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Environmental attitudes and knowledge in urban, Latino youth

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ENVIRONMENTAL ATTITUDES AND KNOWLEDGE IN URBAN, LATINO YOUTH

A Thesis

Presented to the

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San Bernardino

In Partial Fulfillment

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by

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ABSTRACT

The researcher conducted pretests and posttests in the summer of 2009 with children, ages 8 to 12, enrolled in the Audubon Center at Debs Park's programming. The Audubon Center at Debs Park is located in the third largest park in the city of Los Angeles and is part of the National Audubon Society's effort to engage underrepresented communities in conservation activities.

The program consisted of four, weeklong experiences during which participants learned about the natural systems in the park and the larger watershed. During the week, participants also had the opportunity to spend time in natural settings and develop stronger ties to the natural environment.

The majority of the camp participants were Latino and all were from urban communities. The research assessed several factors that are essential to the objectives of environmental education. The tests consisted of three sections: Environmental Knowledge, Environmental Attitudes, and Knowledge of Action Strategies.

On environmental knowledge and attitudes, the researcher concluded that the activities of the Audubon Center at Debs Park had a positive effect on participants, with significant increases in both areas. Although

measures related to action strategies were not statistically significant, knowledge in this area did increase.

This study has implications for environmental educators working with underserved audiences and also sheds light on programming directed towards Latino or urban youth.

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Finally, I want to thank Lisa and Aidan Byrd for their support during this process.

DEDICATION

This work is dedicated to the children, birds, reptiles, amphibians, mammals and insects of northeast Los Angeles.

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CHAPTER ONE

BACKGROUND

Introduction

Chapter One presents an overview of the project. The contexts of the problem are discussed followed by the purpose, significance of the project, and assumptions. Next, the limitations that apply to the project are reviewed. Finally, definitions of terms are presented.

Purpose of the Project

The purpose of the thesis was to evaluate an environmental education program at the Audubon Center at Debs Park to examine if the program improved participants' knowledge and attitudes about the environment. Located just minutes from downtown Los Angeles, the Audubon Center conducts programs primarily for urban, low-income, and ethnic minority children. The majority of these children are Latino. These programs focus on helping these children develop strong ties to the local natural environment, while also providing educational enrichment. During the program in question, children, ages 8-12, take part in a week long explorations of Debs Park and the surrounding watershed. During this program, children learn about the

social and natural history of the region and how these topics relate to current environmental conditions.

Context of the Problem

Increasingly, children in the United States are becoming further and further removed from natural places (Louv, 2005). Nowhere is this more evident than in urban Los Angeles. In high density, urban communities, characterized by low academic achievement and high rates of poverty, can these children develop positive attitudes towards and knowledge about nature?

Significance of the Thesis

Currently, there is very little information about how children from urban communities respond to environmental education. Much of the literature focuses on traditional audiences, and this thesis is an attempt to begin the process of assessing this growing demographic.

Assumptions

The following assumptions were made regarding the project:

1. Through an intensive week-long program, children from urban communities would increase their knowledge and positive feelings about the environment.

Limitations of the Thesis

During the development of the project, a number of limitations were identified. The following limitations apply to the project:

1. The subjects of the study were recruited from a geographically limited area in the city of Los Angeles, and even more limited area of Los Angeles County.
2. Although the majority of the subjects could be characterized as coming from low-income families, some of the subjects were not.
3. Although the majority of the subjects were identified as Latino, some of the subjects were not.
4. Although all of the subjects lived in an urban setting, many of them had already participated in Audubon Center programming. There was no way to control for previous experiences that the subjects had participated in, either through the Audubon Center, with other organizations, or with their families.
5. There was no control group.

Definition of Terms

The following terms are defined as they apply to the project. *Environmental education* is defined as education that "... 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 solution" (Stapp, 2005).

In regard to demographics, *Latino* will be used to describe people of Mexican, Central and South American descent. *Urban* is used to describe children who reside in a city setting (Merriam-Webster, 2009).

Environmental knowledge will be used to describe an overall understanding of basic environment and ecological concepts. *Environmental attitudes* is used to describe a "...set of values and feelings of concern for the environment." These definitions are taken from the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Tbilisi Declaration (2005).

Organization of the Thesis

The thesis portion of the project was divided into five chapters. Chapter One provides an introduction to the context of the problem, purpose of the project,

significance of the project, limitations and definitions of terms. Chapter Two consists of a review of relevant literature. Chapter Three documents the steps used in developing the project. Chapter Four presents the results and discussion from the project. Chapter Five presents conclusions and recommendations drawn from the development of the project. Project references follow Chapter Five. The Appendices for the project consists of: Appendix A PRETEST; Appendix B POSTTEST; Appendix C CHILD ASSENT. Finally, the Project references will be presented.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

In this section, the author examined the foundations of environmental education as a field and how they related to instilling knowledge and attitudes related towards the environment. Secondly, the author described literature related to conservation organizations, the principles related to Audubon Centers, and the relationship to ethnic minority communities. Next, the author discussed the Latino ecological world-view and how it relates to conservation organizations. Finally, the author described the theories behind the curricular development of Audubon Center summer day camp content and its relation to relevant research.

