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# The Impact of Environmental Education on Environmental Literacy and Motivation in Urban Communities

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THE IMPACT OF ENVIRONMENTAL EDUCATION ON ENVIRONMENTAL  
LITERACY AND MOTIVATION IN URBAN COMMUNITIES

by

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A capstone submitted in partial fulfillment of the  
requirements for the degree of Master of Arts in Education.

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## CHAPTER ONE

### Introduction

The focus of this capstone will center on the question of, does environmental education increase environmental literacy and motivation in urban communities in the United States (U.S.)? This chapter will focus on my topic question as well as what led me to make the decision to write about this topic. I will also discuss my personal history and background information and what personal factors helped lead me to my career and the topic at hand. In addition, I will give an overall discussion on urban communities and what they are made up of, and why they are important. This chapter will close with a discussion on urban environmental education (EE) and why it is important to consider integrating into school systems across the U.S.

### Personal Background

For as long as I can remember I have always been passionate about nature and wildlife. Some of the earliest memories I have of becoming interested in nature are of me make my mother watch back-to-back episodes of National Geographic's *Wild* and Animal Planet's *Crocodile Hunter* on television as a child, until all hours of the night, refusing to go to bed because the next story was going to be even better than the last. I also remember flipping through the pages of my father's subscription to National Geographic Magazine and looking with wonder at all of the exotic places and animals each issue covered and imagining me there. I remember thinking any job that would allow me to see a Bengal tiger or an elephant up close in the wild was the only job for me!

As I grew older, and as my interest in nature continued to grow, so did my interest in what career path I would take. For most of my childhood, I was set on becoming a wildlife veterinarian. The idea of helping animals that were sick or injured and to be able to travel to all of those foreign and mysterious places that I had seen on television and in those magazines, seemed like the most amazing and rewarding job in the world to me. While my interest would later ultimately shift to EE, it is important that I first explain a little background history as to why.

Growing up in the big city of Phoenix, Arizona, had its challenges. While I loved the outdoors and wildlife, living in the desert made going outside and doing outdoor activities such as camping or hiking a challenge, especially in the summer months. A combination of being in school through most of the cool season, and having two working parents, made getting out of town to head up north to cooler climates difficult as well. There were also not a lot of activities a young girl interested in wildlife veterinary medicine could participate in either. My parents did their best by sending me on field trips to local science centers and took me to the Phoenix Zoo and natural history museums whenever they could. My parents also sent me up north to summer camp a few times for a couple of weeks which I loved. I remember at times almost being discouraged that I would have to wait until college to really be able to get away from the city to be able to do things outdoors and to work with wildlife and to get experience in the wildlife veterinary medicine field. However, toward the end of high school, I discovered that there were many opportunities to work with wildlife around me that I had not considered before, and one opportunity in particular that caused the focus of my career to shift dramatically.

The summer after high school, I discovered that at 18 years of age, you were able to work with wildlife as a volunteer at the Phoenix Zoo. I thought that this would be a great opportunity for me to possibly get some experience in the field of wildlife medicine, as the zoo even had some volunteer positions that worked with their medical staff team. Unfortunately, at the time I began there were no volunteer positions available with the medical team. Still wanting to gain experience, I began volunteering as an assistant zoo keeper instead. My job as an assistant zoo keeper consisted of cleaning enclosures, distributing animal diets and providing behavioral enrichment activities for the animals. While I was initially disappointed I could not get any volunteer work on the medical side, I was pleasantly surprised at how much I enjoyed volunteering as an assistant keeper. I ended up loving the position as it allowed me to experience working with various different animal collections, including the education animals, and it was my experience with the education animals that really began a transformation process for me career wise.

I became fascinated with the education programs at the zoo. When first watching the programs, I remember seeing the looks on the faces of the kids and adults who were participating and how enthralled they all were in the subject matter and how much they seemed to really care about the animal they were learning about. Hearing them ask questions and seeing them get excited to understand a little bit more about the animals and where they came from inspired me. I just did not realize yet that there were other career opportunities like this outside of a zoo setting.

I continued with the zoo for about a year and began college at Arizona State University. Still unsure of my real career path at this point, I decided to major in Applied

Biological Sciences with a concentration in wildlife and restoration ecology, as the career path was versatile for this degree. During college, I also began volunteering for the Arizona Game and Fish Department at their wildlife rehabilitation and education center in north Phoenix. Here I gained experience actually working with the public and helping deliver important discussions on wildlife and environmental issues using non-releasable rehabilitated wildlife or other instructional methods to both adult and student groups. Once again, I found that I really enjoyed seeing the effect that EE programs had on the public, both young and old. Not only were the topics helpful and important to teach, but I realized, I really loved teaching and delivering this powerful information to the public, and seeing it develop in them in such a positive way. It was here I truly realized my love of promoting and participating conservation initiatives and EE. I finally knew that once I graduated I wanted to find a job in the EE field, and I did just that!

After college, I was able to find a job as a Teacher/Naturalist with Audubon Arizona, the state chapter of the National Audubon Society, one of the oldest and largest conservation organizations in the U.S. I was so thrilled when they offered me the position. I felt like my dream was finally coming true. The offices for Audubon Arizona reside at the Nina Mason Pulliam Rio Salado Audubon Center, in central Phoenix. The Center is not only the headquarters for Audubon Arizona, but is also an environmental education center. The Center, in my opinion, is one of the most unique to an urban environment, as it rests in the heart of Phoenix in Rio Salado Habitat Restoration Area, a 600-acre park space in the historic Salt River corridor (Audubon Arizona, 2016). The Center is less than two miles from downtown Phoenix, and is a gateway to Sonoran riparian habitat that is used by over 200 different species of birds and other wildlife



(Audubon Arizona, 2016). The Center is free to the public, and offers interactive exhibits, connections to the Rio Salado Habitat's sixteen miles of hiking and riding trails and a variety of EE programs, including family nature walks, live wildlife encounters and lectures, birding classes, and EE field trip programs for schools (Audubon Arizona, 2016). While I was excited to be working in such a unique environment, I did not realize how much I still had to learn about the world of EE.

During the course of my first year with Audubon was when I began to realize how important EE truly is, especially in urban environments. It's not that I did not *know* before that I was delivering important information to the public, I just never thought about how EE is so much more than just a way of providing that information to the public; it is a pathway to change and understanding. As I dug deeper, I began to realize that there is a real pandemic of environmental illiteracy in the U.S. and the availability of education programs, in urban environments especially, is particularly lackluster. It was a big wake up call to me to realize that while I was part of one of the most important education fields on the planet, it is also one of the most underutilized as well.

Needless to say, because of the fact I grew up and still live such a large urban community that is Phoenix, Arizona and the importance and the impact I feel I make on my students every day, the lack of credit given to EE and its impact on urban communities, has only increased my passion for being an environmental educator. That is why I feel that the topic of EE and its impact on increasing environmental literacy and motivation in urban communities in the U.S. is one to be studied and revered. EE is a growing field and the more research and support we can achieve, and the greater the focus we can bring on the importance and significance of our work, the more we can

prove that the field is worth expanding and the better off our urban communities will be for that. I am grateful and committed to being part of that process through the research I have conducted that you are about to review.

