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How Do Non-Formal Environmental Education Experiences Shape Pro-Environmental Behavior

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How Do Non-Formal Environmental Education Experiences Shape Pro-Environmental Behavior

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Abstract

This paper attempts to define what behaviors are, what motivates behavior, and how environmental education programs can shape pro-environmental behavior using three factors: social interaction, program structure, and various teaching methods. Data was gathered using a systematic literature review that looked at the purpose and objectives of the paper, methods used for collecting data such as demographics (age, race, gender, location, etc.), the papers focused areas of research, and results. A thematic analysis was also used to code collected data into the themes. The themes that emerged while analyzing the data include social interactions, program structure, and teaching methods. Results conclude that while not everyone learns the same way having programs with social settings that create a sense of community, developmentally appropriate content and various learning methods can help create a positive experience which leads to pro-environmental behaviors. Allowing students to interact with their local environment using various teaching methods can allow children to take on leadership roles, learn problem-solving skills, learn to critically think and build teamwork skills. These are valuable skills to have and will set the child up for success in the future.

Acknowledgments

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Introduction

Studies suggest that environmental programs and experiences have the potential to support positive environmental behavior, as well as developing a person's awareness about environmental issues (Williams 2016, White 2008, D'Amato 2011, Braun 2018, Caplow 2018, Cruz 2018, Furman 2015, Genc 2015). When it comes to forming a behavior, especially a pro-environmental behavior, there are five factors that play a huge role in shaping one's pro-environmental behavior and they are: (1) motivations: what is the intent behind the behavior, (2) norms: what types of norms (social/societal or personal) influence the behavior being performed, (3) social practice theory: who or what are they trying to conform to?, (4) environmental education settings: formal vs. non-formal settings, and (5) Piaget's theory: stages of cognitive development. This paper attempts to better understand how non-formal environmental education experiences shape a person's pro-environmental behavior. To answer this question we must first answer the following questions: what is behavior, what motivates a behavior, and what are some factors within environmental education programs that aid in formulating positive pro-environmental behaviors.

What is behavior?

Behavior is where an individual performs a clear, observable movement that is developed from experiences related to the connection between environmental stimuli and responses to those stimuli such as verbal behavior and physical movement (Joe 2008, Bergner 2011). Behavior can be looked at like a loop or circuit. There is an initiation of a stimulus, interpretation of the stimulus, and as a result, a response to the stimulus is produced. A stimulus is a thing or circumstance that directly influences an activity or evokes a reaction.

When interpreting a stimulus to generate a response there are parameters that go into formulating a behavior/response. Bergner (2011) found that the applied domain of descriptive psychology for behaviors and possible behaviors can best be captured by a formulation that includes eight parameters:

(B) = (I, W, K, K - H, P, A, PC, S)

Where…

B = Behavior, I = Identity: the person's personal identity, W = Want : a condition that the person seeks to bring about, K = Know : the concepts/ideas that are being acted on, K-H = Know-How: the capability to perform a skill or task, P = Performance: the bodily movements, and processes that are involved in the behavior, A = Achievement: the outcome of a behavior, PC = Personal Characteristics: traits, attitudes, interests, values, abilities, knowledge. S = Significance: why the person is doing what they are doing (Bergner 2011). In order for a

behavior to happen there needs to be some type of motive or stimulus behind the performed behavior that is driven by one or all of the eight parameters.

Motives

There are two types of motivations intrinsic and extrinsic motivation. Intrinsic motivation is an internal desire to perform a particular task, which includes curiosity, interest, and enjoyment. These tasks are done to receive an internal reward such as the feeling of happiness, self-worth, and achievement. Whereas extrinsic motivation is unrelated to the task or actions and is driven by an external reward such as grades, GPA, praise from a teacher or parent, or financial rewards (McDevitt & Ormrod, 2016). Knowing what type of motivation is driving the behavior, intrinsic or extrinsic, can determine the motive behind why people behave the way they do. Are they doing the behavior for their own personal growth or are they seeking attention and conforming to social norms.

