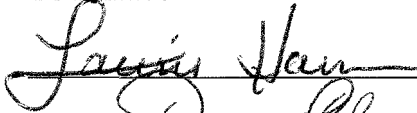# A QUALITATIVE EVALUATION TOOL FOR ELEMENTARY STUDENT ATTITUDES DURING AN OVERNIGHT ENVIRONMENTAL EDUCATION EXPERIENCE
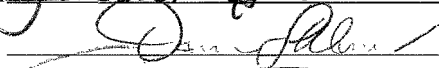
by

Natalie Perez
A Thesis
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
The Requirements for the Degree
of
Master of Science
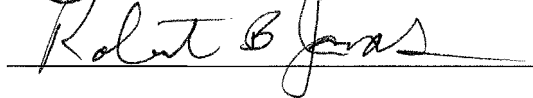Environmental Science and Policy

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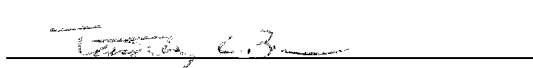Dr. Laurie Harmon, Thesis Director

Dr. Dann Sklarew, Committee Member

Dr. Chris Parsons, Committee Member
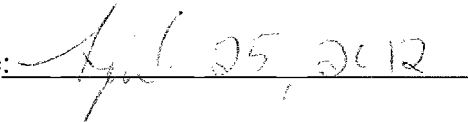
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Spring Semester 2012
George Mason University
Fairfax, VA

A Qualitative Evaluation Tool for Elementary Student Attitudes during an Overnight
Environmental Education Experience

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science at George Mason University

by

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Spring Semester 2012
George Mason University
Fairfax, VA

DEDICATION

This is dedicated to my Mom, my sister Erica and my Kevin.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

Hard Bargain Farm………………………………………………………………….HBF
Alice Ferguson Foundation…………………………………………………………AFF
North American Association for Environmental Education……………………....NAAEE
National Environmental Education Act………………………………………......NEEA

ABSTRACT

A QUALITATIVE EVALUATION TOOL FOR ELEMENTARY STUDENT ATTITUDES DURING AN OVERNIGHT ENVIRONMENTAL EDUCATION EXPERIENCE

Natalie Perez, M.S.

George Mason University, 2012

Thesis Director: Dr. Laurie Harmon

The purpose of this research was to examine a qualitative evaluation tool known as an "Analog Blog" for attitudes of fifth grade students participating in an overnight environmental education experience. Currently, this "Analog Blog" provides students with an opportunity to freely write about their experience throughout their visit. These comments are tracked throughout their overnight field trip (by different color markers) for four defined time periods. Twenty four Analog Blogs were analyzed. Positive statements and feelings dominated all time periods. Many of these positive statements were generated through sensory experiences with animals, wildlife and natural elements. Fear was a category which occurred throughout all time series, but diminished in frequency (from 8.13% of all responses in the earliest time period to 0.30% of all responses in the last time period). Pre and post-questionnaires were also administered to participants to measure knowledge and attitude changes quantitatively. For eight of the

ten matched pairs of school groups, significant increases in knowledge were found. The questionnaires and the Analog Blogs indicated that students were able to not only have a positive interactive experience in the outdoors, but also retained knowledge about ecological concepts.

INTRODUCTION

Children spend far less time in the outdoors than previous generations and are subsequently less connected to the environment. In his 2005 book, *Last Child In the Woods*, Richard Louv, describes this as "Nature Deficit Disorder". With so many competing interests (T.V.s, computers, etc.) as well as educational policies which inadvertently discouraged outdoor time, children today spend only minutes a week in the outdoors (Wells, 2009). Outdoor play time has become increasingly marginalized in childhood, with the implications being that they are less knowledgeable and appreciative of ecological issues (Coyle, 2005). There are also many benefits to childrens' cognitive, physical and social development when they spend time outdoors (Pretty, Angus, Bain, Barton, Gladwell, Hine, Pilgrim, Sandercock, & Sellens, 2009).

During the last several decades, there has been a push to incorporate environmental education into curriculum as one way to address this lack of outdoor time and subsequent lack of ecological knowledge (Drissner Haase, & Hille, 2010). Incorporating learning about the environment as well as hands-on outdoor experiences into school curriculum continues to expand and is broadly known as environmental education. Environmental education can loosely be defined as a concept which teaches students "how to learn about and investigate their environment, and to make intelligent, informed decisions about how they can take care of it." (NAAEE, 2010) In 1990,

congress passed the National Environmental Education Act, citing that current education on environmental issues as well as how to address them were inadequate. The act that "It is the policy of the United States to establish and support a program of education on the environment for students and personnel working with students, through activities in schools, institutions of higher education, and related educational activities, and to encourage postsecondary students to pursue careers related to the environment." (NEEA, 1990, pg. 2)

Generally, the teaching of these concepts and investigations take place in the classroom, schoolyard and off-site facilities. These off-site facilities can include a nature center, or local a park. From environmental education, the idea of environmental literacy is gaining traction as a way to measure effective environmental education. An environmental literate person is knowledgeable about the impact their actions have as well as how the world around them operates. Currently, states are beginning to adopt their own environmental literacy graduation requirements, strengthening the impact and dissemination of environmental education in the United States.

Although policy has been established to further environmental education, it can be difficult to incorporate into learning standards, due mostly to time and budget constraints (Ham & Sewing, 1988). Therefore, schools often turn to outside organizations to help incorporate environmental education into curriculum goals. These partner organizations can be governmental and non-governmental, and support environmental education goals but providing a wide variety of resources to schools ranging from classroom lesson plans to off-site investigative field studies.

Many of these organizations have an underlying goal which frames most, if not all, programming. This goal is one in which students are transformed and change (or continue with) pro-environmental behaviors. Many of these organizations follow a linear attempt to change learner behavior: knowledge → attitude → behavior. However, achieving behavioral change has been shown to be much more complicated than this model originally posited. Knowledge gains do not necessarily lead to an attitude change, therefore a behavioral change (Hungerford & Volk, 1990).

There are federal and state educational policies which provide grants to outside organizations which can support educators in their mission to incorporate environmental education (Potter, 2010). Many of these organizations are reliant, at least in part, on grant funds from governmental and private organizations. Organizations that provide environmental educational programs receiving these grants must be able to show effective outcomes of their programs through some sort of evaluation or assessment process. The difficulty in evaluating program goals is that many of these environmental organizations want to show that their programs helped to instill environmentally responsible behavior in students after participation. This is a particularly complicated outcome to assess and poses logistical challenges for assessment as well. Time constraints and funding for an effective behavioral outcome evaluation can be limiting for many environmental education organizations.

The purpose of this research is to explore a non-traditional evaluation method for possible attitude changes that an overnight outdoor experience has on 5th grade students. The research is exploratory and is intended to better understand how this qualitative

evaluation tool can be used to assess students during an outdoor educational experience.

The evaluation tool is also low cost and has the potential to be analyzed by many of the

current staff members. These features make this evaluation tool unique and important to

organization. Currently, this non-traditional qualitative measurement of students'

attitudes has not been evaluated for its effectiveness as a program evaluation tool.

In addition to this qualitative data, a pre and post content knowledge

questionnaire is administered to students. This questionnaire also contains questions to

assess attitude changes quantitatively. Due to time restraints, this questionnaire only

gauges students' attitudes on five broad questions mostly related to students' comfort

level and desire to spend time outdoors and their desire to protect the environment.

Exploring the major themes which emerge from the qualitative data as well as the results

of the quantitative data, this outdoor program will be better able to evaluate program

goals and overall mission more effectively.

LITERATURE REVIEW

Environmental education program outcomes can be difficult to evaluate effectively and systematically (Carleton-Hug & Hug, 2010). Nonetheless, environmental education programs are continuously observing program outcomes for cognitive gains as well as attitude changes. Measures of attitudes have become a particularly important aspect of environmental education. Thapa (2010) showed that eco-centric attitudes were more of a predictor for pro-environmental behavior than was participation in outdoor activities. Within the research, there is evidence to show that environmental education programs can lead to changes in attitude (Flowers, 2010; Randler, Ilg, & Kern, 2005; Rickinson, 2001) and by extension equivalent behaviors (Sample & Warland, 1973). However, evaluations for attitude changes can be difficult for organizations to regularly and systematically institute, particularly for longitudinal evaluations since finding alumni participants can be elusive (Morgan, Hamilton, Bently, & Myrie, 2009).

The purpose of environmental education is not only to create an environmental literate population, but one which exhibits behaviors which reduce waste, fossil fuel consumption and support conservation efforts in general. There have been many variables identified as being important in changing behavior; however, most agree that knowledge is a precursor to affecting any kind of behavioral change (Hungerford & Volk,

1990). In order for people to change or identify environmental responsible behaviors, they must know about the problem first.

Oftentimes, these organizations use pre and post surveys to evaluate cognitive gains or attitudes. The results are quantified and analyzed for statistical significance (Kruse & Card, 2004; Smith-Sebasto & Semrau, 2004; Bogner, 1998). However it has been argued that quantification of outcomes can marginalize the effects of environmental education (Hillcoat, Forge, Fien, & Baker, 1995; Walsh-Daneshmandi & MacLachlan, 2006).

Though there have been studies which have successfully measured a knowledge gain from environmental education programs, not all program are able to show (or measure) any significant change in attitude or behavior (Dimopoulos, Paraskevopoulos, & Pantis, 2008; Erdogan, 2011). Knowledge as the sole motivator to change attitudes toward the environment is not a proven phenomenon. Flowers (2010) found that a Montana Fish and Wildlife conservation program did indeed improve students' knowledge about native fish, but showed little difference in change in attitude between experimental and control groups. Randler et al. (2005) found that there were not significant differences between control and experimental groups in terms of affective responses to an outdoor component of a classroom lesson on conservation. However, results are not always so straight forward for cognitive gains. Cachelin, Paisley, & Blanchard (2009) had mixed results with regard cognitive gains in ecological knowledge between control and experimental groups, however the students who participated in field-

based experiences did have more sensory and empowerment responses to open ended questions.

There have been many opportunities for researchers to provide students with pre and post surveys to measure the effectiveness of outdoor programs. However, this survey method is not always the most robust method for determining program outcomes. Surveys are sometimes not taken seriously by students (Smith et al. 2004) and responses marked are done so without consideration, with the explanation that it doesn't matter since it is not a graded assignment. Similarly, there is not one standard survey which can effectively evaluate a particular program's outcomes (Monroe, 2010). Organizations are then tasked with finding creative and effective ways to evaluate their programs for funding as well as for program improvements that would better fulfill their organizational mission.

James and Bixler (2008) used a qualitative approach to a 3 day environmental education experience and found that students related to the program mostly through senses as well as social interactions. Indeed, they suggest that "Taken a step further, environmental education) curricula should include opportunities for sensory experiences as a formal component of each curriculum" (pg. 57). Other qualitative assessments of student engagement, learning and attitudes suggest that the context and setting can influence these factors. Classroom research has found that there is a lack of motivation for science in general (Lee & Brophy, 1996) while promoting outdoor engaging experiences for younger students (Randler, 2005).

Morgan et. al (2009) also used a qualitative approach to evaluate the long-term effects of a school gardening program. The emerging themes (relevant to environmental education) were: changes in science and gardening skill and increased environmental awareness. However, the program also provided a positive life experience in a challenging home and school environment.

These positive outdoor experiences can be a powerful factor in shaping adult environmental attitudes. Ewert et al. (2010) showed that early childhood outdoor experiences can lead to more pro-environmental attitudes in adult life. Similarly, Arnold, Cohen, & Warner (2009) investigated the motivational factors of young environmental leaders and found that influential (outdoor) experiences and role models were the most significant factors. Role models citied as influential in creating young environmental leaders were parents, friends and teachers. It has also been observed that appreciative outdoor activities such as hiking, canoeing and cross-country skiing, can lead to more a more preservationist outlook toward the environment (Jackson, 1987).