### **What are Urban Communities?**

According to the *National Geographic Society* (2016), an urban area is the region surrounding a city where most of the inhabitants have nonagricultural jobs. Urban areas are generally very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways (National Geographic Society, 2016). Urban areas are very different from rural areas. Rural areas generally have low population density and large amounts of undeveloped land (National Geographic Society, 2016).

There are many living things share cities with people. While it may vary slightly from city to city, generally in a city you can find streets lined with trees, various wildlife, community gardens, urban parks, streams, rivers, and lakes. Cities are an ecosystem of communities of interacting organisms and their environment and they are shared by people, plants, and animals (Freitas, Griswold, Krasny, Lauber, Tidball, Ulkeritis & Word, 2012). Typically, when considering the quality of the environment, urban ecosystems have been viewed from a deficit-based perspective (Freitas et al., 2012). The focus tends to be on what is lacking in the system, rather than what is valuable.

It seems that urban systems often help create separatism from nature. In the paper by Light (2001), questions whether urban landscapes must be seen as the “source of all environmental ills.” This is something many researchers and ecologists have come to question over the years. The book by Alberti (2008), discusses the downfall of trying to

understand and ecosystem as something that is “separate from people,” and instead to focus on our tendency to view an ecosystem as a linked social-ecological system. Once seen from this perspective, cities are really a place where people and nature coexist and continually influence one another, for better or for worse.

### **What is Environmental Education?**

According to the North American Association for Environmental Education (NAAEE), EE teaches children and adults about the environment through thoughtful minds-on and hands-on investigation methods (NAAEE, 2016). It teaches communities how to make intelligent and informed decisions regarding the environment.

Environmental education discusses not only how humans impact the environment, but also guides the learner and shows them ways to nurture and improve the world around them. Environmental education is taught not only in traditional classrooms, but also in non-traditional classrooms settings such as nature centers, museums, parks, and zoos. In traditional schools, often state and national learning standards are reflected (NAAEE, 2016). Environmental education is a slight myriad of combined subjects such as earth science, biology, chemistry and social studies (NAAEE, 2016). Even math and language arts are involved. The reason for so many different disciplines is because understanding how the environment works, and keeping it healthy, involves knowledge (NAAEE, 2016). According to the NAAEE (2016), “environmental education works best when it is taught in an organized sequence.” “Done right,” environmental education not only leads to environmentally literate people, but also helps increase student academic achievement” (NAAEE, 2016). Through my research I hope to give strength to this statement.

### **Why is Environmental Education Important to Consider?**

I believe that EE is an essential part of our education system, that when fully utilized, is not only a part of the education system that helps us better understand and connect to the environment we live in, but also helps communities fully understand what that connection means. Through EE, communities can begin to realize that their connection to an ecosystem has both positive and negative impacts. My hope is that this realization leads to our communities questioning, what makes a healthy urban ecosystem? How can we, as a community, provide a healthy system in which both people and nature can coexist? How can I help? When an urban community as a whole or when individuals begin to ask themselves these types of questions it shows desire and motivation to become involved in sustaining a healthy urban ecosystems. This increase in motivation is what I hope to show to be a positive byproduct of EE through my research.

Conservationist, Aldo Leopold, who I will discuss in greater detail in Chapter 2, was one of the environmental community's greatest spokespersons. Through his work, one of the loudest messages Leopold (1949) conveyed was that humans need to view the land as an entity with which we must strive to maintain a harmonious relationship with. Leopold's (1949) way of thinking has greatly influenced modern day EE in many ways. Because of Leopold (1949), today EE programs strive to promote understanding and appreciation for the natural environment and the numerous interrelationships that exist within it. In addition, Leopold's (1949) vision of achieving healthier ecosystems through harmonious relationships is central to the purpose of EE.

## **Environmental Literacy and Student Achievement**

While innovators such as Leopold have paved the way for modern day EE, sadly, recent studies show that the U.S. suffers from a tremendous environmental literacy gap that appears to be increasing rather than decreasing. For example, according to the Campaign for Environmental Literacy (CEL), two-thirds of the public fail a basic environmental quiz, and 88% fail a basic energy quiz (CEL, 2007). In addition, roughly 45 million Americans think the ocean is a source of fresh water, and 130 million believe that hydropower is the top energy source in the U.S. (CEL, 2007).

The U.S. has also made little effort to correct this pandemic. Throughout the history of EE, there have been many ups and downs in terms of progress made toward establishing EE as essential programming within our schools nationwide. Since the time of Leopold (1949), numerous laws have been enacted that have both helped and hindered the progress of EE, but in the last thirty years there has been little ‘push’ from the U.S. government to promote EE in schools or major funding to provide support to build informal education centers. Despite this fact, environmental educators have remained determined to continue research and to demonstrate the importance of EE.

In our schools, research has shown that there are enormous benefits from participating in EE programs. Research shows that when EE is integrated into a science curriculum, student achievement in science improves (CEL, 2007). This increase is likely due to the fact that EE connects classroom learning to the real world. In addition, when given a choice, students have been shown to gravitate towards environmental science (CEL, 2007). According to CEL (2007), “science fair administrators note that 40% of all science fair projects relate directly to the environment, and the Corporation for National

and Community Service reports that more than 50% of the service-learning programs they fund are focused on the environment” (CEL, 2007).

Research has also shown that there is a measurable positive impact not only on student achievement in science, but also in reading, math and social studies for students who participate in outdoor EE (CEL, 2007). Perhaps more importantly, EE has been shown to help enhance critical thinking and basic life skills in students (CEL, 2007). The National Science Board of the National Science Foundation’s (2000) report confirmed the importance of EE with the following statement:

"The twin goals of learning are to acquire knowledge and gain skills such as problem solving, consensus building, information management, communication, and critical and creative thinking. Environmental issues offer excellent vehicles for developing and exercising many of these skills using a systems approach...changes should be made in the formal educational system to help all students, educators, and educational administrators learn about the environment, the economy, and social equity as they relate to all academic disciplines and their daily lives." (National Science Board of the National Science Foundation, 2000)

However, despite the backing of these studies and support from numerous reliable and respected organizations, and the overwhelming evidence in favor of EE, there has been little movement toward expanding EE programs in the U.S. and ultimately, I believe the lack of EE in the U.S is our leading cause of environmental illiteracy, especially in our urban communities. Which is why, in addition to showing that EE contributes to increased motivation and environmental literacy among students, I also hope to bring to

light through my research evidence further supporting the positive impact EE has on student academic and personal achievement.

### **Conclusion**

It is clear to me that EE is an important and precedent emerging topic in the education field. Many ecologists have come to recognize that ecosystems are not something to be viewed as separate from people. It is promising that recent studies show the tendency to view ecosystems, including urban ecosystems, as linked social-ecological systems are increasing. To me this is essential, because when communities are able to view the environment from this perspective, they are then able to see that people, cities and nature are not separate from each other but rather connected to each other. It is also promising to me that while the U.S. government may be at a standstill when it comes to advancing EE, thanks to an increased awareness in the environmental community to the importance of helping our urban communities gain a better understanding of the environment, a growing number of educators have become more involved in urban EE.