Environmental Education and Environmental Knowledge

One of the vital foundations of moving people towards positive environmental attitudes and behaviors is the acquisition of environmental knowledge (Hungerford & Volk, 2005). Several studies have looked at the effectiveness of helping children acquire environmental knowledge. One study of fourth graders, found that after an outdoor,

environmental education program students commented about their experience in 4 thematic areas. These areas were information related to actions and attitudes, general content knowledge, and specific environmental knowledge. This research found that a majority of participants retained knowledge up to a year after the intervention (Farmer, Knapp, & Benton, 2007).

Another study took baseline data regarding children, 10 to 13 years old, in Missouri. This study looked at environmental knowledge and attitudes. In general, they found that students' environmental knowledge was moderate. They know a few ecological concepts, but had misconceptions about others. Knowledge of aquatic systems was high, and knowledge related to the importance of wetland habitats was also high. Generally, the students had higher scores related to pro-environmental attitudes than the scores related to environmental knowledge (Greene, Roddiger, Drysdale, Gray, Merrigan, & Witter, 2000).

Environmental Education and Environmental Behavior

In essence, environmental education is directed to help participants work towards solutions to environmental problems (Stapp, 2005). Over the years, since the field

evolved, there has been much discussion and research on how to motivate people to take positive environmental action (D. Stoner, personal communication, September 12, 2008). Traditionally, environmental educators believed in a model that focused on a progression from knowledge, to increased awareness, to action. However, according the Hungerford and Volk, research in the effectiveness of environmental education does not validate this model (2005).

After conducting a meta-analysis of literature related to environmental behaviors, Hines et al. proposed a new model for responsible environmental behavior (1986/87). Although knowledge is an important aspect of action, a number of other variables are associated with positive environmental behavior. These include internal locus of control, positive attitudes towards the environment, economic factors, and social pressures (Hines et al., 1986/87). Moreover, this research cites ecological knowledge, knowledge of action strategies, and attitudes as vital precursors and entry-level variables to positive environmental behavior and action (2005). This research points to important ways that environmental education can achieve its ultimate objectives, of positive environmental action (Stapp, 2005).

Many studies have shown that environmental education can increase positive attitudes related towards the environment. Leeming, Porter, Dwyer, Cobern, and Oliver (1997) found a positive correlation between environmental education activities and children's attitudes regarding the environment. Generally, the students, who participated in EE activities, increased their positive feelings for the environment. However, this study did not find a difference in the control groups and experimental groups in regards to increase knowledge related to the environment. Evans, Brauchle, Haq, Stecker, Wong, and Shapiro (2007) reported similar findings in regards to general environmental attitude in young children. They found that young children, in their study, exhibited moderately high environmental attitudes in general and not necessarily in response to environmental education. However, it was noted that the children were from affluent, mostly white families.

Very little literature exists about changes in attitudes or knowledge in environmental education summer day camp programs, and none could be located that focused specifically on urban or Latino youth.

Conservation Organizations, Audubon Centers, and Minority Communities

Conservation or environmental organizations in the United States have a long history of advocating for the natural environment. The history of these organizations has its roots in the conservation movement of the 1830s (National Audubon Society, Inc., 2005). Generally, conservation or environmental organizations work on local, state, and federal policy but also seek to expose people of various backgrounds to the beauty of nature, while advocating for positive personal environmental behavior (National Audubon Society, Inc., 2005).

The National Audubon Society (Audubon) was founded in 1905 and is one of the oldest conservation organizations in the nation (National Audubon Society, Inc., 2004). Audubon manages nature sanctuaries, is involved in public policy related to the environment, and organizes local chapters across the country. Audubon has 467 chapters, and 24 state offices. Additionally, in the United States there are 43 Audubon Centers and 9 currently in construction or development (R. Petty, personal communication, July 15, 2009).

The mission of Audubon is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and

their habitats for the benefit of humanity and biodiversity (National Audubon Society, Inc. 2005). Over the years, Audubon has been at the forefront of establishing the National Wildlife Refuge system, banning of toxic materials like DDT, and saving species from extinction like the California condor. Additionally, Audubon has a long history of operating environmental education programs, including camps and nature centers (National Audubon Society, Inc., 2004).

Generally, environmental organizations in the United States have not attracted people of color or of lower socioeconomic backgrounds (Mohai, 1985). This corresponds with Audubon's own assessment of its membership (Flicker, 2002). Mohai's research has shown that this phenomenon is less a product of environmental concern and more a product of an external locus of control, a general feeling of disempowerment, and low resources, primarily financial resources (1985).

