (5-Students)	Pre			Post		
	Yes	?	No	Yes	?	No
1. Is a habitat part of an environment?	80%	0%	20%	100%	0%	0%
2. Is the school a habitat for only students?	20%	0%	80%	20%	0%	80%
3. Are habitats just for animals?	20%	0%	80%	0%	0%	100%
4. Are all habitats important?	80%	0%	20%	100%	0%	0%
5. Can you change your school environment?	60%	0%	40%	100%	0%	0%
6. Is it part of your responsibility to take care of the school and surrounding environment?	60%	0%	40%	80%	0%	20%
Post Evaluation only: Would you like to continue participating in hands-on-activities that are about your school and surrounding environment and the habitats within it?				100%	0%	0%
Survey Questions – New 4th Grade members (7- Students)	**Pre**			**Post**		
	Yes	?	No	Yes	?	No
1. Is a habitat part of an environment?	43%	14%	43%	100%	0%	0%
2. Is the school a habitat for only students?	29%	0%	71%	43%	0%	57%
3. Are habitats just for animals?	71%	0%	29%	14%	14%	72%
4. Are all habitats important?	71%	0%	29%	71%	0%	29%
5. Can you change your school environment?	43%	14%	43%	57%	14%	29%
6. Is it part of your responsibility to take care of the school and surrounding environment?	86%	14%	0%	71%	14%	14%
Post Evaluation only: Would you like to continue participating in hands-on-activities that are about your school and surrounding environment and the habitats within it?				57%	29%	14%
Survey Questions – New 3rd Grade members (12- students)	**Pre**			**Post**		
	Yes	?	No	Yes	?	No
1. Is a habitat part of an environment?	75%	0%	25%	84%	8%	8%
2. Is the school a habitat for only students?	50%	8%	42%	0%	17%	83%
3. Are habitats just for animals?	50%	8%	42%	17%	8%	75%
4. Are all habitats important?	42%	33%	25%	100%	0%	0%
5. Can you change your school environment?	17%	0%	83%	83%	17%	0%
6. Is it part of your responsibility to take care of the school and surrounding environment?	67%	8%	25%	67%	17%	17%
Post Evaluation only: Would you like to continue participating in hands-on-activities that are about your school and surrounding environment and the habitats within it?				83%	8%	8%

Table 3. Survey Results on Environmental Knowledge and Awareness Growth

Survey Questions - Returning members now 4th Graders (5- Students)	Correct Answer	Environmental Knowledge/ Awareness Growth
1. Is a habitat part of an environment?	Yes	20%
2. Is the school a habitat for only students?	No	0%
3. Are habitats just for animals?	No	20%
4. Are all habitats important?	Yes	20%
5. Can you change your school environment?	Yes	40%
6. Is it part of your responsibility to take care of the school and surrounding environment?	Yes	20%
Post Evaluation only: Would you like to continue participating in hands-on-activities that are about your school and surrounding environment and the habitats within it?		100%
Survey Questions - New 4th Grade members (7- Students)	**Correct Answer**	**Environmental Knowledge/ Awareness Growth**
1. Is a habitat part of an environment?	Yes	57%
2. Is the school a habitat for only students?	No	14%
3. Are habitats just for animals?	No	83%
4. Are all habitats important?	Yes	0%
5. Can you change your school environment?	Yes	14%
6. Is it part of your responsibility to take care of the school and surrounding environment?	Yes	-15%
Post Evaluation only: Would you like to continue participating in hands-on-activities that are about your school and surrounding environment and the habitats within it?		57%
Survey Questions - New 3rd Grade members (12-Students)	**Correct Answer**	**Environmental Knowledge/ Awareness Growth**
1. Is a habitat part of an environment?	Yes	9%
2. Is the school a habitat for only students?	No	41%
3. Are habitats just for animals?	No	33%
4. Are all habitats important?	Yes	58%
5. Can you change your school environment?	Yes	66%
6. Is it part of your responsibility to take care of the school and surrounding environment?	Yes	0%
Post Evaluation only: Would you like to continue participating in hands-on-activities that are about your school and surrounding environment and the habitats within it?		83%