Ultimately, I chose to center my research around this topic because I believe that the sustainability and the future of the environment relies on ensuring the public is well-educated and my research will provide the evidence to support this notion. I want to see our children grow to become stewards to the environment, especially those within urban communities as they have so much impact on the environment itself. I also want to ensure that this sense of stewardship continues on to future generations as well. To me, EE is a key part to our survival. Environmental education allows us to connect in a very personal way to nature. It allows us to see our own individual impact on the Earth, and at the same

time, is also allows us to see past our own individuality to see the “big picture” and the impact we all have on the Earth as a whole.

In a field that is specifically tailored to the unique needs and characteristics of urban social-ecological systems, my research exploration is intended to stimulate thoughtful discussion about just what those unique needs and characteristics are. The impact that EE has on our urban environment will be discussed throughout my research. The main purpose of my research is to promote additional awareness for the importance of EE in urban communities. This exploration is my effort of reviewing past research and comparing it to my own synthesis of the perspectives and practices of environmental educators and their students in order to better determine if urban EE increases environmental literacy and motivation. A secondary factor to my research is to analyze my results and discuss new ideas intended to help urban environmental educators develop or improve programs that will result in improved environmental literacy and motivation. Research that will be reviewed to support my research question in Chapter 2 includes a review of EE history and theory, research on EE and its current role in urban communities, and an examination of research conducted on the impact of EE in regards to motivation, knowledge and behavioral changes.



## CHAPTER 2

### Literature Review

This chapter will first explore the history and theory of environmental education, particularly in the U.S., the role EE plays in urban communities, and the structure of EE programs. The major focus of this literature review will be on the question, does EE increase environmental literacy and motivation in urban communities in the U.S? Therefore, this chapter includes an examination of studies on the impact of EE, EE program structure, and the impact EE has on motivation, knowledge and behavior changes toward environmental awareness and literacy within urban communities. In addition, this chapter will conclude with an overview of studies that support the idea that EE has a positive impact on student achievement.

### **Environmental Education: History and Theory**

The history of EE in the U.S. has been somewhat tumultuous, and more recently has become a new addition to formal education curriculum in our schools and informally in our local communities. This first portion of this section will focus on the history and development of EE, primarily in the U.S., and will provide an overview of how EE came into development, those responsible for its foundation in the U.S., and how it has slowly made its way into our education system.

In addition to its history, it is equally important to understand the development of EE theory and its place in the modern day classroom. The second portion of this section will review current EE theory and its development and progress in the 21<sup>st</sup> century

classroom. It will conclude with a discussion of its confusion with environmental science and the true key factor of EE.

**Groundbreaking Events and Publications.** According to McCrea (2006), there are numerous origins from which EE was founded. McCrea (2006) noted that the first real mention of the importance of including the topic of the environment in academic lessons was in the 1792 publication, *Emile*, by Genevan philosopher Rousseau. In the U.S., in 1891, Jackman wrote *Nature Study for the Common School* which would go on to define the nature study movement. In addition, in 1908, The American Nature Study Society was established in the U.S. which became the leading organization serving and strengthening the Nature Study movement (McCrea, 2006). These advances were minor but significant as they helped give way to the first major rise in the conservation education movement which came in the 1930's with the "Dust Bowl" (McCrea, 2006). The conservation movement was supported by state and federal natural resource agencies as well as many non-government organizations (McCrea, 2006). However, despite these steps forward, it was the 1940's that would really help establish modern day EE.

The late 1940's was a significant time for EE, but started off on a somber note with the untimely death of the pioneer of the modern conservation movement, Aldo Leopold, in June of 1948. Leopold died shortly before his influential, *A Sand County Almanac* (Leopold, 1949), was published. This book was essentially a documentation of the relationship between humans and the environment. Today, *A Sand County Almanac* (Leopold, 1949) is considered the cornerstone of the American environmental movement, and in the environmental science and conservation community; many consider *A Sand County Almanac* (Leopold, 1949) to be the essential reference to modern day

environmental thinking. The book also helped pave the way for later environmental works that would eventually push the U.S. into the environmental movements of the 1960s and 1970s (Carter & Simmons, 2010). The book was also published just before the first Conference for the Establishment of the International Union for the Protection of Nature (IUCN) which is the oldest and largest global environmental organization that, “helps the world find pragmatic solutions to our most pressing environment and development challenges” (IUCN, 2014). This Conference will be especially significant in the 1970s.

Following the publication of *A Sand County Almanac* (Leopold, 1949), as early as the 1950s, the wisdom of the pursuit of wealth at the cost of the environment began to be questioned (Carter & Simmons, 2010). On the heels of Leopold (1949), was the success of Galbraith’s (1958), *The Affluent Society*, which helped bring attention to emerging smog issues in California cities. In addition, in 1960, Packard’s book, *The Waste Makers*, began to bring attention to issues regarding pollution. However, despite the success of Leopold, Galbraith, and Packard, it took two other authors and their publications to really kick start some of the major environmental legislative changes of the 20th century (Carter & Simmons, 2010). Those authors were Carson (1962) and Udall (1963)

In 1962, Carson’s book, *Silent Spring*, reported that many of the chemicals manufactured and used on a regular basis to help control weed and insect populations was in fact having a serious effect on the environment. With this book, Carson (1962) had the attention of the American public, and if not more importantly, because of *Silent Spring* the public became more aware of the deteriorating environment surrounding them and began to learn more about underlying causes for environmental deterioration (Carter &

Simmons, 2010). In 1963, Udall's, *The Quiet Crisis*, was published. This book provided the public with a deep perspective on environmental history in America (Udall, 1963). The book detailed not only what we had already lost ecologically speaking, but also what we had the potential to lose. During this point in history, *The Quiet Crisis* (Udall, 1963), along with *Silent Spring* (Carson, 1962), became part of unseen environmental legislation and action. Ultimately, both of these books became monumental to the growing environmental movement in the U.S.

**The Birth of Environmental Education.** The year 1972 was a major turning point on an international level for EE due mostly to the fact the first United Nations (UN) Conference on the Human Environment was conducted in Stockholm, Sweden that year and the Conference resulted in the production of the Stockholm Declaration. The Stockholm Declaration is a twenty-six principle declaration specifically on the environment that was unprecedented for its time (Carter & Simmons, 2010). One of the most significant principles of the Stockholm Declaration was Principle 19, which proclaims that:

“Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension. It is also essential that mass media of communications avoid contributing to the deterioration of the environment, but, on the contrary, disseminates information of an educational nature on the need to project and improve the environment in order to enable man to develop in every respect.”

*(Declaration of the United Nations Conference on the Human Environment, Principle 19, 1972)*

This declaration was significant because it meant that the topic of EE was finally gaining international recognition.

Leading up to the UN conference of 1972 in Stockholm, the U.S. was already making great legislative strides over the increased concern for the environment. In just four years, between 1964 and 1968, the U.S. had passed numerous new pieces of legislation in an effort to strengthen environmental protection. Important acts passed during this time included:

- The Wilderness Act of 1964
- Species Conservation Act of 1966
- Wild and Scenic River Act of 1968
- The Solid Waste Disposal Act of 1965
- Clean Air Act of 1965

One of the most important acts passed during the 1960s was The National Environmental Policy Act of 1969. The direct purpose of the National Environmental Policy Act (NEPA) is:

“To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems

and natural resources important to the Nation; and to establish a Council on Environmental Quality.” (P. L. 91-190) (as cited in McCrea, 2006)

NEPA remains the environmental law of the U.S. today. When NEPA was passed, it was through its statement of purpose that the looming environmental concerns that would follow into the 1970’s were made clear.