Norms

Norms play a huge role in the types of behaviors we perform in our day-to-day lives. The two main norms are social/societal and personal norms. Social norms are implied or nonspecific behaviors that create a foundation of correct behaviors, individuals are to conform to within a community, or culture. Whereas personal norms refer to internal standards and self-expectations constructed by the individual concerning a particular behavior (Doran 2016, Schwartz 1977). When participants come into non-formal environmental program settings they have set expectations based on prior experiences, beliefs, and knowledge. Their behavior towards the environment and the program is set by those prior experiences, social and personal norms.

Social norms often place an individual in categories such as popular, nerd, unpopular,

jock, etc. which can alter a person's way of behaving in different settings. Those who are demand as unpopular or nerds may not want to voice their opinion or behave a certain way in fear of being made fun of. Studies have found that placing children in circumstances outside of their everyday environment engages students and gets them outside of their comfort zone, increasing their knowledge, problem-solving skills and critical thinking skills (D'Amato 2011, Williams 2016, Braun 2018, Genc 2015). When the students are placed in a setting where the social norms are homogenous, there is less pressure placed on the student to stray from behavioral norms customary to that setting. They are able to utilize their own talents and skills to demonstrate their knowledge and ability to perform pro-environmental behaviors and/or tasks. D'Amato (2011) interviewed several outdoor adventure education participants and found that having a tight-knit, supportive community within an environmental education program helped facilitate learning, collaboratively work as a team, try new behaviors, and take on new leadership roles.

Now that we have identified what behavior is and the motives behind them we can look into how environmental behaviors and identities are formed.

Environmental Identity formation

In order to understand how people develop pro-environmental behavior and identity, it is important to understand the construct of social practice theory. Through repeat exposure to environmental education programs/courses and the natural world, children and adults are able to construct pro-environmental behaviors that build a personal environmental identity. An identity is a self-constructed definition of who one is, which includes: values, beliefs, and goals in life. Social practice theory states that people develop multiple identities within different segments of

their lives. As they respond to their local environment their words, and actions adapt and conform to those around them.

In a study done by Williams (2016) they found that as a person's sense of self deepens, three changes occur:

1. There is an increase in the salience of this world. They become more aware and knowledgeable about the environment and environmental problems
2. Identification of environmental action occurs. People invest in this world by taking action, responsibility for their actions, caring about their actions' consequences and how others evaluate them.
3. Increased knowledge through kinesthetic learning. People learn through hands-on, interactive experiences, associated with environmental action.

Once a person has acknowledged the first two categories within their lives they can then increase and strengthen their knowledge and sense of self as an environmental steward through repeat kinesthetic learning opportunities.

What is environmental education?

How do non-formal environmental education experiences shape a person's behavior towards the environment? Environmental education experiences create an atmosphere that allows students, participants, and visitors to shape their sense of self, as well as actively construct a body of knowledge from interactions with their environment, rather than absorbing the information at face value (McDevitt & Ormrod, 2016).

Environmental education or EE is a process of teaching youth and adults about elements within the natural environment, the relationships among species within the environment, how human actions impact the environment, and conservation of the environment. Children and adults can learn in all types of settings, such as non-formal and formal. Non-formal environmental education takes place in a setting outside of the classroom which includes: museums, nature centers, zoos, or parks. Here, children experience more social and interactive play, hands-on activities, and self-discovery that help fuel the student's curiosity. Whereas formal environmental education takes place in a classroom, where children have a more structured setting and are eventually tested over a subject to measure learning. White (2008) states that the best learning environments are non-formal, outdoor nature-scapes where students are allowed to explore and discover without structure or authority. However, if programs are not developmentally appropriate for the students, then the child may not be able to understand the content and have a bad experience. Thus, reducing the probability of that child developing a pro-environmental behavior or a positive attitude towards the environment.

Piaget's Theory

Environmental education programs and classes try to push knowledge and responsibility before some of their students have even developed a connection and/or loving relationship with nature. Which is not ideal for students that may have grown up in an urban environment and have never experienced outdoor activities in a rural setting. The connections, emotional, and affective values that children develop towards the environment form earlier than their abstract, logical, and rational perspectives (White 2008).

