Adult Environmental Education: Active vs. Passive Learning Pedagogy

by

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Table of Contents

List of Tables

Abstract

From wildfires to coral bleaching, the global effects of climate change are difficult to ignore. Unfortunately, the number of environmental education (EE) programs that target adults in the United States is lacking. Adults have the biggest impact on the environment and the greatest ability to make positive environmental changes and therefore, the need to expand environmental education for adults is imperative. In order to contribute to improved environmental quality, adults need to be exposed to environmental problems and to be taught ways to reduce their environmental impacts. Existing research highlights the difficulties when attempting to include adults in environmental education programing as they rarely re-enter formal academic settings. Therefore, adult environmental education relies solely on non-formal educational programing.

The purpose of this research is to increase the current knowledge of non-formal EE pedagogical strategies in order to determine which programs are most effective for increasing environmental concern among adults. This research identifies opportunities and challenges for adult, non-formal EE providers in the Tampa Bay area of Florida. Given an understanding of the need for more interactive learning opportunities, the research goal was expanded to include the engagement theory of learning. Engagement theory of learning is a multidimensional concept comprised of cognitive engagement, behavioral engagement, and emotional engagement. Based upon the data collected during this study and the current EE literature, findings reveal that the most effective form of

adult non-formal EE is active learning that incorporates behavioral engagement. This study concludes by providing a list of recommendations for educators for the improvement of adult EE programs currently offered in Pinellas County, Florida, a county within the Tampa Bay Area.

1. Introduction

1.1 Background

It is the year 2020 and the world is on fire. Within the last few decades there have been numerous environmental changes with severely damaging global effects. Oceans that were once home to reefs filled with tropical creatures are dying at alarming rates. Sadly, scientists project that upwards of 90 percent of coral reefs will disappear within the next 20 years as a result of climate change (American Geophysical Union, 2020). Furthermore, climate change is resulting in even further global destruction in the form of powerful hurricanes fed by higher water temperatures. In 2019, Florida's hurricane season claimed a total of 18 named storms, six hurricanes and three major hurricanes reported as Category 3 or above, with sustained wind speeds of at least 111 mph (Solomon, 2019).

If the world's waters are not enough reason to stress the importance of climate change, the lands may be. Towards the end of 2019, Australia experienced some of the worst fires on record for the last several decades. Scientists estimate that as many as one billion animals have died in Australia's wildfires (Zee and Torres, 2020). The 2019 fires were facilitated by extremely high temperatures and prolonged drought; they destroyed over 12 million acres in Australia (Zee and Torres, 2020). It is hard to ignore the global effects of climate change, yet there are few environmental education programs targeting

adults in the United States, the population with the potential for the greatest impact on the environment.

Today, environmental education is an increasingly important area of the K-12 curriculum throughout the United States. According to the North American Association of Environmental Educators (2014), 46 states created environmental literacy lesson plans for use throughout primary education. Today's adults were not as exposed to environmental education as their children and grandchildren are now. They are, however, becoming more aware of environmental issues. According to data from the *Yale Climate Opinion Maps* in 2018, 70% of Americans believe that climate change is happening and 58% of American citizens believe that global warming poses a viable threat to the United States (Marlon, et al., 2016).

According to a 2019 Gallup Environment poll, Americans care less about current and potential environmental problems than they did in 2000 (Jones, 2015; Gallup, 2020). This poll compared six of the most routinely-discussed environmental concerns including water pollution, air pollution and global warming; the results were enlightening. Participants of the 2019 survey were less concerned about every environmental issue listed than those who participated in the same survey in 2000 (Jones, 2015; Gallup, 2020). The decrease in environmental concern from 2000 indicates that despite available education, many U.S. citizens do not fully comprehend the magnitude of current environmental problems and how important environmental health is for themselves and future generations. This being said, when comparing data collected in a 2010 survey compared to similar data from 2019, it appears that there has been an increase in

environmental concern and awareness, providing hope for future environmental movements.

According to the U.S. Environmental Protection Agency (EPA), environmental education (EE) is best defined as, "increasing public awareness and knowledge about environmental issues and providing the skills necessary to make informed environmental decisions and to take responsible actions" (Potter, 2009, p.23). Since the 1970s, when environmental issues first attracted significant public attention, EE has been a growing field of interest in the United States, with EE programs expanding exponentially (Stevenson, et al., 2016). Most EE programs revolve around classroom-based instruction primarily directed towards elementary and middle school students. Since the majority of educational programs are directed towards a younger audience, extensive research on EE exists as it relates to adolescent populations. Clearly, it is important to provide EE to young students, but it is also imperative that education on environmental issues does not stop once these students become teenagers.

It is equally important for adults to be exposed to EE throughout their lifespans. Exposing adults to continued EE is more difficult than exposing school aged children (a captive audience). Continuing EE is especially important, partly because the foundation of EE has recently expanded and continues to mature, so that many older adults missed many EE concepts during their formative years. Furthermore, it is critical to foster a sense of environmental responsibility in adults as they vote and make decisions daily that impact the environment. Due to the influence that adults have on the evolution of environmental protection and health, exposing adults to environmental problems and

teaching them ways to reduce their environmental impacts are vital to improving environmental quality.

1.2 Problem Statement

Although it is important to continue to provide EE to adults, it is also quite challenging. There are limited published studies on EE programs focused on adults, as adults rarely reenter classrooms to learn about environmental problems. Researchers have begun to explore increasing non-formal EE settings as an effective method for educating adults.

Non-formal education is defined as teaching and learning that takes place outside of a classroom or lecture hall. Non-formal adult education often features learners who choose the objectives of study but not the means (Heimlich, 1993). In non-formal educational settings, participants choose which events to attend but they have no control over the presentation of educational content. Non-formal EE covers a large range of topics and may be delivered through the use of various pedagogical strategies. For example, participation in outdoor environmental action projects, such as litter removal at beaches, or taking a guided hike, are considered non-formal educational activities. Offering a vast array of activities is beneficial to both the community and program organizers, as it increases the number of people receiving education. However, a majority of non-formal EE programs are unregulated, they are of extremely varied quality, and are largely untested. The purpose of this research is to increase the current knowledge of non-formal EE pedagogical strategies to determine which programs are most effective for increasing environmental concern. This project also identifies various opportunities and challenges for adult, non-formal EE providers within the Tampa Bay region.

1.3 Research Questions

In order to determine which of the two types of engagement strategies (active pedagogy and passive pedagogy) is more effective for increasing environmental concern, this study proposed the following questions:

1. How does participation in non-formal environmental education programs impact participants' attitudes toward the environment?
2. How do passive learning strategies *compare* with active learning strategies for engaging participants with the environment? Which pedagogical approach has a stronger impact on learners' attitudes toward the environment and is more successful in meeting the goals of environmental education? If one learning strategy is more effective than the other, and why?

   For, each type of program (active and passive), the following were assessed:

   - What impact does program participation have on participants' *sense of connection* to their local environment?
   - What impact does program participation have on participants' *commitment* to working to solve local environmental problems?
   - What impact does program participation have on participants' feelings of *empowerment* to solve local environmental problems?
   - What impact does program participation have on participants' *mastery of the skills* necessary to solve environmental problems?

1.4 Hypothesis

These research questions stimulated two hypotheses. The first hypothesis is that active pedagogy results in more significant changes in participants' attitudes toward the

environment than passive pedagogical approaches. The second hypothesis is that active learning strategies result in greater success than passive learning strategies for achieving the stated goals of environmental education (connection, commitment, empowerment and skills).

2. Literature Review

2.1 Historical Environmental Educational Conferences

The United Nations Educational, Scientific and Cultural Organization (UNESCO) held its first intergovernmental conference in 1968 dedicated to what is now known as sustainable development (Perrot- Lanaud, 2005). UNESCO's first sustainable development conference led the way for the United Nations Conference on the Human Environment held in Stockholm in 1972 (Atchia, 2002; Perrot- Lanaud, 2005). Since the Stockholm conference, there have been many more professional meetings that have contributed to the shaping of EE (Atchia, 2002). The first conference dedicated solely to EE was the World Conference on Environmental Education in 1977. Participants of this conference identified five objectives of EE: awareness, sensitivity, attitudes, skills and participation (Hungerford and Volk, 1990). Since there have been many other conferences regarding EE and protection including the Rio de Janeiro Earth Summit of 1992, which attracted tens of thousands of individuals including representatives of 172 governments, 2,400 non-governmental organizations and 10,000 journalists (Perrot-Lanaud, 2005). There were a few important outcomes as a result of the Rio conferences, including the United Nations Framework Convention on Climate Change and the United Nations Convention on Biological Diversity (Perrot- Lanaud, 2005). The most significant outcome was the development of Agenda 21, a joint program dedicated to implementing sustainable development in the 21st century (Perrot- Lanaud, 2005). Authorities from

around the world met again in 2001 at the UNESCO Congress at Santiago de Compostela Spain to discuss "globalization, protection of biodiversity, environment and poverty, environment and peace" (Atchia, 2002 p. 55), all critical themes in EE.

2.2. Origins of Environmental Education

Environmental education (EE) is a newly established science that is gaining popularity. It was not until the environmental movement of the 1970s that the concept of EE as a scientific study became known in the United States (Stevenson, Ferreira, and Emery, 2016). The words environment and education were not even used in conjunction to one another until the mid -1960s (Palmer, 1998). However, the concept of EE first emerged internationally more than a century ago.

Academics first recognized the link between the quality of the environment and the quality of education in the late 1800s (Palmer, 1998). Scottish professor Patrick Geddes is credited for identifying this link and is often considered the founding father of modern EE (Irwin, 1984; Palmer, 1998). Geddes was a botany professor in Scotland during the early 1900s who became dissatisfied with EE teaching methods and with accepted behavior that led to environmental problems (Irwin, 1984). Geddes is credited with pioneering the instructional method in which students have direct contact with their environment (Palmer, 1998). His views were unique and groundbreaking in the early 20th century because he was perhaps the first to see the importance of recognizing the beauty and functionality in rural areas as well as in towns and cities (Irwin, 1984). Geddes's concepts on environmental sustainability created a foundation for EE and conservation methods that were utilized for decades.

Following the surge in EE during the late 1800s and early 1900s, the demand for EE slowed significantly until the early 1960s. The public seriously embraced EE due to works like Aldo Leopold's (1949) *A Sand County Almanac* and Vance Packard's (1963) *The Waste Makers*. These two famous books not only inspired EE, but also provided a detailed history of the environmental movement (Atchia, 2002). Rachel Carson's (1962) *Silent Spring* also contributed to the development of EE. At a time of significant increases in the use of pesticides, *Silent Spring* brought attention to chemical pesticides, specifically DDT, resulting in, "enormous and unknown risks for both the environment and the public" (Hecht, 2012 p.151). The interest in EE continued into the 1970s when EE became part of the academic lexicon.

One of the most important developments in the field of EE occurred in the 1990s, when the United States passed the National Environmental Education Act (NEEA) (Potter, 2010). The NEEA gave the Environmental Protection Agency (EPA) the responsibility to create an office of EE and to strengthen and expand the discipline. In the 17 years since the passage of the NEEA, the agency has spent over $100 million improving and supporting EE programs throughout the United States. The NEEA was written in hopes that a significant number of people would be introduced to environmental concerns in their community and in turn, feel encouraged to protect their community's natural resources. The NEEA expired in 1996 but was still receiving funding for its programs through 2010 (Potter, 2010). However, following President Trump's election in 2016, the EPA budget has been cut by 31% with no report on current funding for NEEA programs (2018 Federal Budget).

Even though the idea and practice of EE had been circulating for centuries, it was not until 1992 that the EPA finally defined EE:

> Increasing public awareness and knowledge about environmental issues and providing the skills necessary to make informed environmental decisions and to take responsible actions. It is based on objective and scientifically sound information. It does not advocate a particular viewpoint or a course of action. It teaches individuals how to weigh various sides of an issue through critical thinking and it enhances their own problem-solving and decision-making skills (as noted in Potter, 2010, p. 23).

The EPA's definition allowed for the science and practice of EE to be formed in a structured setting, one that could be used for years to come.

While it is true that some environmental educators disagree on selected elements of the EPA's definition of EE, there are many essential elements of EE that educators do agree upon. One is that EE is an interdisciplinary practice; EE is known to span the natural sciences, social sciences and the humanities (Simmons, 2000). Another important, and agreed upon, element of EE in the United States is that humans and their landscape modifications are an interactive part of the environment. Consideration that humans and their creations are part of the environment includes issues relating to a multitude of differing human experiences - ranging from political concerns to moral beliefs (Simmons, 2000). Another widely accepted element of EE is that EE recognizes the importance of attitudes, values, and commitment in shaping environmental issues (Simmons, 2000). Scientists emphasize that environmental issues are not strictly scientific in nature; rather, they are a collage of problems (Simmons, 2000).

2.3 EPA's Components of EE

The Environmental Protection Agency's (2016) five components of EE are considered the foundation for EE in the United States:

- Awareness and sensitivity to the environment and environmental challenges;
- knowledge and understanding of the environment and environmental challenges;
- attitudes of concern for the environment and motivation to improve or maintain environmental quality;
- skills to identify and help resolve environmental challenges; and,
- participation in activities that lead to the resolution of environmental challenges.

Environmental awareness is often the primary educational goal of most EE programs (Clover, 2002; Yoleri, 2012). An increase in awareness simply means that an individual is exposed to more knowledge about the environment and environmental issues. Environmental awareness helps people become conscious of significant environmental problems and an understanding that the overall health of the environment is important, at the very least, as it provides the basis of human life support (clean air, clean water, food, fiber and shelter). Often, environmental educators believe that an increase in awareness of environmental problems results in positive behavior change (Hamid, et al., 2017).

Awareness of environmental issues is definitely important; however, one cannot forget sensitivity, or the degree to which an individual cares about the environment (Bustam, et al., 2003). Awareness alone will not result in behavior change; individuals need to *care* about environmental issues in order to provide support for sound

environmental policy. Researchers have found that the best way to instill environmental sensitivity is through EE and outdoor activities at a young age (Bustam, et al., 2003).

Furthermore, mere awareness of, and sensitivity to, environmental issues is not enough; people must also be *knowledgeable*. Environmental knowledge refers to one's understanding of the causes of, extent of, and possible solutions to environmental problems (Zsóka, et al., 2013). Researchers have found that environmental knowledge and pro-environmental attitudes are interconnected (Zsóka, et al., 2013; Bamberg, 2003). An increase in knowledge, awareness, and sensitivity are related to the third objective of attitudes of concern and motivation; these ideas are all interconnected. The hope is that by increasing knowledge and sensitivity, an individual's attitude will be affected and therefore he or she will be motivated to perform pro-environmental behaviors (Hungerford and Volk, 1990).

The last two objectives, skills and participation, are also interconnected. Generally, skills refer to the ability to demonstrate analytical or critical thinking about specific environmental problems; skills can also refer to the physical abilities needed to solve complex environmental problems (Hungerford and Volk, 1990; Eisenberg and Berkowitz, 1990). Without proper skills, individuals might be aware of issues and want to help solve them, but they will be unable to contribute to a solution without requisite skills. The final objective, participation, means to provide people with the opportunity to be actively involved in solving environmental problems (Hungerford and Volk, 1990). Ideally, participation will increase both knowledge and skill level and hopefully result in environmentally-conscious citizens.

2.4 Empowerment

In addition to the attainment of skills to successfully make positive environmental changes, one must then feel personally empowered to follow through with those changes. Empowerment is a broad term that refers to the way in which power is gained or given (Staples, 2017). Since the late 1970s, the term empowerment has been linked to local development, activism and mobilization (Hagquist and Starrin, 1997). The idea of empowerment was especially important during the civil rights, women's rights and environmental movements as it fueled the influence of previously-vulnerable populations. Populations that had typically been unrepresented in political and social arenas began to use their feelings of empowerment to gain influence in the community and to give voice to their formerly under-recognized demands (Hagquist and Starrin, 1997).