On April 22, 1970, a Harvard law student named, Denis Hays, collaborated with Gaylord Nelson, a U.S. Senator from Wisconsin at the time, in an effort to enlist the aid of campus activists from across the country for an environmental teach-in that would later become known as Earth Day (Carter & Simmons, 2010). Earth Day, 1970, involved an estimated 20 million people, with nearly 1,500 college campuses that participated (Carter & Simmons, 2010). Another landmark development of 1970 was a study conducted by the National Science Teachers Association (NSTA) which pointed out that among all of the districts and schools, across all 50 states, only 54 programs existed at the time with any EE element (National Science Teachers Association, 1970). In August 1970, in response to Earth Day and the NSTA study, U.S. President Richard Nixon addressed Congress and stated:

“It is also vital that our entire society develop a new understanding and a new awareness of man’s relation to his environment, what might be called “environmental literacy.” This will require the development and teaching of environmental concepts at every point in the education process.” (Nixon, 1970, p. vii)

It was then that EE was given the green light and the path to “environmental literacy” was born.

In 1970, U.S. Congress passed the National Environmental Education Act of 1970 (McCrea, 2006). The Act authorizes the:

- Creation of an Office of Environmental Education in the U.S. Dept. of Health, Education and Welfare
- Establishment of a National Advisory Council for environmental education
- Establishment of a domestic grants program (McCrea, 2006)

There were a few major shortcomings of the act, that included only a lifespan of five years and limited funding but despite these missteps, EE was finally a part of federal law and infrastructure (McCrea, 2006).

The early 1970s truly set the foundation for modern EE within the U.S. After the passing of the National Environmental Education Act of 1970, EE and environmental efforts were once again in the eye of the American public. In 1971, the National Association for Environmental Education was formed by a group of educators who were concerned over the development of EE materials (Carter & Simmons, 2010). The group was later renamed the North American Association for Environmental Education (NAAEE), which is how it is still known today (Carter & Simmons, 2010). The Journal of Environmental Education was already in print by 1971 and in its 1969 inaugural issue, Stapp (1979) of the University of Michigan, firmly reiterated the need for EE and identified objectives of the new field (Bennett, Bryan, Fulton, MacGregor & Stapp, 1969).

In addition, a number of major conferences were held throughout the decade that addressed different aspects of the concern for and the development of EE (Carter & Simmons, 2010). The topics of these conferences ranged from elementary and secondary education, to higher education, and addressed emerging issues in the field (Carter & Simmons, 2010). These ideas eventually came to light in 1978 at the National Leadership Conference in Environmental Education in Washington, D.C. This Conference reviewed recommendations of past EE conferences, and assessed the current situation in EE in the U.S. in attempt to develop a clear set of recommendations to further EE in the U.S. (Stapp, 1978).

The Stockholm conference of 1972 may have set the stage for EE internationally, but the International Workshop on Environmental Education, held in Belgrade, Yugoslavia in October of 1975, resulted in The Belgrade Charter (1975) (Carter & Simmons, 2010). The Belgrade Charter (1975) described the goals, audiences, objectives and guiding principles of EE and more importantly proposed the most widely accepted definition of the goal of EE which is:

“To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.” (The Belgrade Charter, 1975).

In addition to the developments for the International Workshop on Environmental Education, in October 1977, the world’s first Intergovernmental Conference on



Environmental Education was held in Tbilisi, Georgia, USSR. During this conference, the document known as The Tbilisi Declaration was formed and remains what is considered to be the definitive statement on what EE is and what it should strive to be (Carter & Simmons, 2010). The goals set forth in the Declaration have provided the foundation for the field since 1978:

- (a) to foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;
- (b) to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;
- (c) to create new patterns of behavior of individuals, groups and society as a whole towards the environment (UNESCO, 1978, p. 26)

While EE was gaining momentum internationally toward the end of the 1970s, heading into the 1980s, the same could not be said of EE back in the U.S.

**The 1980s to the 21st Century.** Overall, the 1980s were not as kind to EE as the previous decade had been, especially within the U.S. government. In 1981, under President Ronald Reagan, the Omnibus Budget Reconciliation Act (OBRA) was passed and repealed P.L. 91-516, an Act to authorize the United States Commissioner of Education to Establish Educational Programs to Encourage Understanding of Policies, and Support of Activities, Designed to Enhance Environmental Quality and Maintain Ecological Balance (P.L. 91-516).

In addition to OBRA, in 1988, the election of President George H.W. Bush also marked the beginning of a politically rocky era for the environment and for education in general (Carter & Simmons, 2010).

In 1990, the new National Environmental Education Act (P.L. 101-619) was signed into law by President Bush. The act established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a Federal EE program. It also authorized the following:

- Environmental education grants
- Student fellowships
- The President's Environmental Youth Awards
- The Federal Task Force and National Advisory Council
- The National Environmental Education and Training Foundation (NEETF)

(McCrea, 2006)

Over the four years of the senior Bush administration, followed by eight years of the Clinton administration, the U.S. experienced a slow but substantial change in the federal government (Carter & Simmons, 2010). During this time, a new focus began to take place on the quality of EE materials and instruction that was encouraged by the academic standards movement (Carter & Simmons, 2010). As a result, the NAAEE began to develop standards for EE through the *National Project for Excellence in Environmental Education* (McCrea, 2006). Today, the Project provides set of recommendations for the development and administration of high quality non-formal EE materials and programs (McCrea, 2006).

The first decade of the twenty-first was also a struggle with regard to support within the U.S. government for EE. Too much disappointment, EE was completely ignored in the reauthorization of the Elementary and Secondary Education Act in 2001, which is commonly known as The No Child Left Behind Act (NCLB) (Carter & Simmons, 2010). During the first decade, there were also additional attempts to reinstate the National Environmental Education Act, which failed (Carter & Simmons, 2010). Environmental education was still considered a useful tool, but ultimately, any great strides to move EE forward in the political arena, were on hold during this time. Although, despite being unable to make progress politically, the EE community still continued to promote, demonstrate, and document the benefits of involving children in these types of programs (Carter & Simmons, 2010).

There would be a revival in the EE field in the political field with the publication of Louv's (2005), *Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder*. The book focuses on the cause and effect of society's lack of involvement in nature and re-sparked interest in the outdoors, the environment and movement toward new campaigns in favor of EE (Louv, 2008). One of the more notable of these recent campaigns was the support for the reauthorization of the National Environmental Education Act, alternatively named the No Child Left Inside Act (Bullwinkle, 2008). The No Child Left Inside Act was introduced to U.S. Congress in 2007 and would amend the NCLB Act to provide funding for EE programs and teacher professional development in states with K-12 environmental literacy plans (Bullwinkle, 2008). The No Child Left Inside Act was passed by the House of Representatives in 2008, but was never passed by the Senate (H.R.3036, 2007). The No Child Left Inside Act has been reintroduced several

times since 2008, but has never been enacted. As of February 2015, The No Child Left Inside Act was reintroduced once again in the House of Representatives and is awaiting approval (H.R.882, 2015).