METHODS

The Organization:

The Alice Ferguson Foundation is an environmental educational non-profit which has been chartered in the state of Maryland since 1954. The Alice Ferguson Foundation serves students and teachers throughout the metro Washington D.C. region and consists of both advocacy and educational components. Hard Bargain Farm (HBF) is the foundation's educational branch serving Pre-K to fifth grade students. Hard Bargain Farm strives to "…promote understanding and stewardship of the natural resources in the Potomac River watershed and the legacy of farming in America" (Hard Bargain Farm). The property is a three hundred and thirty acre working farm located along the Potomac River, in Accokeek, Maryland comprised of woodlands, wetlands, crop fields and grasslands, a ½ acre children's garden and a late 19th century barnyard including various farm animals. The property is home to a wide variety of native flora and fauna. Students visiting the farm are encouraged to interact with their environment throughout their stay. Hard Bargain Farm also has an on-site lodge which includes separate male and female bunk rooms with a capacity for 44 total students, showers, a classroom, a large common room and a full kitchen. The common area of the lodge includes a taxidermy showcase of local wildlife as well as a living, caged five foot Eastern Rat Snake.

Hard Bargain Farm is also a MAEOE (Maryland Association for Environmental and Outdoor Education) certified green center. As part of this certification HBF has implemented the trash-free facility program, developed by the advocacy branch of the Alice Ferguson Foundation. Students were given several different options for dealing with trash throughout their visit including a pig bucket, for food scraps, a compost bin and an option for terra-cycle recycling. At the end of the visit, their trash was weighed and results were posted in the common room of the lodge.

When students arrived they were given a short orientation and introduced to Hard Bargain Farm's trash free facility program and are then split into groups of four (approximately ten students per naturalist). Two groups went to the farm (in opposite directions) while two groups went on the habitat hike (in opposite directions) and each group was led by a naturalist. All groups met back at the lodge after two hours to have lunch. After lunch the two groups switched routes and headed back out onto the property for another two hours. After all groups had participated in the habitat hike and farm life tour, all students met back at lodge and took a thirty minute hay wagon ride to the Potomac River.

Participants:
Approximately seven hundred fifth grade students visited Hard Bargain Farm for an overnight stay at the on location Warhem lodge between the months of September 2010 and May 2011, with the exception of one school group which came for an overnight stay in April of 2010. Students arrived anywhere between 10am and 11am and left

between 12:00pm and 1:00pm the following day. The students who participated in this study were from various public schools in Maryland's Prince George's county.

Prince George's county is 482.69 square miles and shares a western border with Washington D.C. and the Potomac River. Demographic and median income information for Prince George's county as compared to the greater state of Maryland is available in tables 1 and 2. The high percentages of minority races and ethnicities in Prince George's County as a whole were reflected in students who participated in this research at Hard Bargain Farm.

Table 1: Prince George's County population and median income

Total population	Caucasian	African American	Asian	Hispanic/ Latino	Median Household Income
863, 420	19.2%	64.5%	4.1%	14.9%	$71,260

(U.S. Census Bureau, 2010)

Table 2: Maryland population and median income

Total population	Caucasian	African American	Asian	Hispanic/ Latino	Median Household Income
5,773,552	58.2%	29.4%	5.5%	8.2%	$70,647

(U.S. Census Bureau, 2010)

Hard Bargain Farm currently has a partnership with Prince George's county school district to bring students to the farm as part of their Maryland state science curricula goals. The participants in this study were all from various public schools in Prince George's county and were all in 5th grade.

The Program:

Students coming for an overnight stay participate in several different activities while at the farm, these activities correlate with various Maryland scientific standards. First day activities include a habitat hike, farm tour and wagon ride around the property with each one of these activities led by a trained naturalist. In the evenings, staff leaves the students with their teachers and chaperones and they are free to conduct their evening activities as they see fit. When requested, a volunteer from the humane society will come to the lodge in the evening and do a program on bats. This volunteer is a naturalist at Hard Bargain Farm, but conducts evening programs as a representative of the humane society. On the second day of their overnight experience, students participate in cow milking, an antique tool demonstration, garden class, or worm class (depending on the time of year and availability of staff) and an interactive lesson called "Who Polluted the Potomac". A more detailed description of student activities is located in table 3(pg, 14).

Table 3: Description of activities students participate in while on an overnight visit to Hard Bargain Farm.

Activity	Description	Concepts addressed
Habitat Hike	An approximately 1.5 mile hike through woodlands, crop fields and wetlands (marsh and swamp) culminating at the Potomac River shoreline. This hike allows students the opportunity to observe wildlife, such as Bald Eagles and Osprey in their native habitats. Weather permitting, students equipped with nets and buckets stop at Accokeek Creek (a tributary of the Potomac River) to catch and closely observe wildlife living in the creek.	Watersheds, Adaptations, Energy cycles and organism roles within (Producer, consumer and decomposer).
Farm Life tour	Students are led around the barnyard and pasture to learn about the various farm animals and their roles on the farm. Students are encouraged to interact with the animals. In addition to the barnyard, students collect eggs from the chicken coops, visit the hay loft and explore the root cellar.	Animal and plant food and fiber sources, inheritance, adaptations, sustainability, organism roles.
Cow Milking class	Students are able to learn about dairy production on a farm. Students are also able to milk one of the Jersey cows in the milking barn as well as turn fresh (pasteurized) milk into butter, with a chance to taste it during lunch.	Food sources
Children's garden class	Seasonally appropriate garden lessons to teach students about pollinators, soil and plant parts. Garden lessons are generally only taught in the early fall and spring.	Soil, adaptations, watershed, inheritance, energy cycle
Worm class	Students learn the basics of vermiculture and separate worms and eggs to start a new vermiculture bin for reducing food waste	Organism roles, energy cycles, soil, reducing waste
Antique tool demonstration	Students are introduced to antique farming tools and the way in which technology has changed farming throughout the decades.	Farming, technology
Who Polluted the Potomac?	An interactive activity where students hold small vials filled with a "pollutant" to add to the mock Potomac River. Students learn (and can visualize) how everyday activities contribute to the pollution in the Potomac River.	Watersheds, pollution

Quantitative Data collection:

Hard Bargain Farm developed a questionnaire to gauge student learning and attitudes toward spending time in nature and the desire to protect the environmental before and after an overnight visit. This questionnaire contains a total of seven questions (see appendix A). The first question contained five parts meant to evaluate student attitudes about their desire and comfort to spend time in the outdoors, protect the environment, as well as their personal empowerment to protect the environment. The remaining six questions were a mix of multiple choice and write in answers. These six questions were meant to assess student knowledge of watersheds (representing 6 total points), energy cycles/organism roles (representing 3 points), adaptations (representing 4 possible points) and natural resource use (representing 6 possible points), for a total of 19 possible points.

The pre-questionnaires were administered to students in two different ways. Students were either given this questionnaire while at their school, in their classroom anywhere from a week to a day before arriving at HBF. Or students were given the questionnaire on their first day at the farm (either inside or outside on picnic tables), before embarking on any activities for the day. All schools which completed a pre-questionnaire also completed a post1- questionnaire. The post1- questionnaire is identical to the pre questionnaire, except students are told to circle the 'Post 1' option on the top right corner of the questionnaire. This post1-questionnaire was administered to all students at the farm after on their last day, before lunch and after all classes and

activities had concluded for the day. To assess retention, some school groups completed a Post2-questionnaire which was completed in at the school, in the classroom. Again, the post2- questionnaire that was identical to the pre- and post 1-questionnaire, but was administered in the school's classroom one to three weeks after their visit to Hard Bargain Farm. Post2-questionairres were uniquely identified by instructing the students to circle the 'Post 2' option in the upper right corner of the questionnaire.

Each time a questionnaire was administered to a school group, the students were given a pencil (except when in the classroom) and students were asked to spread out and refrain from talking. The moderator of the questionnaire directed students on how to fill in the informational portion of the questionnaire (Birth date, date, school, teacher, and correct pre/post option selected). The moderator read each question out loud for students. The students were given the option to either follow along with the moderator or complete the questionnaire at their own pace. As the questionnaires were collected by the moderator, they were checked to make sure that the appropriate information was completed. These surveys were matched by individual students (identified by their birth date) to analyze pre and post scores anonymously.

Qualitative Data collection:

Data were collected from April 2010 and September. 2010 to June, 2011. Qualitative data were collected through an "Analog Blog", comprised of a sheet of butcher paper that is approximately 24 inches tall by 48 inches long. This piece of paper was placed on a table in the common room of the lodge, readily accessible to students.

The specific school name and date was recorded on the underside of the sheet of paper. The students were provided with markers throughout their visit to write on the blog as desired. The colors of the markers were changed at various times though out the visit. There are four times points represented by four different colors: first arrival of the students, lunch time, the evening of the first day and the entire second day (see table 4). Prior to their first activity students were instructed to use the blog if they desired, with the only rules being: 1) Only use the markers provided, 2) All comments must be related to their time at the farm and nothing else and 3) No names allowed.

In all, 24 Analog Blogs were collected. From these 24 school groups there were 10 school groups which had pre- and post 1- questionnaires. Of those 10 school groups with pre- and post1-questionnaires, 8 had completed post 2-questionnaires as well.

Table 4: Analog Blog time series and corresponding student activities

	Time series			
	1	**2**	**3**	**4**
Corresponding student schedule	First arrival of students. Students set up their bunk rooms, given an orientation and are taught about the trash free facility program. *Red markers are available for student use*	During lunch (after their first activity, which was either the habitat hike or the farm life tour) *The markers were changed to the color blue for student use*	After the Hay Ride and after all standard HBF classes (Habitat hike and farm life tour) *The markers were changed to the color green for student use*	Entire second Day *The markers were changed to the color purple for student use*

Human Subject Review Board:

Throughout the data collection process, respondents were kept completely anonymous. Students were not allowed to write their name on the questionnaires or the Analog Blog. The questionnaires and Analog Blog data remained the property of the Alice Ferguson Foundation. A completed application was submitted to George Mason's Human Subjects Review Board. The Human Subjects Review Board determined the application was exempt from needing additional review as this research did not meet the federal definition of human subject research.

RESULTS

The written blog entries were recorded in Microsoft Excel and organized by school and time series (time period). The Analog Blog entries were read through in entirety, with each written statement on the blog counted as an individual entry. Using the constant comparative analysis, categories were created for each time series and each entry coded for its appropriate category. There were a total of 1,732 total entries, of those, 109 entries could not be discerned for a meaning, either because they were illegible, or the statement was completely irrelevant to HBF programs (e.g., "Toast rocks!"). These entries were not coded. From the data, eight primary categories and twenty four sub categories within these larger primary categories emerged. See table 25 (pg. 69) for a list of all Analog Blog primary and sub categories.

The resulting categories were corroborated with three other naturalists who currently work at Hard Bargain Farm. After discussion, there were two sub categories which were added, weather (which was initially under physical) and general stewardship statements (in addition to the category "Trash/recycling"). Any entries which were not initially coded in the same way were discussed and eventually agreed upon (see tables 5 – 8). If a statement appeared just once in a time series, it was not given a separate sub category. However, if it appeared twice, it was given a unique sub category. Because there was an overwhelming amount of positive statements, and a relatively smaller amount of neutral and negative statements, these negative and neutral statements were

given their own unique category and were not coded under any other sub category, with the exception of weather. A neutral statement such as "It's raining" was coded as only weather. However, as with all other negative statements, if a comment about weather was negative, such as, "Not fun about rain", it was coded as a negative statement, and was not coded under the category of weather. This provided an overall assessment of positive and negative and neutral statements.