Piaget's theory states that at the concrete operational stage (7-11 yrs.) children begin to thinking logically about concrete events. They become more empathetic and begin to understand that their own thoughts are unique to them and not everyone shares those same thoughts, feelings, and opinions (McDevitt & Ormrod, 2016). Whereas in the formal operational stage (12 - 17yrs.) children begin to think abstractly and reason about hypothetical problems. They think more about moral, philosophical, ethical, social, and political issues. This helps them think critically about the future and reason hypothetical situations. Meaning that all before the age of seven children have developed a perception and connection to their local environment.

Exposing children to positive environmental experiences before the age of seven will set the tone for shaping pro-environmental behaviors towards the environment. We need to allow children to develop that connection and love for nature, biophilia, before we ask them to extensively learn about nature and become environmental stewards.

Environmental Program Structure

White (2008) found that there are three stages of development for a child's environmental values and their environmental education: (1) early childhood (ages 3/4 to 7), (2) early/middle grade school (ages 7 to 11), (3) adolescence (ages 12 to 17).

Stage 1: Early Childhood - Building Empathy

The first stage of development is the early childhood stage, ranging from ages three on up to the age of seven. When teaching to children in this the stage the main objective should be to develop empathy between the child and the natural world. White (2008) found that the best way

to foster an empathetic connection to nature was through the use of animal interactions. Everyone has a tendency to gravitate towards baby animals or animals in general, however, young children have a natural curiosity and empathy for animals. Studies have found that children under the age of six dreams about animals 90% of the time (White 2008). Going back to Piaget's theory, children do not begin to think logically about concrete events until about the age of seven, however, they do become more empathetic. Cultivating connections with local species that they may find in their yards, neighborhoods or communities, allows the children to relate to them.

Stage 2: Early/middle-grade school - Exploring the World

During this stage exploration of the nearby, wild and semi-wild, natural world and learning your place in it is key when building a connection to nature. The process of using the local environment to teach concepts in language arts, mathematics, social studies, science, and other subjects, is called place-based learning (Sobel 2004). This teaching pedagogy emphasizes using hands-on, and real-world learning experiences, to increase academic achievement, stronger ties to the community, and enhances appreciation for the natural world. The purpose of place-based education is to get children learning about their local environment, connecting and making a difference within their community. In formal classroom settings, there is limited learning about local wildlife. By using place-based learning experiences, we are able to foster a sense of personal connection to their local environment. It is during the early childhood stage that children's experiences shape their values, attitudes, and basic orientation toward the world and environment (White 2008). If a child or adult does not have a personal connection to a

person, place, thing, or in this case the environment, then they are less likely to take part in wanting to preserve it. To them, it will no significant value without that connection.

Stage 3: Adolescence—Taking Action

The desire to take social action begins around age twelve. As children start to discover their sense of self and feel a connection to society, they naturally want to make a difference and save the world, assuming they had opportunities in the early childhood and early/middle-grade school stages to develop empathy towards the natural world. White (2008) states that opportunities for environmental preservation should focus on the child's local environment, where they can relate to the outcomes.

Studies have found that by creating programs/courses focused on creating empathetic relationships with the natural world, providing wholesome learning experiences, and providing opportunities for social action the program/course can foster learning, create pro-environmental behaviors. As well as provide new opportunities to gain valuable skills such as teamwork, leadership, critical thinking and problem-solving (Williams 2016, White 2008, D'Amato 2011, Braun 2018, Sobel 2004, Caplow 2018, Cruz 2018, Furman 2015, Joe 2008, Genc 2015).