Due to under representation of minority communities in staffing, membership and program participants, Audubon believes that it needs to engage new, diverse communities and constituents in order to become relevant in this century. To this end, Audubon has committed to creating a network of environmental education centers across the

country, with many of them being sited in urban, minority, and low-income communities (Flicker, 2002). This effort seeks to raise the level of environmental knowledge and engender conservation action in traditionally underserved communities (Flicker, 2002). Generally, Audubon Center programs are participant centered, take place outdoors, are relevant to their audience and science based, and lead to action (Flicker, 2002).

The goals of the Audubon Center at Debs Park's, located in northeast Los Angeles, programs are: to awaken an on-going interest in the local natural world, to change personal actions in ways that are more environmentally sensitive, and to nurture positive relationships with nature (Audubon Center at Debs Park, 2008). The Audubon Center at Debs Park is part of Audubon's efforts to engage Latino audiences (Koeppell, 2004)

The flat-land neighborhoods surrounding Debs Park - including Highland Park, Lincoln Heights, El Sereno and Cypress Park - are characterized by high-density housing, high poverty rates, gang activity, and educational underachievement. The vast majority of residents are Latino (71%) followed by Asian (16%) and Caucasian (9%). Almost half of the target area residents are foreign born and 80% speak a language other than English. With nearly

40,000 young people living within two miles of the park, 31% of whom live in poverty, the need for positive, accessible community resources is critical (City of Los Angeles - Department of City Planning, 2006).

The majority of Audubon Center program participants reflect the demographics of the local community. A recent analysis of Audubon Center day camp participants revealed 61 % were Latino, with an additional 10% citing biracial, Latino/White ethnic background. Additionally, the majority of staff are bilingual speakers, live in the community, and frequently conduct programs in Spanish, where needed. Center staff work with community members to insure that programming is culturally relevant to the audience and to conduct effective outreach.

Activism, Concern, Class, and Culture

According to Flicker (2002), there are strong correlations between Audubon membership and income, and most members are from the upper-middle class. Some researchers equated a higher degree of environmental concern with membership in established conservation organizations, like Audubon or the Sierra Club (Tucker, 1978). Although members of conservation organizations do display responsible environmental behavior, and members of

these organizations do primarily come from an upper-middle class background, these two factors should not be used to discount the environmental attitudes, knowledge, and values across social classes and in the general population (Mohai, 1985; Tucker, 1978).

As stated previously, Mohai (1985) elucidated many factors associated with participation or non-participation in environmental activism, including financial support of conservation organizations. He found that participation in organizations was attributed to three main variables; attitude strength, personal efficacy, and resource availability. People who possessed high levels of all three variables were more likely to participate in organizations. If an individual was lacking in any of the variables, they would be less likely to participate. However, Mohai's study found that high levels of attitude strength alone, or environmental concern, did not correlate to participation in conservation organizations, and that high levels of attitude strength were found throughout social classes (1985). The two most important predictors related to participation were resource availability, primarily financial resources, and personal efficacy, or empowerment, with attitude strength being the weakest predictor (Mohai, 1985). Mohai (1985) concludes

that socioeconomic status was not a determining factor in positive attitudes towards the environment. We can assume from this that the lower socioeconomic status of the communities near the Audubon Center at Debs Park would not preclude them from having high environmental values and attitudes.

Additionally, the majority of the people that live in the communities near the Audubon Center at Debs Park are Latino and many of these are immigrants from Mexico, Central, and South America (City of Los Angeles - Department of City Planning, 2006). Studies have shown that residents of Mexico, Central, and South America exhibit higher concern about environmental problems than United States residents. Specifically, 31% of United States residents cited that environmental problems were "extremely serious", whereas 63% of Mexicans, 51% of Peruvians, and 84% of Nicaraguans listed environmental problems as "extremely serious" (Dunlap, Van Liere, Mertic, Catton, & Howell, 1992).

However, some research has revealed that acculturation, the process of immigrants changing their views, behavior, speech patters in relation to their new country's dominant culture, affects environmental values and viewpoints of Latinos in the United States (Schultz,

Unipan, & Gamba, 2000; Caro & Ewert, 1995). This data would seem to suggest that as immigrants become assimilated into the dominant culture, they lose aspects of their culture including high values towards the environment. However, a study in South Florida that focused on Latino views on the environment found that Latino subjects responded more favorably to a biocentric world view than did the non-Latino respondents (Noe & Snow, 2005).

Curricular Considerations for Audubon Center Program Development

Audubon Center summer day camp curriculum was designed based on research into developmentally appropriate practice for general environmental education programs as it relates to Stapp's definition found in Chapter One. Specifically, the curriculum seeks to move participants along the continuum of that definition, from knowledge about the environment, to awareness of environmental issues, to motivation to act (Stapp, 2005). This definition also relates to the objectives for environmental education developed by UNESCO's Tbilisi Declaration, including developing sensitivity towards the environment, knowledge of ecological concepts, and the advancement of a set of values related to an affinity

towards the environment. Center staff uses environmental education goals for curriculum development developed by Hungerford, Peyton, and Wilke that use content validation related to the UNESCO objectives (2005). In order to insure that the curriculum content is developmentally appropriate, Center staff refer to grade level emphases developed by the Wisconsin Department of Public Instruction, which also correlate to Stapp's definition and UNESCO's objectives. Based on these considerations, the staff determined that summer camp curriculum would focus on environmental sensitivity, knowledge of ecological concepts, local environmental problem investigations, and action skills (Engleson, 1993).