The primary categories created were positive statements or emotions, negative statements or emotions, neutral statements or emotions, fear, creating stewardship, logistics, external impacts and activities.   The positive statements or emotions category contained statements which exhibited a positive feeling or experience. These statements were either general or specific. For example, "I love the goats!", was under the sub category of 'animals', which was under the larger primary category of positive statements or emotions. The fear and neutral categories did not contain any sub categories. Negative statements or emotions contained two sub categories, 'boredom' and 'disgust'. The statement "I hate cows" was coded as a negative statement, and was not additionally coded under the sub category, 'animals'. A statement such as "I'm bored", was coded under the sub category boredom, under negative statements or emotions. Statements which contained multiple expressions about the HBF experience were coded for all relevant categories.   For example: "I am freezing cold and that's not cool. But I'm still having fun though", would be coded under physical ("I am freezing"), negative statements ("That's not cool") and fun ("…still having fun though"). Statements such as "My feet hurt" were not coded under negative statements. During discussions with other

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naturalist it was determined that this was more of a statement about a physical feeling, albeit an unpleasant one, rather than a statement expressing a negative emotion or experience. Statements which did not have a positive word (happy, excited, fun, like, love, etc.) but did contain an exclamation point, were coded as a positive statement. For example: "Goats, cows, chickens, and animals!" would be coded under positive statements about animals. Statements which could not be objectively categorized as positive or negative, such as "We collected eggs", were coded under the primary category of neutral statements.   Entries referring to the "walk" or the "hike", without a specific reference to the habitat hike were coded under the category of 'outdoors'.

Learning was a category which changed from the first time series to the successive three. In time series one, learning contained statements which expressed an expectation to learn while at the farm. However, in time series two and four, learning became something that students had accomplished or exhibited. For example in time series one a typical learning statement was, "I'm going to learn a lot", where as in time series two, three and four, typical learning coded entries were more specific, "I learn how to compost" and "…I learned about the Potomac River"

Tables 5-8 (pg. 22-25) illustrate the primary categories for each time series, with a description and example entries.

Table 5: Time series 1 primary categories with descriptions and number of entries in each category

443 Total Entries

Categories	Description	Number of responses in category	Percentage
Positive statements or emotions	A positive statement or expression of a positive feeling; "This is awesome", "I'm happy and so glad", I'm having so much fun! I love to be here so much", "….the view is amazing"	404	91.2%
Fear	Expressing fear or uncertainty overall or about any farm or outdoor elements: "…The snake freaks me out", "I think I am going to get scared", "So many bees and spiders here. I'm so scared"	36	8.13%
Logistics	Statements about HBF Facilities and Questions are grouped into this category; "I am loving the bunks", "Dorms are so cool", "I wonder if they have my size in boots?"	32	7.22%
Environmental Conditions	Statements about the weather conditions or a student's physical state: "I feel cold and hungry", "I'm mad because I want to go outside"	23	5.19%
Negative statements or emotions	General or specific negative statements: "I really hate insects!!", "I don't think I like it, it's kind of creepy…"	19	4.29%
Creating Stewardship	Statements related to HBF programs which are aimed to teach students how to reduce, reuse and recycle, "I like the trash free idea", "I am happy because we are going to learn about recycling"	7	1.58%
Neutral	General or specific statements which cannot be objectively classified as positive or negative: "Day 1 so far everything is going fine", "Today so far everything has been alright…"	8	1.81%
Evening Activities	Activities and which take place during the evening	0	0%

Table 6: Time series 2 categories with descriptions and number of entries that fall in each category

383 Total Entries

Categories	Description	Number of responses in category	Percentage
Positive statements or emotions	A positive statement or expression of a positive feeling; "So far this day is totally awesome", "The walk was fun", "I was so excited when I came here"	319	83.29%
Environmental Conditions	Statements about the weather conditions or a student's physical state (generally caused by weather conditions): "I feel sleepy", "I am cold"	53	13.84%
Negative statements or emotions	General or specific negative statements; "…I hate bugs", "Getting stuck is not cool", "Not fun about rain"	18	4.70%
Creating Stewardship	Statements related to HBF programs which are aimed to teach students how to reduce, reuse and recycle and appreciate the environment, "I'm glad we had a short amount of trash", "Hard Bargain farm is a place where you can explore and learn"	13	3.39%
Neutral	General or specific statements which cannot be objectively classified as positive or negative; "Ok but still cold", "I feel ok"	11	2.87%
Fear	Expressing fear or uncertainty overall or about any farm or outdoor elements; "I had fun but I was scared", "The hike and walk was terrifying but very fun and interesting. I loved it!!"	7	1.83%
Activities	Activities and which take place during the evening, such as telling ghost stories around the campfire; "I am scared of the ghost", "This evening I ate my dinner and it was good."	7	1.83%
Logistics	Statements about HBF Facilities and Questions are grouped into this category; "The girls bunk is so fun!",	5	1.31%

Table 7: Time series 3 categories with descriptions and number of entries that fall in each category

457 Total Entries

Categories	Description	Number of responses in category	Percentage
Positive statements or emotions	A positive statement or expression of a positive feeling; "Loving this", "I love feeding the goats and sheep"	301	65.86%
Evening Activities	Activities and which take place during the evening, such as telling ghost stories around the campfire or the hay wagon ride; "Hay Ride was awesome", "Campfire was fun…", "The scary stories were cool"	81	17.72%
Environmental Conditions	Statements about the weather conditions or a student's physical state (elements which can positively or negatively impact a student's outdoor experience); "Hills Hills Hills! Too much hills", "I'm so cold"	55	12.04%
Negative statements or emotions	General or specific negative statements; ""Too much work", "This is not cool still wet", "I hate this place", "I don't like the food"	26	5.69%
Neutral	General or specific statements which cannot be objectively classified as positive or negative; "The goat was eating my shirt", "I saw a turkey that is named Roofus",	12	2.63%
Creating Stewardship	Statements related to HBF programs which are aimed to teach students how to reduce, reuse and recycle and appreciate the environment, "I learn how to compost"	9	1.97%
Logistics	Statements about HBF Facilities and Questions are grouped into this category, "The beds are so cool", "I wonder how much sleep we are going to get"	4	0.88%
Fear	Expressing fear or uncertainty overall or about any farm or outdoor elements, "So happy and scared", "Wow I was scared of the owl."	3	0.66%

Table 8: Time series 4 categories with descriptions and number of entries that fall in each category

331 Total Entries

Categories	Description	Number of responses in category	Percentage
Positive statements or emotions	A positive statement or expression of a positive feeling; "Good trip", "I really like this farm", "I just milked a cow it was so awesome"	313	94.56%
Neutral	General or specific statements which cannot be objectively classified as positive or negative; "It was weird milking the cows", "The worms are little"	17	5.14%
Negative statements or emotions	General or specific negative statements; "I hate it here…", "I am mad", "Hated the cows"	16	4.83%
Environmental Conditions	Statements about the weather conditions or a student's physical state (elements which can impact a student's outdoor experience);; "It's cold", "I feel tired because I woke up early", "Felt cold but had fun"	14	4.23%
Evening Activities	Activities and which take place during the evening, such as telling ghost stories around the campfire, the hay wagon ride, or meals; "I love our butter cookies"	12	3.63%
Creating Stewardship	Statements related to HBF programs which are aimed to teach students how to reduce, reuse and recycle and appreciate the environment, "Hard Bargain farm is making me think about putting changes in my life", "I learn a lot of new awesome stuff"	7	2.11%
Other	Statements about HBF Facilities and Questions are grouped into this category, "Do girls have more work than boys?", "I slept good on the top bunk it was so fun"	6	1.81%
Fear	Expressing fear or uncertainty overall or about any farm or outdoor elements, "I'm so freaked out cause there's a snake in here"	1	0.30%

Figure 1 provides a visual interpretation of the Analog Blog categories and how the frequencies of entries in the primary categories change throughout the time series.
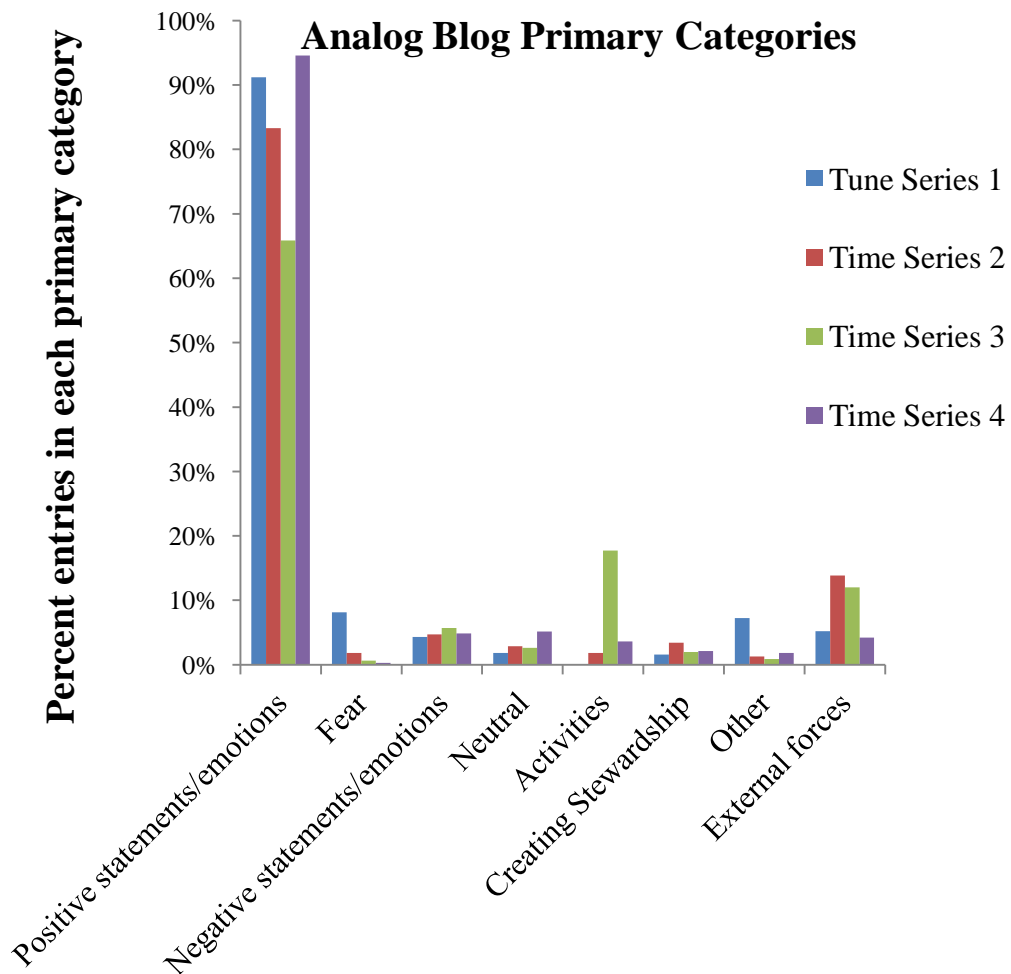

Figure 1: Analog Blog primary categories with percent of entries.