Empowerment is closely linked to the strength needed to confidently make decisions and to act on one's own behalf. Once-powerless individuals, after being empowered, are then able to, "become active participants in the creation and implementation of the policies, decisions, and processes which affect them" (Staples, 2017, p. 31). Empowerment is often studied in terms of community/team empowerment or individual empowerment. Although the core of empowerment is the same whether the base is a group or individual, the overall perceptions are somewhat varied. Individual empowerment focuses on personal growth and development and team empowerment is a shared perception of success and growth between multiple individuals working as a greater unit (Chen, et al., 2007) In all areas of empowerment, research has shown that when people feel more empowered they innately feel better about themselves and have increased self-respect and self-esteem (Staples, 2017). For this study, individual

empowerment is the specific concept being explored.

Hungerford and Volk (1990) identified specific variables that predispose individuals to an interest in the environment; some of Hungerford and Volk's variables were classified as empowerment variables (Chawla and Cushing, 2007). Empowerment variables include one's skill in using environmental action strategies and the belief that one can be successful (Chawla and Cushing, 2007). Stern (2000) found that for individuals to be motivated to act on solving environmental issues they need to feel empowered; in other words, they need to believe that they can have an effect on solving environmental issues (Chawla and Cushing, 2007).

2.5 Environmental Movement Accomplishments

The 1970s was an important environmental renaissance period in the United States. From the creation of the Environmental Protection Agency, to the various environmental acts enacted during this period, the 1970s is rightfully known as the beginning of the environmental movement in the United States. One of the most notable accomplishments of this movement was bringing awareness of environmental issues to most American citizens. One specific issue that helped spread awareness for the environmental movement was the effects of exposure to toxic chemicals on public health. One of the most notable cases involved abandoned chemical dumps at Love Canal (near Niagara Falls in upstate New York) and the subsequent health problems caused by the toxic chemical barrels left underground by a few chemical plants (Silveira, 2001; Roger, et al., 1978). Subsequently a school was built on the abandoned property. Several children became very ill due to seepage of these chemicals on the school playground

(Roger, et al., 1978). The Love Canal incident was highly publicized and illustrated the connection between environmental damage and public health, which in turn motivated individuals to solve these problems.

Events such as the Love Canal disaster provided fuel for the environmental movement and resulting legislative changes. Congress passed and improved various environmental laws, including water quality legislation and air pollution laws in 1965, 1970, and 1972 (Silveira, 2001). Citizens' growing concerns led to the Pesticides Act of 1972 (Silveira, 2001). The environmental movement also brought attention to the issue of dredging and filling, industrial siting, and offshore oil development, resulting in the Coastal Zone Management Act of 1972 (Silveira, 2001). After this wave of early environmental regulation, additional laws have been passed and executive orders signed to mitigate environmental damage.

Historically, environmentalists have pushed for the expansion of EE in American schools and by 1980 there were EE coordinators in all 50 states (Bodzin, Klein and Weaver, 2010). With the development of educational programs, more children than ever before were being exposed to EE. A 2014 study of EE and sustainability within American public schools found that, overall, there were significant EE and sustainability initiatives throughout the American public-school system (Chapman, 2014). Individual school programs included efficient use of resources, healthy operations, environmental curriculum, food and nutrition, and student leadership (Chapman, 2014).

Unfortunately, most of the EE programs incorporated into the American public-school system cease after the formative years. A study completed in 2001 showed that only 11.6% (n = 496) of four-year universities indicated that an environmental literacy

course was required for all students (Wolfe, 2001). Of the same 496 schools, only 55 % reported offering an environmental education course that counted towards general education requirements (Wolfe, 2001).The lack of environmental education programs offered in higher education is particularly disturbing given that many of the decisions regarding environmental outcomes are voted upon by adults who are not being properly educated on the matter. The pressure to be environmentally-competent and to practice a sustainable way of life as an adult is learned behavior, leading one to believe that environmental education should be a required course for all formal higher education programs.

Another result of the environmental movement was the desire for more EE programs for adults. However, an increase in programs does not necessarily mean that Americans' opinions on environmental issues changed. One way to determine if EE efforts have been successful is to analyze available survey data over the last few decades. Since 1989, Gallup has published *Trends in Americans' Worry About Environmental Problems*; Gallup's research showed a steady decline in the level of the public's concern about environmental problems (Jones, 2015). The environmental problems identified in Gallup's research included concern over clean drinking water, polluted air, rainforests, and global warming, all of which were of less concern in 2015 compared to 1989 (Jones, 2015). Gallup's data reinforces the notion that an increase in environmental programs or knowledge does not necessarily result in more concerned citizens. Looking deeper into Gallup's data, it shows that the number of concerned citizens is now increasing; however, the *levels* of concern are still below that of 1989 (Gallop, 2020). The poll did not indicate why levels of concern are on the rise, but one possibility is awareness of recent

environmental tragedies that have occurred globally.

2.6 EE Criticisms: Individuals not collective action

Often the EE agenda focuses primarily on raising awareness and advocating for personal behavior change (Clover, 2002). Such a platform focuses on environmental issues at an individual level, with the hope that increasing awareness will lead to changing behavior and result in an overall increase in environmental health. Clover (2002) had two specific criticisms for this type of educational plan. First, studies have found that most adults are aware of the various socio-environmental threats around the world (Clover, 2002). Thus, the awareness-raising component of EE has been accomplished. The bigger issue Clover (2002) has with this agenda is that environmental issues are often complex political and social problems. Often EE programs focus on an individual's personal environmental impact and connection; Clover (2002) argues that this ignores bigger political issues that form a basis of most major environmental problems. Clover (2002) argues that the result is that corporate lobbying, massive tax-breaks to major polluters, and subsidies to chemical industries, are often ignored.

Like Clover, Hill (2013) argues that for EE to be successful, capitalism must be reformed. Hill agrees that EE focused on individuals is unsuccessful. Indeed, Chris William contends that most proposed solutions to environmental problems are directed at privileged individuals, such as driving hybrid vehicles or recycling efforts. Williams argues that in order to solve the environmental crisis there needs to be a focus on deeper and fundamental transformation (as noted in Hill, 2013). Hill (2013) believes that adult EE needs to transform the current instrumental or technical learning into socioeconomic

learning. To facilitate such learning, Hill (2013) recommends the creation of a deep, green adult education; the focus of which would be to turn economical/financial consciousness to eco-consciousness.

The problems that Hill and Clover discussed are related to the concept of environmental citizenship. Environmental citizenship, a term often used in environmental education literature, can be categorized in two ways. The first is the personal duty approach, in which humans "have an individual responsibility to take actions that protect the environment while also claiming rights to environmental goods, such as clean air and water" (Schild, 2016, p. 21). This categorization places the responsibility on individuals to solve environmental problems and minimizes the role of institutional structures in the causes and resolutions of environmental problems (Schild, 2016). A downside to this category is that it fails to incorporate the importance of collective action, and results in depolarization and privatizing of environmental issues (Schild, 2016).

The second categorization of environmental citizenship emphasizes deliberation, civic participation and an overall commitment to a common good (Schild, 2016). This version of environmental citizenship, called the participatory rights approach, argues that "economic reforms, technological advancements, or individual lifestyle changes will not be enough to tackle environmental issues…" (Schild, 2016, p.22). This version of environmental citizenship recognizes that for environmental issues to be improved, individuals need to go beyond their personal beliefs and proceed in collective action to make positive environmental changes and aligns with the views of Hill and Clover previously outlined. The downside of this particular version of environmental citizenship is that it does not consider existing structures of injustice within political agencies that

stunt environmental growth and health (Schild, 2019).

2.7 EE Criticisms: Lack of Adult EE

Unlike education for children, the origins of which can be traced back to early Greece, adult education did not become systematically organized until the 1920s (Knowles, 1975). From 1929 to 1948 the *Journal of Adult Education* published various articles that explored the unique teaching styles required to teach adult learners. Many educators were not used to teaching adults and there was a lack of research supporting the new ideas of adult EE, thus some adult educators felt uncomfortable in this new field (Knowles, 1975). As a disciplinary field, adult education did not take off until the 1960s, when new research provided insights into adult learning (Knowles, 1975). As with EE for children, environmental adult education (EAE) did not become a subject of interest until the 1970s. The first article that distinguished EAE from traditional EE was Emmelin's 1976 publication entitled *The Need for Environmental Education for Adults* (as noted in Haugen, 2009). Emmelin's article was important in bringing awareness to the need for continuous EE, while also explaining how adult EE needs differ from traditional EE. Unfortunately, even after 1976, adult EE did not take root internationally nor in North America.

The Brundtland Commission Report, *Our Common Future,* reignited the desire for adult EE in 1987 (Lange, 2010). The Brundtland Report provided a global agenda for sustainable development and encouraged the International Council for Adult Education (ICAE) to establish the Learning for the Environment Program in 1991 (Lange, 2010). However, even with these advances and the media attention from the International

Council for Adult Education's 1989, 1992, 1995, and 2000 environmental education publications, adult EE lay nearly dormant until the late 1990s (Lange, 2010). The fifth UNESCO international conference on adult education in 1997 produced a formal definition of adult education:

> [A] permanent process in which individuals gain awareness of their environment and acquire the knowledge, values, skills, experiences, and also the determination which will enable them to act individually and collectively to solve present and future environmental problems . . . as well as to meet their needs without compromising those of future generations (UNESCO, 1999, p. 4).

As it is a new field, studies regarding adult EE are severely lacking. There are a multitude of articles that analyze the success and misfortunes of EE for children, but few on adult EE. According to Lange (2010), theoretical and empirical research is needed to bring EE to fruition and social relevance.

2.8 EE Criticism: Lack of Inclusivity

Another criticism of the EE agenda is its lack of diversity; specifically, the observation that EE often does not address the concerns of, nor actively advocate for, participation from people of color (Lewis and James, 1995). The original definitions of EE reflect an inclusive field of study. The National Environmental Education Act of 1990 defines EE as "a study of the factors influencing ecosystems, mental and physical growth, living and working conditions, decaying cities, and population pressures" (as quoted in Lewis and James, 1995, p.1). Lewis and James (1995) explain that the "environment" is all-encompassing and "environmental issues" are social, physical, and economic. This

original EE framework was created to improve the quality of life for all people. Unfortunately, environmental educators have found that the discipline is less inclusive than originally intended. Not only does the content focus primarily on biological sciences lacking human ecological topics, but also educators find it difficult to locate material suitable for multicultural urban settings (Lewis and James, 1995). Lewis and James (1995) cite the work of Sly (1991), who found that even though environmental issues impact all races and socioeconomic groups, EE has focused primarily on white, middle-class students. To help create EE agendas that are inclusive, a more diverse group of people need to be involved in creating EE programing. One cannot expect a group that lacks diversity to create a program that will address the needs of various ethnic and socioeconomic groups.

A diverse group of educators is not the only thing needed to improve EE for communities of color; educators need to understand the cultural significance of nature to many communities. As Finney (2014) explains, there are various natural environments that black individuals associate with slavery. For example, one of Finney's (2014) interview subjects claimed that trees are associated with lynching. Also, slaves were often called animals for living in the woods; the comparison of slaves to animals was used by slave owners to make slaves feel subhuman (Finney, 2014). The stories and beliefs of the past were passed onto future generations resulting in entire communities harboring negative feelings toward the environment. Thus, for EE to be successful, the fears and ideas of communities of color need to be addressed.

To address the lack of diversity and understanding within current EE curricula, Nordström (2008) recommends incorporating multicultural education within EE. Cultural

education can be defined as both teaching *in* a multicultural society and teaching *about* multicultural societies (Nordström, 2008). More importantly, though, is the goal of cultural education: to ensure educational equality among individuals of diverse ethnic, racial and socioeconomic status (Banks, 2006). Thus, it is beneficial to combine EE and multicultural education because environmental issues affect people from all walks of life, and they all deserve access to proper EE. The hope is that connecting environmental and multicultural education for students from all backgrounds, will lead to greater understanding of the interconnectedness of people, society, and the environment (Nordström, 2008).

The percentages of communities of color in America are rapidly increasing; it is important that these communities are aware of, and committed to, environmental causes. According to a 2015 U.S. Census Bureau report, more than half of American children are expected to be from minority communities by 2020 (Chappel, 2015). For the environmental movement to be successful the entire American population needs to be involved. Thus, the fate of the environmental movement will be in the hands of minority groups; the groups that have often been excluded from the environmental movement. It is also important that diverse communities are involved in EE to address the issue of environmental justice. Environmental justice, also known as environmental racism, revolves around the realization that communities of color and low-income communities have a disproportionate burden of pollution and other environmental health hazards (Garibay, Ong, and Vincent, 2016). If low-income communities and communities of color are not educated on environmental issues, they will not be able to properly fight against environmental injustices.

2.9 Behavior Change

An underlying goal of EE is behavior change; educators want to help individuals make informed decisions regarding their environmental behavior (Boyes and Stanisstreet, 2012). Most environmental educators are under the impression that an increase in environmental awareness and knowledge will result in behavior change. However, research has found that merely increasing environmental awareness and knowledge will not change behavior (McGuire, 2015; Boyes and Stanisstreet, 2012; Masud, Akhtar, Afroz, Al-amin, Kari, 2015). Masud (2015) found that an increased awareness was completely unsuccessful for elevating an individual's pro-environmental behavior. McGuire (2015) concluded that to accurately influence behavior through EE, one needs to understand the psychology of how people think and what determines behavior.

Other researchers have analyzed how individuals' attitudes (rather than knowledge, per se) impact their views on the environment (Masud, et al., 2015; Sapians, Beeton, and Walker 2016). It is believed that positive attitudes will enhance an individual's pro-environmental behaviors, which will minimize the negative human-caused impact (Masud, et al., 2015). However, more research is needed to prove the claims that attitude directly affects behavior. There are many different opinions regarding the specific attitude variables that need to be altered to affect behavior. Sapians argues, for example, that self-transcendent values, a value for others rather than one's self, are correlated to pro-environmental behaviors (Sapians, et al., 2016).

It is difficult to employ behavioral research when studying environmental education because behavioral change is such a broad and complex topic. Extensive

literature exists on the challenges to understanding why people behave the way they do (Martin, Weiler, Reis, Dimmock, and Scherrer, 2017). Research has found that human behavior changes over time due to external contextual influences and internal psychological attributes (Martin, et al., 2017). Most behavioral studies will focus on internal, or intrinsic factors, such as attitudes or beliefs. However, external factors such as physical barriers or monetary fines will also influence the way in which individuals behave (Martin, et al., 2017).

The complexity of environmental behaviors is evident in the fact that there is an entire subcategory of psychology rightfully called environmental psychology. When environmental psychology first appeared in the 1960s, it was a response to the public's "dissatisfaction with human environments not being planned, designed, and built to be optimally appropriate for human beings" (Gärling, 2014, p. 127). However, as Gärling (2014) points out, there was little awareness that people caused environmental problems in the 1960s. As time progressed and researchers came to an understating of how detrimental human behavior has been to the environment, environmental psychology shifted its focus to changing human environmental behaviors (Gärling, 2014). Even with an entire field dedicated to environmental behavior research, there is still a lack of scientifically-proven theories that address how to actually change environmental behaviors.

A common factor in behavior change research is that the studies are longitudinal; longitudinal research allows one to accurately conclude if there was a change in human behavior. Longitudinal research is conducted over a certain period of time, as short as a few weeks to several years, and participants need to be reevaluated periodically. If

researchers are unable to conduct longitudinal studies due to time constraints, they may choose to study attitudes instead of behavior, as research on attitude change is able to be conducted over a shorter period of time.

2.10 Pedagogical Approaches: Active and Passive Learning

The knowledge obtained by students is heavily influenced by the pedagogical approach the instructor chooses to use. Pedagogy is a method of teaching and learning. Pedagogy focuses heavily on connections and synergy between teachers and their pupils, including differing learning strategies, environments and tasks (Welch, 2017). There are different pedagogical approaches used within adult education. Two approaches analyzed for this study are active and passive learning. Active learning refers to any style of learning in which the learner is responsible for his or her own learning (Michel, Cater and Varela, 2009). The process of active learning is described as students doing things and dynamically thinking about what they are doing in the midst of completing a task. Participants who are engaged in active learning are not only participating in the educational activity at hand but are attempting to gain a better understanding of the educational content through active participation in the activity (Michel, Cater and Varela, 2009). A specific subset of active learning is service learning. Service learning is an educational experience that incorporates active community service in order to strengthen communities and enrich the overall learning experience (Service learning, 2017). Of course, there are many more categories and types of active learning including: facilitating small-group discussions, leading laboratory experiments, taking field trips and using games as a way to enhance the learning experience (Michel, Cater and Varela, 2009).