The staff at the Audubon Center also takes Hines behavior model, described in the previous section, into account when creating the camp curriculum (1986/87). Additionally, staff creates learning objectives using guidelines for excellence in environmental education created by the North American Association for Environmental Education (2004).

CHAPTER THREE

METHODOLOGY

Introduction

This chapter described survey subjects, treatment, steps used in the development of the survey instrument, and how data were analyzed.

Sample Group

The sample that took part in this study, there were other campers that did not fall into the age range specified or whose parents/guardians did not consent to have their children participate, included children ages 8 through 12 who were participants in the Audubon Center at Debs Park's summer day camp program. Children were enrolled in camp by their parents or guardians. All children who applied to camp were subsequently enrolled in one or more weeklong sessions. Audubon Center staff recruit participants by distributing fliers, sending out mailings, through the internet, and by through other Center programming. The Audubon Center deliberately recruits participants from local communities, giving priority enrollment for previous campers and residents in specific ZIP codes that are located near the Center. According to the survey, 51% of campers had been

previously enrolled in at least one previous year of camp. In total, 51 campers were administered the pretest and 49 of those completed the posttest. Those who did not complete both the pretest and the posttest were not included in data analysis.

Ethnic background of campers was obtained by an optional question in parent/guardian registration forms administered by the Audubon Center. Categories were: Native American, Asian, Filipino, Pacific Islander, African American, Latino, White, and Other. These categories were taken from Los Angeles Unified School District demographic measures (Los Angeles Unified School District, 2009). According to responses, the ethnic background of the campers was as follows: 65% Latino, 19% White, 10% Latino/White, 3% Asian/White, 1% Asian, and the remaining 2% combinations of several categories (Table 1). This roughly corresponds to data from the city of Los Angeles that states that the communities that surround the park are over 70% Latino, almost half are foreign born, and 80% speak a language other than English (2006).

Table 1. Ethnic Background of Camp Participants

Ethnic background	Percentage of Participants
Latino	65%
White	19%
Latino/White	10%
Asian/White	3%
Asian	1%
Other combinations	2%

Optional financial background information was also provided by parents/guardians on the registration forms. In order to apply for camp financial aid, parents were required to provide information of family size and taxable income based on their previous year's tax forms. Parents were not required to present documentation to qualify for financial aid, but were required to sign the forms stating that information provided was factual. Poverty, very low, and low income levels were provided by the City of Los Angeles' Community Development Department, developed from the US Departments of Health and Human Services, and Housing and Urban Development (City of Los Angeles - Human Services and Family Development Division, 2008). According to these guidelines, economic background of campers was as follows: 9% had no taxable income, 25% were at poverty level or below, 26% fell within the guidelines for very

low or low income levels, and 35% either did not apply for financial aid or income levels were higher than low income. An additional 5% had their fees waived due to extreme financial situations (Figure 1).