Quantitative Questionnaire Results:

The pre-, post1- and post2-questionnaire results were scored using an answer key. Each school's results were entered into excel and recorded by school and date of overnight visit. The individual student scores were recorded anonymously and a two-tailed t-test was run for each of the ten schools. All results which fell at or below the 0.05 confidence level were considered significant. Of the ten schools with pre- and post-questionnaire results, seven had higher post-test scores. Further, all of these pre- and post1-test increases were sustained at the time of the post2-test administration. The three schools which did not show any differences between pre- and post 2-questionnaires are spread throughout the school year. There were not any schools which showed any increases or decreases between post1- and post 2-questionnaire scores. Table 9 (pg. 28) shows all the schools which had pre- and post-questionnaire data.

Table 9: Content knowledge questionnaire results (with a perfect score being 19) Bolded schools are those which exhibited an increase between pre- and post-test scores

School	N	Month, Year of field trip	Mean Pre-test score	Mean Post 1-test score	Mean Post 2-test score	t-Test results for pre- / post1-test	t-Test results for pre- / post 2-test
A	22	Sept. 2010	7.55 sd = 4.19	8.77 sd = 4.96	N/A	p-value = 0.18 t-value = 1.37 df = 21	N/A
B	**19**	**Oct. 2010**	**5.42 sd= 2.80**	**6.84 sd = 3.00**	**N/A**	**p-value = 0.04 t-value = 2.20 df = 18**	**N/A**
C	**19**	**Oct. 2010**	**8.10 sd = 3.65**	**11.6 sd = 3.00**	**12.20 sd = 3.61**	**p-value <0.01 t-value = 4.41 df = 19**	**p-value <0.01 t-value = 4.78 df = 19**
D	**16**	**Nov. 2010**	**7.69 sd = 3.75**	**10.19 sd = 4.86**	**10.94 sd = 4.91**	**p-value = 0.03 t-value = 2.49 df = 15**	**p-value <0.01 t-value = 3.55 df = 15**
E	**9**	**Dec. 2010**	**7.62 sd = 3.62**	**11.85 sd = 4.28**	**10.92 sd = 5.30**	**p-value <0.01 t-value = 4.53 df = 12**	**p-value <0.01 t-value = 3.16 df = 12**
F	16	Jan. 2011	11.63 sd = 4.69	13.25 sd = 4.52	13.50 sd = 3.32	p-value = 0.10 t-value = 1.76 df = 15	p-value = 0.010 t-value = 1.76 df = 15
G	**42**	**Jan. 2011**	**7.79 sd = 4.44**	**10.02 sd = 4.67**	**10.21 sd = 4.26**	**p-value <0.01 t-value = 2.81 df = 41**	**p-value <0.01 t-value = 3.06 df = 41**
H	**23**	**Mar. 2011**	**7.43 sd = 3.65**	**9.7 sd = 4.78**	**11.04 sd = 4.37**	**p-value = 0.02 t-value = 2.42 df = 22**	**p-value <0.01 t-value = 3.28 df = 22**
I	16	May 2011	6.56 sd = 3.65	7.88 sd = 4.57	7.31 sd = 4.92	p-value = 0.23 t-value = 1.24 df = 15	p-value = 0.45 t-value = 0.77 df = 15
J	**26**	**May 2011**	**14.38 sd = 3.35**	**16.00 sd = 2.43**	**16.52 sd = 2.20**	**p-value = 0.03 t-value = 2.32 df = 20**	**p-value = 0.02 t-value =2.62 df = 20**

Figure 2 is a visual illustration of all schools pre-, post1- and post2- questionnaire results for the content knowledge portion of the questionnaire, represented by questions 2 through 7 (see Appendix A, pg. 54)
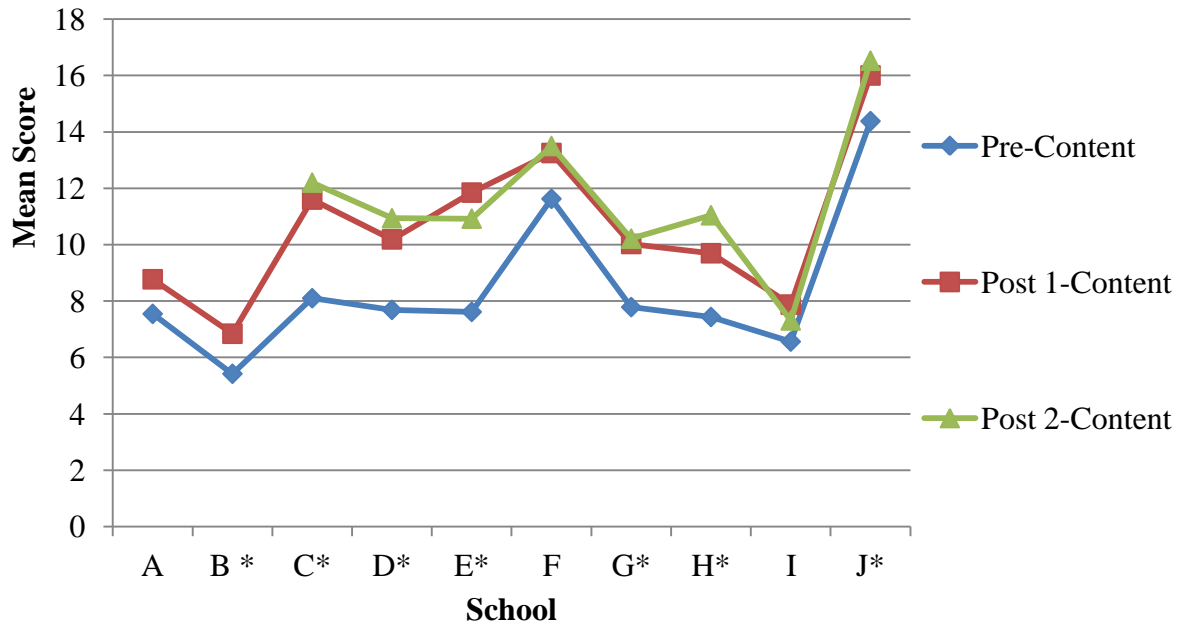
Figure 2: Content knowledge increases between pre- and post-questionnaires. Starred schools are those with an increase between pre- and post-questionnaire scores.

Tables 10– 14 (pgs. 31-35) represents the attitude assessment portion of the survey for each individual statement of the five-part question. Overall students did not show any significant change in attitudes between pre-, post1- and post2-questionnaire results. However, all but one of the statements did have at least one school which showed either an increase or a decrease in their level of agreement with the statement.

Table 10: Questionnaire 1a. A score of 4 reflects that the respondent strongly agrees with the statement.

	I can help the environment				
School	Pre-test Mean	Post 1-test Mean	Post 2-test Mean	t-Test pre-/post1-test	t-Test pre-/post2-test
A	3.55 *sd = 0.60*	3.67 *sd =0.58*	N/A	p-value = 0.19 t-value = 1.37 df = 20	N/A
B	3.74 *sd =0.45*	3.76 *sd =0.42*	N/A	p-value = 0.67 t-value = 0.44 df = 18	N/A
C	**3.30** *sd = 0.66*	**3.75** *sd = 0.55*	**3.75** *sd = 0.44*	**p-value = 0.02** t-value = 2.44 df = 19	**p-value = 0.02** t-value = 2.44 df = 19
D	3.63 *sd =0.50*	3.69 *sd =0.48*	3.75 *sd =0.45*	p-value = 0.33 t-value = 1.00 df = 15	p-value = 0.16 t-value = 1.46 df = 15
E	3.46 *sd =0.52*	3.62 *sd =0.51*	3.77 *sd =0.44*	p-value = 0.44 t-value = 0.81 df = 12	p-value = 0.10 t-value = 1.76 df = 12
F	3.69 *sd =0.48*	3.81 *sd =0.40*	3.63 *sd =0.50*	p-value = 0.16 t-value = 1.46 df = 15	p-value = 0.58 t-value = 0.57 df = 15
G	3.52 *sd =0.63*	3.55 *sd =0.55*	3.41 *sd =0.59*	p-value = 0.81 t-value = 0.24 df = 41	p-value = 0.32 t-value = 1.00 df = 40
H	3.45 *sd =0.60*	3.52 *sd =0.51*	3.59 *sd =0.50*	p-value = 0.54 t-value = 0.62 df = 21	p-value = 0.16 t-value = 1.45 df = 20
I	3.56 *sd =0.63*	3.63 *sd =0.50*	3.63 *sd =0.50*	p-value = 0.72 t-value = 0.37 df = 15	p-value = 0.67 t-value = 0.44 df = 15
J	3.48 *sd =0.60*	3.76 *sd =0.44*	3.76 *sd =0.44*	p-value = 0.42 t-value = 0.83 df = 20	p-value = 0.72 t-value = 0.37 df = 20
All Schools	3.54 *sd =0.13*	3.68 *sd = 0.10*	3.66 *sd = 0.13*	--	--

Note: Bolded schools reflect significant mean differences

Table 11: Questionnaire 1b. A score of 4 reflects that the respondent strongly agrees with the statement.

	I would like to spend more time out in nature in the future				
School	Pre-test Mean	Post 1-test Mean	Post 2-test Mean	t-Test pre-/post1-test	t-Test pre-/post2-test
A	3.33 *sd = 0.80*	3.32 *sd = 0.80*	N/A	p-value = 1.00 t-value = 0.00 df = 20	p-value = t-value = df =
B	**3.32** *sd = 0.67*	**3.66** *sd = 0.58*	N/A	**p-value = 0.01** t-value = 3.15 df = 18	N/A
C	3.25 *sd = 0.91*	3.35 *sd = 0.81*	3.30 *sd = 0.86*	p-value = 0.68 t-value = 0.42 df = 19	p-value = 0.82 t-value = 0.24 df = 19
D	3.56 *sd = 0.63*	3.44 *sd = 0.81*	3.56 *sd = 0.63*	p-value = 0.63 t-value = 0.49 df = 15	p-value = 1.00 t-value = 0.00 df = 15
E	3.77 *sd = 0.44*	3.85 *sd = 0.38*	3.69 *sd = 0.48*	p-value = 0.58 t-value = 0.56 df = 12	p-value = 0.58 t-value = 0.56 df = 12
F	3.38 *sd = 0.62*	3.69 *sd = 0.60*	3.56 *sd = 0.73*	p-value = 0.06 t-value = 2.08 df = 15	p-value = 0.27 t-value = 1.15 df = 15
G	3.10 *sd = 0.94*	3.33 *sd = 0.72*	3.10 *sd = 0.93*	p-value = 0.06 t-value = 1.95 df = 40	p-value = 0.71 t-value = 0.37 df = 40
H	**2.95** *sd = 0.92*	3.38 *sd = 0.67*	**3.50** *sd = 0.60*	p-value = 0.12 t-value = 1.63 df = 19	**p-value = 0.01** t-value = 2.77 df = 19
I	3.31 *sd = 0.60*	3.63 *sd = 0.62*	3.63 *sd = 0.50*	p-value = 0.72 t-value = 0.37 df = 15	p-value = 0.67 t-value = 0.44 df = 15
J	3.24 *sd = 0.94*	3.43 *sd = 0.75*	3.38 *sd = 0.80*	p-value = 0.33 t-value = 1.00 df = 20	p-value = 0.45 t-value = 0.77 df = 20
All Schools	3.32 *sd = 0.23*	3.51 *sd = 0.18*	3.47 *sd = 0.19*	--	--

Note: Bolded schools reflect significant mean

Table 12: Questionnaire 1c. A score of 4 reflects that the respondent strongly agrees with the statement.