Methods

In order to collect data for this project, the first step is to frame the research question, "How does non-formal environmental education shape a person's behavior towards the environment ?". Asking questions such as, who is the target audience, why should this topic be studied further, and why should people care, to help further define the purpose of the research project. During the framing process, any words that may be difficult for the general public to

understand were defined, as well as words associated with the general idea/purpose of my research. The next step was to start researching scholarly articles related to the research question and the general topic of interest. The best option for data collection is to do an in-depth systematic literature review. “A systematic review is a high level overview of primary research on a particular research question that systematically identifies, selects, evaluates, and synthesizes all high-quality research evidence relevant to that question in order to answer it (Northcentral, 2019)”.

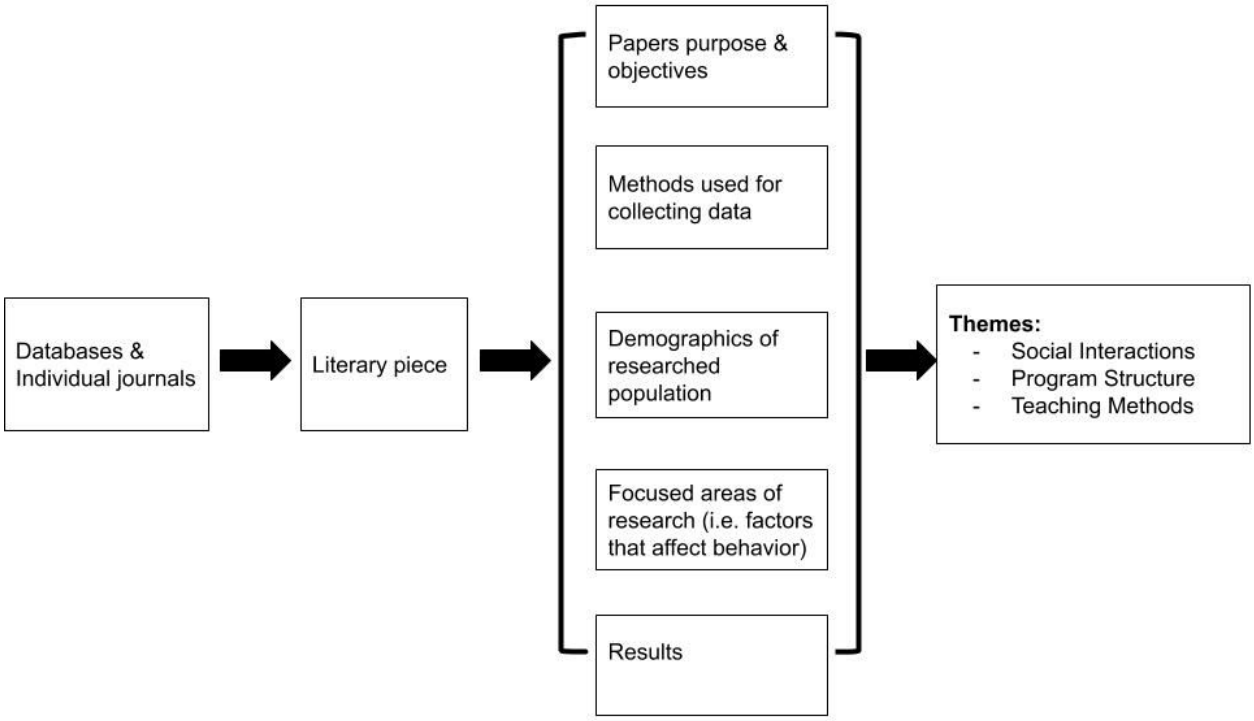
To collect reliable data, sources from the University Nebraska-Lincoln online library, databases and journals were used. Literary sources came from databases such as JSTOR, ELSEVIER, Environmental education research journal, various academic search premier sources, and readings suggested by my advisor, Dr. Pennisi. When reading a piece I would also look at some of the articles they referenced. In this paper, fourteen literary pieces were compiled and analyzed.