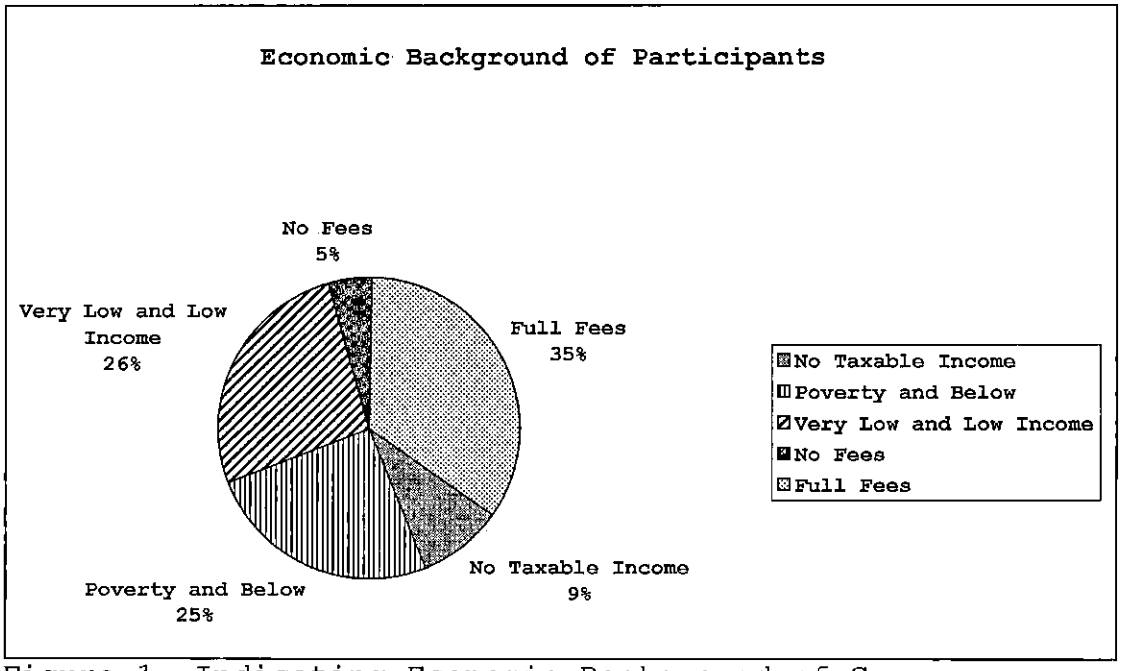

Figure 1. Indicating Economic Background of Camp Participants, as Reported by Parent/Guardians

According to parent/guardian registration forms, all campers resided in urban or suburban communities located within Los Angeles County.

Nine of the campers attended at least one other camp week during the summer. Additionally, 84% of campers

reported that they had previously visited the Audubon Center.

Design

A single-sample pretest-posttest design was employed. A survey was used to test for content knowledge and attitudes towards the environment. Generally, both tests were identical in wording, consisting of 5 knowledge based statements, 4 attitude scale statements. The final questions, 2 on the pretest and 1 on the posttest, tests consisted of different questions. These final questions were used on the pretest to determine if participants had visited the Center and/or attended camp previously. On the posttest, this question was used to determine the participant's level of satisfaction with the camp program (Appendix A and Appendix B).

The initial statements in the survey were based on specific learning objectives created by Audubon Center staff regarding camp outcomes. These statements were also derived from the curricular emphasis of "Ecological Foundations" as described by Hungerford and Volk (2005). The statements were designed to test knowledge related to the local natural environment. The first three statements were dichotomous, true/false questions, with another

choice for those who were unsure of the correct answer (Appendix A, Appendix B).

Questions 4, 5 and 6 followed, which asked what animals had been seen and where by the respondent. For these questions, space was given in which respondents could write or draw their answers. The space was intentionally blank and without lines so that respondents could list as many answers as they could.

The second section, on the reverse of the survey form, consisted of four statements designed to assess participants' attitudes towards the environment and knowledge of action strategies to help local natural resources. These statements were derived from a larger Grade 3 Affective Disposition Scale survey developed by Dr. Tom Marcinkowski, of the Florida Institute of Technology, for Pine Jog Environmental Education Center (Pine Jog) in Florida. The original survey, developed in the 1990's, was part of a three-year study, with unpublished results, conducted by Pine Jog to assess participants' attitudes towards the environment. The statements were slightly changed to be more relevant to the Audubon Center's location and camp content (Appendix A, Appendix B).

Question 8 asked for campers to list action strategies related to protecting local natural resources. As previoiusly noted, knowledge of action stratagies is an important step towards environmentally friendly behavior (Hines, Hungerford, & Tomera, 1988/87).

The last questions (Question 9, 10 on the pretest, and Question 9 on the posttest) on both surveys differed, as they were simple demographic information questions. The pretest asked if the camper had previously visited the Audubon Center and/or attended previous camp sessions and the posttest asked if campers would like to attend camp the following summer.

Treatment

The Audubon Center offered four weeks of summer day camp. Each week, the camp activities took place Monday through Friday. Camp days began at 9:00 a.m. and ended at 4:00 p.m.. During the first two weeks the students were introduced to the natural and cultural history of the Los Angeles River region. The third week was used to provide students with more in-depth content related to the natural and cultural history of the region, with an emphasis on environmental issues. The fourth and final week of the

camp was used to focus on a study of animal species present in the region (Appendix C).

During each of the four weeks' first days, after a brief introduction by Center staff in the morning, campers were administered the pretest. Campers were read the approved and scripted verbal assent and upon agreement, were given the survey (Appendix D). The same protocol was followed on the last days of camp sessions during the administration of the posttest. The posttest was delivered near the conclusion of the day, generally around 2:30 pm. Both surveys were administered in the Center's classroom by the researcher in a group setting. Center staff provided reading comprehension aid to participants, but were instructed not provide answers or clues to answers. For both treatments, subjects had unlimited time to complete the surveys.

Data Analysis Procedures

All categorical responses were assigned numerical values. Means and frequencies were calculated using Microsoft Excel. T-tests were performed using a web-based application hosted by Vasser College. Cohen's *D* was calculated using an internet-based application hosted by the University of Colorado. The campers' verbal responses

to Survey questions 4 and 6 were transcribed and the information coded into a Microsoft Excel spreadsheet by the researcher.