			I am comfortable being out in nature		
School	Pre-test Mean	Post 1-test Mean	Post 2-test Mean	t-Test pre-/post1-test	t-Test pre-/post2-test
A	**3.09** *sd = 0.92*	**3.45** *sd = 0.80*	N/A	**p-value = 0.03** t-value = 2.35 df = 21	N/A
B	3.50 *sd = 0.76*	3.58 *sd = 0.60*	N/A	p-value = 0.36 t-value = 0.94 df = 17	N/A
C	3.45 *sd = 0.69*	3.40 *sd = 0.88*	3.25 *sd = 1.02*	p-value = 0.80 t-value = 0.25 df = 19	p-value = 0.33 t-value = 1.00 df = 19
D	3.56 *sd = 0.63*	3.67 *sd = 0.62*	3.75 *sd = 0.45*	p-value = 0.33 t-value = 1.00 df = 14	p-value = 0.19 t-value = 1.38 df = 15
E	3.50 *sd = 0.67*	3.69 *sd = 0.48*	3.77 *sd = 0.44*	p-value = 0.17 t-value = 1.48 df = 11	p-value = 0.08 t-value = 1.92 df = 11
F	3.63 *sd = 0.50*	3.75 *sd = 0.45*	3.56 *sd = 0.63*	p-value = 0.50 t-value = 0.70 df = 15	p-value = 0.50 t-value = 0.70 df = 15
G	3.49 *sd = 0.64*	3.41 *sd = 0.79*	3.40 *sd = 0.71*	p-value = 0.86 t-value = 0.18 df = 37	p-value = 0.68 t-value = 0.42 df = 38
H	3.38 *sd = 0.67*	3.26 *sd = 0.81*	3.43 *sd = 0.79*	p-value = 0.61 t-value = 0.53 df = 20	p-value = 0.33 t-value = 1.00 df =20
I	3.31 *sd = 0.60*	3. 44 *sd = 0.62*	3.63 *sd = 0.50*	p-value = 0.65 t-value = 0.46 df = 15	p-value = 0.24 t-value = 1.23 df = 15
J	3.57 *sd = 0.81*	3.48 *sd = 0.87*	3.57 *sd = 0.87*	p-value = 0.43 t-value = 0.81 df = 20	p-value = 1.00 t-value = 0.00 df = 20
All Schools	3.45 *sd = 0.16*	3.51 *sd = 0.15*	3.55 *sd = 0.18*	--	--

Note: Bolded schools reflect significant mean differences

Table 13: Questionnaire 1d results. A score of 4 reflects that the respondent strongly agrees with the statement.

I'd rather spend my free time out in nature than inside.

School	Pre-test Mean	Post 1-test Mean	Post 2-test Mean	t-Test pre-/post1-test	t-Test pre-/post2-test
A	3.18 *sd = 0.96*	3.43 *sd = 0.68*	N/A	p-value = 0.30 t-value = 1.07 df = 20	N/A
B	3.37 *sd = 1.01*	3.28 *sd = 1.18*	N/A	p-value = 0.36 t-value = 0.94 df = 17	N/A
C	3.10 *sd = 0.79*	2.85 *sd = 1.18*	3.10 *sd = 0.91*	p-value = 0.29 t-value = 1.10 df = 19	p-value = 1.00 t-value = 0.00 df = 19
D	3.38 *sd = 0.72*	3.38 *sd = 0.72*	3.56 *sd = 0.51*	p-value = 1.00 t-value = 0.00 df = 15	p-value = 0.27 t-value = 1.15 df = 15
E	3.46 *sd = 0.78*	3.77 *sd = 0.60*	3.54 *sd = 0.88*	p-value = 0.17 t-value = 1.48 df = 12	p-value = 0.75 t-value = 0.32 df = 12
F	3.31 *sd = 0.70*	3.00 *sd = 0.65*	3.25 *sd = 0.77*	p-value = 0.10 t-value = 1.74 df = 14	p-value = 0.67 t-value = 0.44 df = 15
G	**3.21** ***sd = 1.02***	**2.80** ***sd = 0.95***	3.05 *sd = 0.81*	**p-value = 0.02** t-value = 2.46 df = 39	p-value = 0.09 t-value = 1.74 df = 38
H	3.14 *sd = 0.96*	3.00 *sd = 1.12*	3.22 *sd = 0.85*	p-value = 0.58 t-value = 0.57 df = 18	p-value = 0.85 t-value = 0.20 df = 20
I	3.38 *sd = 0.89*	3.50 *sd = 0.82*	3.50 *sd = 0.52*	p-value = 0.70 t-value = 0.40 df = 15	p-value = 0.65 t-value = 0.46 df =15
J	3.14 *sd = 0.65*	3.00 *sd = 1.05*	3.10 *sd = 0.77*	p-value = 0.42 t-value = 0.83 df = 20	p-value = 0.72 t-value = 0.37 df = 20
All Schools	3.27 *sd = 0.13*	3.20 *sd = 0.32*	3.29 *sd = 0.21*	--	--

Note: Bolded schools reflect significant mean differences

Table 14: Questionnaire 1e results. A score of 4 reflects that the respondent strongly agrees with the statement.

	It is important to me to protect the environment				
School	Pre-test Mean	Post 1-test Mean	Post 2-test Mean	t-Test pre-/post1-test	t-Test pre-/post2-test
A	3.81 *sd = 0.40*	3.73 *sd = 0.55*	N/A *sd =*	p-value = 0.67 t-value = 0.44 df = 20	p-value = t-value = df =
B	3.89 *sd = 0.32*	3.78 *sd = 0.43*	N/A	p-value = 0.33 t-value = 1.00 df = 17	p-value = 0.10 t-value = 1.71 df = 19
C	3.70 *sd = 0.57*	3.80 *sd = 0.41*	*3.90 sd = 0.31*	p-value = 0.49 t-value = 0.70 df = 19	p-value = 0.10 t-value = 1.71 df = 19
D	4.00 *sd = 0.00*	3.88 *sd = 0.34*	3.81 *sd = 0.40*	p-value = 0.16 t-value = 1.46 df = 15	p-value = 0.08 t-value = 1.86 df = 15
E	3.69 *sd = 0.48*	3.77 *sd = 0.44*	3.77 *sd = 0.44*	p-value = 0.58 t-value = 0.56 df = 12	p-value = 0.34 t-value = 1.00 df = 12
F	3.75 *sd = 0.58*	3.81 *sd = 0.40*	3.94 *sd = 0.25*	p-value = 0.33 t-value = 1.00 df = 15	p-value = 0.08 t-value = 1.86 df = 15
G	3.45 *sd = 0.85*	3.60 *sd = 0.66*	3.43 *sd = 0.86*	p-value = 0.28 t-value = 1.10 df = 39	p-value = 0.86 t-value = 0.18 df = 39
H	3.73 *sd = 0.46*	3.52 *sd = 0.67*	3.73 *sd = 0.55*	p-value = 0.21 t-value = 1.28 df = 21	p-value = 0.72 t-value = 0.37 df = 20
I	3.69 *sd = 0.79*	3. 69 *sd = 0.70*	3. 69 *sd = 0.60*	p-value = 1.00 t-value = 0.00 df = 15	p-value = 1.00 t-value = 0.00 df = 15
J	3.14 *sd = 0.65*	3.00 *sd = 1.05*	3.10 *sd = 0.77*	p-value = 0.27 t-value = 1.14 df = 20	p-value = 0.49 t-value = 0.70 df = 20
All Schools	3.67 *sd = 0.24*	3.65 *sd = 0.27*	3.67 *sd = 0.30*	--	--

Figure 3 illustrates the overall attitude scores as measured by pre-/post1-/post2-
questionnaire results. As figure 3 shows, all schools had a relatively high mean attitude
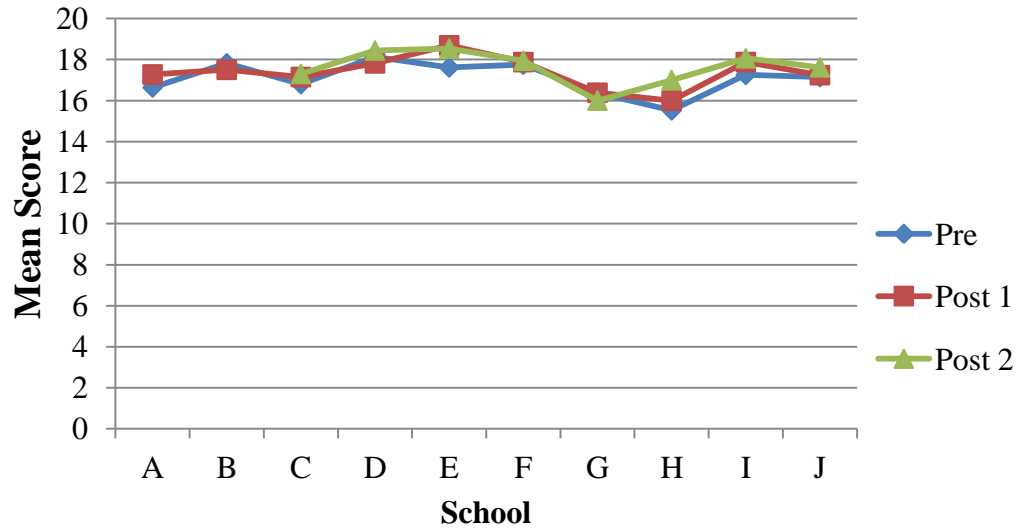score, with no mean scores differences between pre and post scores.

Figure 3: Quantitative attitude assessments results as measured with the questionnaire. A
score of 20 indicates that students felt that the statements strongly reflected their values
toward the environment.

Figure 4 is an overlay of attitude and content knowledge mean scores for all schools. Starred schools are those which showed an increase between pre- and post1-questionnaire scores.
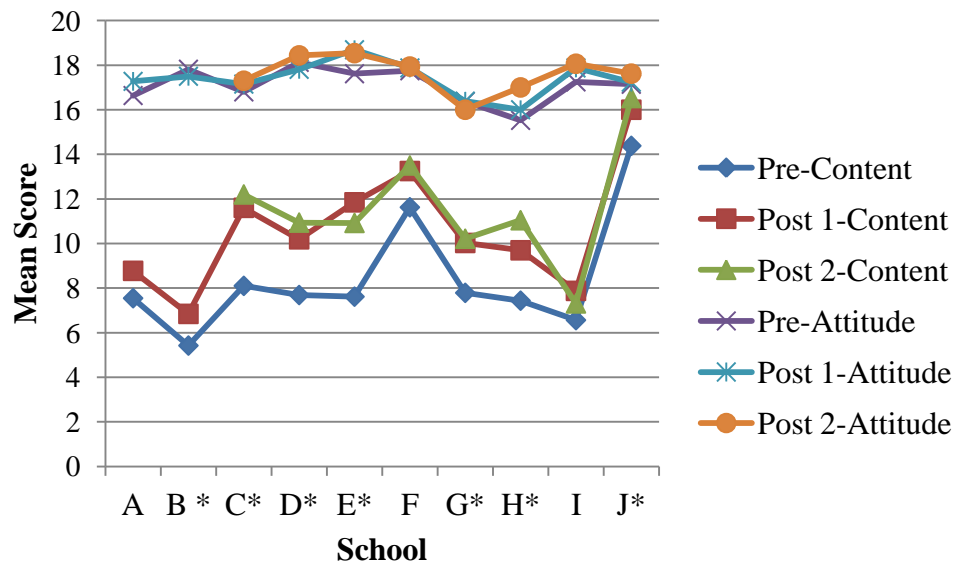

Figure 4: Attitude and content questionnaire results for all schools

DISCUSSION

The Analog Blog data showed that the majority of students chose to mostly write about what they did, how they felt about it (both emotionally and physically), and whether or not they liked an experience. This pattern occurred in time series two through four. Time series one contained mostly anticipatory and initial assessment statements. Results showed that the positive statements and emotions category dominated across all time series. Students expressed more non-specific positive feelings in earlier time series (1 and 2). These general positive statements included, "This trip is awesome" and "This place rocks!" At that time point students had not had many opportunities to be outside, so these statements most likely represented students' first impressions of the farm. For many of these participants, not only was this type of outdoor experience a new one, but an overnight trip away from home was as well (B. Johnson personal communication, November 21, 2011). Falk (1983) and Randler (2005) suggest that the novelty of such a new place can overwhelm learning. These positive statements became more specific throughout the time series. Participants related their experiences with the farm animals mostly through sensory expressions, such as "I got to touch a goat!" or a statement of affection, "I love the chickens!". Many students did not choose to share what, if anything, they had learned about these animals or their roles on the farm.