Graph 1. Pre and Post Schoolyard Habitat Drawing Results

CHAPTER FIVE

CONCLUSION AND IMPLICATIONS

The intent of this project was to see if exposure to an after school Environmental Science Club would impact the students' knowledge, awareness and attitude toward the schoolyard environment. Research has shown that many students lack environmental knowledge and awareness which effects their attitude and sense of environmental responsibility. This project focused on increasing third and fourth grade students' understanding of the schoolyard environment and attitude towards it. The subject matter used to accomplish this was centered on habitats within the schoolyard.

Conclusion

The data gathered in this project revealed that the participating third and fourth grade students had some prior environmental knowledge and understanding of habitats, but several students did not transfer that prior knowledge to their schoolyard habitat. The returning members, who were third graders the previous school year, also demonstrated a deficiency in knowledge and awareness of the schoolyard habitat although they were more

knowledgeable than the new third and fourth grade students.

Using community members to enhance student's sense of place was exciting and a successful teaching point for the students. Students were able to see and hold insects (preserved and mounted) that are a part of their environment, gain knowledge from an expert on the subject, and realize the importance these creatures play within the environment. Contact with community members and being actively engaged in activities helped the students to construct their own ideas of what a habitat is and their relationship to their environment.

The use of environmental songs was another engaging, and enhancing medium for increasing student knowledge and awareness of their environment and habitats. The lyrics were environmentally educational. The tunes were patterned after popular nursery tunes that tend to stick in the student's head as a reminder of their environment. Student's enjoyed and asked for time to sing. They have been observed singing the songs on campus during recess. These songs along with the activities the students were engaged in during this project helped increase their knowledge of habitats as indicated in the post surveys on Tables 1 and 2 and in the post drawings on Graph one. Some

songs were written by this author (lyrics only) and some by other song writers. The songs used for this project are listed in appendix C.

The activities and experiences presented to the students and the anecdotal evidence of overheard student conversations suggest there was an increase in internal locus of control for some students. The data gathered from questions five and six on the pre and post survey show a change in attitude for several students. From group discussions, observations during recess duty, and overhearing student conversations, I found that several students realized that they can take care of the schoolyard habitat(s). Comments made by the participating students about not harming the living things that live on the schoolyard and approaching other students to ask them not to harm the creatures or trees on campus shows the beginning of an internal locus of control. Although not all the students who participated in this project showed signs of internalizing a locus of control, they did gain knowledge of the life that is on campus. They have begun the process of becoming familiar with their surroundings.

The new members that participated in the after school Environmental Club showed growth, but more time and hands on experiences are needed for these students to gain the

knowledge and awareness necessary to understand fully the meaning of being an environmentally responsible citizen. More than one month of being exposed to environmental education experiences are needed for some students to become familiar with, to connect with and feel comfortable in the natural environment.

Implication

The Environmental Science Club has been in existence for two years and has been instrumental in allowing students to connect with the environment. The use of environmental curriculum acquired through the Network for Environmental Science Teaching (NEST) is highly recommended. NEST has several curriculums but for this project the NEST curriculum Project Wild was used. The hands on activities were very engaging. Another curriculum used for this project from the American Forest Foundation was Project Learning Tree: Pre K-8 Environmental Education Activity Guide which also has many activities for students to engage in and construct ideas about the environment and its resources. Painted Lady Butterflies, composting kits with worms and other engaging, educational habitats for students to experience and learn from can be purchased on the Internet. This author used the Carolina Biological

Company to purchase the butterfly larva, worms, and habitat items needed for these creatures to grow and survive.

Last year (2007\08) fifteen students, a combination of third, fourth and fifth graders, participated in the after school Environmental Science Club. This year, twenty-nine students (just third and fourth graders for this project) participated. Several fifth graders are waiting to be a part of the club. There appears to be an interest among the upper grade students to experience and learn about their environment. Environmental activities and projects, such as composting to help with recycling and to nourish the schoolyard plant habitat will be the next activity for the Environmental Science Club students. The Environmental Science Club needs to continue so that children will be exposed to and become familiar with their environment thus allowing the students the chance to bond with it.