**Environmental Education Theory.** Due to its broad base, for many, EE has been difficult to define or even conceptualize. Environmental education is without a doubt a unique discipline that taps into knowledge generated across a wide range of academic disciplines. It is up to EE practitioners to accurately and clearly relay that knowledge to their audience. While we have examined the history of EE in depth, we have not yet examined how it is actually practiced. By looking deeper at the way EE is taught, it may be possible to shed some light on why defining it definitively or conceptualizing it is such a difficult task.

Looking at the big picture, in order to get a sense of EE in action, a simple definition does not do much good. The Montgomery (2005) article is an excellent example of an environmental educator's thoughts on what EE really is in reality and what it truly means to be an environmental educator. According to Montgomery (2005), "We see it (environmental education) as building a sense of responsibility for the environment." "Once you feel responsible for the environment, you have the inclination to make well-informed choices and will then take appropriate actions" (Montgomery, 2005). In order to build this sense of responsibility in our learners, Montgomery (2005) suggests educators use the following four steps:

1. The first step, appreciation, involves attitudes, emotions, and awareness toward a resource.

2. The second step, knowledge, focuses on facts.
3. The third step, understanding, involves concepts.
4. The fourth step, responsibility, is demonstrated through action. (Montgomery, 2005)

Essentially, we can begin to break EE down to appreciation, knowledge, understanding and responsible action.

Environmental science is another factor in this whirlwind of confusion. While environmental science is a major contributor to the EE knowledge base, in recent years educators have often had difficulty distinguishing one from the other, although theoretically and conceptually they are very different. Part of the issue is the variability found in definitions of these terms. A major contributing factor to this mix up may be the fact that there is a broad range of topics that educational materials are produced for, and used in, for environmental science courses (Carter & Simmons, 2010). However, the essential characteristics of EE and environmental science are fairly straightforward and distinct. “Environmental science is the engine of data collection and knowledge creation” (Carter & Simmons, 2010). Environmental education is really how you communicate and apply knowledge about the environment in order to increase understanding and sense of responsibility.

Ultimately, the key of EE is environmental literacy. Another way of making EE and its goals clearer to the masses is to describe it as, “a way to instill environmental literacy in our nation’s pre-K-16 students,” which is how it is recognized and described by the Board of Director of the National Science Teachers Association (National Science

Teachers Association, 2003). There is no argument that EE and environmental science are closely related and that they are interdependent. However, to say that they are both the same is like saying that science and education are the same, and we are able to recognize very clearly this statement is inaccurate. Environmental literacy requires knowledge and skills that both build upon and go beyond environmental science. While there are many different definitions of environmental literacy, the National Project for Excellence in EE has identified four key elements of environmental literacy (NAAEE, 2004):

- 1) First, environmental literacy depends on a willingness and ability to ask questions about the surrounding world, speculate and hypothesize, seek and evaluate information, and develop answers to questions.
- 2) Second, environmental literacy is contingent upon understanding environmental processes and systems, including human systems.
- 3) Third, the environmentally literate citizen is able to identify, investigate, and formulate potential solutions to environmental issues.
- 4) Fourth, students are motivated, and understand that what they do as individuals and in groups makes a difference in their world. (NAAEE, 2004)

The commentary by Chase (1988) focused on the roots of many of our continuing, and developing, environmental problems. Chase proposed that any problems we have were either caused by or made worse by, what he termed, “academic tunnel vision” (Chase, 1988). In addition, Chase (1988) also stated that, “true advances and breakthroughs often occurred on the cusps between disciplines where influences and knowledge from other fields provided a richer environment for innovation and

development.” In essence, “Knowledge may be acquired through a narrowly defined study, but applying that knowledge well and often requires a more holistic approach” (Chase, 1988). As it is practiced today, EE is the embodiment of that “holistic approach” (Chase, 1988).

Ultimately, today it can be concluded that EE uses knowledge and data from a wide range of sources and disciplines to teach the public about the environment. Environmental education uses not only science as its foundation, but also reaches far into other fields, such as art and humanities. Environmental education teaches and promotes responsible and ethical environmental practices for every day, or on both National and global levels. It strives to teach through current scientific knowledge and provides guidelines and methods to educators to instruct using both traditional and hands-on learning methods. The ultimate goal is developing an environmentally literate citizen.

### **Environmental Education and Urban Communities**

It is important to understand what role EE plays within urban communities. This section will question the importance of EE, how it fits into an urban community, and what urban community programs are and what they promote. We will also begin to discuss studies conducted that investigate views of the importance of EE programs, structure of environmental programming, how children in particular view the environment, and the potential effects EE may or may not have on urban environments.

**Questioning the Importance of Environmental Education.** Taking into account the negative effect cities have on the environment, we must also ask ourselves how EE can help change and improve this effect. At this point, the answer to this question must seem obvious. However, you will find the answer is much more complicated than you

realize. As Freitas (2012) states, “Because human interaction with ecosystem elements in cities can lead to positive and negative effects, the question of what makes a healthy urban social-ecological system, a system in which both people and the rest of nature can thrive is important” (Freitas et al., 2012). There is much to consider from this statement.

To answer this question, it is important to go back to Leopold (1949). One of Leopold’s (1949) most famous excerpts on the importance of a balanced human-nature relationship was his statement on “land ethic” from *A Sand County Almanac* (Leopold, 1949). Leopold (1949) wrote, “A thing is right if it tends to preserve the stability, integrity, and beauty of the biotic community. It is wrong if it tends otherwise” (Leopold, 1949). This idea that Leopold (1949) put forward is considered by many environmental educators as their ultimate goal to achieve when educating the public and one that should be at the forefront of all lesson plans.

Project Learning Tree (2010), a prominent organization, “Committed to creating a future where the next generation values the natural world and has the knowledge and skills necessary to make informed decisions and take responsible actions to sustain forests and the broader environment,” has cited many studies that center around the question of, why is EE important (Project Learning Tree, 2010)? Project Learning Tree (2010) states,

“Raising an environmentally literate generation of problem solvers will help ensure that tomorrow's decision-makers are prepared for the challenges they will likely face. Studies have shown EE engages students in learning, raising test scores, and encouraging youth to pursue career in environmental and natural resources” (Project Learning Tree, 2010).



According to one of the studies cited by Archie (2003), educators at Pine Jog Environmental Education Center in Palm Beach County helped eleven Florida schools restructure their curriculum to organize activities and multidisciplinary teaching units around environmental themes (Archie, 2003). Why environmental themes? “Children have a natural interest in the environment around them. Interested students are motivated students, and motivation is a key ingredient for academic achievement” (Archie, 2003). The eleven schools studied have diverse student populations, and results of the restructuring for each school were remarkably similar (Archie, 2003). The research found that the students at these schools were more enthusiastic about learning and performed better academically after the restructure (Archie, 2003). The study also found that after the restructure, teachers were more enthusiastic about teaching, brought more innovative instructional strategies into the classroom, and took on additional leadership in school change as well (Archie, 2003).