Active learning has significant advantages when compared to other learning styles, including the first-hand ability to improve problem-solving using applied critical thinking skills. Active learning refers to students' dynamic participation in educational programs with an overall goal of participatory problem-solving. One particular subset of active learning is solely dedicated to improving problem-solving tactics, a pedagogy known as problem-based learning methods. In active, problem-based learning, students are encouraged to vigorously work through problems and to reflect on issues in order to acquire knowledge on a deeper level than can be obtained during passive learning (Cattaneo, 2017). Problem–based learning is also used to empower learners to use any obtained knowledge and skills to develop viable solutions to problems (Cattaneo, 2017).

Besides being incredibly useful for problem solving, active learning has been readily linked to the improvement of overall critical thinking skills (Nelson and Crow, 2014; Tedesco-Schneck, 2012). Active learning has been used for centuries with the first recorded use being within Socrates' passages. Socrates used active learning to foster critical thinking in his followers. Socrates encouraged his students to use reflective thinking through proactive questioning, a widely accepted form of active-learning (Tedesco–Schneck, 2012). As time passed, there were more cases of active learning and research supporting its use. In 2004, Burbach, Matkin and Fritz found that active-learning strategies did improve critical thinking when using the Watson-Glaser Critical Thinking Appraisal (Nelson and Crow, 2014). The Watson-Glaser Critical Thinking Appraisal scale measures decision-making ability, predicts judgment, problem solving, and creativity (Nelson and Crow, 2014).

In most educational settings, the majority of information is provided through

passive learning. Passive learning knowlege is presented using lectures with little to no time for student discussions or other educational exercises (Michel, Cater and Varela, 2009). Studies have found that education that relies solely on passive learning strategies results in less information being retained by the individuals involved, especially when compared to active learning or mixed methods (Michel, Cater and Varela, 2009). One of the main problems with passive learning is the lack of student attention. It was found that most students tend to lose focus easily during lessons involving only passive learning (Michel, Cater and Varela, 2009). Over time, educators have attempted to change learning techniques and lessons to incorporate more active learning strategies into their curriculum (Michel, Cater and Varela, 2009). Educators have noticed the negative effects of lecture-only, passive learning and studies have shown that students prefer active learning pedagogy (Bonwell and Eison, 1991); however, many EE programs are still heavily focused on passive learning only. Many EE programs rely solely on lecture-based series to relay information to individuals and communities. This study will attempt to compare active versus passive learning strategies in regard to outcomes of EE in hopes of determining the superiority of active or passive learning strategies, one over the other.

2.11 Engagement Theory of Learning

Active and passive learning are not the only pedagogies used in classroom settings. Another educational concept is the engagement theory of learning. The engagement theory of learning is a multidimensional concept that combines differing learning strategies to increase student participation and overall success. There are three components of student engagement: behavioral engagement, emotional engagement and cognitive engagement. A majority of research looks at these concepts independently as

separate educational identities. Engagement theory differs as it purports that the most successful teaching strategy is to incorporate a multidimensional construct that uses strategies from all three engagement components. Fredricks argues that analyzing "components of engagement individually separates students' behavior, emotion, and cognition [when] in reality these factors are dynamically interrelated within the individual…" (Fredricks, et al., 2004). However, because most established studies look at the three components of engagement theory separately it is important to understand each type separately.

In academia, behavioral engagement is defined in three ways. According to the piece, *School Engagement: Potential of the Concept, State of the Evidence*, the first definition involves engaging in positive conduct, such as listening and following rules (Fredricks, et al., 2004). The second refers to the involvement in learning and academia, such as putting forth effort and asking questions; the final definition considers school event participation (Fredricks, et al., 2004). When looking at elementary, middle, and high school students, researchers have found that there is a positive correlation between behavioral engagement and achievement-related outcomes. This being said, it has also been deduced that behavioral engagement alone may not be an accurate predictor of student performance on assignments that require a deeper, more solidified knowledge of the material (Fredricks, et al., 2004).

In engagement theory, emotional engagement refers to any affective reaction that a student may feel during an activity, including "interest, boredom, happiness, sadness, and anxiety" (Fredricks, 2004). Fredricks and his colleagues found that there was a lack of research focused solely on emotional engagement. This being said, there are studies

that show a correlation between achievement and a combination of emotional and behavioral engagement (Fredricks, et al., 2004).

The final component in engagement theory, cognitive engagement, is connected to the theory of investment. In this context the idea of investment refers to one's "thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills" (Fredricks, et al., 2004). Cognitive engagement is either strategic or self-regulating and ranges from simple memorization to the use of self-designed learning strategies to promote in-depth understanding and expertise of any given material. According to Fredricks, there have been numerous studies focused on the benefits of incorporating cognitive engagement strategies in the classroom (Fredricks, et al., 2004).

2.12 Evaluating Environmental Education Effectiveness

At the core of this study is an evaluation of available non-formal EE programs for adults located across Pinellas County. By separating the educational programs into a range of active and passive learning techniques, the effectiveness of specific programs can be better analyzed. The overall goal of EE is to create a more environmentally-literate society (Carleton-Hug and Hug, 2010). As a general rule, to improve environmental literacy, the design of most EE programs is developed to change the learner's cognitive affective and participatory knowledge, skills and behavior (Carleton-Hug and Hug, 2010). However, what is lacking is evaluation of adult environmental programs to determine whether or not they have obtained their intended goals (Carleton-Hug and Hug, 2010).

Researchers Carleton-Hug and Hug (2010) identified various challenges resulting

in the lack of evaluation of EE programs. One of the main challenges to evaluating EE is the diversity of the field. There are many different definitions of EE, which lead to disagreements over the ultimate goal. The current debate is whether or not the goal of EE is, "to influence intended behavior, knowledge, and/or attitudes" (Carleton-Hug and Hug, 2010, p.160). In schools, EE spreads into other disciplines; earth science, natural sciences, and social sciences are just some of the many subjects within which EE can be taught (Carleton-Hug and Hug, 2010). The problem with the diversity in definition and educational discipline is that it is difficult to create an evaluation tool that is relevant for all EE programs when each program may be fundamentally different.

Another problem identified by Carleton-Hug and Hug (2010) is a lack of clear program objectives. In their research they discovered that many programs did not have clearly listed objectives and if they did, they were often not reaching the goals that were set forward (Carleton-Hug and Hug, 2010). Before an evaluation assessment is created, researchers need to know what the program is trying to accomplish; clear objectives and missions are needed for every EE organization. Armed with accurate evaluation criteria, environmental educators can analyze their programs to determine if they are designing them to actually meet their goals.

2.13 Measuring Attitudes

In this study, adult participants' environmental attitudes were measured with the hope that after adults participate in an EE activity, there will be a change in some of their environmental attitudes. It is of foremost importance to have an understanding of the adult participants' environmental attitudes, both before and after the activity, to

determine the level of change brought on by the educational activity. The importance of determining attitude is a topic that has been thoroughly discussed within the field of psychology.

One of the main topics researched by environmental psychologists is environmental attitudes (EA). The topic is of such popular appeal that half of all environmental psychology publications are specifically related to EA (Mifront and Duckitt, 2010). One definition of attitudes that can be found within psychological work is the, "favorable or unfavorable feelings toward a characteristic of the physical environment or toward a related problem" (Metin, 2010, p.3). Researchers often look into attitudes with the false belief that a change in attitude will change behavior. Even though behavior and attitudes are not necessarily correlated, research into both attitudes and behaviors are important to the field of EE.

Attitudes are considered a latent construct, meaning that attitudes are theoretical in nature and cannot be directly observed (Mifront and Duckitt, 2010). In social sciences attitudes have to be inferred from overt responses (Mifront and Duckitt, 2010). Determining attitudes from overt responses can be done through either direct self-report methods or implicit measurement techniques; this study used methods from each category. Surveys and interviews are considered direct self-report methods and are the primary methods used in environmental attitude research (Mifront and Duckitt, 2010). Participant observation was also used in this study, which is considered an implicit measurement technique. In social science research attitudes are often measured using scales. There have been hundreds of scales created to identify environmental attitudes; a

few of the many environmental attitude scales will be discussed in the next section of this paper.

2.14 Attitudinal Scales

There are many attitudinal scales used in research; however, not all were compatible with this research. One attitudinal scale was created in 2010 by Turkish Researcher, Mustafa Metin. Metin created an environmental issues attitude scale for students that could be used for various grade levels. Metin created a 27-item scale called General Attitude Scale about Environmental issues (GASE) that measures five dimensions of environmental issues. The first factor measures individuals' willingness to learn and be informed about environmental issues; the second measures explanations of disbelief as related to environmental issues (Metin, 2010). The third factor measures an individual's sensitivity towards environmental issues and saving the environment (Metin, 2010). The last two factors measure a disbelief in environmental pollution and belief in protecting habitat (Metin, 2010). Metin's survey was administered to 1,225 students in Turkish schools at various grade levels. Using Cronbach alpha statistical tests, Metin's scale was found to be a valid and reliable attitude scale to measure attitudes toward environmental issues (Metin, 2010). Even though Metin's scale was found to be reliable, I did not choose it for this study. Metin's study was only conducted with school-aged individuals while my study looks at adults. Metin's scale was also not selected as it was created in Turkey; thus, there might be cultural differences that may affect the construction of interview questions.

According to Milfront and Duckitt (2010), even though there have been thousands of environmental attitudinal scales created, like the one above, there are only three that

have been used widely and that have had their validity and reliability assessed. The three scales that Milfront and Duckitt consider reliable and valid are: the Ecology Scale, the Environmental Concern Scale, and the New Environmental Paradigm (NEP) scale (Milfront and Duckitt, 2010).

Malony and Ward originally created the Ecology Scale in 1973; it was revised to its current version in 1975. The Ecology Scale contains 45 questions and evaluates four subcategories: verbal commitment, actual commitment, affect, and knowledge (Malony, Ward, and Braucht, 1975). Verbal commitment refers to what an individual says they are willing to do regarding ecological and pollution issues, while actual commitment is action an individual takes (Malony, Ward, and Braucht, 1975). How the person feels about the issues is the affect and knowledge is any relevant knowledge the individual has (Malony, Ward, and Braucht, 1975). It was found that the Ecology Scale only takes 10 minutes and clearly distinguishes individuals who have a high concern and commitment for ecological issues (Malony, Ward, and Braucht, 1975). However, the Ecology Scale was not chosen for this study as it has become outdated and new environmental issues have emerged (Milfront and Duckitt, 2010).

Russell and Joan Weigel created the Environmental Concern Scale in 1978. The Environmental Concern Scale is a 16-item Likert scale that analyzes individuals' concern about conservation and pollution issues (Weigel and Weigel, 1978). The original scale was found to be reliable by using samples from both a Western city and a New England town (Weigel and Weigel, 1978). Validity of the scale was checked using known-group comparisons that indicated that Sierra Club members had a greater concern and were more homogeneous in their environmental attitudes when compared with a random

sample of adults (Weigel and Weigel, 1978). Even though the Environmental Concern Scale was found to be reliable and valid for adult populations, it was not chosen for this study because the questions have not been updated since the 1970s and thus have lost some relevance (Milfront and Duckitt, 2010).

The New Ecological Paradigm (NEP), the last scale that Milfront and Duckitt have identified as reliable and valid, was determined to be the most appropriate scale for this study. Unlike the Ecology Scale and the Environmental Concern Scale, the NEP was created using only general environmental topics and measuring the overall relationship between humans and the environment in order to avoid becoming outdated (Milfront and Duckitt, 2010). Another unique aspect of the NEP scale is that it measures an ecocentric system of beliefs rather than anthropocentric beliefs (Milfront and Duckitt, 2010). Dunlap and Van Liere published the original NEP scale in 1978. However, this study used the revised NEP scale published in 2000. The revised NEP scale is comprised of a list of 15 statements; participants are asked to disagree or agree with them. For example, "despite our special abilities humans are still subject to the laws of nature" and "humans will eventually learn enough about how nature works to be able to control it" (Dunlap, et al., 2000). The 15 statements, including six from the original scale, were created to include five hypothesized facts of an ecological worldview (Dunlap, et al., 2000). The five hypothesized facts of the NEP scale are "the reality of limits to growth, anti-anthropocentrism, the fragility of nature's balance, rejection of exceptionalism, and the possibility of an Eco crisis" (Dunlap, et.al, 2000). For this study, the NEP scale was incorporated into a larger survey. The supplemental survey questions were designed to address variables and questions that are specific to this study and to the study sites.

2.15 Pre- and Post- Surveys

The NEP scale is able to determine participants' environmental attitudes. However, the objectives of this study included assessing if there had been a change in environmental attitudes prevalent before engagement in an educational activity versus after engaging in the activity. To determine if there was a change there needs to be both pre- and post-surveys. A pre-survey simply means a survey distributed before an activity, while a post-survey is done after the activity is completed. Post-surveys can be administered immediately after completion of the activity or can be conducted months after an activity has taken place. Using pre- and post-surveys is a favorite of many researchers as it is believed to detect any changes of participants' beliefs as a result in their participation in the program; changes can include participants' knowledge, attitudes, or behaviors (Colosi and Dunifon, 2006).

2.16 Summary

The environmental movement in the United States made great strides toward environmental protection during the 1970s to the 1990s. Enactment of significant legislative changes has increased environmental protection and awareness. However, persistent and urgent challenges of the global environment make it critical that the general population be aware, educated and empowered. The research conducted during this study acknowledges one of the current flaws of EE programs: a severe lack of suitable adult programs. This study will help bring to light to the groups of people who attend environmental programs and determine the efficiency of current adult environmental programs. The information collected in this study will contribute to our understanding of how existing adult EE activities influence both participants' knowledge

and their attitudes toward the environment. By comparing diverse types of activities on a scale from passive to active learning strategies, this study will help to identify which type of learning experience is more effective for increasing both knowledge of the environment and a commitment to solving environmental problems.

3. Methodology

In order to meet the research objectives, qualitative research was utilized to better understand the impact EE activities have on adult participants. Surveys, participant observation, and interviews were used to obtain qualitative data which were analyzed using standard techniques, including content and thematic analysis and percent analysis. The data collected was reviewed to reveal specific themes that highlight the differences between active and passive learning pedagogies and which strategy produces the best educational outcomes.

3.1 Study Sites

Four environmental education organizations provided the study sites for this research. Data was collected at two natural preserves, Weedon Island Nature Preserve and Boyd Hill Nature Park, during activities such as nature walks, invasive plant removal programs and lectures hosted at the preserves. Data was also collected at events held by two environmental non-profits, Keep Pinellas Beautiful and Tampa Bay Watch. These two organizations conduct many environmental activities such as beach clean-ups and the construction of sustainable ecological habitats. A combination of qualitative research techniques were used at each site and are discussed in the following sections.

Weedon Island Nature Preserve. Weedon Island Preserve is a 3,190-acre natural area located in Pinellas County, Florida, it is a natural oasis surrounded by a bustling suburban community (Weedon Island, 2017). The current mission of the preserve is "to

empower citizens to make informed decisions about natural and cultural resources" clearly demonstrating the park's commitment to EE (Weedon Island, 2017). One of the passive learning activities offered at Weedon Island is the monthly anthropology lecture; the preserve also offers more active events such as guided mangrove hikes.

Boyd Hill Nature Preserve. Boyd Hill Nature Preserve is another natural environment in Pinellas County, Florida, and offers similar learning experiences as those offered by Weedon Island Nature Preserve. Boyd Hill is a 245-acre preserve located in the heart of Saint Petersburg, formerly known as Lake Maggiore Park (Boyd Hill Nature Preserve, 2017). One of the adult programs currently being offered at Boyd Hill is a natural history speaker series. The speaker series features a diverse range of speakers on Florida's natural and cultural history (Boyd Hill Nature Preserve, 2017).