Summary

The after school Environmental Science Club has allowed students to be exposed to their environment and has increased their knowledge and awareness of their schoolyard habitat. There has been an increase in

student's attitudes towards being environmentally responsible citizens. Using community members and the school grounds (place-based education) was an effective way for students to construct their knowledge of the school environment and their relationship to it. As pointed out by Hungerford (1996) in the literature review, research has not supported the idea of acquiring environmental knowledge and awareness as a linear way of achieving environmentally responsible behaviors. The theme from his study though indicated that if students are to become environmentally responsible citizens they must first establish a bond with (a love for) their environment. Children tend to bond with what they become familiar with. This concept of familiarizing students with the environment and begin developing a bond with it is what occurred in this project. In the words of Sobel (2005) children need to be taught to love the natural surrounding world before being asked to heal its wounds.

APPENDIX A

PARENT/STUDENT CONSENT FORMS

INFORMED CONSENT – PERMISSION TO PARTICIPATE IN ENVIRONMENTAL EDUCATIONAL ACTIVITIES DESIGNED TO INCREASE ENVIRONMENTAL KNOWLEDGE AND AWARENESS

Dear Parents,

The after school Environmental Science club, in room 602, will meet on Tuesday and Thursday from 3:15pm – 4:15pm for the month of September. Your child will be participating in hands-on lessons designed to increase their knowledge and awareness of their environment. The first six lessons will be on what is a habitat. The lessons are part of a research project I am doing for my Master's Degree at California State University San Bernardino (CSUSB). CSUSB has approved this project and so has the Institutional Review Board (IRB). The lessons fit into the state science standards.

However, I need your permission for your child to attend and participate in this project. Participation in this project is completely voluntary. You may withdraw your child from the lessons at any time. Your child will not be asked to do anything different with these lessons than what he/she would be asked to do in a regular classroom. Neither will your child be graded on these lessons. There are no foreseeable risks to students as a result of participation in this project. During the course of the research, I will not use your student's name, address, or any other personal information. Confidentiality will be maintained at all times, and at the end of the study, I will destroy all student work that came from the lessons.

Thank-you,

Mrs. Sandra Jones

I give permission for (student's name) _____
to participate in the research project on increasing environmental knowledge and awareness.

Parent's signature _____ Date_____

CARTA DE CONSENTIMIENTO – PERMISO PARA PARTICIPAR EN ACTIVIDADES AMBIENTALES EDUCATIVAS DISEÑADAS PARA INCREMENTAR EL CONOCIMIENTO Y LA CONCIENCIA AMBIENTAL

Estimados padres de familia,

El para escolar del Club de Ciencias Ambientales, en el aula 602, se reunirá las martes y jueves de 3:15pm a 4:15pm. Su hijo(a) estará participando en lecciones diseñadas para incrementar su conocimiento y su conciencia ambiental. Las primeras seis lecciones serán a cerca de lo que es un hábitat. Estas lecciones son parte de la investigación para un proyecto que estoy haciendo para obtener mi Maestría de la California State University San Bernardino (CSUSB). CSUSB a aprobado dicho proyecto y también por Institucional Revéis Borde (IRB). Estas lecciones cumplen con los estándares estatales con respecto a las ciencias.

Sin embargo, necesito de su permiso para que su hijo(a) pueda atender y participar en este proyecto. Usted podrá retirarlo(a) en cualquier momento y la participación de su hijo(a) es completamente voluntaria. Durante éstas lecciones, no se le calificará, ni se le pedirá a su hijo(a) hacer nada diferente a lo que normalmente haría dentro de su aula. Tampoco se prevé que haya algún posible riesgo como resultado de su participación en el proyecto. Durante el transcurso de la investigación, no usaré el nombre, dirección, ni cualquier otro tipo de información personal del(a) alumno(a). Confidencia será mantenida en todo momento y al final del estudio, destruiré todos los trabajos de los alumnos(as), obtenidos como resultado de estas lecciones.