Environmental Knowledge

For environmental knowledge statements, items 1 through 3, correct answers were given the score of 1, while incorrect answers, including "Not Sure", were given a score of 0. Each respondent's scores, for the pretest and posttest were then totaled and the scores were analyzed using a t-test for correlated samples. The null and alternative hypotheses were as follows:

H_o: $\mu_{pre} = \mu_{post}$ and H_1: $\mu_{pre} \neq \mu_{post}$

Means, standard deviations, and effect size (i.e., Cohen's *D)* of results were calculated. Additionally, frequencies of answers were used to determine the percentages of increases and decreases between the two surveys.

Knowledge related to local animals was analyzed by adding correct answers, determined by the researcher and comparing the means of the pretest and posttest.

Environmental Attitude

The environmental attitude statements were also given numeric codes, but in this case, "Not Sure" responses were given a number in between the positive answer and the

negative answer. "Not Sure" was seen by the researcher as meaning neutral but decidedly not "Negative". Positive responses were given a score of 3, negative answers were given a score of 1, and "Not Sure" answers were given a score of 2. Each respondent's scores, for the pretest and posttest were then totaled and the scores were analyzed using a two sample t-test for correlated samples. Means, standard deviations, and effect size (i.e., Cohen's *D)* of results were calculated. Additionally, frequencies of answers were used to determine the percentages of increases and decreases between the two surveys.

Action Strategies

On the question regarding "Action Strategies" (i.e., Questions 8), all correct answers were given a numerical value of 1 and incorrect answers a numerical value of 0. Correct answers were based on the researcher's judgment. Each respondent's scores, for the pretest and posttest were then totaled and the scores were analyzed using a t-test for correlated samples. Means, standard deviations, and effect size (i.e., Cohen's *D)* of results were calculated.

The final questions, dichotomous in nature, on both pretests and posttests were analyzed by calculating frequency of answers and calculating percentages based on

the total population. All positive answers were tabulated and compared to the number of negative responses using percentages of respondents.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

Included in Chapter Four was a presentation of the findings, and discussion of the findings.

Presentation of the Findings

As described in the previous section, the surveys could be broken into three distinct sections, environmental knowledge and environmental attitudes. On both surveys the total population is 49 (n = 49).

Environmental Knowledge

For environmental knowledge, the scores between the pretest and posttest proved to be statistically significant ($p = 0.00265$) based on $p < .05$. The mean scores between the two surveys increased as did the standard deviation. Additionally, the Cohen's D equaled 0.5 correlating to an effect size of 0.24 (Table 2).

Table 2. Mean, Standard Deviation, t-statistic, *p*-value, Cohen's *D* on Knowledge Statements

Test	Mean	Standard Deviation	*t (df)*	*p*	Cohen's D
Pretest	1.06	0.92			
Posttest	1.55	1.02	3.17 (48)	0.003	0.5

The frequency of answers given between the pretest and the posttest changed. Correct answers increased by 31% while incorrect answers decreased by 11% and 'Not Sure' decreased by 40%(Table 3).

Table 3. Frequency of Knowledge Related Answers and Percent Change

	Pre	Post	% Difference
Not Sure	57	34	-40%
Wrong	38	34	-11%
Correct	52	75	+44%

There was no change in the numbers of animals conveyed by the participants, on both the pretest and the posttest participants mentioned a total of 138 animals.

Environmental Attitude

On the statements related to environmental attitudes, the pretest revealed already high values towards the environment, with 520 points out of 588 total points possible. The mean of pretest scores was 10.61, out of 12 total, with a standard deviation of 1.7. The posttest had a mean of 11.06 with a standard deviation of 1.09. The results reached significance, with a *p*-value of 0.0007. The Cohen's *D* equaled 0.31 (Table 4).

Table 4. Mean, Standard Deviation, t-statistic, *p*-value, Cohen's *D* on Attitude Statements

Test	Mean	Standard Deviation	*t (df)*	*p*	Cohen's *D*
Pretest	10.61	1.7			
Posttest	11.06	1.09	3.62 (48)	0.0007	0.31

Additionally, the range of answers on the pretest was 8, while the range on the post-test was 3. On the pretest, only one participant had the lowest possible score of 4 points. On the pretest, 6 participants scored 8 points. On the posttest, no participants scored below 9 points (Table 5).

Table 5. Frequency (f) of Environmental Attitude Scores on Pretest and Posttest

Score	(f) Pre	(f) Post
4	1	0
8	6	0
9	3	5
10	10	12
11	7	7
12	22	25

The frequency between pretest and posttest of expressed positive attitudes toward the environment increased by 8 percent. The frequency of negative attitudes decreased 43 percent and neutral attitudes decreased by 20 percent (Table 6).

Table 6. Frequency of Attitude Related Answers and Percent Change

	Pre	Post	% Difference
Negative	23	13	-43%
Neutral	24	19	-20%
Positive	151	164	+8%

Action Strategies

The final identical question related to knowledge of environmental action strategies. Respondents were prompted to write "things that they could do to help the Arroyo". In this section, the mean increased, while the standard deviation lessened. The *p*-value approached significance at 0.59 (Table 7). Additionally there was an increase of responses from the pretest to the posttest that was measured at 8%.