Keep Pinellas Beautiful. Keep Pinellas Beautiful (KPB), a Keep America Beautiful affiliate, is a non-profit organization founded in 1992 that serves the entire Pinellas County area. "The mission of Keep Pinellas Beautiful is to conserve and beautify the natural environment through community engagement and education" (Keep Pinellas Beautiful, 2017). Every month KPB hosts various interactive environmental cleanups throughout the county. Cleanups range from simple beach cleanups to more extensive mangrove cleanups.

Tampa Bay Watch. Tampa Bay Watch is an environmental non-profit established in 1993. The main goal of Tampa Bay Watch is to help the Bay recover from its environmental problems; the goal is accomplished through habitat restoration and protection activities hosted by the organization throughout the year (Tampa Bay Watch, 2017). Tampa Bay Watch is most known for its salt marsh and oyster restoration projects.

As of today, Tampa Bay Watch has restored over 249 acres of wetland habitat and planted 334,204 plugs of salt marsh grass (Tampa Bay Watch, 2017).

3.2 Distinguishing between Active and Passive Learning

An important aspect of this study is the separation of learning activities into either active or passive learning strategies. However, when researching the activities at each study site, it became clear that the distinction between active and passive is often blurred. The main difference between passive and active learning is the process of critical thinking. Active learning is learning in which participants are actively engaged in the subject matter rather than just listening to content in lecture form. Thus, some activities that may appear to be active learning, such as guided hikes, might not actually be active learning. Guided hikes are physically active, but depending on the environment, the education elicited during the hike can technically be classified as either an active or passive learning strategy. If there is minimal discussion during the hike and the guide is lecturing information to the participants during the activity it would be classified as a mentally-passive activity, thus making it an example of passive learning. Due to the grey area in existing classifications of active versus passive learning activities, a scale was created to determine whether a given activity is mentally active, or passive as well as physically active, or passive. The following table (Table 1), shows an example of how an activity was categorized as passive or active. In this example, the activity was a guided hike where little critical thinking was required. If an activity is 80% active or passive, a check mark will be placed in the corresponding box. Any activity that is an equal mix of active and passive will be considered combined.

Table 1: Example of active/passive chart for a purely listening guided hike

	Physically	Mentally
80 % or more Active	X	
Combined		
80 % or more passive		X

3.3 Study Population

This research focuses solely on adult environmental education in Pinellas County. According to the U.S. Department of State (2017), in the United States, once a child turns 18, he or she is classified as a legal adult. Because of the legal age requirement, only individuals aged 18 and older were asked to participate in this research study. The adult population of Pinellas County is over 900,000 people (U.S. 2019 Census). However, the study population of this research is not all adults in Pinellas County; rather, only those adults who attend non-formal EE in Pinellas County. While the sample frame for this research is limited to adults who attended the same events as I did. Originally, the USF Institutional Review Board only approved this study for participants between the ages of 18 to 65 as older adults are considered a vulnerable population in research. However, as this excluded many individuals who wanted to participate in this study, approval was granted to increase the age limit of participants to anyone over the age of 18. A total of 126 adults participated in this study; 15 of whom are older than 65.

3.4 Qualitative Methods

This study utilized surveys, participant observation, interviews and document analysis. Surveys, participant observation and interviews are considered qualitative research. According to Berg and Lune (2017) qualitative research "refers to the

meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things" (p.2). Qualitative methods are beneficial when trying to understand complex ideas such as attitudes and behavior.

Qualitative research combines many different methods to provide a superior, more inclusive understanding of a topic. Qualitative research predominantly focuses on an interpretive, naturalistic approach to its subject matter (Berg and Lune, 2017). The unique naturalistic approach means that qualitative researchers prefer to study subjects in their natural settings and attempt to make sense of and to interpret the personalized meanings behind things and experiences shared by a given group of subjects.

This research was structured as a series of case studies. According to Berg and Lune (2017) the case study method is a way for researchers to "systematically investigate an event or a set of related events with the specific aim of describing and explaining these phenomena. . ." (p.160). Case studies are beneficial as they can be used to examine various types of phenomenon, from the simplest of ideas to very complex situations (Berg and Lune, 2017). Case studies use a variety of data-gathering techniques that can result in meaningful results; they are particularly useful for applied research as they contain practical goals and are focused on specific places and particular organizations.

Various types of sampling methods are used in qualitative research; for this study, purposive samples were used. Purposive sampling, often called judgmental sampling, is when researchers use previous knowledge of some group to select subjects are representative of a specific population of interest (Berg and Lune, 2017). This technique allows researchers to make conclusions about certain populations. For this study, sample participants were adults who participate in environment education activities.

3.5 Survey Methodology

Surveys, also referred to as questionnaires, are valuable tools that allow researchers to ask people about their attitudes, behaviors, opinions and beliefs (Polland, 2005). Surveys, when designed properly, help researchers determine how people really think and act. Determining how people really think and act is a difficult task as humans tend toward biases when answering questions about themselves.

To determine participants' attitudes towards the environment, both before and after an educational event, the New Ecological Paradigm (NEP) scale was used. The NEP scale was developed by Riley Dunlap and his colleagues and contains eight positively-worded and seven negatively-worded statements that can be used to determine an individual's level of environmental concern (NEP Scale, 2012). Additional data was gathered to Dunlap's scale to measure participants' feelings of connection with their environment, their sense of empowerment in solving environmental problems, and their commitment to solving environmental problems. Additional questions were added to identify participants' demographic information. See Appendix A.

Of the 23 events attended, surveys were distributed for 19 of these events. To allow for ample time, the pre-survey was distributed to participants who arrived early. I approached adults who were waiting for the activity to begin, introduced myself and explained the consent form with willing participants. Hard copies of the survey were then distributed. Participants were asked to initial their surveys at the top so that pre- and post-surveys could be correctly linked. Immediately following participation in the activity, the same set of participants were given the post-survey. Each survey contained an informed consent form that was signed before completing the pre-survey. One

hundred and twenty-six pre-and post-surveys were completed. Thirty-four adult participants were surveyed at Weedon Island Preserve and Boyd Hill Nature Preserve. Twenty-eight adults were surveyed at Keep Pinellas Beautiful events and 30 participants were surveyed at Tampa Bay Watch events.

3.6 Survey Data Analysis

Data from the survey was analyzed using percent analysis. Percent analysis systematically breaks down how participants answered each question. This type of analysis was further used to determine how the results changed depending upon the given variables. Variables that were used in this percent analysis were demographics, commitment, connection, empowerment, and classification as passive or active learning strategies.

Survey data was also analyzed to determine human environmental attitudes using the NEP scale; remember, the NEP scale is a reliable and valid survey that indicates participants' ecological view. The NEP scale contains 15 statements that incorporate "five hypothesized facets of an ecological worldview: 1) the reality of limits to growth (1, 6, 11); 2) anti-anthropocentrism (2, 7, 12); 3) the fragility of nature's balance (3, 8, 13); 4) rejection of exceptionalism (4, 9, 14); and, 5) the possibility of an eco-crisis (5, 10, 15)" (Dunlap, et al., 2000, p.8). The odd-numbered statements were worded so that agreement indicates a pro-ecological view. Conversely, the even-numbered statements were worded so that disagreement indicates a pro-ecological view (Dunlap, et al., 2000).

For each statement, participants were asked to select one of the following: *strongly agree*, *mildly agree*, *unsure*, *mildly disagree*, or *strongly disagree*. To determine each participant's NEP score, the qualitative responses first needed to be coded. Each

statement response was given a number 1 through 5. There were eight odd-numbered statements that indicate a pro-ecological view when agreed upon. These eight statements were coded as follows: *strongly agree* was counted as 5 points and *strongly disagree* was counted as 1 point. There were seven even-numbered statements that indicated a pro-ecological view when disagreed upon. These seven statements were coded as follows: *strongly disagree* was given 5 points per statement and *strongly agree* was given 1 point. A possible total of 75 points could have been obtained depending upon statement responses. Each participant completed a survey, the 15 questions were reviewed, and the scores were calculated. To determine the overall percentage obtained, participants' scores were divided by the 75 total potential points and multiplied by 100. Following Thomson (2013), participants with NEP scores between 79-100 percent are considered to have a pro-ecological view; participants with a NEP score between 54-78 percent are considered to have a mid-ecological view and participants with total scores of 53 percent or less are considered to have an anti-ecological view. NEP survey scores were calculated for each participant both the pre-and post-event and the two scores were compared to see if there were any changes. For participants whose post-survey results placed them into a different category, their surveys were individually analyzed to see which particular responses changed. Any of the statements in which a participant changed their response by at least two measures, such as from *strongly agree* to *unsure* were recorded. I then looked at participants who recorded the greatest changes from the pre-to post-event and attempted to determine whether or not there were any similarities between them.

3.7 Participant Observation

Observation was another tool utilized for this study. Participant observation is a method that allows researchers to obtain data in a natural setting, by observing and participating in the activities along with the individuals being studied (Dewalt, 2002). Participant observation was conducted at each of the four study sites. At Weedon Island Nature Preserve, I attended seven events with a total of 10 hours of participant observation. I also attended seven events at Boyd Hill Nature Preserve, during which 11 hours of participant observation were conducted. Tampa Bay Watch events were of the longest duration and I attended only three events resulting in 10.25 hours of participant observation. Finally, my attendance at six Keep Pinellas Beautiful events led to 11.5 hours of participant observation.

Observational data includes notes and photos taken continuously throughout the events. For example, it was possible to photograph animals and scenic areas during guided hikes. These photographs were later used as a reference to help me to recall specific details of the events. During lectures and activities with low physical impact I was able to write down notes and observations throughout the event. During the more physically-demanding events, such as building oyster domes, it was impossible to record notes during the event. I was, however, able to have brief conversations with participants throughout the physically-demanding events as well as during the less physical events. These conversations included discussions regarding their experiences with environmental activities, their motivation for attending the event, how the activity is impacting them and if the experience was positive or negative overall.

As part of the observational data collected, I also kept field notes following each activity. I attempted to record observational clarifications of the event as well as descriptions of people and places involved in the activity. I also maintained a separate journal to record personal reflections, thoughts, concerns and frustrations during the experience. Reviewing the journals following event attendance was needed to determine if any new patterns emerged that needed further investigation.

3.8 Participant Observation Data Analysis

Participant Observation was analyzed using thematic content analysis. Thematic analysis is the emergence of themes throughout qualitative data (Aronson, 1994). The first step was to identify keywords in the transcript and to search the collected data to locate similar keywords. The second step was to analyze the sentences that surrounded the keywords. The specific sentences surrounding key words were then placed into an spreadsheet and analyzed to determine recurring themes. Thematic analysis of field notes allowed for identification of positive and negative atmosphere, and the comments and expressions of the participants at each event. Thematic analysis and the identification of key words was also used to determine if skills were acquired during the activity and if participants felt empowered following event attendance.

3.9 Interview Methodology

Often described as an art rather than a science, interviewing at its core is a conversation with purpose, the purpose being to gather information (Berg and Lune, 2017). Interviews are useful to understanding people's lives. Unfortunately, individual responses are influenced by factors that lie below conscious awareness; thus, the validity of what people say during interviews is affected (Berg and Lune, 2017). Therefore,

during interviews one can ask questions that address preferences, rationalizations and intentions but interviews are not the best method for discussing actual events, behaviors, or deeper motivations (Lune and Berg, 2017). Participants, educators, and program coordinators were interviewed for this research. The purpose of interviewing the participants after the activity was to obtain a further understanding of their personal experiences during the activity; specifically, to determine the level of empowerment and commitment participants felt toward solving environmental problems. I conducted an interview with the program director or educator at each research site. The intended goal of these interviews was to better understand the ongoing and future adult-specific EE programs offered at each site.

For all interviews, I utilized a semi-standardized interview technique along with a preconceived structural outline. This technique employed a list of predetermined questions from which to structure the initial outline but allowed space for deeper questioning to obtain the most information possible from the subject (Berg and Lune, 2017); see Appendix B for interview prompts. Interviews were recorded with permission from the participant and were transcribed at a later time. Participants for interviews were recruited while collecting post-event surveys. The post-event survey included an option for participants to provide an email or phone number if the participant was willing to participant in an interview. Unfortunately, few participants agreed to be contacted at a later date and only three interviews were conducted. Two of the interviews were conducted in person and the third was conducted over the phone; all three participants agreed to be recorded. Along with the three participants, a staff member from each study site was also interviewed. Three out of the four staff members interviewed also agreed to

be recorded; the fourth consented to only notes being taken during the interview. The staff interviews were all conducted at each staff participants' corresponding research site.

3.10 Interview Analysis

After the interviews were concluded, I transcribed the recordings. I first analyzed the interviews using thematic content analysis, similar to the method used for the participant observations. I also used process coding, emotion coding and value coding. Process coding is where gerunds, ("-ing" words), are located to connate action within the collected data (Saldaña, 2016). Gerunds can be classified as simple observable activities, such as reading and playing, or general conceptual actions, such as adapting and surviving (Saldaña, 2016). Emotion coding is another form of coding that was used for this study. When using emotion coding, any emotion experienced or recalled by the participant during the activity is identified. In emotion coding, the researcher may identify the participants' unspoken emotions by paying close attention to non-verbal cues (Saldaña, 2016). The final coding I used is value coding. The purpose of value coding is to determine the participants' perspectives and worldviews by identifying their baseline values, attitudes and beliefs (Saldaña, 2016). A value is described as the importance that one places on themselves or others and on material things or ideas (Saldaña, 2016). Conversely, an attitude is defined as the way we think and feel about ourselves and other people, ideas or materialistic objects (Saldaña, 2016). Beliefs are a larger system of concepts that include values and attitudes, but also include personal knowledge, experience, opinions, morals and other perceptions of the social world (Saldaña, 2016). Table 2 provides examples of words that were used in each coding method. After I identified key words, I completed the thematic analysis steps.

Table 2. Examples of Words for Each Value Code

Types of Coding	Process	Emotion	Value
Possible Words:	Recycling, reusing	Motivation, happy, scared, angry, love, upset, excited, worried, anxious, compelled, compassion, passionate, dedicated	Believe, feel, important, valuable, critical, significant, insignificant, unimportant, crucial, urgent,
Possible Words:	Learning, educating	Connected, hopeful, informed, stronger, better prepared, empowered, able, competent, capable	Believe, feel, important, valuable, critical, significant, insignificant, unimportant, crucial, urgent,

3.11 Variables

Specific variables needed to be operationalized for this study. Operationalization means to clearly define research variables and to explain how specific variables are measured. There are various ways in which concepts can be defined and studied; therefore, it is important that each researcher clearly explains and defines concepts. The specific variables that needed to be operationalized for this study were: connection and empowerment.

Connection. Connection, according to the *Oxford University Press* (2017), is "a relationship in which a person or thing is linked or associated with something else" (n.p.). It has long been hypothesized that when an individual has a direct connection to nature, they are more likely to engage in pro-environmental behaviors than someone who lacks a direct connection to nature (Hinds and Sparks, 2008). In the context of environmental education, connection is related to both affective connection and environmental identity.

Affective connection is the emotional affinity that individuals have with nature, which has been shown to predict protective behaviors towards nature and natural environments (Hinds and Sparks, 2008). Environmental identity refers to how people see themselves in relation to the natural world; more plainly stated, environmental identity reflects one's connection to the natural world (Hinds and Sparks, 2008).

Researchers have found that environmental identity is linked to both environmental behaviors as well as environmental attitudes (Hinds and Sparks, 2008). Understanding one's connection to the environment and gaining insight as to how to strengthen one's connection to the environment is imperative to environmental education. Statements numbered 2, 6 and 9 from the environmental attitudes portion of the pre-and post-event survey were used to determine each participant's personal feelings of connection to their surrounding environment. The statements asked whether or not the participant considers humans and nature to be separate entities or whether they believe that the natural world is a community in which they belong, and whether or not plants and animals have as much of a right to exist as humans.

Empowerment. Empowerment can be defined as a concept that entails the action of giving power and authority to another person (Hagquist and Starrin, 1997). However, the idea of empowerment has also been historically used as a motivational concept. Hagquist and Starrin (1997) explain that as a concept, empowerment most closely relates to an individual's self-determination to obtain what they feel that they deserve. It is this level of self-determination that correlates highly to the desire to achieve change. This study utilizes the concept of individual empowerment, in which participants believe they have the capability of effecting change to solve environmental problems. Statements 14

and 19 from the environmental attitudes section of the pre-event survey were used to determine participants' levels of empowerment. From the post-event survey, Statements 2, 4, 14 and 19 were all used to determine the participants' levels of empowerment.