Table 1. (Analyzed Literary Pieces)

Title	Author
What is behavior? And so what?	Raymond M. Bergner
Fostering changes in attitude, knowledge and behavior: demographic variation in environmental education effects	Tina Braun, Richard Cottrell & Paul Dierkes
Place-based education for environmental behavior: A 'funds of knowledge' and social capital approach	Austin R. Cruz, Samantha T. Selby & William H. Durham
Are We Preaching to the Same Choir? A Mixed-Methods Comparison of Audiences at Animal-Themed Interpretive Facilities	Susan Caplow
Outdoor adventure education: Applying transformative learning theory to understanding instrumental learning and personal growth in environmental education	Laura Galen D'Amato, Marianne E. Krasny
The relative importance of social and personal norms in explaining intentions to choose eco-friendly travel options	Rouven Doran, Svein Larsen
The development of prosocial behavior in adolescents: a mixed methods study from NOLS	Nate Furman, Jim Sibthorp
The project-based learning approach in environmental education	Murat Genc
Understanding behavior to understand behavior change: a literature review	Joe E. Heimlich & Nicole M. Ardoin
A comprehensive model of the psychology of environmental behaviour—A meta-analysis	Christian A. Klockner
Elements of success in environmental education through practitioner eyes	Theodore S. May
Place-based education: Connecting classroom and community. Nature and Listening	David Sobel
Nurturing children's biophilia: Developmentally appropriate environmental education for young children	Randy White & Vicki L. Stoecklin
Environmental identity formation in nonformal environmental education programs	Corrie Colvin Williams & Louise Chawla

When looking at each literary pieces the purpose and objectives of the paper, methods used for collecting data such as demographics (age, race, gender, location, etc.), the papers focused areas of research such as factors that affect behavior, and results (Figure 1).

Figure 1. (Systematic and Thematic Analysis Process)



After reading through various credible, scholarly literary pieces, a thematic analysis was used to look for commonalities between the literary pieces. A thematic analysis is a way to "identify patterns of meaning across a dataset that provide an answer to the research question being addressed. Patterns are identified through a rigorous process of data familiarisation, data coding, and theme development and revision" (School of Psychology, 2006). The University of Auckland suggests that when doing a thematic analysis you go through a five-step process to

analyze a data set. The first step is to read and re-read the data to familiarize the content. Next, code the data by grouping information and data into labeled groups. Then, search for themes among the coded groups to collect patterns of meaning (potential themes). Next, review the themes. “This phase involves checking the candidate themes against the dataset, to determine that they tell a convincing story of the data and one that answers the research question”(School of Psychology, 2006). Finally, define, name and develop an analysis of each theme. Shown in (Figure 1) are the themes that emerged during the thematic analysis.

Results

During the thematic analysis portion of this project, three themes/factors emerged: (1) Social interaction: peer-to-peer interaction and peer-to-teacher/staff interaction, (2) course/program structure: structured, (3) teaching methods: kinesthetic learning, place-based learning. Studies have shown that implementing one or all of these themes/factors into your environmental education course or program, promotes positive experiences, and influences pro-environmental behavior. (Williams 2016, White 2008, D’Amato 2011, Braun 2018, Caplow 2018, Cruz 2018, Furman 2015, Genc 2015, Klockner 2013, May 2000).

Social interaction

In environmental education programs, social interaction with peers and feeling accepted plays a huge role in how a person’s environmental behavior can be shaped. Many times our behaviors are influenced by what our peers may think of us and social norms. Studies have found that environmental education programs that remove participants from modern life components, creates a sense of belonging, “close-knit” and “supportive” community, as stated by the participants (Williams 2016, D’Amato 2011). Taking the participants out of their day-to-day

environment and getting them out of their comfort zone creates a setting where the participants can tune into their surrounds and rely on others for support when carrying out program activities, tasks, or roles. In a study done by Genc (2015), they found that participants involved in project-based learning exchanged views, while simultaneously learning cooperative learning and intergroup competition. Participant S10 in Genc's study states that project-based learning has strengthened their will to learn. During the interviews, conducted by Williams (2016), many participants became emotional as they reflected on the relationships they formed with peers at the environmental education programs. When someone physically shows emotion towards something, in this case, relationships built while at a program, then you truly know that the event or things have had a major impact on their lives.