Atentamente,

Sra. Sandra Jones

Concedo permiso a (nombre del[a] alumno[a])_____
_____para participar en el proyecto de investigación para incrementar el conocimiento y la conciencia ambiental.

Firma del padre de familia:_____ Fecha:_____

INFORMED CONSENT – PERMISSION TO PARTICIPATE IN ENVIRONMENTAL ECUCATIONAL ACTIVITIES DESIGNED TO INCREASE ENVIRONMENTAL KNOWLEDGE AND AWARENESS

Dear Students,

The Environmental Science Club will be meeting on Tuesday and Thursday, for the month of September in room 602, from 3:15pm – 4:15pm. We will be doing lots of fun indoor and outdoor environmental science activities on where we live. The first six meetings will be on fun activities on habitats. These activities are part of a research project I am doing to earn my Master's Degree from California State University San Bernardino. After the first six meetings we will still continue with fun activities on habitats but they will not be a part of the research for my Master's Project.

If you want to be a part of these fun activities and help me by being in my research project, you need to sign this consent form and return it to me. We will have a great time exploring the school grounds, playing games, singing songs, drawing and sharing what we have discovered. You will not be graded or asked to do anything you wouldn't do in your own classroom. Just come and have fun.

I, (student's name) _____, agree to participate in Mrs. Jones' research project on where we live.

Date_____

Thank-you,

Mrs. Jones

CARTA DE CONSENTIMIENTO – PERMISO PARA PARTICIPAR EN ACTIVIDADES AMBIENTALES EDUCATIVAS DISEÑADAS PARA INCREMENTAR EL CONOCIMIENTO Y LA CONCIENCIA AMBIENTAL

Estimados alumnos,

El Club de Ciencias Ambientales se reunirá las martes y jueves en el aula 602, de 3:15pm a 4:15pm. Llevaremos a cabo muchas divertidas actividades ambientales del área donde vivimos, tanto en interiores como al aire libre. Las primeras seis reuniones serán divertidas actividades, a cerca de los hábitat. Estas actividades son parte de un proyecto de investigación que estoy llevando a cabo para obtener mi Maestría de la California State University San Bernardino. Después de las primeras seis reuniones, aun seguiremos llevando a cabo divertidas actividades a cerca los hábitat, pero ya no serán parte de la investigación para el proyecto de mi Maestría.

Si quieres ser parte de estas divertidas actividades, y ayudarme al ser parte de la investigación para mi proyecto, necesitarás firmar esta carta de consentimiento y regresármela. Nos la pasaremos muy bien, al explorar los patios de la escuela, jugando, cantando, dibujando y compartiendo lo que hemos descubierto. No serás calificado, ni se te pedirá hacer algo que no hayas hecho en tu aula. Solo ven y diviértete.

Yo, (nombre del alumno)_____,
acepto participar, en el proyecto de investigación del área donde vivimos, de la Sra. Jones.

Fecha:_____

Atentamente,

Sra. Jones

APPENDIX B

DATA INSTRUMENTS

(This was used for pre & post mapping data to measure growth in environmental awareness)

Draw a picture of your school habitat.

(This is the pre & post survey used to measure knowledge, awareness, and attitude towards the school environment. The last question was only on the post survey.)

Survey

Is a habitat part of an environment?

Yes No

Is the school a habitat for only students?

Yes No

Are habitats just for animals?

Yes No

Are all habitats important?

Yes No

Can you change your school environment?

Yes No

Is it part of your responsibility to take care of the school and surrounding environment?

Yes No

(Post question)

Would you like to continue participating in hands-on activities that are about your school and surrounding environment and the habitats within it?

Yes No

APPENDIX C

SONGS

A Habitat Is a Place to Live

(Tune: Oh Suzzana)

Lyrics by Sandra Jones

Verse One

A habitat's a place to live.

It's a special home.

To plants and animals alike

A place to call their own.

Chorus

Food, water, space

And shelter's what they need

A habitat provides these things

A happy place to be.

Verse Two

A habitat's the big ocean

The sandy beach as well.