4. Data Analysis and Discussion

4.1 Demographics

All participants signed a consent form to participate in research for this study (see Appendix C). The research plan for this study had previously received IRB approval by the USF committee. There were 126 participants in this study; 62.70% were female and 37.30% were male. The ethnic distribution breakdown revealed that 88.89% identified as Caucasian, 4.76% identified as African American, 3.17% identified as biracial or multicultural, 1.59% identified as (Hispanic, Latino or Spanish origin) and 1.59% identified as Asian, Asian-American, or Pacific Islander. The age demographic revealed that: 30.95% were between 25-34 years old, 26.19% were between 51-64 years, 19.84% between the ages of 35-50, 11.90 % were older than 65 years, and 11.11% were between 18-24 years old. A review of the level of education revealed that 31.75% had completed a four-year college degree, 21.43% had completed a graduate degree, 20.63% had attended some college, 15.08% had completed a 2-year degree, and 11.11% had graduated from high school or had obtained a GED. See Table 3 (page 57).

In summary, the majority of participants were Caucasian women who were between the ages of 25-34 who had completed at least four years of college. The U.S Census reports that 52% of Pinellas County citizens are female (U.S Census Bureau, 2017), which, even with the slight increase, does not explain the vast discrepancy between male and female participation in this study. Pinellas County census data also reports that 74% of the population is white, 10% black, 10% Hispanic, 3% Asian, and 2%

are multiracial (U.S Census Bureau, 2017). This information is vital when considering the distribution of race and ethnicity among research participants. As one would expect from the data distribution, the majority of participants were white. However, when compared to the census data, one would have expected 50% more participants by African Americans. The study data also reveals a significant shortage of Hispanic representation when compared to county averages. This is a problem as it shows how underrepresented minority groups are in environmental education-based activities. The United States is full of blended nationalities, all of whom are contributing to environmental issues and who should be educated on how to make the best environmental decisions.

The census data also reveals that the majority of the Pinellas county population falls between the ages of 50-69 (31%), while only 23% of the population is between 20-39 years of age (*U.S. Census Bureau,* 2017). The data from this study reveals that the largest number of participants were from 25-34 years old (30.95% of participants) and 51-64 years old (26.19% of participants). Even though the research distribution did not perfectly align with county age distributions, the representation does makes sense when considering the event types and timing. Many of those who participated in the events were either young adults with families or retired community members. One of the potential reasons that the two age groups mentioned were so heavily represented, as opposed to other age groups, could be the increase of scheduling flexibility shared between the two groups. For example, the events attended at Tampa Bay Watch were all held during the week; therefore, most of the participants at these events were retired individuals and no school-aged children were in attendance. According to an interview with a member of the Tampa Bay Watch staff, the organization has a core group of

volunteers who attend almost every event; these 15 individuals are mostly men aged 60 or older (2018). Furthermore, many of the attended events were held on Saturdays which would lead one to assume that a variety of people would attend, however this was not typically the case. The Weedon Island staff member indicated during their interview that for individuals aged 25 to 40 there are a lot of public activities held in St. Petersburg on the weekends resulting in competition and fewer attendees for environmental activities during weekends.

The next demographic that was explored in detail is the education level held by participants. The Pinellas County 2019 census shows that a majority of Pinellas County citizens identify as having some college experience, 31% of the population. The census also reports that 20% of the current population earned a bachelor's degree and 11% have earned a post graduate degree (*U.S. Census Bureau,* 2017). This being said, the data from this study showed that most of the participants surveyed had earned at least a 4-year college degree (53.18%). This is interesting as it shows that when compared with county statistics, the educational level of the participants at these events is actually an over-representation of the overall educational level found in the community. Two final statements on the demographic portion of the survey were related to political party affiliation and their primary motivations for attending environmental activities. In response to political party affiliation, 48.41% were Democrats, 28.57% were Independent, 13.49% were Republicans, and 9.52% reported their political affiliation as Other. According to the *Florida Division of Elections*, as of 2019, there are 682,531 active registered voters in Pinellas County (*Florida Division of Elections,* 2019). Of these registered voters, 34.96% are registered Republicans, 35.51% are Democrats,

28.4% report no party affiliation and 1.13% are registered in a minority party (*Florida Division of Elections,* 2019).

As stated earlier, 48.51% of the participants in this study were registered Democrats, which is significantly higher than the current political distribution for the county. The research also indicates that Independents were more represented in this study than one would expect from the county distribution. Representation from the Republican Party was substantially lower than it should have been given the county-wide political distribution. While the lack of Republican representation is staggering, it is not surprising as there is currently a well-publicized environmental debate between the Republican and Democratic parties.

The environmental divide between Republicans and Democrats first began during the Reagan administration during, 1981 to 1989, a time when environmental regulations were said to be a burden on the economy (Dunlap and McCright, 2008). This divide has become significantly greater since the issue of climate change became popular during the 1990s (Dunlap and McCright, 2008). As of 2019, 74% of Democrats consider protection of the environment a top priority, as opposed to 31% of Republicans (Bowman, 2019). Bowman states that, "Sixty-seven percent of Democrats and Democratic-leaning Independents said dealing with global climate change should be a top priority, compared to 21% of Republicans and Republican-leaning independents" (Bowman, 2019 p. 1). Discrepancies in survey participation bears this out. From a general perspective, it would be a logical assumption that individuals who do not care about the environment will not attend nature-based events. This being said, encouraging Republicans to attend events in nature is a necessary step in bridging the environmental divide between Republicans and

other political parties. Studies have found that being in nature and feeling connected to natural environments is an integral aspect for fostering responsible environmental behaviors and encouraging environmental protection (Ernst and Theimer, 2011).

The last demographic analyzed was the participants' motivation for attending the event. When the participants were asked about their attendance via the study survey, they were given a list of potential options from which to choose a response. The two most popular responses from subjects were that they were attending the event simply to help improve their local environments (38.89%), as well as to learn more about their local environment (19.05%). Both responses indicate a desire to further ecological wellness at a local level. See Table 3.

Table 3: Demographics

Demographics		
Participants Gender		
	Female	62.70%
	Male	37.30%
Highest level of completed education		
	College Degree	31.75%
	Graduate Degree	21.43%
	Some College	20.63%
	2-year Degree	15.08%
	High School Diploma or GED	11.11%
Racial or Ethnicity		
	White or Caucasian	88.89%
	African American	4.76%
	Asian, Asian American, or Pacific Islander	1.59%
	Biracial or multicultural	1.59%
	Hispanic, Latino, or Spanish origin	1.59%
Age		
	18 - 24 years	11.11%
	25 - 34 years	30.95%
	35 - 50 years	19.84%
	51 - 64 years	26.19%
	65 + years	11.90%
Political Affiliation		
	Democrat	48.41%
	Independent	28.57%
	Republican	13.49%
	Other	9.52%
Motivation for attending the event		
	"To help improve my local environment"	38.89%
	"To learn more about my local environment"	19.05%
	Multiple Answers	11.11%

	Other	8.73%
	"To see some local wildlife"	8.73%
	"To enjoy being outside"	4.76%
	"I am required to attend for school"	4.76%
	"To learn more about the area since I am from out of town"	3.17%
	"To get some exercise"	0.79%

4.2 Event Staff Interviews

Staff member interviews were used to gain deeper insight into the adult educational events held at each study site. After the interviews were completed, I conducted an analysis on the data collected. During this analysis, I concluded that a few themes were shared among participants. The staff members of each study site all noted that they believed there was a significant lack of participation from young adults. Staff members across the sites mentioned that the majority of participants were either young children and their families or community members who are retired; however, the middle age range was significantly under-represented in these programs. Each organization recognized this void and have made numerous unsuccessful attempts to encourage greater participation from the median age groups. One staff member explained that her organization attempted to involve more adult learners by starting a kayaking tour during spring break to explore the mangroves and to incorporate active education; however, even this was unpopular for reasons she cannot explain. Staff members expressed frustration in the inability to reach certain groups of people and expressed a great need for community members of all ages to engage in environmental activities and to be exposed to environmental education activities.

A second theme that was identified during my analysis was that each site had recently undergone, or was currently undergoing, changes that would affect their adult EE programs. Three of the sites were hiring new team members into positions of authority. In fact, three out of the four staff members interviewed at the sites were actually new hires in places of authority. One of the new hires stated that she had promised innovative programs that would excite learners about the world of environmental education, noting that she has been, "able to revisit our programs and think about what we've done and see what is getting old and how can we breathe life into it." (Participant 2, 2018). Another staff member interviewee mentioned that her organization was in the process of adding a new a building that will be used as a hub for furthering adult environmental education programs, a massive change that will hopefully contribute to the furthering of environmental education throughout many age groups. It was clear that even though some of the concepts differed, all of the staff members interviewed were aware of the need to focus on improving environmental education and most had plans set forth as to how they wanted these changes to be made.

The final common theme prevalent during staff interviews was a lack of permanent team members and how this turnover affected each organization. Two interviewees mentioned that volunteers were vital for organizing and executing many events, such as educational hikes and tours. Staff mentioned that although they are currently dependent on such volunteers and appreciate their efforts, structure is seriously lacking when volunteers are in control of the courses. Many staff interviewees complained that they have no regulation over the narratives relayed by the volunteers and

often wish they had a say in what was being lectured to improve on the educational content being shared.

Another issue that the staff members being interviewed mentioned was the difficulty in having their current team comprised, for the most part, of part time employees. Two of the staff being interviewed mentioned that the workload and responsibility was enough to burden a full-time employee, but the organization had only hired part-time employees for the same amount of responsibility. This being said, the staff understood why their employees were unable to complete their given tasks as their organization was simply not providing the employees enough time to successfully meet expectations. A few of the interviewees mentioned a lack of funding for full-time positions throughout their organizations, which explains the need to overload part-time employees. One staff member even mentioned that at their particular organization management often promised the staff that full-time positions were soon to open up, but as the months passed without any new positions, it was clear the staff began to seriously doubt the organization's sincerity. The longer the staff waits for full-time positions, the worse team morale becomes, and the more unmotivated and disconnected staff members become.

During staff interviews, the concept of passive and active learning pedagogy was mentioned multiple times. I attempted to determine whether or not the interviewees understood the difference in these learning pedagogies and if they were able to determine which pedagogy was used in their programs. When discussing active learning with a representative from Weedon Island, she said she understood the differences between active and passive learning, but it was not something she purposefully considered when

planning adult programs offered at the preserve. The representative said that she considered the hikes to be more interactive and the lectures as passive. She also mentioned that the lectures offered are typically curated by outside speakers and she had no control over the pedagogy employed in their programs.

The KPB representative explained that they try and incorporate active learning while teaching children in the classroom. This being said, they also admitted that there is a lack of active learning opportunities in the current programs offered to adult learners. The staff member who was interviewed at Boyd Hill said she did not consider her adult programs to be either passive or active learning, but a different pedagogy called interpretive learning. This learning strategy does not use assessments nor tests to quantify the amount of knowledge gained from an activity, which is unusual for typical environmental education programs. This staff member acknowledges that most people will not retain all of the information given in a course, so interpretive programs focus on small core messages to be retained. The representative for Tampa Bay Watch did not consider their adult restoration programs as environmental education. She felt that restoration projects could be considered informal education; she would classify them as primarily outreach based. It was her hope that people who participated in these events would leave with a better understanding of why the restoration efforts were being done and the impact they made to the environment. This staff member mentioned that adult education is an area that could use some improvement and expressed hope for implementing new programs in the future. I found this to be interesting as part of Tampa Bay Watch's mission statement is to restore and protect Tampa Bay estuaries through educational programs (Tampa Bay Watch, 2018).

4.3 Attitudinal Scale Results

The core of this research was based upon analyzing environmental attitudes using the NEP scale. For this study, participants with NEP scores between 79-100 percent were considered to have a pro-ecological view, participants with a NEP score between 54-78 percent were considered to have a mid-ecological view, and participants with scores 53 percent or less were considered to have an anti-ecological view. The pre-survey results revealed that 41.27% of the 126 participants held a pro-ecological view. The same survey revealed that a majority of participants (58.73%), were found to have a mid-ecological view and no participants were found to have an anti-ecological view. It is worth noting that at this point I found that all of the participants who attended the events originally began with at least a mid-ecological view and none began with an anti-ecological view. This is not surprising as most of the events attended were at nature preserves and one would not expect people who hold anti-ecological views to attend nature parks. However, it is important to consider lack of anti-ecological views when looking at the environmental events as a whole. While it was favorable that the attendees had a more positive ecological viewpoint, it is important to also reach those with an anti-ecological view when considering environmental education. The educational activities are intended, regardless of learning styles, to further environmental education across the masses. With a lack of participants who originally share an anti-ecological view, there is significant underrepresentation in this particular category which could be exploited for further educational opportunities in the future.

The post-survey results were also analyzed using the NEP scale. The post-survey indicated an increase in pro-ecological views, with 46.83% of participants falling into this

range, up from the original 41.27%. The post-survey also revealed that participants who had a mid-ecological view decreased to 50.79% (from 58.73%). Another change, and arguably the most surprising, was the difference in the anti-ecological view. The participants with an anti-ecological view (0% prior to the activity) actually increased to 2.38% following the environmental activity. See Table 6 and Table 7. Although it is difficult to determine exactly what made the participants' change their views following the activity (as these three participants were not personally interviewed after the event), the data can be viewed as an attempt to reveal why their attitudes shifted. When analyzing the pre-and post-data between the three participants, there were few similarities. Of the three participants, two were male, were Republican and they had all completed at least some college These participants initially had low NEP scores following the pre-survey: 0.67, 0.59 and 0.57, respectively. During the post-survey the scores decreased to 0.45, 0.53, and 0.53, respectively. This shift, albeit slight, dropped the participants from the low end of the mid-ecological range and into the anti-ecological range. Each of the three participants that shared a drop in their ecological views attended different events. The first participant attended an emotional engagement lecture at Weedon Island, the second attended an emotional engagement hike at Boyd Hill, and the third participant attended a cognitive engagement beach cleanup with KPB. Furthermore, each of these participants changed responses to different statements, further increasing variability.

For context, when I was analyzing the survey data, only the answers that differed by two or more points were considered to be noteworthy. For example, if a participant originally marked a statement as unsure, the participant score would be three points. If

during the post-survey the same participant marked the same statement as *strongly agree*, the score increased to five points, a difference of two points. This two-point scale is significant as this change will impact a participant's NEP score. A one-point change was not viewed as significant as this minimal change does not have as great an effect on NEP scores. It is important to note that these are subjective categories; each participant could have their own interpretation of what *strongly agree* means. All three participants had a score change; the participant with the most change was the female participant whose score decreased from 0.67 to 0.45. She significantly changed her responses to six of the environmental attitude statements (to see which statements were altered refer to Table 4). The second participant whose score fell into the anti-ecological role following the event only significantly changed two statements; Statement 5, "human ingenuity will insure that we do not make the Earth unlivable," changed from *strongly disagree* to *unsure,* while Statement 17, "humans will eventually learn enough about how nature works to be able to control it," changed from *strongly disagree* to *strongly agree*. The third participant also only significantly changed two statements; Statement 4, "when humans interfere with nature it often produces disastrous consequences," was changed from *mildly agree* to *mildly disagree* and Statement 18, "If things continue on their present course, we will soon experience a major ecological catastrophe," was changed from *mildly agree* to *mildly disagree*.