Having strong relationships and meaningful interactions with teachers and staff members of environmental focused programs can also influence pro-environmental behavior formation. A teachers passion and enthusiasm for the program is what promotes effective environmental programs and pro-environmental behavior (May 2000, Genc 2015, White 2008).

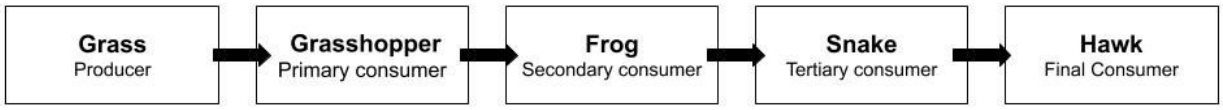
Children model what they see because they are still learning new skills and trying to conform their behaviors to social norms. When they see adults, role models, or teachers exhibiting a specific behavior, they are likely to mimic what they see. These findings are consistent with a study done by Williams (2016), who found that participants learn forms of action form social groups and that they would imitate behaviors done by inspiring instructors. They found that the staff at the three programs modeled qualities of interaction: gentle, respectful, attentive, appreciative and caring modes relating to nature. They also found that

participants in the Wild Bear and Thorne program believed that their degree choices were influenced, partly, by exposure to the natural sciences and program mentors.

Program structure

Another factor that plays a role in shaping a person attitude and behavior towards the environment is the teaching methods used in the programs. When in school many subjects are taught in sequential or chronological order, enabling the best possible learning results. In order for us to learn about certain topics, we need to know the basics before we move up in levels of learning and knowledge. Williams (2016) states that environmental education programs need to be designed as a series of events to deepen environmental interests and identities over time. For example, we learn about animals, what they eat, their habitat and characteristics before we learn about the food chain and how all the animals are connected (Figure 2).

Figure 2.



White (2008) argues that no matter what the program teaches, the curriculum being taught need to take into consideration the age level or the developmental stage (early childhood: ages 3-7, early/middle-grade school: ages 7-11, adolescence: ages 12-17) the child is in. If we want children and/or adults to create an emotional connection and pro-environmental behavior to the environment then we need to use developmentally appropriate experiences designed to match

developmental needs, interests, abilities and learning styles (White 2008). By dissecting behaviors into habits, tasks and skills, opportunities and making them easier and more relevant to the level of learning for the students. Then environmental educators are able to make the education course or program a more enjoyable and rewarding experience. Thus, the participants are more likely to create those pivotal connects to nature and pro-environmental behaviors to become environmental stewards.

Teaching methods

Incorporating various types of teaching methods within an environmental education program can create an opportunity for children to use or learn new learning styles. There are seven types of learning styles: (1) visual: spatial, (2) aural: auditory/musical, (3) verbal: linguistic, (4) physical: kinesthetic, (5) logical: mathematical, (6) social: interpersonal, (7) solitary: intrapersonal (Learning-styles-online 2019). One type of teaching method that tries to encapsulate all seven of these learning styles is place-based learning. Place-based learning (PBL) is the process that emphasizes using hands-on, real-world learning experiences to gain connections and appreciation for the natural world and the surrounding community. Place-based learning uses the local environment to teach concepts in language arts, mathematics, social studies, science and other subjects (Sobel 2004). The purpose of place-based education is to get children learning about their local environment, connecting and making a difference within their community. In formal classroom settings learning about the local environment is not as common, as learning about exotic places and wildlife. Teaching and engaging children in place-based learning creates those experiences that foster a sense of personal connection to their local

environment. When people have those personal connections to the natural environment and an issue arises, they will want to take action to solve the pressing problem.

Environmental education programs that focus on hands-on, place-based learning are known to have a lasting impact on participants (Williams 2016, White 2008, D'Amato 2011, Caplow 2018, Cruz 2018, Furman 2015, Genc 2015, Sobel 2004). In a study done by Williams (2016), they found that all eighteenth of their study respondents recalled various hands-on learning experiences that increased their awareness of the natural world. One participant in particular retained memories from more than 40 years later, talked about in detail her experience at the program. She could remember she found three owl feathers and them being beautiful, very soft, and almost like fur. The second thing she remembers finding was an owl pellet, that had bones and fur in it. Having that opportunity to use her senses and touch and interact with something tangible strengthened her experience to grow a love for the natural environment as well as create a memory she can tell for years to come and possibly inspire others.