**Environmental Education and Healthy Urban Systems.** A study by Cornell University on *Environmental Education in Urban Systems: An Exploration in Research and Practice* discusses how cities have become an intricate and essential part of modern day life (Freitas et al., 2012). According to the study, currently, more than half of the world’s population (Brunn, Williams, & Zeigler, 2003) and nearly 80% of the population (Parlange, 1998) of the U.S. live in urban areas (as cited in Freitas et al., 2012). Today, most people either work in or frequently visit a city either out of necessity, or for entertainment purposes (Freitas et al., 2012). Because of the increase in frequency and the necessity of cities for modern day life, cities have come to have a huge impact on the environment. The reason for the impact is easy to imagine when examining what is

required of the environment to sustain modern day city life. Due to the fact that cities provide room for large groups of people to live together in, in turn, cities require extensive environmental alterations (Freitas et al., 2012). To live in a city, people require not only housing, but places to work, eat, shop, structures for and methods of transportation on a widespread level, and various other facilities such as medical facilities that can support large numbers of people (Freitas et al., 2012). There is also the need for electricity and running water, and all of these elements ultimately affect the environment (Freitas et al., 2012). We must also consider the impact of day-to-day human activity in cities on carbon emissions and solid waste as well (Freitas et al., 2012). When looking at all that is required for a city to be functional and sustainable for large human populations, ultimately, it is hard to argue that if humans require cities to live, it is not without leaving a potential large and lasting impact on the environment.

When considering environmental quality, typically, urban ecosystems have been viewed from what Freitas et al. (2012) would describe as a, “Deficit-based perspective with a focus on what is lacking rather than what is valuable” (Freitas et al. 2012). In addition, and perhaps more importantly, urban systems perpetuate a feeling of separateness from the environment. A better way of putting this is that urban systems often, “Perpetuate unsustainable notions of human exceptionalism and exceptionalism that reinforce facile dichotomies about “people” being separate from “nature” and create additional alienation of people from their ecological homes in the biosphere” (Freitas et al., 2012).

Freitas et al. (2012) raised some important questions in their study that each environmental educator should ask themselves when working in an urban environment, such as:

- How well does an environmental education practice rooted in an appreciation of biotic communities and ecosystems apply to urban social-ecological systems?
- Which biotic communities have been so heavily altered by people?
- What are the factors that contribute to the health, and resilience, of urban systems? (Freitas et al., 2012)

When thinking about the later question, we must consider that some of these characteristics, species diversity, healthy populations of species, etc., might be similar to those discussed of any ecosystem (Freitas et al., 2012). We must also consider that some characteristics may be interrelated, as they may extend beyond biotic components and relationships and crossover into some of the characteristics of similar social systems (Freitas et al., 2012).

Part of the reason for the Freitas et al. (2012) study was to discuss what the unique needs and characteristics of urban social-ecological systems are (Freitas et al., 2012). They did this by combining research, perspectives and practices of environmental educators to come up with ideas that might help urban environmental educators. The Freitas et al. (2012) study began with asking the question, “What makes a healthy urban environment” (Freitas et al., 2012)? Freitas et al. (2012) interviewed twenty urban environmental educators that helped them identify fourteen different characteristics needed for urban environments to be healthy and grouped those characteristics into five basic categories:

- 1) Characteristics of the Environment – features of the biophysical and built environment, such as land, water, air, and buildings.
- 2) Environmental Influences on People – ways that people are affected by their environment.
- 3) People’s Relationship to the Environment – how people understand or interact with their environment.
- 4) Characteristics of People – features of human communities and interactions therein.
- 5) Human Assets – resources or capacities that people have. (Freitas et al., 2012)

Through the interviews, ecological and social factors were considered overall most important. The characteristic of green space, was one of the characteristics of urban systems that the educators interviewed mentioned the most frequently as being important (Freitas et al., 2012). In addition, having an safe and healthy urban environment in which people could live healthy lives was discussed second most frequently during the interviews, with specific focus on a clean environment free from pollution as being the main focus of a healthy environment (Freitas et al., 2012). The study also revealed that educators believe that people actively engaged in the environment is essential to a healthy urban system (Freitas et al., 2012). The educators interviewed also put heavy emphasis on people’s relationship to the environment as being important in healthy urban systems (Freitas et al., 2012). However, they also argued that other characteristics of people are important, to consider, even those without a direct connection to the environment (Freitas et al., 2012). The characteristics of a healthy urban environment considered of least concern by the educators interviewed included: planning process, in terms of

consideration of how human actions will influence the quality of the environment in advance; environmentally friendly lifestyles; a clean environment; and aesthetics (Freitas et al., 2012).

While Freitas et al. (2012) identified these characteristics based on their interviews with the twenty urban environmental educators, while those interviewed were all experts in urban environments, Freitas et al. (2012) understood that this was a small group to sample from and wanted to know if those educators ideas about healthy cities resonated with others (Freitas et al., 2012). So, Freitas et al. (2012) conducted a survey with members of the North American Association for Environmental Education (NAAEE) and asked them the same questions as the group of twenty urban environmental educators.

Freitas et al. (2012) used what they had learned in the initial interviews to help design an almost identical survey for NAAEE members (Freitas et al., 2012). The survey allowed Freitas et al. (2012) to rate how important environmental educators thought different characteristics of urban systems were. As with the interviews, NAAEE members considered both ecological and social factors important in cities (Freitas et al., 2012). However, some characteristics were perceived as more important than others such as those reflecting people's relationship to the environment (Freitas et al., 2012). The characteristics of people, meaning those that were solely concerned with people and how they related to each other, was perceived as relatively less important (Freitas et al., 2012).

Overall, the interview respondents and the survey respondents both tended to think that ecological and social characteristics were important (Freitas et al., 2012). It should be noted that the environmental educators who had less of a specific focus on

urban communities tended to deemphasize the importance of the social characteristics (Freitas et al., 2012). However, the results showed that educators in the survey who had taken an interest in urban areas were more likely to see all of these characteristics as important (Freitas et al., 2012). Those interested in urban areas saw the social characteristics of cities as more important than the other characteristics (Freitas et al., 2012). This tells us that urban environmental educators, with a strong focus on systems heavily impacted by people, are more likely to recognize that social components and ecological components are both necessary to create a healthy urban environment (Freitas et al., 2012). In addition, they may even view social characteristics as an advantage to cities (Freitas et al., 2012).

**Examining Programs for Urban Communities.** There are many factors to consider when examining how to structure an EE program. The main goal of many EE programs is to promote not only the understanding of but also the appreciation of the natural environment. Environmental education programs should show the countless interrelationships that exist within the natural environment as a way to promote healthier ecosystems and more harmonious relationships between people and the environment promoted by education (Freitas et al., 2012). How environmental educators are able to successfully and ethically achieve this harmonious relationship is the real question.

The Freitas et al. (2012) results reviewed characteristics that educators thought healthy urban systems should have (Freitas et al. 2012). Ultimately, urban EE programs work to improve these characteristics but often tend to focus on some characteristics more than others. As part of their results, Freitas et al. (2012) presented a list of a wide range of outcomes educators believed were both feasible and important to achieve

through urban education programs. Some short, medium and long-term outcomes of these programs may include:

Short-term:

- A broad understanding of the environment
- Awareness of the environment
- Awareness of connections to the environment
- Environmental appreciation
- A sense of responsibility toward the environment and the community
- Support for programs that protect and enhance the environment
- Environmental stewardship
- Advocacy and voting in support of the environment

Medium-term:

- Improved social and communication skills in youth
- Youth educating and having positive influences on other youth and family members
- Youth making friends with youth from different schools and neighborhoods
- Youth making connections with adults in professional settings
- Improved academic results for youth
- A broader conception of learning and more diverse approaches to teaching
- Use of natural areas in teaching
- Improved physical, mental, and emotional health.
- Appreciation of the environment and a sense of ownership towards it lead people to take care of it.