Table 4: Statements altered by Participant 1

Statement:	Pre-Survey Response	Post- Survey Response
Statement 1: We are approaching the limit of the number of people the Earth can support.	Strongly Agree	Strongly Disagree
Statement 7: Humans are seriously abusing the environment.	Mildly Agree	Mildly Disagree
Statement 8: The Earth has plenty of natural resources if we just learn how to develop them.	Mildly Disagree	Mildly Agree
Statement 9: Plants and animals have as much right as humans to exist.	Mildly Agree	Mildly Disagree
Statement 10: The balance of nature is strong enough to cope with the impacts of modern industrial nations.	Mildly Disagree	Mildly Agree
Statement 15: Humans were meant to rule over the rest of nature.	Mildly Disagree	Mildly Agree

Many of the participants' scores changed from pre- and post-survey. When comparing pre- and post- NEP scores, I found 113 of 126 participants had overall changes to their scores. Of these 113 participants, 55 participants' post-survey NEP scores actually decreased following the activity, while 58 of the participants' scores increased. This being said, of the 113 participants that showed a change in the score following the activity, only 28 showed enough change in NEP score to result in an altered NEP classification. Twelve participants' scores increased enough that their environmental view classification shifted from a mid-environmental category to a pro-environmental category. Conversely, 13 participants' scores had decreased post-survey dropping them from the pro-environmental category to the mid-environmental category and, to my surprise, three participants posted anti-ecological views following the event. Refer to Table 5 for a description of the events attended by the 28 participants whose NEP categorization was changed.

Table 5: Participants whose pre-survey and post-survey NEP categorization changed

From Mid-Ecological view to Anti-Ecological view			
Event Location	**Activity**	**Engagement Theory**	**Number of Participants**
Weedon Island (9/20/18)	Anthropology Lecture	Emotional	1
Boyd Hill (10/14/18)	Alligator Walk	Emotional	1
KPB (9/29/18)	Gandy Beach Cleanup	Cognitive	1
From Mid-Ecological view to Pro-Ecological View			
Event Location	**Activity**	**Engagement Theory**	**Number of Participants**
Tampa Bay Watch (11/6/18)	Construction of Oyster Beds	Behavioral	3
KPB	Gandy Beach Cleanup	Behavioral	2
Tampa Bay Watch (10/19/18)	Filling Oyster Bags	Behavioral	2
Weedon Island (9/20/18)	Anthropology Lecture	Emotional	2
Boyd Hill (9/16/18)	Aviatory Tour	Emotional	1
Boyd Hill (9/9/18)	Alligator Walk	Emotional	1
Boyd Hill (10/9/18)	Bringing wildlife to your backyard Lecture	Cognitive	1
From Pro-Ecological View to Mid-Ecological View			
Event Location	**Activity**	**Engagement Theory**	**Number of Participants**
Tampa Bay Watch (10/16/18)	Constructing Oyster Domes	Behavioral	4
Tampa Bay Watch (10/19/18)	Filling Oyster Bags	Behavioral	1
KPB (11/16/18)	Street Cleanup	Behavioral	3
KPB (11/18/18)	SAH Cleanup	Behavioral	2
KPB (12/2/18)	Gandy Beach Cleanup	Behavioral	1
Weedon Island (9/14/18)	Sub-irrigated Planter Lecture	Cognitive	1
KPB (9/29/18)	Gandy Beach Cleanup	Cognitive	1

Upon further analysis, of the 12 participants who changed from a mid-ecological to pro-ecological view following the environmental event, seven attended a behavioral

engagement event, four attended an emotional engagement event, and one attended a cognitive engagement event as illustrated in Table 5. It was difficult to determine which exact changes in the survey responses accounted for the overall viewpoints as each participant changed their responses to a variety of statements resulting in the classification changes. I was able to narrow down two statements in which a large number of participants changed their responses from the pre-survey to post-survey. Five of twelve participants changed their responses to Statement 5 which was, "Human ingenuity will ensure that we do not make the earth unlivable." Two participants changed their responses from *strongly agree to strongly disagree,* two others changed their responses from *strongly agree to unsure,* and the fifth changed their response from *mildly agree to mildly disagree.* Four participants changed their answer for Statement 8, "The Earth has plenty of natural resources if we just learn how to develop them." Two participants changed their responses from *strongly agree to mildly disagree* and one changed *from strongly agree* to *unsure, unsure* to *strongly disagree.*

Of the thirteen participants whose categorizations decreased from pro- to mid-ecological views, eleven attended behavioral engagement events and two attended cognitive engagement events. These thirteen participants had the most inconsistencies when compared to other groups that had shifting ecological views in the pre- and post-survey. The most obvious change was depicted in Statement 4: "When humans interfere with nature it often produces disastrous consequences," and Statement 16, "The balance of nature is very delicate and easily upset." Five of thirteen participants changed their responses to these statements, lowering their ecological scores. For Statement 4, three participants changed their responses from *mildly agree* to *mildly disagree*, one participant

changed from *strongly agree* to *mildly disagree* and the fifth changed response from *mildly agree* to *strongly disagree*. For Statement 16, two participants changed their responses from *strongly agree* to *strongly disagree,* two participants changed from *strongly agree* to *mildly disagree*, and the fifth changed from *mildly agree* to *mildly disagree*.

The remaining results varied, Statements 1, 3, 5, 8, 13, 15 and 17 were all changed from the pre- to post-survey by participants, lowering their ecological view categories. The findings reveal that a noteworthy number of people who participated in the events actually had a negatively-impacted ecological view after attending the event; it was nearly impossible to determine exactly why this occurred.

After the post-surveys were completed, some participants noted that the statements were the same and they were confused as to why they had to complete the same survey twice. Participants also seemed eager to leave following the events, especially events that were physically demanding or more time-consuming. The participants seemed to take more time completing the pre-survey compared to the post-survey, which could explain the variability in responses. A few participants mentioned the negatively-worded statements were confusing which also may have contributed to the change in NEP scores.

The reason I analyzed the NEP scores was to answer the first research question: How does participation in non-formal environmental education programs impact participant attitudes toward the environment? When reviewing the NEP results, I can conclude that participation in non-formal EE programs did not have an impact on participants' attitudes towards the environment. Simply put, most of the participants

already had positive attitudes towards the environment prior to attending the environmental events and activities.

Table 6: NEP distinction pre-and post-survey for all participants and by gender.

All Participants:	Pre-Survey NEP Score	Post- Survey NEP Score
Pro-Ecological view	41.27%	46.83%
Mid-Ecological view	58.73%	50.79%
Anti-Ecological view	0%	2.38%
Female Participants n = 79	Pre-Survey NEP Score	Post- Survey NEP Score
Pro-Ecological view	44.30%	48.10%
Mid-Ecological view	55.70%	50.63%
Anti-Ecological view	0%	1.27%
Male Participants n = 47	Pre-Survey NEP Score	Post- Survey NEP Score
Pro-Ecological view	36.17%	51.06%
Mid-Ecological view	63.83%	44.68%
Anti-Ecological view	0%	4.26%

n= number of participants

Table 7: NEP distinction pre-and post-survey for all participants by political affiliation

Democrat Participants n = 61	Pre-Survey NEP Score	Post- Survey NEP Score
Pro-Ecological view	49.18%	62.30%
Mid-Ecological view	50.82%	37.70%
Anti-Ecological view	0%	0%
Republican Participants n = 17	Pre-Survey NEP Score	Post- Survey NEP Score
Pro-Ecological view	23.53%	23.53%
Mid-Ecological view	76.47%	64.71%
Anti-Ecological view	0%	11.76%
Independent Participants. n = 36	Pre-Survey NEP Score	Post- Survey NEP Score
Pro-Ecological view	44.44%	41.67%
Mid-Ecological view	55.56%	58.33%
Anti-Ecological view	0%	0%
Other Affiliation Participants. n = 12	Pre-Survey NEP Score	Post- Survey NEP Score
Pro-Ecological view	16.67%	16.67%
Mid-Ecological view	83.33%	75.00%
Anti-Ecological view	0%	8.33%

n= number of participants

4.4 Active or Passive Learning

Throughout the study period, a total of 23 events were attended across four selected research sites. At each event I took into consideration the mental and physical requirements, classifying each as either mentally or physically active, passive, or a combination of both. A majority of the events (52.17%), were classified as mentally passive and physically active. Seven events (30.43%), were categorized as mentally

passive and physically passive. Only two events (8.70%), were classified as a combination of mentally and physically passive. No events were classified as mentally active; therefore, I was unable to compare mentally-active learning versus mentally-passive learning pedagogy.

The original hypothesis of this study was that active pedagogical approaches result in more significant changes in participants' attitudes toward the environment than passive pedagogical approaches and that active learning strategies result in greater success than passive learning strategies in attempting to achieve the stated goals of environmental education (connection, commitment, ecological knowledge, empowerment and skills). As outlined in the literature review, active learning is considered to be significantly more advantageous when compared with other pedagogies; specifically, the ability to improve problem solving with a focus on critical thinking. Researchers have found that strategies that call for passive learning result in less information being retained when compared to active or mixed learning methods (Michel, Cater and Varela, 2009). Therefore, it is problematic that no events attended were based solely in active learning. This is clearly an important learning strategy that needs to be incorporated into adult environmental education programs in the Tampa Bay area.

4.5 Engagement Theory of Learning

Since it was later determined that none of the events could be classified as mentally active, I shifted the focus of this research to another educational concept to further classify each event: engagement theory of learning. In this concept, the theory of engagement incorporates behavioral engagement, emotional engagement and cognitive engagement (Fredricks, 2004) allowing further classification of the attended events.

Due to the fact that engagement theory was not an original component of this study, the only way I was able to classify each event was by previously-collected field notes. Due to broad definitions within engagement theory, I originally determined that each event was found to have incorporated both behavioral and emotional engagement. However, in order to determine the effectiveness of each engagement strategy, each event was categorized by only one type of engagement. For this study, for a behavioral engagement classification, the third definition, participation, was used. The events that were determined to be primarily behavioral events were most often the events during which physical participation were required. Events for which the primary outcome was a positive emotional response were considered to incorporate emotional engagement including excitement, happiness, and interest. For example, the alligator walk was listed as an emotional engagement event as the main focus was centered around the excitement of spotting alligators in their natural habitat. This statement supports the existing literature that indicates that animal encounters invoke emotional responses that can influence environmental beliefs (Jacobs, 2012). The events in which I noted that participants put in extra effort to understand the educational topics or learn necessary skills were said to incorporate cognitive engagement. Of 23 total events, nine were categorized as behavioral engagement, six as emotional engagement, and eight as cognitive engagement. Refer to Table 8.

Table 8: Classification of events by Engagement Theory

Behavioral Engagement (*n*=52)	
Boyd Hill Nature Preserve	9/8/2018: Garden Workday
Tampa Bay Watch	10/16/2018: Constructing oyster beds
Tampa Bay Watch	10/19/2018: Filling oyster bags
Tampa Bay Watch	11/6/2018: Constructing oyster beds
Keep Pinellas Beautiful	10/13/2018: Treasure Island Cleanup
Keep Pinellas Beautiful	10/20/2018: Invasive Removal
Keep Pinellas Beautiful	11/16/2018: Street Cleanup
Keep Pinellas Beautiful	11/18/2018: SAH Cleanup
Keep Pinellas Beautiful	12/2/2018: Gandy Cleanup
Emotional Engagement (*n*=32)	
Weedon Island Preserve	9/20/2018: Anthropology Lecture
Weedon Island Preserve	11/10/2018: Guided Hike
Boyd Hill Nature Preserve	9/9/2018: Alligator Walk
Boyd Hill Nature Preserve	9/16/2018: Aviatory Tour
Boyd Hill Nature Preserve	10/14/2018: Alligator Walk
Boyd Hill Nature Preserve	11/25/2018: Wildflower Walk
Cognitive Engagement (*n*=42)	
Weedon Island Preserve	9/1/2018: Guided Hike
Weedon Island Preserve	9/14/2018: Sub-Irrigated Plant Lecture
Weedon Island Preserve	9/15/2018: Bird Watching Hike
Weedon Island Preserve	10/5/2018: Lecture on Composting
Weedon Island Preserve	10/10/2018: Lecture on Microplastics
Boyd Hill Nature Preserve	10/2/2018: Lecture on Climate Change
Boyd Hill Nature Preserve	10/9/2018: Bringing wildlife to your backyard lecture
Keep Pinellas Beautiful	9/29/2018: Gandy Beach Cleanup

n = number of participants

4.6 Updated Research Questions

In order to determine which engagement theory, behavioral, emotional or cognitive, ultimately led to a greater increase in environmental concern, a series of questions were generated. These questions were used as overall guidelines for the study and were addressed by each environmental subset during the research process. The questions follow:

- What impact does program participation have on participants' *sense of connection* to their local environment?
- What impact does program participation have on participants' *commitment* to working to solve local environmental problems?
- What impact does program participation have on participants' feelings of *empowerment* to solve local environmental problems?
- What impact does program participation have on participants' *mastery of the skills* necessary to solve environmental problems?

4.7 Connection

The first research question that was addressed during the research process was: What impact does program participation have on participants' *sense of connection* to their local environment? In order to determine the level of environmental connection, three particular statements were added to the environmental attitudes portion of the survey that participants completed during each environmental activity. Participants were asked to identify if they *strongly agree, mildly agree,* were *unsure, mildly disagreed* or *strongly disagreed* with the following statements:

Statement 2: “Humans and nature are separate entities.”

Statement 6: “I think of the natural world as a community to which I belong.”

Statement 9: “Plants and animals have as much right as humans to exist.”

I analyzed each statement using pre-and post-survey data, as well as participant observation, to determine if there were changes to connectivity. I concluded that emotional engagement events had the greatest effect on connectivity, followed by cognitive events, and finally behavioral events.

Connection: Emotional Engagement. Results for the emotional engagement events indicated that originally 81.25% *strongly or mildly disagreed* with Statement 2, as mentioned above, from the environmental attitudes portion of the survey. However, following the event the number of participants who *strongly or mildly disagreed* when asked the same statement was increased to 84.37%. As for Statement 6, the same percentage of participants *strongly or mildly agreed* with the statement during both the pre-and post-surveys (96.88%). The final statement addressed, Statement 9 during the pre-survey 93.75% *strongly agree or mildly agree,* and the post survey results indicated that after the event, 84.37% now *strongly agree or mildly agree.*

Table 9: Emotional engagement participant response to connection survey statements

Emotional Engagement	Before Event	After Event
Statement 2 (SD or MD)	81.25%	84.37%
Statement 6 (SA or MA)	96.88%	96.88%
Statement 9 (SA or MA)	93.75%	84.37%

During my assessment of the data collected during the events classified as emotional engagement, the results indicated that most participants who attended these events were previously connected to the environment before attending the events. Based on my observations, four of the six emotionally-engaged events fostered a deeper sense of connection to the local environment. These four events were all outdoor events in which participants were actively engaging in the natural world, fostering a sense of environmental connection. For example, an event hosted by Boyd Hill involved a nature hike through the preserve in search of alligators. The guides gave participants tips on how to search for the alligators and encouraged participants to be present in the activity, further fueling human and environmental connectivity. Two of the emotional engagement events that increased levels of connectivity were a wildflower walk through Boyd Hill and a guided hike at Weedon Island. During these events, participants were actively looking for plant and animal species and were encouraged to ask Statements throughout the experience (Field notes, 2018). Another event that inspired feelings of connection to the environment was hosted by Keep Pinellas Beautiful at Gandy Beach. The events during which individuals have positive experiences in nature and feel connected to their environment relates to the concept of affective connection. As mentioned previously, affective connection is the emotional affinity that individuals have with nature which can predict protective behaviors towards natural environments (Hinds and Sparks, 2008).

Connection: Cognitive Engagement. Participants who attended cognitive engagement events had previously shown a connection to their environment, as indicated by their survey responses. For Statement 2:" Humans and nature are separate entities," 83.33% of participants in both the pre- and post-survey responded with either *strongly*

disagree or mildly disagree. For Statement 6: "I think of the natural world as a community to which I belong," the pre-survey results showed that 92.9% of participants responded with *strongly agree or mildly disagree,* while 97.61% responded with *strongly agree or mildly disagree* following the event. For Statement 9: "Plants and animals have as much right as humans to exist," 92.86% of participants *strongly or mildly agreed* to the statement both before and after the event. After attending cognitive engagement events, I found that 62.5% of the events actively incorporated the idea of connection into each lesson. Unlike the behavioral events, which stressed environment connection by physically surrounding the participants in natural environments, cognitive events stressed theoretical environmental connectivity. During the cognitive events, lecturers were forced to create a feeling of environmental connectivity without actually exposing the participants to natural environments. An example was the cognitive climate change lecture at Boyd Hill. This lecture used a movie and discussion to show that although climate change is a global issue, the effects of climate change personally affect many individuals. This educational tactic is used to incite a feeling of attachment to the environment at both a global and personal level without the need to physically use nature as a learning tool.