The outdoors was another experience that students choose to write positively about as well. However, there was one particular aspect about the outdoors that students referenced in many of these statements. Hard Bargain Farm has a grassy hill which is expressly used for students to roll down. The "rolling hill" is an aspect of HBF programming which is designed to create a positive sensory experience in direct contact with natural elements. The Analog Blog data would suggest that this was achieved. Students referred to the hill as 'fun' and 'epic'. There were a few statements which suggested some negative aspects of the rolling hill, such as the "itchy" grass, though these types of comments were sparse.

Grouping statements as positive, negative and neutral allowed for the overall feelings and interpretation of the HBF overnight experience to be more easily observed. Across all time periods, participants preferred to share what they did and their feelings about those experiences rather than what they learned (if anything). This could possibly be attributed to feeling overwhelmed by these new experiences, and less able to concentrate on the central lessons surrounding them (Balling & Falk, 1980). This could explain why there were relatively few entries about learning, whether to express a desire to learn or a statement about something participants had learned.

As time progressed, the statements about fear became more scattered. There were a total of 36 entries in the time series one time series about fear. The number of entries drops to just 7 entries during time series 2 (after the students have experienced their first activity for the day). Several of the entries were a mix of feelings. One statement

exemplified these statements best: "The hike and walk was terrifying but very fun and interesting. I loved it!!" Later time period entries coded for fear were more specific.

Many of the fear statements which appeared in time series one were either general, "I'm scared...", or targeted toward the outdoor environment, and in particular invertebrates "I'm terrified there is so much bugs out here…", "So many bees and spiders here. I'm so scared". Fear of invertebrates is not a new phenomenon among the greater public as well as students who participated in environmental education programs (Bixler & Carlisle, 1994). Culturally, invertebrates evoke negative perception in society and can be a barrier to environmental education program goals (Looy & Wood, 2006). However, general statements which expressed fear were not present in the final time series. The only statement which did express fear in the final time series was directed at the resident snake in Warhem Lodge. Although this fear of insects did diminish over the four time series, there were two negative statements about insects in the final time series. Some were specific "I hate stink bugs" and others more general "Too many bugs here". Although these statements were negative in their nature, they could indicate that students were perhaps less fearful of insects, but still retain a negative feelings towards insects. Students also expressed a clear fear of animals, particularly farm animals, "I'm so scared of the roosters and turkey…", "I am scared of pigs". By the final time period, there were not any statements about fear of farm animals.

Two responses expressed a different emotion, disgust, in the context of milking cows, which only appeared in time series one. Both responses were from the same school, which could possibly contribute to the repetitive nature of the two entries.

Disgust is unique from fear (Rozin & Fallon, 1987), and can create barriers to learning and appreciation for the environment (Bixler & Carlisle, 1994). However in the time series four (from this particular school), students described milking a cow as "fun and gross" rather than disgusting. Although these statements suggest students enjoyed this unique interaction with this farm animal, there was still a level of discomfort.

Animals as a dominant sub category occurred throughout the four time periods. Time series one contained mostly statements about excitement or anticipation to see animals "I can't wait to see animals" or "I love animals". Over the next three time series the students' entries about animals became, understandably, more specific and interactive, writing about the farm animals and their experiences with them while on their tour. Many of these entries were sensory rich. This is consistent with James and Bixler's (2008) findings that students' outdoor experiences are enhanced by sensory experiences, particularly touch. Animals as a component to an environmental education program can also increase environmental attitudes (Kruse & Card, 2004).

An interesting phenomenon also occurred within time series three and four. There were several negative comments in one particular school. These comments were mostly general, with only one specific one, "The chickens are dirty". However, all six of these entries were scratched out with the color marker associated with the successive time period, indicating that students disagreed with their earlier comments, or at least that different students disagreed with their comments. This could have happened for several reasons. These statements were written in the evening when students and teachers are left without any HBF staff and were responsible for providing structure and activities for

students during this time. Teachers new to HBF programming or teaching in general, were sometimes unprepared to satisfactorily provide an engaging structured evening for students (B. Wright, personal communication, September 12, 2011). During this unstructured evening time, students could have had little to do and become bored. However, when HBF programming began again in the morning, students could have felt that those comments no longer reflected the way they felt about the field trip.

Students tended to write less about the wildlife they had observed on the habitat hike and more about their experience with dip-netting in the creek, searching for macroinvertebrates (crayfish, dragonfly larva, etc.). This activity was very hands on and engaging. This chance to explore the wildlife in the creek was an important aspect of the programming at Hard Bargain Farm. This specific activity was important because it could be transformative. Vadala, Bixler, and James (2007) found that adults who live a conservation oriented lifestyle or have careers in conservation tended to have more interactions with wildlife during play time rather than social interactions. Additionally, this experience could foster a better appreciation of macroinvertebrates, since they are generally viewed in a negative or fearful way (Bixler & Carlisle, 1994).

Fun was a category present throughout all time series. Fun was used to describe many activities which students took part in. This type of motivation can lead to a longer lasting effect of learning and interests in students about the environment, an important implication for programming (Drissner et al. 2010). Fun can lead to improvements in the learning process through intrinsic motivation (Bisson & Luckner, 1996). Though feelings of anticipation and excitement might overpower this possible improved learning

opportunity as students did not choose to share entries about learning or what they did learn while participating in their daily activities.

Questionnaires and Analog Blogs:

Of the ten schools which had available questionnaire data, seven had an increase between pre- and post-content knowledge scores. School A and I, which did not show an increase between pre- and post- content scores, did have a relatively large amount of negative statements in the Analog Blog time series, with the majority of them falling in time periods 2, 3, and 4 (See tables 15 and 23, pgs. 56 & 65). School F also did not show any increases between pre- and post-content knowledge scores, however, this was the only school which did contain a statement which directly related to the kind of stewardship Hard Bargain Farm hoped to instill in students, "Hard Bargain farm is making me think about putting changes in my life."

The school which experienced the greatest knowledge gains was school E. It should be noted that although this school had the greatest pre- and post-questionnaire gains, the mean post-questionnaire score was relatively low (11.85 points out of a possible 19). School E had relatively typical responses when compared to all schools. The majority of the entries for all time series were positive, in fact the only entry which was not completely positive was an entry coded as fear and happiness: "So scared and happy". This school also had learning as a category in time series one, expressing the desire to learn while at the farm.

School J showed increases between pre and post scores and the school also had the highest average pre and post mean scores of all schools. However, this school also had fear as a dominant category in the first time period. The Blogs also revealed that students choose to write about their experiences dip netting in the creek and what they found, referring to these macroinvertebrates as "cool". Contrary to Balling & Falk (1980), this very engaging and fun (according to the Analog Blog) activity did not overwhelm students in a way which hindered learning, as related to the content questionnaire results.

School F, had fear as the most dominating theme in the Analog Blog time series one, and by time series two, the category was no longer present. However, this could suggest that students came to Hard Bargain Farm with preconceived fears encouraged by the media, parents and friends (Bixler & Carlisle, 1994). These fears may have hindered the students ability to engage in the hands-on learning activities and absorb the informational material. Though, later time series showed a dominance of positive statements.

The attitude assessment portion of the student questionnaire did not show any differences between pre- and post1-/ post2-questionnaire results. Although there were no changes in overall assessment of environmental values among schools, four of the five statements had a least one school which showed a difference in pre- and post-test scores.

Schools C and J increased scores between pre- and post-test scores when asked if the statement "I can help the environment" was a value which reflected them. There were no differences between post1- and post 2-questionnaire scores. Although these

were the only two schools which showed any changed between pre- and post1-questionnaire scores for this particular statement, all of the schools began with a relatively maxed out average on pre surveys. This would indicate that many of the participants felt that the statement "I can help the environment" mostly reflected their values. Although the questionnaire did not show any changes for this value for other schools, the Analog Blogs did show that students were aware and wrote positively about some of the waste reduction techniques that students were taught during their overnight experience.

For the statement, "I would like to spend more time out in nature in the future", there were two schools which showed an increase between pre-and post-test scores. This is a value which Hard Bargain Farm would like to increase in audiences, particularly students. Haluza-Delay (2001) found that students who participate in these kinds of outdoor programs can see their home environment separate and removed from the environment as a whole. The Analog Blog time series four entries indicated that students had a desire to return to HBF, but did not relate any of their experiences at HBF to their home or school life. Interestingly, school H showed an increase between pre- and post2-questionnaire results, rather than pre- and post1-questionnaire results. This could be because students had a chance to reflect on their experience, and decided that spending more time out in nature was an activity which was more important to them than they had initially realized.

School A was the only school which showed an increase in pre- and post-test scores for the statement "I am comfortable being out in nature". School A, did not,

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however, show any increase in content knowledge gains. School A also did not have any entries about fear in their Analog Blog. This could indicate that students had less mental obstacles to overcome to increase their comfort in the outdoors.

The statement "I'd rather spend my free time out in nature than inside" actually showed a decrease in scores between pre- and post-questionnaires for school G. The Analog Blog for school G contained statements about students being tired, cold and having feet that hurt. This school visited HBF in January of 2011. Presumably, most students do not typically spend an entire day outdoors in the middle of winter, so this physical discomfort could offer an explanation for a decrease in scores for this statement. These physical concerns can affect a students' overall outdoor experience in a negative way (James & Bixler, 2008). Though, like all Analog Blog results, the majority of statements were positive in nature.

There were no schools which exhibited significant changes between pre- and post-questionnaire results for the statement, "It is important to me to protect the environment." This value is one which reflects students and an overnight visit to Hard Bargain Farm did not contribute to any increases or decreases in this value. However, the scores for this statement are also relatively high, with the mean for all schools being a 3.67 out of a possible 4.

Limitations of the Analog Blog:

Though the "Analog Blog" can generate a lot of data for analysis, there were limitations of the blog as an effective evaluation tool. First, students that wrote on the

blog were self-selected. It is possible only the most extreme responses were being recorded on the blogs. It is also possible that even with a relatively large volume of entries for each time series, the entries might only have represented a small percentage of total students on any particular overnight field trip. Therefore a handful of highly content or highly discontented students could have skewed results.

Second, there were logistical problems associated with the blog as well. Consistently changing markers for the designated time periods tended to be a problem. Therefore, there were some entries which should be under different time periods, but were entered under their color coded time series (since it was impossible to tell exactly which time series it should have been under). Anecdotally, this researcher can say that many times the entries which appeared in the wrong time series, were those which should be in time series two or three, but appeared in time series one.

Other logistical problems included recording entries and unequal available time for each time period. Transcribing entries electronically was a time consuming process and could be difficult to read student handwriting. Also, there were certain time periods which have less time available for students to write, in particular time series one, which was only available to students for several minutes before heading outside for the classes for the day. However, time series three was available to students for the entire evening.

Implications for Hard Bargain Farm:

Although the blogs generated a lot of data, much of it was unspecific. Because the farm does not employ many full time staff to dedicate to processing and analyzing

large quantities of blog data, a guided approach might be the best option to gathering better quality data.