Table 7. Mean, Standard Deviation, t-statistic, *p*-value, Cohen's D on Action Strategies

Test	Mean	Standard Deviation	*t (df)*	*p*	Cohen's *D*
Pretest	1.28	0.97			
Posttest	1.38	0.86	0.54 (48)	0.59	0.01

The final question of the posttest asked if participants would be interested in attending future camp sessions. 92% of respondents responded in the positive.

Discussion of the Findings

Environmental Knowledge

Based on the data, there was a statistically significant change ($p = 0.003$) between the pretest and the

posttest scores on knowledge related to local natural environment, specifically the Arroyo Seco Watershed. The Cohen's *D* supports a significant educational gain. We can assume that since there were changes on these basic questions, knowledge related to other ecological concepts shared with the participants also increased through participation in the camp program. Another study found that students also retained ecological knowledge when interviewed a year after the educational experience (Farmer et al., 2007).

Interestingly, the standard deviation between the surveys increased, indicating a wider spread of answers from the mean on the posttest than on the pretest. These findings show that the Audubon Center's learning objectives are being met and participants are developing their ecological knowledge. As discussed previously, ecological knowledge is a vital component to reaching the objectives for environmental education (Hungerford & Volk, 2005).

There was no change in the number of animals that they students could name. This was a surprising result since there were many opportunities for campers to become familiar with native animal species, in particular in the third and fourth weeks of camp. The researcher believes

that many of participants may not have been in a proper mindset to take a test when the posttest was delivered, which will be discussed further in recommendations.

Environmental Attitude

In relation to the statements relative to participant attitudes towards the environment, participants scored very high on the pretest. This indicates that the participants entered camp with previous positive attitudes towards the environment. Since over half of the participants had attended camp, and a majority had visited the Center, their attitudes could have been influenced by their prior experiences. There are also many other variables associated with positive environmental values that could explain the high entry level of the participants. As indicated by Noe and Snow, Latinos exhibit higher values towards the environment than Americans of other cultural backgrounds (1989/90). Although there was little room for improvement between the pretest and the posttest, respondents did significantly increase the positive responses ($p = 0.0007$), while decreasing the negative responses. Additionally, the standard deviation between the two tests indicated more clustered responses, and a smaller range of answers. Based on this finding, participants' responses, on the posttest,

were grouped towards the higher end of the positive response scale. These findings correlate with the findings of other researchers, specifically Evans et al. (2007) whose research focused on young children from primarily white, affluent families. The Audubon Summer Camp experience did meet its goals of strengthening participants' positive attitudes towards the environment.

Action Strategies

Another area where participants' responses increased between the pretest and the posttest was in their knowledge of action strategies related towards the environment. Although this change was not statistically significant ($p = 0.59$), there was an 8% increase in knowledge of action strategies. Knowledge of action strategies is an important precursor to positive environmental behavior (Hines, Hungerford, & Tomera, 1989/90).

The final question on the posttest gauged participants' desire to attend camp again at the Audubon Center. The result, 92%, was interpreted to indicate a high level of satisfaction with the camp content. It is hoped that participants will continue to attend summer camp and build upon previous knowledge and develop stronger ties to the local natural world.

Overall, the Audubon Center at Debs Park camp provided an opportunity for urban, Latino youth to learn more about the environment while increasing participants' knowledge, positive attitudes towards the environment, and knowledge of action strategies.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Introduction

Chapter Five provided conclusions based on the data presented. Additionally, the researcher delineated recommendations for further research. Lastly, the Chapter concluded with a summary.

Conclusions

The conclusions extracted from the project follows.

1. Participants in the Audubon Center at Debs Park's summer camp program showed significant increases in their knowledge of ecological foundations and positive attitudes towards the environment.
2. Participants increased their knowledge of action strategies towards protecting the environment.
3. The participants represented an understudied demographic in the field of environmental education and responded positively to programming related to increasing environmental knowledge and positive attitudes.

Recommendations

The recommendations resulting from the project follows.

1. A larger sample size would provide more information about the participants and more possibly more significant results.
2. More items on the survey instrument could also provide deeper understanding of the effects of this environmental education program.
3. A control group made up of participants with similar demographics would provide a good comparison between groups.
4. Survey protocols should be change to take into account the effects of participants' emotional states on the last day of camp. There was much excitement about the conclusion of camp, a pending Open House for camp families, and the promise of free playtime. It is difficult to gauge if the posttest results accurately reflect environmental knowledge and attitudes.
5. A delayed posttest would provide information about retention of knowledge and attitudes. This would also remove participants from the excitement and emotions of the last day of camp

and allow the participant to reflect on what they learned and how they feel about the environment.

6. The results of this survey should not be construed as representing a whole population, but rather a sample of a small segment of a population in a specific geographic region.
7. The survey should be refined and replicated with other organizations, or Audubon programs, that are working with similar demographics in different regions around the country.