Discussion

The goals of this study were to identify how non-formal environmental education settings contribute to shaping a person's pro-environmental behavior toward the environment. After analyzing data into themes that emerged throughout several literary pieces, the results concluded that not everyone learns the same way. Some may learn better by doing physical (kinesthetic) hands-on learning while another may learn better socially (interpersonally) by doing group work. When participants, students, or visitors are exposed to positive social interactions with peers and instructors, program structure, and various types of teaching methods they are more likely to form a positive pro-environmental behavior towards the environment.

There are some key factors to a successful and influential non-formal environmental education program. The first is having an atmosphere that creates a sense of belonging or community. One where children can feel and be themselves and are able to showcase their skills. When staff display positive, pro-environmental behaviors, youth participants will mimic their behavior because they are so influenced at that stage in life. The next factor is having developmentally appropriate courses for all ages. Giving a child a task outside of their capability can deter them from making a positive connection to the environment. The final factor is having a variety of teaching methods within your program. Not everyone learns the same way, so having a variety of methods can allow children to have a positive experience because they are in their comfort zone. It can also allow the child to grow an envelope new skills if they try learning using a different teaching method. Using these factors can create a comfortable and positive experience for participants and allow them to shape pro-environmental behaviors towards the environment.

Summary/Conclusion

Allowing students to interact with their local environment and using teaching methods such as place-based, project-based, or kinesthetic learning, can allow children to take on leadership roles, learn problem-solving skills, learn to critically think and build teamwork skills. These are valuable skills to have when learning about new topics, working in group projects or in the workplace. Environmental education programs are helping participants not only build a deeper connection to their local, natural environment and creating pro-environmental behaviors, they are also setting them up for success in the future by using experiences that shape and strengthen valuable leadership, problem-solving, critical thinking and social skills.

Recommendations for future studies:

Future studies should further research this topic using local data. Methods such as pre- and post surveys, interviews of past program participants, pre- and post interviews, as well as surveys, deem to be the best methods of data collecting as expressed by various literary pieces. Future studies should also look into using these factors: social norms, personal and practices: place-based, project-based, kinesthetic learning to create a program or class tailored to the goals of the project and local surrounding to gather data. I would also recommend when looking into research articles about behavior and environmental experiences, look into different subjects such as phycology, biology, education, and ecology. As well as looking deeper into other theories, motives for environmental behaviors, and biophilia.

Challenges & Limitations:

The biggest limitation I faced was that my research question "How do non-formal environmental education experiences shape a person's behavior?" may have been too specific. What I mean by that is instead of focusing on experiences I should have just looked at environmental education as a whole. Since my question was too specific it was hard to find enough data to support my hypothesis that non-formal environmental experiences shape pro-environmental behaviors. Many of the literary pieces I came across talked about environmental education experiences/programs but did not correlate it to shaping one's behavior.

One challenge I faced while doing this project was time and time management issues. As a full-time student (15 credit hours), working (18 hours a week) and interning on the side, I found it hard to find time to go and gather local data using methods including pre- and post surveys, conducting interviews and/or doing a trial program. That is why I decide to do a

systematic literature review instead. Gathering local data would have made the project more personal, as well as put my hypothesis into action. I also found it difficult to prioritize my thesis over other homework that was due at an earlier date. Having a day and time set every week to work on my thesis would have made the process a lot easier and less stressful.

Another challenge I faced was not setting time aside to work more with my advisor. This is one aspect of the thesis process I wish I would have taken more advantage of. However, I believe that taking some of Dr. Lisa Pennisi's environmental education classes prior to the thesis class helped set a foundation of knowledge that I could use throughout this project.

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Appendices