Guiding questions might provide more succinct data about student attitudes. These guiding questions should try to elicit students to think about what they have learned as a way to empower their actions in an environmentally responsible way. These guided questions should also focus on specific program goals, such as waste reduction. Hard Bargain Farm hopes to empower students to make better decisions (with regard to the environment) presently, not just in the future. Therefore, these questions should be targeted to elicit responses which can gauge whether students are truly feeling empowered and know how to take action at home or at school (if waste reduction behaviors are not currently in place).

These questions could also elicit responses about a particular aspect of students' visit, such as their sensory experiences during their stay. Because these can be such powerful experiences, asking students to reflect on them could generate specific data about their perception of being outdoors. These guided questions could also start by assessing what adjectives or feelings students associate with the outdoors, or a particular element of the outdoors. These guiding questions should always be written on the actual blog so that students can always refer back to it if they choose to write on the blog at a later time period.

Based on the current results of the Analog Blogs, questions about what students are specifically scared of might be an effective way to generate insightful responses about what students are fearful of (as related to the outdoors). Some suggestions might be a

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prompt which states, "Worms are…." while students are free to write what statements or adjectives they associate with worms. While maintaining the four time periods, HBF could monitor statements about this invertebrate to see how or if responses change.

One of the more appealing aspects (to students) was that the Analog Blog was a place for students to freely write whatever they wanted. In order to maintain this freedom, keeping all current procedures for the Analog Blog the same, a suggestion might be to change the paper provided for the blog on the second day with a guiding question (written on the blog) such as, "When I go home I will change the way I _____ so that I can help protect the Potomac River" This would generate specific responses to monitor whether HBF is providing useful information to empower students to help the environment and how they are processing this information in the context of their personal lives. Because the blog is self selected, this guiding question would also eliminate any students which did not feel that they learned anything that they could do to help protect the environment. This question would eliminate general responses, which might be an "easy" and an obligatory response, such as 'recycling' or 'not litter', which are behaviors which HBF consistently reinforces. Overall, Hard Bargain Farm should think about what environmental values are most important to program goals and allow that conclusion to drive the guided questions.

The most valuable part of the Analog Blog is its ability to be an easily adaptable evaluation tool. If the responses generated from a particular guiding question are not generating enough or specific data, it is an easy process to change the guiding question to try again to generate enough quality data.

Although guided questions would help to add specificity to the data, it might be worthwhile for Hard Bargain farm staff to discuss how the blog is presented to students. Perhaps, with the initial introduction of the blog to students, moderators of the blog could provide some specific examples of how students can better express themselves, i.e., "Instead of just 'This is awesome!' tell me what is awesome and why".

Policy Implications:

Research has shown that environmental attitudes can be a predictor of support for environmental protection policies (Rauwald & Moore, 2002). Therefore, it is important that Hard Bargain Farm continues to work toward fostering a connection to nature in these young students. Because participation in Hard Bargain Farm programs is generally reserved for younger audiences, HBF, has a true opportunity to affect attitudes toward the environment (Cachelin et al., 2009). Hard Bargain Farm has been providing programming for students for several decades. This programming has the ability to affect generations of individuals, who grow up to be voting citizens.

More broadly, other environmental education organizations with similar goals and missions could easily incorporate this type of evaluation tool for programming. The data collected in the Analog Blog illustrated outcomes of environmental education experiences in general. Funding agencies are increasingly focused on assessing outcomes to determine program effectiveness (Tilt, 1996). Tools such as, the Analog Blog, can be implemented to provide a simple and effective way to illustrate learning, attitudinal, and

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behavioral outcomes. These outcomes are important in creating an environmentally

literate citizenry, but also one which has an appreciative attitude toward the environment.

CONCLUSION

The Analog Blog was initiated by the Alice Ferguson Foundation as a measure of student attitude and perception changes toward the environment as a result of an overnight visit to the farm. The purpose of this research was to help the foundation more effectively use the blog as an evaluation tool for student attitudes.

This research provides a baseline for qualitative data associated with an overnight field trip to Hard Bargain Farm. Overall, the data suggests that students experienced Hard Bargain Farm in a positive way and possibly increased their awareness and knowledge of ecological issues. Much of the data suggests that students began the overnight experience with certain expectations and feelings (fear, fun, happiness) and these expectations are either met, sustained or became less relevant (as shown by diminishing frequencies in subsequent time periods). Changes in student attitudes or perceptions after this overnight field trip are still unclear. This assessment of student attitudes can be further refined by incorporating guiding questions or prompts which can provide more specific responses from students.

The Analog Blog is a valuable tool for Hard Bargain Farm for evaluating students in a quick, low cost and manageable way. This evaluation tool can be used to strengthen grant applications as this research has found that what students choose to share diverted from fear to other categories. This is important in showing that grant money for these

short-term HBF programs can be effective in focusing students attentions away from

fearful aspects of the outdoors (from their perspective) to an arguably more positive

focus. It is important that Hard Bargain Farm maintain their current programs with the

emphasis on creating a positive outdoor experience for students through the senses,

which creates more opportunities for intrinsic motivation to learning about ecological

concepts.

Pre   Post1   Post 2

Birthdate: _____   Date: _____

Teacher's Name: _____   School: _____

1. For each of the following statements please put a check in the box that shows how you feel now.

	Not me at all	Mostly not me	Sort of like me	Yes! That's me!
a.) I can help the environment.				
b.) I would like to spend more time out in nature in the future.				
c.) I am comfortable being out in nature.				
d.) I'd rather spend my free time out in nature than inside.				
e.) It is important to me to protect the environment.				

2. Circle the answer that you think BEST defines the word, "watershed."

    a.   A building where water is stored.

    b.   When waves splash onto the shore and wash away land.

    c.   When it rains on a lake and the water evaporates into the sky and then falls as rain again.

    d.   All of the land that drains rainwater into a nearby creek, river or a bay.

    e.   I'm not sure.

3. **Look at the picture. Choose which of the following objects are IN the watershed. Circle one answer.**

a. school

b. roads, cars, bridge

c. farm

d. city

e. all of the above are in the watershed

f. I'm not sure.

4. **Give one example of each kind of organism listed below OR give a definition:**

KIND OF ORGANISM	YOUR EXAMPLE
Producer	
Consumer	
Decomposer	

5.   **In a garden, which of the following is a natural resource?**

a.   The tools

b.   The soil

c.   The gardener

d.   The fence

e.   I'm not sure.

6. **Which of the following best matches an organism with its adaptation.**

   a. A goose has downy feathers to keep it warm in winter.

   b. Deciduous tree leaves change color in the Fall to attract squirrels.

   c. A cow has black and white spots to camouflage with its environment.

   d. Roses have thorns so butterflies have a place to sit.

   e. I'm not sure.

7. **Read the following. *Then*, write down what the farmer does that has a positive impact on the natural outdoor environment.**

> **A farmer uses rain barrels to collect rain water to irrigate (water) her crops. Afterwards, she applies chemicals to add nutrients to the soil so the crops will grow more quickly. Finally, she drives her tractor to harvest her crops.**

What does the farmer do to have a positive impact on the natural environment?

Table 15: School A Analog Blog primary and subcategories for each time series

Time series	Category	Percentage of entries in category
1	Questions	40.00%
	Fun	25.00%
	Animals	10.00%
	General positive statements	10.00%
	HBF Facilities	5.00%
	Neutral statements	5.00%
	Wildlife	5.00%
	HBF Facilities	5.00%
2	Negative statements	53.33%
	Outdoors	20.00%
	Recycling	6.67%
	Learning	6.67%
	Physical	6.67%
3	General positive statements	27.27%
	Fun	18.18%
	Animals	18.18%
	Food	9.09%
	Boredom	9.09%
	Physical	9.09%
	Outdoors	9.09%
4	Animals	23.08%
	Scary Stories	15.38%
	Negative statements	7.69%
	Trash	7.69%
	Questions	7.69%
	Fun	7.69%

Table 16: School B Analog Blog primary and sub
categories for each time series

Time series	Category	Percentage of entries in category
1	Animals	38.89%
	Excitement	27.78%
	General positive statements	22.22%
	Anticipation	11.11%
	Fun	11.11%
	Recycling	5.56%
	Fear	5.56%
2	No entries for this times series	
3	Animals	38.89%
	Fun	27.78%
	Tools	16.67%
	General positive statements	11.11%
	Outdoors	5.56%
	Learning	5.56%
	New Experiences	5.56%
	Hay Ride	5.56%
4	No entries for this time series	

Table 17: School C Analog Blog primary and sub categories
for each time series

Time series	Category	Percentage of entries in category
1	Fear	50.00%
	Questions	12.50%
	Animals	12.50%
	Physical	8.33%
	HBF Facilities	8.33%
	Negative statements	8.33%
	Outdoor	8.33%
	Excitement	4.17%
	Social	4.17%
	General positive statements	4.17%
2	Fun	40.91%
	Animals	31.82%
	Outdoors	22.73%
	General positive statements	18.18%
	Wildlife	18.18%
	Excitement	9.09%
	Physical	4.55%
	Expectations	4.55%
	Fear	4.55%
3	No Entries for this time series	
4	Animals	37.93%
	General positive statements	34.48%
	Fun	17.24%
	Food	3.45%
	Smell	3.45%
	Returning	3.45%
	Learning	3.45%
	Gratitude	3.45%

Table 18: School D Analog Blog primary and sub categories
for each time series

Time series	Category	Percentage of entries in category
1	Anticipation	20.00%
	Weather	20.00%
	General Positive Statements	20.00%
	Physical	10.00%
	Outdoors	10.00%
	Animals	10.00%
	Fun	10.00%
2	No time series 2 entries	
3	General positive statements	31.58%
	Fun	13.16%
	Animals	13.16%
	Food	13.16%
	Physical	10.53%
	Campfire	7.89%
	Questions	2.63%
	Hay Ride	2.63%
	Wildlife	2.63%
	Boredom	2.63%
4	General positive statements	62.50%
	Fun	12.50%
	Food	12.50%
	Weather	4.17%
	Campfire	4.17%
	Returning	4.17%

Table 19: School E Analog Blog primary and sub categories
for each time series

Time series	Category	Percentage of entries in category
1	Excitement	52.94%
	Happiness	29.41%
	Learning	11.76%
	General positive statements	5.88%
	New Experiences	5.88%
	School Pride	5.88%
	Outdoors	5.88%
	Animals	5.88%
2	No entries for time series 2	
3	General positive statements	31.58%
	Fun	13.16%
	Animals	13.16%
	Food	13.16%
	Physical	10.53%
	Campfire	7.89%
	Questions	2.63%
	Wildlife	2.63%
	Hay Ride	2.63%
	Boredom	2.63%
4	General positive statement	55.56%
	Happiness	22.22%
	Weather	11.11%

Table 20: School F Analog Blog primary and sub
categories for each time series

Time series	Category	Percentage of entries in category
1	Positive Statements	42.11%
	HBF Facilities	31.58%
	Fun	10.53%
	Animals	10.53%
	Excitement	10.53%
	Expectations	5.26%
2	Physical	42.86%
	General positive statements	33.33%
	Fun	14.29%
	Animals (+)	9.52%
	Trash	4.76%
	Fear	4.76%
3	Animals (+)	40.00%
	Physical	24.00%
	General positive statements	20.00%
	Weather	8.00%
4	Animals (+)	54.17%
	General positive statements	37.50%
	Fun	16.67%
	HBF Facilities	4.17%
	Stewardship	4.17%
	Social	4.17%
	Returning	4.17%