Table 10: Cognitive engagement participant response to connection survey statements

Cognitive Engagement	Before Event	After Event
Statement 2 (SD or MD)	83.33%	83.33%
Statement 6 (SA or MA)	92.9%	97.61%
Statement 9 (SA or MA)	92.86%	92.86%

Connection: Behavioral Engagement. Like the previous engagement strategies, the survey results that focused on the behavioral engagement events revealed that participants who attended felt previously connected to the environment. For Statement 2:" Humans and nature are separate entities," 90.38% of participants *strongly* or *mildly disagreed* prior to the event and this number dropped to 86.54% following the event. With Statement 6: "I think of the natural world as a community to which I belong," 100% of participants *strongly* or *mildly* agreed when questioned in the pre-survey, while afterwards only 94.23% *strongly* or *mildly agreed*. This change would indicate that participants' level of connectivity decreased, this could have resulted from physical exhaustion as most behavioral engagement events were more physically demanding when compared to the emotional and cognitive engagement events. For the final statement, Statement 9, "Plants and animals have as much right as humans to exist," pre survey results indicated that 94.23% of participants *strongly* or *mildly agreed* with the same number agreeing post-survey.

Table 11: Behavioral engagement participant response to connection survey statements

Behavioral Engagement	Before Event	After Event
Statement 2 (SD or MD)	90.38%	86.54%
Statement 6 (SA or MA)	100%	94.23%
Statement 9 (SA or MA)	94.23%	94.23%

Of all of the behavioral engagement events, I identified five that included an obvious connection to the local environment, 55.56%. The behavioral events that I

attended were typically more physically demanding than any of the other events. Behavior events included the removal of invasive plants and the building of oyster domes, as opposed to other events that were primarily lecture based. After participating in multiple, varied events, I noticed that participants experienced higher levels of affective connection during events that required greater physical demands. Through participant observation, I concluded that when exerting energy into an activity that directly and positively impacts local environments, it is easy to feel a more intense bond with nature (Field notes, 2018). For example, Tampa Bay Watch participants volunteered to build concrete oyster domes and bag oyster shells that were used to prevent shoreline erosion and to create new habitats for local sea life. Although both events were active and physical, the oyster domes that were built on the Tampa Bay Watch property were not placed in the same location, making it harder to connect thoroughly with the project. This being said, the bags were immediately taken via boat ride to the local shoreline and placed in the water. The ability to create something positive that immediately results in improving the local environment resulted in higher levels of affective connection for those who participated in the activity (Field notes, 2018).

4.8 Commitment

Commitment was measured through research Statement 4 on the post-survey, as seen below:

> Statement 4: After participating in this activity, I feel more motivated to act on behalf of the environment.

In conclusion, I found that behavioral engagement events were the most likely to increase personal commitment to solving environmental problems. Personal commitment scores followed for cognitive events, and lastly for emotional events.

Commitment: Behavioral Engagement. Upon further review, I found that 100% of the participants in the behavioral engagement events responded to Statement 4, with either *strongly agree or mildly agree*. I observed that 77.78% of behavioral engagement events instilled a personal feeling of commitment to solving environmental problems. As mentioned previously, most of the behavioral engagement events were events that required varying levels of physical labor, such as environmental cleanups. Each of these events demanded commitment and effort from the participants to complete. Participants expressed their desire to return and continue volunteering for these organizations. This commitment was observed during many of the Tampa Bay Watch events. During these events, there were large groups of volunteers who attended every event, regardless of the time or location, clearly representing their continued commitment to solving environmental problems (Field notes, 2018).

Commitment: Cognitive Engagement. When reviewing the cognitive event data, I found that 92.86 % of participants *strongly agree or mildly agree* to Statement 4, "After participating in this activity, I feel more motivated to act on behalf of the environment." Conversely, I observed that only 50% of the attended cognitive events instilled a personal level of commitment. Two of the events that I personally felt increased a commitment to bettering the environment were lectures at Weedon Island. One of the lectures was on microplastics, the negative environmental impacts they have and how to reduce microplastic usage. The other lecture was a basic introduction to

composting. Both not only personally resonated with me but offered simple, feasible changes that I can make to better my local environment. The simplicity of these changes made it easier for me to commit to making the effort to improve and positively impact the environment (Field notes, 2018). Participants of the two events also expressed feelings of commitment to solving environmental issues. During the microplastics lectures, participants were interested in learning ways to reduce their contribution to the plastics issue and inquired about how to find more environmentally-friendly alternatives to everyday objects (Field notes, 2018). Many of the participants who attended the composting lecture explained that they were already composting at home but wanted to improve the system they were using. Also, each participant was given a device to store kitchen scraps to encourage the participants to start composting; many of the participants were happily surprised to have been given this device and said they intended to use it (Field notes, 2018).

From participants' interviews, I found that individuals who attended behavioral engagement events felt committed to solving environmental problems after attending the events. Only three participants were interviewed overall and all three were from behavioral events, thus conclusions from these interviews were considered for relative significance. All participants interviewed had participated in Keep Pinellas Beautiful clean up events and mentioned that they would like to attend future cleanup events and felt committed to reducing environmental waste (Participant Interviews, 2018). Two participants specifically expressed a desire to reduce plastic usage in their own home by increasing recycling efforts (Participant Interview, 2018).

Commitment: Emotional Engagement. The events that were least likely to result in feelings of commitment to environmental betterment were the emotional engagement events. Even though emotional engagement influences feelings of environmental connectivity, this many not always correlate to a feeling of environmental commitment, so this study looks at the two variables as separate entities. Only 59.38% of participants who attended emotional engagement events responded to Statement 4; "After participating in this activity, I feel more motivated to act on behalf of the environment," with either *strongly agree or mildly agree.* Based upon participant observation, I found that none of the emotional engagement events instilled commitment. A majority of the engagement events were nature walks or animal observation events and were primarily focused on participant entertainment. The topics of focus, such as the alligator observation hike, were educational and pleasurable, but they did not instill a sense of environmental commitment nor did they create a desire to improve local environments (Field notes, 2018).

Table 12: Participant response to commitment survey statement

	After Event
Behavioral Engagement	
Statement 4 (SA or MA)	100%
Cognitive Engagement	
Statement 4 (SA or MA)	92.86%
Emotional Engagement	
Statement 4 (SA or MA)	59.38%

4.9 Empowerment

Four statements from the survey were used to determine if events instilled a sense of environmental empowerment in participants. These four statements, two from the post-survey section and two from the environmental attitudes portion of the survey are copied below:

> Statement 2: This activity made me feel that my actions can make a difference for the environment.
>
> Statement 6: After participating in this activity, I feel our environmental problems are so large we can't do much to help.
>
> Statement 14: I don't think my actions will have an impact on solving environmental problems.
>
> Statement 19: I am very confident that my actions will make a difference in protecting our environment.

In conclusion, I found that behavioral engagement events had the greatest impact on feelings of empowerment, followed by events in the cognitive, and then emotional, categories.

Empowerment: Behavioral Engagement. Survey data revealed that, 92.3% of individuals who participated in behavioral engagement events *strongly agree* or *mildly agree* with Statement 2, while 94.23% *strongly disagree* or *mildly disagree* with Statement 6. The pre-survey results for Statement 14 showed that 82.68% of participants *strongly disagreed* or *mildly disagreed* with this statement; following the event, this increased to 86.54%. In the pre-survey, 71.15% of individuals *strongly agreed* or *mildly*

agreed with Statement 19, but this increased to 82.69% during the post-survey. Through participant observation, I determined that all of the behavioral engagement events instilled a sense of empowerment. As stated throughout, behavioral events were often cleanup events or other physically-intensive events where some goal was being accomplished. I noticed that being able to see the immediate impact one's actions, such as removing excess trash from waterways, can make participants feel as if they can make a tangible contribution on behalf of the environment (Field notes, 2018). Many participants explained that they felt as though they accomplished something after these physically demanding events and were eager to participate in similar events in the future. (Field notes, 2018).

Table 13: Behavioral engagement participant response to empowerment survey statements

Behavioral Engagement	Before Event	After Event
Statement 2 (SA or MA)		92.30%
Statement 6 (SD or MD)		94.23%
Statement 14 (SD or MD)	82.68%	86.54%
Statement 19 (SA or MA)	71.15%	82.69%

Empowerment: Cognitive Engagement. Similarly to behavioral events, a high number of cognitive engagement participants *strongly agreed* or *mildly agreed* with Statement 2: “This activity made me feel that my actions can make a difference for the environment,” 85.7% to be exact. Furthermore, 76.19% of participants *strongly agreed* or *mildly agreed* with Statement 6, “After participating in this activity, I feel our

environmental problems are so large we can't do much to help." Pre-survey data indicated that 78.57 % of participants *strongly disagreed* or *mildly agreed* with Statement 14: "I don't think my actions will have an impact on solving environmental problems," and this increased to 80.95% of participants in the post-survey. For Statement 19: "I am very confident that my actions will make a difference in protecting our environment," 69.04% of participants *strongly agreed* or *mildly agreed* in the pre-survey, increasing to 83.33% following the event. I identified 62.5% of the attended events categorized as those meant to instill empowerment. A specific event that I noted had incorporated the concept of empowerment was a lecture at Boyd Hill that shared ten ways to increase animal life in one's backyard. During this event participants gained knowledge regarding small changes to bring more wildlife into one's home, regardless of property size. The changes were modest and manageable and participants seemed to be willing to implement these small changes. A few participants mentioned how easy some of the suggestions were and appeared shocked they did not think of them themselves. For example, the lecturer mentioned making sure your bird bath was kept clean with fresh water, but not to use any chemicals to clean it. A few participants mentioned they didn't even consider regularly cleaning their bird baths and were going to start doing so.

Table 14: Cognitive engagement participant response to empowerment survey statements

Cognitive Engagement	Before Event	After Event
Statement 2 (SA or MA)		85.70%
Statement 6 (SD or MD)		76.19%
Statement 14 (SD or MD)	78.57%	80.95%
Statement 19 (SA or MA)	69.04%	83.33%

Empowerment: Emotional Engagement. Unlike the two previous categories, in which a high percentage of individuals positively responded to Statement 2, "This activity made me feel that my actions can make a difference for the environment," only 53.12% of emotional engagement participants *strongly agreed or mildly agreed* with this statement. However, 81.25% of participants responded *strongly disagreed or mildly disagreed* to Statement 6: "After participating in this activity, I feel our environmental problems are so large we can't do much to help." Data revealed that 78.13% of emotional engagement participants *strongly disagreed or mildly disagreed* to Statement 14: "I don't think my actions will have an impact on solving environmental problems," both before and after the event. While only 50% of participants originally *strongly agreed or mildly agreed* to Statement 19: "I am very confident that my actions will make a difference in protecting our environment," this number slightly increased to 59.4% in the post-survey. Through participant observation, I found that none of the emotional engagement events attended instilled a sense of empowerment. The events that were classified as emotionally-engaging were typically fun and entertaining but did not encourage participants to make lasting environmental changes.

Table 15: Emotional engagement participant response to empowerment survey statements

Emotional Engagement	Before Event	After Event
Statement 2 (SA or MA)		53.12%
Statement 6 (SD or MD)		81.25%
Statement 14 (SD or MD)	78.13%	78.13%
Statement 19 (SA or MA)	69.04%	83.33%

Across each category, a high number of participants reported feelings of empowerment after the event they attended. The pre-survey results indicate that for most of the categories, participants already had pre-established feelings of empowerment prior to attending the events. Therefore, even when there was a slight increase from pre- to post-survey response, **most events did not have a notable effect on feelings of empowerment as the feelings of empowerment were previously recognized.**

4.10 Skills

Using participant observation, I was able to identify which events had an impact on participants' skills. It was determined that 55.56% of behavior engagement events resulted in learned skills. Of the cognitive events, 50% of the events attended resulted in learned skills. For emotional engagement events, I determined that none of the events resulted in a learned skill.

I identified learned skills in five of the nine behavioral engagement events. For example, while participating in behavioral engagement events, I was taught how to identify and remove invasive plants, build oyster domes and to create oyster bags used in

connection with coastal restoration. I observed participants being taught these skills and watched as they helped other participants perfect the newly-learned skills (Field notes, 2018). Four of the eight cognitive engagement events also taught skills. Examples include the composting and sub-irrigation lectures at Weedon Island. During the composting lecture, participants were given tips on how to compost properly and were also given the materials needed to start a small kitchen compost. During the sub-irrigation lecture, experts explained how to build one's own sub-irrigation system and participants were given the opportunity to buy a system already made in order to jump-start the irrigation process. As mentioned earlier, I did not identify any skills that were learned during emotional engagement activities.

4.11 Conclusion

After determining a lack of mentally-active learning pedagogies, I shifted the emphasis of this study to the engagement theory of learning. The reimagined research question now explores which type of engagement strategy, behavioral, emotional or cognitive, increased environmental concern most effectively. When comparing the differing engagement strategies, the factors that I weighed were: the overall connection participants' felt to the environment, the commitment they felt for solving environmental problems, the sense of empowerment they felt after completing the events, and any skills obtained during the event that were needed to solve environmental problems. In order to determine which engagement strategy was the most successful I used a 3-point ranking system for each variable. After ranking each strategy under every given variable, I determined that emotional engagement had totaled nine points, cognitive engagement totaled 11 points and behavioral totaled 12 points. These rankings show that behavioral

activities provided the greatest overall impacts; however, the differences overall between the three categories were minimal. Current research on engagement theory does not consider one type of engagement theory to be superior over the others (Fredricks, et al., 2004). Instead research has shown that each type of engagement theory has its own successes and failures, as mentioned in the literature review. Fredricks recommends incorporating all three types of engagement strategies for the best learning outcomes (Fredricks, et al., 2004).

Even though research in engagement theory does not find one subset to be superior over the others, numerous scholars mention the benefits of emotional connection with nature and pro-environmental attitudes (Lumber, et al., 2017). That being said, the data collected during this research did not confirm those findings. Emotional engagement did not relate to an increased level of commitment to solving environmental issues or to instilling feelings of empowerment to solve the problems. This juxtaposition is an important research finding that needs to be explored further.

Another interesting aspect of the emotional portion of this study is its focus on positive emotions. All of the emotional events were oriented toward encouraging positive emotions (joy, excitement, love); however, negative emotions can also be used to instill greater concerns and higher levels of commitment. Invoking negative emotions has shown to be a valuable tool, especially in environmental marketing. For example, the recent desire to ban plastic straws can be linked to a disturbing video where a plastic straw is removed from a sea turtle's nose, thus invoking negative reactions to plastic straws in consumerism (Rosenbaum, 2018).

One of the biggest factors that has to be considered when looking at the overall conclusion is the type of participants at the given events. Most of the individuals who participated in the environmental educational events had a prior understanding of the environment and a desire to partake in environmental education programs. The participants lacked overall diversity in their previously established environmental literacy. This highlights the need for programs in Pinellas County to reach a more diverse group of people, not just individuals who already have strong environmental protection tendencies. Park programs are constrained by their geographic limitations, but non-governmental organizations have the capacity to bring educational programming into the community and to target less-environmentally aware groups. Innovative programming that works with businesses, corporations and civic organizations (non-environmental) is needed to increase the impact and demographic reach of EE programming.

As mentioned in the literature, a lack of inclusivity is a known critique of environmental education. However, most of the research on diversity and EE is focused on the lack of African American participation in nature-based activities. As found in prior studies, this study coaligned in the concept that African American individuals are underrepresented at EE events. Furthermore, as a result of this study, I concluded that there was even less representation from Hispanic community members, which has not been discussed in prior studies. This is an important issue that deserves to be further explored and discussed.

Besides the issue of inclusivity, the literature also mentioned two more critiques of current EE; a lack of adult environmental education and the focus on individualism instead of collective action. This study found that there were many environmental

programs available for adults in Pinellas County. However, most offered significantly more programs for children than for adults. A majority of the programs offered are structured for families; therefore, even though adults do attend, the educational content is not as complex as it would be if the program was geared for adults only. Two of the staff members interviewed did not even consider the programs that I attended to be environmental education. The staff preferred to call the events interpretive learning programs or outreach events as opposed to EE. This leads me to the conclusion that although there are EE programs available to adults in Pinellas County, there is still plenty of room for growth and innovation.