Long-term:

- The creation, restoration, stewardship, and use of healthy green spaces offering a variety of ecosystem services.
- An urban infrastructure that is designed to lessen the impact of people on the environment and enhance human health. (Freitas et al., 2012)

As reflected in the results of Freitas et al. (2012), when thinking about programing for EE, we not only want to consider our intent in doing what we do and our end goals, but we want to also consider what we are helping our audience experience.

According Simmons (1994),

“A major aim of environmental education is to encourage children especially urban children, to experience and appreciate the wonders of nature. Through schools, camps, nature centers, and a variety of youth organizations, environmental educators provide programs that introduce urban children to natural systems. Most of these programs are built on the conviction that positive youthful experiences in natural settings will contribute to a lifelong commitment to maintaining a quality environment” (Simmons, 1994).

Simmons (1994) also believes environmental educators have a better chance of meeting their goals by creating, “Well-designed learning experiences that take place in natural environments.” Any environmental educator knows, and Simmons (1994) agrees, that being able to structure these experiences appropriately for urban children is one of the biggest challenges of EE. The study conducted by Simmons (1994) was conducted specifically with children, to try and gain a better understanding of how people relate to



the environment, before participating in an EE program effects the program itself, and how that has an effect on how a program should be structured in the future.

The Simmons (1994) study was built on previous studies of urban teacher's perceptions and preferences for natural settings. For this study, Simmons (1994) surveyed third and fourth grade students from four cities in the urban Chicago area participated. Two schools from each urban area were recruited, and from each school two classrooms were selected based on teacher willingness (Simmons 1994). The data was collected in two parts. First, the children were first asked to rate on a one to five scale a set of thirty black and white photos in terms of preference from the ones they liked the most, to the ones they liked the least (Simmons 1994). The photos were all taken in early autumn in the Chicago area and varied according to attributes such as tree cover, lawns, trails and facilities (Simmons 1994). Then three to four randomly selected students were interviewed from each classroom and the child was asked a series of questions about what they liked or disliked about the photos (Simmons 1994). The results showed the most highly preferred grouping of photographs were those that depicted school sites (which were not labeled as such), urban nature and open fields (Simmons 1994). In addition, the results of Simmons (1994) study made it apparent that children hold strong preference for nature and nature related scenes. It was found that children also associate various hazards with particular settings such as; at night nature is frightening to children (Simmons 1994). In addition, Simmons (1994) pointed out that it is important how the educator introduces the site to children and how that may affect the outcome or goals of the environmental lesson. Simmons (1994) concluded that it is the responsibility of the teacher to build overall positive views held by their students.

## **Examination of Impact: Motivation, Knowledge, Behavior Changes and Student Achievement**

Understanding how and what knowledge EE provides to an urban community and how it may influence behavior is an important aspect for change. Research surrounding how EE leads to an a better understanding of environmental issues and how this may lead to motivational changes toward environmental stewardship within urban communities will be discussed in this section. The first section will focus mainly on how EE increases a better understanding of the environment and how EE incorporates ethical values into its programs to promote behavioral change. This section will also discuss how behavior is impacted in an urban community and how those skills lead to better environmental decision making within the community.

**Knowledge, Behavior and Motivation.** The 2001 study by the NAAEE and the National Environmental Education and Training Foundation (NEETF) describes the efficacy of environment-based education in helping young people become lifelong learners and leaders. However, as most teachers know, a well-rounded education means more than just achieving high test scores. The NAAEE and NEETF (2001) report looks at the effects of environment-based education (EBE), specifically on young people, and how it impacts important skills for improved motivation, life-long learning, career preparation, and attitudes of respect and responsibility. A seemingly encouraging recent annual public opinion survey conducted by NEETF of adult Americans found that 95% of parents support EE in our schools (NAAEE & NEETF, 2001). However, this most likely stems from a common perception that exposing a child to nature, animals, and cleaner communities helps overcome apathy and teaches respect (NAAEE & NEETF,

2001). This is however not necessarily the case. In fact, something much deeper and more impactful is happening among those who are involved in EE programs.

The article by Agyeman and Kollmuss (2002), focused on environmental psychology and how because environmental psychology looks at the range of complex interactions between humans and the environment, it is therefore a very broad field with many branches. The main goal of the Agyeman and Kollmuss (2002) article was to look at the psychological roots of environmental degradation and the connections between environmental attitudes and pro-environmental behaviors. Agyeman and Kollmuss (2002) specifically discuss how complex it is to answer to the questions, why do people act environmentally, and what are the barriers to pro- environmental behavior? Agyeman and Kollmuss (2002) discuss the numerous theoretical frameworks have been developed to explain the gap between the possession of environmental knowledge and environmental awareness, and displaying pro-environmental behavior.

It is clear that motivation plays a critical role in both learning and effective teaching. In their 1999 report, authors Krynock and Robb found that, “Students who perceive their studies as relevant to their lives are more highly motivated to learn.” So, in turn, how students perceive their studies has important implications for EE. A major portion of the NAAEE and NEETF (2001) study focused on how environmental topics and projects seem to hold a great deal of interest for students, particularly when they are aimed close to home (NAAEE & NEETF, 2001). The report also looked at how environmental projects and topics provide many opportunities for student-focused learning and how it can possibly hold more impact for a child to learn about a problem with a local creek or wetland or about neighborhood effects of recycling and conservation

programs, versus an issue affecting a similar environment but in another country across the world (NAAEE & NEETF, 2001). Research on EBE confirms that this type of education is academically rigorous and results in higher test scores (NAAEE & NEETF, 2001). EBE ensures that students do not simply learn about science, but that they actually perform science (Kennedy, 1999) (as cited in NAAEE & NEETF, 2001). Through EBE, students can change their behavior from passive to active by practicing leadership skills in their own communities and schools (NAAEE & NEETF, 2001). Allowing students to confront public policy issues in the classroom can help empower them and also promote and instill effective and responsible citizenship (NAAEE & NEETF, 2001). Overall, the NAAEE and NEETF (2001) report found that as part of an overall educational development program, EBE plays an important role in providing students with a well-rounded education and helps increase motivation and attitudes of respect and responsibility.

A companion report to the NAAEE and NEETF (2001) report, conducted by the State Education and Environment Roundtable (SEER), an organization formally advised by twelve state education departments, provided case studies that describe both personal observations along with test score results for seven schools that have adopted EBE. The 1998 study conducted by Hoody and Lieberman of SEER, was mostly qualitative, with some quantitative data collected. The study described forty schools that have benefited not only academically, but also behaviorally by integrating and applying the environment into science, mathematics, social studies and language arts concepts. The Hoody and Lieberman (1998) team had four major objectives for the study for the schools chosen:

- 1) to describe their common features

- 2) to identify their “best practices” that characterize the pedagogies
- 3) to examine factors that lead to their success or challenged them
- 4) to compile data on their effects on students, learning, teachers, and instruction.