Table 21: School G Analog Blog primary and sub categories for each time series

Time series	Category	Percentage of entries in category
1	Anticipation	34.78%
	General positive statements	30.43%
	Excitement	26.09%
	Expectations	17.39%
	Animals	17.39%
	HBF Facilities	8.70%
	Fun	4.35%
	Negative statements	4.35%
2	General positive statements	42.86%
	Physical	19.05%
	Outdoors	14.29%
	Animals	9.52%
	Fun	9.52%
	Neutral statements	4.76%
3	Food	20.00%
	General positive statements	22.86%
	Hay Ride	14.29%
	Outdoors	14.29%
	Animals	11.43%
	Fun	8.57%
	Physical	8.57%
	Negative statements	2.86%
	Fergusons	2.86%
	Campfire	2.86%
4	General positive statements	37.50%
	Animals	18.75%
	Fun	18.75%
	HBF Facilities	12.50%
	Gratitude	12.50%

Table 22: School H Analog Blog primary and sub categories for each time series

Time series	Category	Percentage of entries in category
1	General positive statements	45.45%
	Fun	27.27%
	Expectations	13.64%
	General negative statements	9.09%
	New Experiences	9.09%
	Neutral statements	4.55%
	Animals	4.55%
	Fear	4.55%
	Anticipation	4.55%
2	Animals	30.77%
	General positive statements	19.23%
	Outdoors	15.38%
	Fun	11.54%
	Negative statements	7.69%
	Fergusons	3.85%
	Excitement	3.85%
	Physical	3.85%
3	General positive statements	27.59%
	Fun	13.79%
	Outdoors	10.34%
	School Pride	6.90%
	Negative statements	6.90%
	Animals	3.45%
	Hay Ride	3.45%
	HBF Facilities	3.45%
	Anticipation	3.45%
4	Animals	28.07%
	General positive statements	19.30%
	Fun	17.54%
	Hay Ride	7.02%
	Negative statements	7.02%
	School Pride	3.51%
	New Experiences	3.51%
	Games	1.75%
	Food	1.75%
	Learning	1.75%

Social	1.75%
Weather	1.75%

Table 23: School I Analog Blog primary and sub categories for each time series

Time series	Category	Percentage of entries in category
1	Expectations	41.18%
	Fun	35.29%
	General positive feelings	23.53%
	Anticipation	11.76%
	Learning	11.76%
	Excitement	5.88%
	Fear	5.88%
	Happiness	5.88%
	New Experiences	5.88%
2	Fun	44.44%
	General negative statements	22.22%
	Outdoors	22.22%
	Animals	11.11%
	General positive statements	11.11%
	Negative statements	11.11%
	Physical	0.33%
	Accomplishment	0.11%
	Fear	0.11%
	Happiness	0.11%
3	Fun	27.27%
	General positive statements	18.18%
	Animals	9.09%
	General negative statements	9.09%
	Expectations	9.09%
	Food	9.09%
	Games	9.09%
	Physical	9.09%
4	Fun	30.00%
	Physical	30.00%
	Animals	20.00%
	Negative statements	20.00%
	General positive statements	10.00%
	Boredom	10.00%

Outdoors	10.00%

Table 24: School J Analog Blog primary and sub categories for each time series

Time series	Category	Percentage of entries in category
1	Expectations	35.00%
	General positive statements	30.00%
	Fear	20.00%
	Fun	10.00%
	Outdoors	10.00%
	Questions	10.00%
	Excitement	10.00%
	Facilities	5.00%
	Animals	5.00%
	Insects	5.00%
2	Wildlife	27.27%
	General positive statements	27.27%
	Fun	22.73%
	Outdoors	22.73%
	Expectations	4.55%
	Physical	4.55%
	Expectations	4.55%
3	General positive statements	36.84%
	Hay ride	7.89%
	Fun	7.89%
	Physical	7.89%
	Wildlife	5.26%
	Weather	5.26%
	Animals	5.26%
	Homesick	2.63%
	Food	2.63%
	Negative statements	2.63%
	Outdoors	2.63%
	Insects	2.63%
4	General positive statements	80.00%
	Fun	13.33%
	Returning	6.67%
	Gratitude	6.67%
	Adventure	6.67%

Table 25: All Analog Blog primary and sub categories

Primary Category	Sub Categories
Positive statements or emotions	General positive statements, Animals, Fun, Obstacle course, Desire to returning (to HBF), Outdoors, Happiness, Gratitude, Happiness, New Experiences, Expectations, Adventure, Wildlife
Fear	No sub categories for fear
Negative statements or feelings	All negative statements, Disgust, Boredom
Neutral	All neutral statements
Evening Activities	Hay Ride, Campfire, Scary stories, Food (Dinner), Games
External forces	Statements about the weather conditions or a student's physical state or comfort
Creating stewardship	Statements about a desire to learn, statements which reflect learning (in the context of the Potomac River watershed), Statements which express a desire to change behaviors as a result of being at Hard Bargain Farm.
Other	Statements about HBF facilities, Questions

REFERENCES

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REFERENCES

Arnold, H. E., Cohen, F. G. & A. Warner (2009). Youth and environmental action: perspectives of young environmental leaders on their formative influences. *Journal of Environmental Educatio*, 40(3), 27-36.

Balling, J., & Falk, J. (1980). A perspective on field trips: Environmental effects on learning. Curator, 23(4), 229-240.

Bisson, C. & Luckner, J. (1996). Fun in Learning: The Pedagogical Role of Fun in Adventure Education. *Journal of Experiential* Education, 19(2), 108-12.

Bixler, R.D. & Carlisle, C.L. (1994). Observed fears and discomforts among urban students. *Journal of Environmental Education*, 26(1).

Cachelin, A., Paisley, K., & Blanchard, A. (2009). Using the significant life experience framework to inform program evaluation: The nature conservancy's wings & water wetlands education program. *The Journal of Environmental Education*, 40(2), 2-14.

Coyle, K. (2005). Environmental literacy in America. The National Environmental Education & Training Foundation.
Retrieived from: http://www.neefusa.org/pdf/ELR2005.pdf

Carleton-Hug, A. & W. Hug. (2010). Challenges and opportunities for evaluating environmental education programs. *Evaluation and Program Planning,* 33, 159–164.

Dimopoulos, D., Paraskevopoulos, S., & Pantis, J. D. (2008). The cognitive and attitudinal effects of a conservation educational module on elementary school students. *The Journal of Environmental Education,* 39(3), 47-61.

Drissner, J., Haase, H, & Hille, K. (2010). Short-term environmental education-Does it work.?- An evaluation of the 'green classroom'. *Journal of Biological Education,*44(4), 149-155

Falk, J. H. (1983). Field trips: A look at environmental effects on learning. *Journal of Biological Education, 17,* 137–142.

Flowers, A.B. (2010). Blazing an evaluation pathway: Lessons learned from applying utilization-focused evaluation to a conservation education program. Evaluation *and Program Planning,* 33, 165-171.

Haluza-Delay, R. (2001). Nothing here to care about: Participant constructions of nature following a 12-day wilderness program. *The Journal of Environmental Education*, 32(4), 43–48.

Ham, S.H. & Sewing, D.R. (1988). Barrier to environmental education. *The Journal of Environmental Education,* 19(2), 17-24.

Hard Bargain Farm Environmental Center. www.fergusonfoundation.org/hbf/hbf_index.shtml. Accessed January 2012.

Hillcoat, J., Forge, K., Fien, J., Baker, E. (1995). 'I think it's really great that someone is listening to us ...': young people and the environment. *Environmental Education Research,*1(2), 159-171.

Hungerford, H.R. & Volk, T.L. (1990). Changing learning behavior through environmental education *Journal of Environmental Education,* 21(3), 8-21.

Jackson, E. L. (1987). Outdoor recreation participation and views on resource development and preservation. *Leisure Sciences, 9(4):* 235–250.

James, J.J. & Bixler. R.D. (2008). Children's role in meaning making through their participation in an environmental education program. *The Journal of Environmental Education,* 39(4), 44-59.

Johnson, B. Prince George county public school science coordinator. Personal communication, November 21, 2011.

Kruse, C.K. & Card, J.A. (2004). Effects of a conservation education camp program on campers' self-reported knowledge, attitude, and behavior. *The Journal of Environmental Education,* 33(4), 33-45.

Lee, O. & Brophy, J. (1996). Motivational Patterns Observed in Sixth-Grade Science Classrooms. *Journal of Research in Science Teaching,* 33(3), 303-318.

Looy, H. & Wood, J.R. (2006). Attitudes Toward Invertebrates: Are Educational "Bug Banquets" Effective? *Journal of Environmental Education,* 37 (2), 37-48

Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder.* Chapel Hill, NC : Algonquin Books of Chapel Hill.

Morgan, S.C., Hamilton, S. L., Bentley, M. L. & Myrie, S. (2009). Environmental education in botanic gardens: Exploring Brooklyn botanic garden's project green reach. *The Journal of Environmental Education,* 40 (4), 35-52.

National Environmental Education Act. 1990. Retrieved from: www.epa.gov/enviroed/pdf/neea.pdf. Accessed December 2011.

North American Association for Environmental Education. "What is Environmental Education" Available at: http://www.naaee.net/what-is-ee. Accessed January 2012.

Potter, G. (2009). Environmental education for the 21st century: Where do we go now? *The Journal of Environmental Education,* 41(1), 22-33.

Pretty, J., Angus, C., Bain, M., Barton, J., Gladwell, V., Hine, R., Pilgrim, S., Sandercock G., & Sellens, M.. (2009). Nature, Childhood, Health and Life Pathways. Interdisciplinary Centre for Environment and Society Occasional Paper. Retrieved from: http://www.hphpcentral.com/wp-content/uploads/2010/10/Nature-Childhood-and-Health-iCES-Occ-Paper-2009-2-FINAL.pdf. Accessed January 2012.

Randler, C., Ilg, A., & Kern, J. (2005). Cognitive and emotional evaluation of an amphibian conservation program for elementary school students. *The Journal of Environmental Education,* 37(1), 43-52.

Rauwald, K.S. & Moore, C.F. (2002). Environmental attitudes as predictors of policy support across three countries. *Environment and Behavior*, 34(6), 709-739.

Rickinson, M. (2001). Learners and Learning in Environmental Education: a critical review of the evidence. *Environmental Education Research* 7(3): 207-320.

Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Reports*, 94, 23-41.

Sample, J. & Warland, R. (1973). Attitude and Prediction of Behavior. *Social Forces* 51: 292-304.

Smith-Sebasto, N. J. & Semrau. H. J. (2004). Evaluation of the environmental education program at the New Jersey school of conservation. *The Journal of Environmental Education,* 36 (1), 3-18.

Thapa, B. (2010). The Mediation Effect of Outdoor Recreation Participation on Environmental Attitude-Behavior Correspondence. *The Journal of Environmental Education,* 41(3), 133-150.

Tilt, W. (1996). Moving beyond the past: a grant-maker's vision for effective environmental education. *Wildlife Society Bulletin*, 24(4), 621-626.

U.S. Census Bureau. Prince George's county quick facts. Retrieved from: http://quickfacts.census.gov/qfd/states/24/24033.html. Accessed: January 2012.

Vadala, C.E, Bixler, R. D., & James, J. J.(2007). Childhood Play and Environmental Interests: Panacea or Snake Oil? *The Journal of Environmental Education,* 39 (1), 3-17.

Walsh-Daneshmandi, A. & MacLachlan, M.(2006). Toward effective evaluation of environmental education: Validity of the children's environmental attitudes and knowledge scale using data from a sample of Irish adolescents. *The Journal of Environmental Education,* 37(2), 13-23.

Wright, B. Hard Bargain Farm program manager. Personal communication, September 12, 2011.

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