APPENDIX A

PRETEST

Audubon
CENTER AT DEBS PARK

Name: _____

Welcome to Audubon Summer Day Camp!

We are glad you came and we want to make sure you have a good time while you are here. We would like to know a little bit about you and what you like to do. This is not a test, and you will not get a grade on it. Your answers to these questions will help us to make our camp better.

1. I live in a watershed? *Please circle one*

True False Not Sure

2. The Arroyo is not found in the city? *Please circle one*

True False Not Sure

3. No animals have gone extinct in the Arroyo? *Please circle one*

True False Not Sure

4. What are some animals that live in the Arroyo:

5. Have you ever seen any of these animals? *Please circle one*

Yes No

6. Where did you see them?

Please continue on the back ⟶

7. Tell us how you feel about these things. There are no right or wrong answers. Do you agree, are you not sure, do you not agree. *Please circle your answer*

Only a few people need to do things to help plants and animals.	Agree	Not sure	Don't Agree
It is important that I do things to help plants and animals.	Agree	Not sure	Don't Agree
I want to spend time doing things to help the Arroyo	Agree	Not sure	Don't Agree
When I do something for plants and animals, I believe it helps the Arroyo	Agree	Not sure	Don't Agree

8. What are some things you can do to help the Arroyo?

9. Have you visited the Audubon Center at Debs Park before? *Please circle one*

Yes No

10. Is this your first time at Audubon Summer Day Camp? Please *circle one.*

Yes No

Have a great week!!!

APPENDIX B

POSTTEST

Audubon
CENTER AT DEBS PARK

Name:_____

Audubon Summer Day Camp

We hope you enjoyed camp this summer. Please answer the following questions about your week at camp. This is not a test, and you will not get a grade on it. Your answers to these questions will help us to make our camp better.

1. I live in a watershed? *Please circle one*

   True False Not Sure

2. The Arroyo is found only in the mountains? *Please circle one*

   True False Not Sure

3. No animals have gone extinct in the Arroyo? *Please circle one*

   True False Not Sure

4. What are some animals that live in the Arroyo:

5. Have you ever seen any of these animals? *Please circle one*

   Yes No

6. Where did you see them?

Please continue on the back →

7. Tell us how you feel about these things. There are no right or wrong answers. Do you agree, are you not sure, do you not agree. *Please circle your answer*

Only a few people need to do things to help plants and animals.	Agree	Not sure	Don't Agree
It is important that I do things to help plants and animals.	Agree	Not sure	Don't Agree
I want to spend time doing things to help the Arroyo	Agree	Not sure	Don't Agree
When I do something for plants and animals, I believe it helps the Arroyo	Agree	Not sure	Don't Agree

8. What are some things you can do to help the Arroyo?

9. Do you want to come to Audubon Summer Camp next summer? *Please circle one.*

Yes No

See you soon!!!

APPENDIX C

CAMP CURRICULUM

General Curriculum for Audubon Summer Camp Weeks

Day	Weeks 1, 2
Monday:	Responsible environmental behavior
	Bird natural history
	Watershed concepts
Tuesday:	Animal introduction
	Food web concepts
	Metamorphosis
Wednesday:	Trip to Angeles National Forest
	Art activities
	Stream investigations
Thursday:	Adaptation activities
	Stewardship activities
Friday:	Natural history games
	Art activities
	Family Open House

Day	Week 3
Monday:	Responsible environmental behavior
	Stream investigations (Water Quality)
	Animal study
Tuesday:	Cultural history of Arroyo Seco
	Animal study
Wednesday:	Trip to Lower Arroyo Park
	Stream investigations (Water Quality)
	Positive action projects in Arroyo Seco
Thursday:	Water quality findings and analysis
	Animal study
	Issue investigation
Friday:	Animal reports and art
	Art activities
	Family Open House

Day	Week 4
Monday:	Responsible environmental behavior
	Arroyo animal presentation
	Scientific method introduction
	Insect natural history and investigations
Tuesday:	Animal adaptations
	Fish investigations
	Amphibian natural history and investigations
Wednesday:	Trip to Lower Arroyo Park
	Bird natural history and investigations
Thursday:	Mammal natural history an investigations
	Field research methods
Friday:	Reptile presentation and investigations
	Art activities
	Family Open House

APPENDIX D

CHILD ASSENT

Child Assent - Oral

My name is Jeff and I am the Director at the Audubon Center. I'm studying how our programs, like camp, help you all learn about nature and about how you feel about nature. During camp we're going to give you two pieces of paper with questions on them. One of these we are going to give to you today and the other at the end of the week. It should only take a few minutes for you to write down your answers. This is not a test, and you will not get a grade on it.

If you feel like you don't want to answer the questions, you can stop at any time. This is totally voluntary and if you don't want to do it, we won't be mad at you.

Your answers will not be shared but I am going to use your answers to write a report on our camp.

If you have questions about our study, let me or one of our Teacher Naturalists know.

Thanks for your help

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