For fish and birds and small sand crabs

A place they'd never sell.

Chorus

Verse Three

A habitat's a mountain peak…

With tress and streams and creeks.

Plants and creatures love it there

A place for them to keep.

Chorus

Verse Four

A habitat's a dry desert

Where not much water falls.

The plants and animals are tough

They don't drink much at all.

Chorus

Refrain

Our habitat is Indio (name your city or sing, Our habitat's a big/sm. city).

With everything we need.

For people, plants and all creatures

To live most happily.

Schoolyard Habitat

(To the tune of BINGO)

Lyrics by Sandra Jones

The Schoolyard is a habitat

For many living things.

Trees, grass, worms, bugs, birds (repeat 3x)

All sharing habitats.

Boom De Ada

(Guitar – G or C progression)

Lyrics by Sandra Jones

(Chorus)

Boom de ada, boom de ada, boom de ada, boom de ada

Boom de ada, boom de ada, boom de ada, boom de ada

I love the herbivores, I love the carnivores,

I love the omnivores, I love all living things,

I love all eco-systems

And each habitat

(Back to chorus)

What Is A Habitat?

(Tune: I'm a Little Tea Pot)
Lyrics by Sandra Jones

All habitats have certain things
Arranged in such away
For a good living.
Food, water, space and shelter it gives
For a great habitat
For creatures to live.

Life in a habitat is limited
Too many creatures
Make it too crowded.
When there's not enough of what one needs
Then creatures
Begin to leave.

Some travel far while others stay.
Some creatures die
That is nature's way.
My habitat is best for me
It has every –
Thing I need!

Habitat Song

By Bill Olive
(Tune: Kind of follow "Lollypop")

Chorus

Habitat, habitat, have to have a habitat

Habitat, habitat, have to have a habitat

Habitat, habitat, have to have a habitat

You have to have a habitat – to carry on!

The ocean is a habitat

A very special habitat

It's where the deepest waters at

It's where the biggest mammal's at

It's where our future food is at

It keeps the atmosphere intact

The ocean is a habitat – that we depend on!

Chorus

The forest is a habitat

A very special habitat

It's where a bear can scratch its back

It keeps the ground form rolling back

Renews the oxygen in fact

A very cool place to be at

The forest is a habitat – that we depend on!

Chorus

The river is a habitat

A very special habitat

It's where the freshest water's at

For people, fish and the muskrat

But when the people dump their trash

The river takes the biggest rap

The river is a habitat – that we depend on!

Chorus

Savannahs are a habitat

A very special habitat

It's where some herbivores are at

Zebras, oryxes and giraffes

They feast on trees and yellow grass

And when they're done they take a nap

Savannahs are a habitat that we depend on!

Chorus

Animal Fair

(Silly song, sung just for fun)

I went to the Animal Fair
The birds and the beasts were there
The big baboon by the light of the moon
Was combing his auburn hair.

You should have seen the monk
He sat on the elephant's trunk
The elephant sneezed and fell on his knees
And that was the end of the monk.
The monk, the monk, the monk.

Said a flea to a fly in a flue
Said the flea "Oh what shall we do?"
Said the fly, "Let us flee!"; said the flea, "Let us fly!"
So they flew through a flaw in the flue.

I went to the Animal Fair
The birds and the beasts were there
The big baboon by the light of the moon
Was combing his auburn hair.

You should have seen the monk
He sat on the elephant's trunk
The elephant sneezed and fell on his knees
And that was the end of the monk.
The monk, the monk, the monk,
The monk, the monk, the monk.

APPENDIX D

COMMUNITY OUTREACH CONTACTS

Community Outreach contacts

Presenters used for this project:

1. The Living Desert Zoo and Gardens

   Hands on display and presentation of local butterflies,

   Beatles, and bats.

   Contact person: Linda Gaeta

   47-900 Portola Ave

   Palm Desert, Calif. 92260

   (760) 346-5694

2. Dawn Ross

   Hands on display and presentation of local desert insects

   (760) 567-1234

These presenters came to the students.

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