Most of the programs focused primarily on individualism instead of collective action. This means that the programs concentrated on how individuals can make personal changes to positively impact the environment as opposed to joining forces to make environmental changes. An example in encouraging personal recycling efforts versus encouraging support by political groups and laws that could affect recycling at a communal level. By focusing on personal action only, positive collective action education is lacking, an important consideration for long term environmental education and environmental health. It would help with EE growth if programs attempted to incorporate more ideas regarding collective action.

Unfortunately, I was unable to explore the area of active learning, since there were no events that were classified as active learning being offered in Pinellas County during the study period. This is especially unfortunate since research has shown that active learning is a superior learning strategy, especially when compared to passive learning. The lack of learning strategies offered leads me to conclude that there is a real

need to reevaluate the current adult EE programs offered across Pinellas County. Based on the data collected and on current literature, the most effective form of adult non-formal EE would be active learning that incorporates behavioral engagement.

To improve and expand the current adult environmental education programs offered throughout Pinellas County, I propose the following recommendations for programs and for further research.

- Create a professional standard for adult environmental education in Florida.
- Educators should gain a better understanding of the local communities and determine programs that fit their needs.
- Provide programs in Spanish to increase accessibility to minorities.
- Non-profit organizations should expand their educational programs to the community, which nature parks are unable to do, to better reach the population that is not already environmentally aware and committed.
- Expand marketing efforts to local communities of minorities and Republicans, i.e. underrepresented communities.
- Incorporate active pedagogy into the programs offered, such as allowing time for discussions and asking questions that involve critical thinking.
- Try to incorporate behavioral engagement into all programs, even lectures.
- Encourage the collaboration between teachers and scientists to provide pedagogically sound and content rich curricula to parks and other organizations who want to offer EE programs.
- Offer digital programs or events at varied times to allow for more access to programs.

- Increase the amount of adult EE programs and include topics relating to collective action.
- Provide factual resources and tips for ways in which individuals can improve their environments.
- Consider if participants are already environmentally aware that they can comprehend more complex ideas.
- Train educators on the benefits of different learning pedagogies
- Avoid administering post survey immediately after the event as participants are often fatigued and disinterested in completing the survey. Instead consider administer post survey at a later time.
- Follow up with participants at a later date to determine if the knowledge they acquired had a lasting impact, therefore creating a longitudinal study.
- It would be recommended that the education activity (i.e., films, hands on activity, lecture), be controlled to determine if one type of educational activity produces a better retention rate.
- In order to get a better response rate from the participants for the interviews a greater effort needs to be made to follow up by email or phone over a longer period of time.
- It would be interesting to look at the preferences among the political parties and sort the data accordingly. In this study the greater percent of the participants were democrats.
- Conduct participant observation before the study sites are chosen. Therefore, active learning events could be identified ahead of time. Thus, the intended goal

of determining which learning pedagogy, active or passive, could be accomplished.

While there are ample opportunities for participation in environmental education programming at parks and through NGOs in Pinellas County, there is room for improvement to make such programs more effective in educating a large section of the adult population.

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Appendices

Appendix A: Pre- and Post-Survey

Pre- Survey

Demographics

1. Are you
    a. Male
    b. Female
    c. Other

2. What is the highest level of education that you have completed?
    a. Less than a high school diploma
    b. High school grad. or GED
    c. 2-year degree (AA, AS, professional school if two - year degree)
    d. Some college
    e. College graduate (4 - year degree, BA, BS)
    f. Graduate Degree (Masters, MA, MS, MD, Ph.D, etc)

3. Which of the following best describes your racial or ethnic group?
    a. African American
    b. American Indian
    c. Asian, Asian American, or Pacific Islander
    d. White or Caucasian
    e. Hispanic, Latino, or Spanish origin
    f. Biracial or multicultural
    g. Some other group

4. What is your age?
    a. 18 - 24 years old
    b. 25 - 34 years old
    c. 35 - 50 years old
    d. 51 – 64 years old
    e. 65 years or older

5. Please provide your zip code : _____

6. Which political party are you most likely to support?
    a. Democrat
    b. Republican
    c. Independent
    d. Other

7. What is your primary motivation for attending today's event?
    a. To enjoy being outside
    b. To learn more about my local environment
    c. To get some exercise
    d. To learn more about the area since I am from out of town
    e. To see some local wildlife
    f. I am required to attend for school
    g. I am required to attend for other reasons
    h. To help improve my local environment
    i. Other:

Environmental Attitudes

1. We are approaching the limit of the number of people the Earth can support.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

2. Humans and nature are separate entities

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

3. Humans have the right to modify the natural environment to suit their needs.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

4. When humans interfere with nature it often produces disastrous consequences.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

5. Human ingenuity will insure that we do not make the Earth unlivable.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

6. I think of the natural world as a community to which I belong.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

7. Humans are seriously abusing the environment.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

8. The Earth has plenty of natural resources if we just learn how to develop them.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

9. Plants and animals have as much right as humans to exist.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

10. The balance of nature is strong enough to cope with the impacts of modern industrial nations.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

11. Despite our special abilities, humans are still subject to the laws of nature.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

12. The so-called "ecological crisis" facing humankind has been greatly exaggerated.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

13. The Earth is like a spaceship with very limited room and resources.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

14. I don't think my actions will have an impact on solving environmental problems.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

15. Humans were meant to rule over the rest of nature.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

16. The balance of nature is very delicate and easily upset.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

17. Humans will eventually learn enough about how nature works to be able to control it.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

18. If things continue on their present course, we will soon experience a major ecological catastrophe.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

19. I am very confident that my actions will make a difference in protecting our environment.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

20. At the present time do you think laws and regulations for protecting wild or natural areas have gone too far, not far enough, or have struck about the right balance

a. Gone too far
b. Not far enough
c. Struck about the right balance

21. Number these environmental issues in order of most importance, with 1 = most important.

a. Air pollution
b. Climate change
c. Flooding
d. Litter
e. Pollution of marine environments
f. Overpopulation
g. Contamination of fresh water
h. Loss of habitat
i. Loss of biodiversity
j. Overconsumption of resources

22. At the present time, where does most the energy used in this country come from?

a. Nuclear reactors
b. Hot springs
c. Hydropower
d. Solar batteries
e. Burning of fuels such as coal, oil and gas

23. Which of the following is the best at filtering (or cleaning) water?

a. Forests
b. City storm drains
c. Wetlands
d. Lakes

24. What happens to the sulfur dioxide released by a factory's smokestacks?

a. The sulfur dioxide stays in the air forever.
b. The sulfur dioxide immediately falls to the earth as dust
c. The sulfur dioxide eventually falls to the earth as acid rain
d. The sulfur dioxide escapes from the atmosphere into space

25. The burning of fossil fuels has increased the carbon dioxide content of the atmosphere. What is the most immediate effect that this increasing amount of carbon dioxide is likely to have on our planet?

a. A warmer climate
b. A cooler climate
c. Decreased relative humidity
d. Increased relativity humidity

26. Which of the following is the most urgent environmental problem for Pinellas County?

a. Climate Change
b. Hurricanes
c. Drought
d. Mosquito population
e. Pollution
f. Flooding

27. Which of the following is NOT an invasive Florida plant species?

A. Air Potato
B. Brazilian Pepper
C. Old World Climbing Fern
D. Firebush

28. In which ways can climate change affect Pinellas County?

A. Increased Flooding
B. More severe hurricanes
C. Increased heat index
D. None of the above
E. Some of the above
F. All of the above

Post-Survey

1. This activity increased my knowledge of local ecosystems.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

2. This activity made me feel that my actions can make a difference for the environment.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

3. I did not learn anything from this activity.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

4. After participating in this activity, I feel more motivated to act on behalf of the environment.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

5. This activity increased my knowledge of large environmental problems.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

6. After participating in this activity, I feel our environmental problems are so large we can’t do much to help.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

7. Please list three things you learned during this activity

Environmental Attitudes

1. We are approaching the limit of the number of people the Earth can support.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

2. Humans and nature are separate entities

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

3. Humans have the right to modify the natural environment to suit their needs.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

4. When humans interfere with nature it often produces disastrous consequences.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

5. Human ingenuity will insure that we do not make the Earth unlivable.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

6. I think of the natural world as a community to which I belong.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

7. Humans are seriously abusing the environment.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

8. The Earth has plenty of natural resources if we just learn how to develop them.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

9. Plants and animals have as much right as humans to exist.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

10. The balance of nature is strong enough to cope with the impacts of modern industrial nations.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

11. Despite our special abilities, humans are still subject to the laws of nature.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

12. The so-called "ecological crisis" facing humankind has been greatly exaggerated.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

13. The Earth is like a spaceship with very limited room and resources.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

14. I don't think my actions will have an impact on solving environmental problems.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

15. Humans were meant to rule over the rest of nature.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

16. The balance of nature is very delicate and easily upset.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

17. Humans will eventually learn enough about how nature works to be able to control it.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

18. If things continue on their present course, we will soon experience a major ecological catastrophe.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

19. I am very confident that my actions will make a difference in protecting our environment.

Strongly Agree ---- Mildly Agree ---- Unsure ---- Mildly Disagree ---- Strongly Disagree

Interview request

1. Would you be willing to take part in a brief interview (either in person or over the phone) to discuss these issues further?

If yes, please could you write your full phone number here and email address here:

Future Contact

If you would be willing to answer some follow-up questions via email in a few weeks, please add your email address here:

_____

Appendix B: Interview Scripts

Participant Interview Script

First, tell me a little about yourself. What kind of work do you do?

Do you belong to any environmental organizations? Which ones?

Do you have any educational background in environmental issues? Tell me about that.

- Tell me a little about why you decided to attend this event.
  - Is this the first time you have attended an event with this organization?
  - How often do you attend events like this one?
  - Would you be interested in doing this kind of activity again?

- Tell me about your experience during this activity. How did you feel? What was it like?
  - What were your favorite parts about this activity?
  - Tell me about what you liked and what you didn't like.
    - why?
  - If you were in charge of this program what would you do differently?
    - why?

- Can you tell me about what you learned, if anything, during this activity?
  - Did the activity leader talk about local ecology? Environmental problems? Human behavior?
    - If yes, tell me about that.
  - Did the activity leader explain each of the activities or steps in the activity?
    - If yes, tell me about that.
  - Did the activity leader make any suggestions for things you could do to help the local environment?
    - If yes, such as?
  - In your opinion would this activity be considered an educational one?
  - What do you think the main purpose of this activity was?

- Tell me about any impact this activity might have on your own behavior. Do you think you might make changes in your own behavior, things you might do differently?
  - Can you explain to me how this activity affected your feelings or ideas about the environment?

- what do you look for when choosing what events to attend?
    - What kinds of things make an outdoor activity attractive to you?
        - Are you looking for very physical activities?
        - Looking for more informative activities?
        - What do you hope to get out of these kinds of activities?
    - Is important to you that you learn something at these events?
- Thinking back over this activity, and any others you might have participated in recently, what makes it a success for you - or not a success?

Expert Interview Script

What is your current position in this organization?

How long have you worked for this organization?

Tell me about how you first got this job.

Tell me about a typical day at work. What kinds of things do you do?

Tell me a little bit about your background. Have you worked in environmental organizations or agencies a long time?

Tell me a bit about your educational background. Is your education in environmental education, park management or policy?

Tell me about the programs you offer.

How many programs per month?
How many participants? Adults, kids, schools?
What types of programs? Hikes, lectures, gardening, restoration?
How long has this park/agency been offering educational programs?
Has the focus of the programs changed over time?

Do you keep demographic data about participants - age, race, gender, etc.?

If so, how do you use this data (for recruiting, etc.)?

Tell me about the staff you have working here. Are they mostly paid or volunteers?

Do you require a certain educational background for educators or activity leaders?
Do activity leaders go through on-site training?

If so, is that training formal, or informal?

Who does the hiring and training of educational staff?

Do you consider all of your programs educational?

What are the main goals of the programming you offer?

Are you looking for outcomes that are mostly about information transfer, emotional connection, commitment to working for the environment?

Do these goals vary by type of activity?
Can you tell me about that?
For example, does a guided hike have a different objective than a restoration activity?

Do you keep regular data assessing your various activities?
How do you measure the success of these activities?

In your expert opinion, what are the most important goals be for adult environmental education activities?
What should we be focusing on?
What do adults need to learn - what is the most critical thing you want them to get out of coming here and participating?

When designing your educational programs do you take into account if they are active or passive?
Clarification if necessary: passive activities generally involve listening to a guide or lecturer, watching a film, any kind of activity that does not involve real hands-on type learning.

How many of the activities you offer here are passive, compared to active?

Which type of activity do you think is more successful or has a greater impact on the participants?

Can you tell me what you feel are the most important components when? creating educational programs for adults?

Is there any way in which these events can be improved?

In thinking over all of the types of activities you offer, which ones tend to be most popular?
Why do you think that is?
Would you also say these are the most successful programs, in terms of impact on participants?

In your experience, what is the main reason people come to your events?

What is their main motivation for participating in these events (clean-up, hikes, lecture… depending on the activities mentioned by interviewee)?

Do you think there is a difference in motivation depending on the type of activity? Tell me about that.

Is there anything else you can think of that I should know about your educational programming?

Thanks for your time. This has been very helpful.

Appendix C: Study Consent Form

Informed Consent to Participate in Research Involving Minimal Risk and Authorization

to Collect, Use and Share Your Health Information

Pro # _____00035590_____

You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

We are asking you to take part in a research study called: Adult Environmental Education: Active vs. Passive Learning Pedagogy

The person who is in charge of this research study is Kelly McKenna. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by Dr. Rebecca Johns, Dr. Barnali Dixon, and Dr. Christopher Meindl.

The research will be conducted at Weedon Island Nature Preserve, Brooker Creek Preserve, Boyd Hill Nature Preserve, Keep Pinellas Beautiful cleanups and Tampa Bay Watch events.

Purpose of the study
The purpose of this study is to determine the effectiveness of adult environmental learning programs.

Why are you being asked to take part?
We are asking you to take part in this research study because you are an adult participant in an environmental education activity.

Study Procedures:
If you take part in this study, you will be asked to complete a short survey questionnaire (10-15 minutes). The questions will ask you about your experience with environmental

education and your thoughts and feelings about the activity you participated in. During the activity the principle investigator will be making notes and partaking in informal conversations. The principle investigator may take photos during the activity. The survey is anonymous and will only ask for your initials unless you choose to give your name and contact information for a follow-up interview. The surveys will only be accessible to the key personnel of this research and will remain in a locked cabinet until they are shredded within 5 years.

Total Number of Participants
A total of 150 individuals will participate in the study at all sites.

Alternatives / Voluntary Participation / Withdrawal
You do not have to participate in this research study.

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.

Benefits
You will receive no benefits by participating in this research study.

Risks or Discomfort
This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation
You will receive no payment or other compensation for taking part in this study.

Costs
It will not cost you to take part in the study.

Privacy and Confidentiality

We will keep your study records private and confidential. Certain people may need to see your study records. Anyone who looks at your records must keep them confidential. These individuals include:

- The research team, including the Principal Investigator and research advisors.
- Certain government and university people who need to know more about the study, and individuals who provide oversight to ensure that we are doing the study in the right way.
- Any agency of the federal, state, or local government that regulates this research.

- The USF Institutional Review Board (IRB) and related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance.

We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

You can get the answers to your questions, concerns, or complaints

If you have any questions, concerns or complaints about this study, or experience an unanticipated problem, call Kelly McKenna at 727-481-3954.

If you have questions about your rights as a participant in this study, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu.

Consent to Take Part in this Research Study

And Authorization to Collect, Use and Share Your Health Information for Research

I freely give my consent to take part in this study I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

_____ _____

Signature of Person Taking Part in Study Date

_____

Printed Name of Person Taking Part in Study

Do you wish to be contacted for an interview at a later date?

Please circle one option: Yes No

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.

_____

Signature of Person obtaining Informed Consent Date

_____

Printed Name of Person Obtaining Informed Consent