(Hoody & Lieberman, 1998)

The Hoody and Lieberman (1998) SEER study is considered a benchmark for understanding the EBEs role in educational reform and also academic performance. Encouragingly, the results of the study showed that enthusiasm and the desire to teach and learn increased in each of the schools studied with an environmental-based context than within a traditional education framework (Hoody & Lieberman, 1998). The study concluded that students exposed to programs that use environment as integrated context (EIC), were found to become enthusiastic, self-motivated learners (Hoody & Lieberman, 1998). In addition, the study found that EIC students obtained additional educational benefits, such as a comprehensive understanding of the world, advanced thinking skills, and an increased awareness and appreciation diverse viewpoints (Hoody & Lieberman, 1998). Another interesting result from the SEER study was that it found that regardless of any socio-economic factors, student performance in each of the schools improved (Hoody & Lieberman, 1998).

**Community Impact: Benefits, Challenges, and Growth.** Since its beginning, the very core of EE is to educate individuals and communities about the environment through meaningful mind-on and hands-on methods. The purpose of a study by Cheak and Volk (2003) was to evaluate the impact of an EE program on the students and the island community of Molokai, Hawaii. According to Cheak and Volk (2003), the setting was specifically appropriate for a study focused on community impact due to the fact that

several enclaves of households exist on the island. The island itself is only thirty eight miles long and eight miles wide, and is considered a "community" island (Cheak & Volk, 2003). The island was also chosen by Cheak and Volk (2003) for their study as because of its small size, it is logical to assume that any environmental problems or issues that might arise would affect individuals and groups throughout the whole island and not just one area.

The Cheak & Volk (2003) study overall was very influential. It was an all-encompassing study that evaluated not only students, but also parents, and the community (Cheak & Volk, 2003). The program was put in place for five years, in fifth and sixth grade classes. It was designed to help learners take an in-depth look at environmental issues in their community, and make data-based, reflective decisions about those issues (Cheak and Volk, 2003). More importantly, it was designed to have the community itself participate in resolving those issues (Cheak & Volk, 2003).

For this study, both qualitative and quantitative methodologies were employed (Cheak & Volk, 2003). Interviews were conducted with student, parent, school personnel and community members (Cheak & Volk, 2003). Throughout the study, connections to students' critical thinking, environmental literacy, and participation in the community were discussed following a plan (Cheak and Volk, 2003). In addition, reading, writing, and speaking skills were looked at, and student and teacher characteristics and parent and community viewpoints were taken into consideration.

As with the results of Hoody and Lieberman (1998) and NAAEE and NEETF (2001) studies, the Cheak and Volk (2003) study found that, "Students who experienced investigative environmental instruction appeared to be more skilled in dimensions of

critical thinking associated with EE than did students who had no direct experience with the program” (Cheak & Volk, 2003). The data analysis also revealed a strong influence on the community as a whole. This impact, “Went beyond a positive effect on parental involvement. It affected members of the community at multiple levels of involvement, whether those community members happened to be parents of students who were participating in the program or not” (Cheak & Volk, 2003). The study observed students being deeply involved in peer collaboration and the community working together on significant issues cohesively (Cheak & Volk, 2003). The results were clear that the program permeated the entire island community and generated conversation. Its presence went, “Beyond the classroom and engaged the local newspaper, parents, community members, agencies and citizen councils” (Cheak & Volk, 2003).

In addition to Cheak and Volk’s (2003) study, research by Krasny, Kudryavtsev, and Stedman (2012) suggests that an well ecologically informed sense of place, that includes strong place attachment and ecological place meaning, contributes to pro-environmental behaviors. However, it is still considered unclear whether environmental education can intentionally influence a sense of place, especially in urban environments (Krasny et al., 2012). The study began in the Bronx, New York City, in 2010. The purpose of the Krasney et al. (2012) study was to investigate the impact of urban EE programs on sense of place. For the study, Krasny et al. (2012) used both pre and post survey results from five week environmental and non-environmental summer youth programs and compared results.. Their results emulate how important having a focus on local communities for EE really is.

The survey results in the experimental (environmental education program) group suggest that relatively short but intensive summer urban EE programs may significantly increase students' ecological place meaning (Krasny et al., 2012). In contrast, improvement was not observed in the control group that engaged in non-environmental programs (Krasny et al., 2012). So, according to Krasny et al. (2012), the findings from the experimental group may be attributed to urban EE programs that combine multiple teaching approaches. The findings were also consistent with the idea that, "Place meanings are not solely inherent and may be influenced through direct experiences and interpretations of places" (Krasny et al., 2012). In conclusion, when combined with other constructs such as place attachment, self-identity, environmental behavior, and community-based restoration, the concept of ecological place meaning may open new avenues for thinking in terms of how people interact with nature and what motivates them to engage in environmental stewardship in urban settings (Krasny et al., 2012).

A comprehensive survey of EE and sustainability among public schools in twelve states was conducted by Chapman in 2014. The states selected for the survey included: Colorado, Florida, Hawaii, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Oregon, Virginia, Washington, and Wisconsin (Chapman, 2014). The point of the survey was to gain an understanding of how schools' EE programs develop environmental literacy among students and the environmental knowledge, skills, attitudes and behaviors students need to become environmental stewards and to boost academic achievement. As a results, the survey results provide one of the first green school baseline evaluations for public schools in the U.S. (Chapman, 2014).



Surveys were sent to 17,500 traditional and charter public school principals (Chapman, 2014). The results of the survey indicated that 57% of principals believe informal EE is extremely or very important in helping students achieve environmental literacy (Chapman, 2014). In terms of looking outside the classroom for curriculum, schools report that 50% of learning experiences is outdoors, 41% are service learning projects, 40% happens in the school garden, 38% report using the campus as a hands-on learning laboratory, and 36% report using civic engagement projects with environmental themes as part of their curricula (Chapman, 2014). In addition, few principals indicated that their school has a high level of success in integrating EE in the curriculum with 29% stating that they are Not Very/Not At All Successful. The survey concluded that the integration of EE in curriculum is on its way but is still not well developed. In addition, the data indicates that resources available for EE and sustainability are not properly distributed, “Which makes it more difficult for financially disadvantaged schools and districts to become greener” (Chapman, 2014).

**Student Academic Achievement.** Using the Environment as an Integrating Context (EIC) for student learning, the South Carolina EIC School Network collected data in forty-eight schools across the nation since 1996. The results of this data collection indicated that the EIC Model program has significant positive effects on academic achievement, classroom behavior, and instructional practices (Falco, 2004). “The EIC Model employs natural and social systems as the context for learning while taking into account the best practices of effective educators” (Falco, 2004). According to Falco (2004), a successful EIC Model integrates the following fundamental strategies:

- Integrated, interdisciplinary instruction

- Collaborative teaching methods
- Community-based investigations
- Learner-centered, constructivist approaches (student asking, teacher guiding)
- Cooperative and individual learning
- Use of local community and natural settings as the context for learning and instruction (Falco, 2004)

It should be noted that the EIC Model focuses on educational results using the environment to engage students in the process of their education and enrich their learning experience through, “Real-world, hands-on, community based projects and activities, with the ultimate goal of helping these students not only to understand and appreciate the environment but also to achieve higher levels of overall academic success” (Falco, 2004). State curriculum standards served as the foundation for achievement measurement and focused on middle school students.

The quantitative and qualitative EIC Model data collected in South Carolina by an outside evaluator the first year of the programs operation show improvements in student attendance, behavior and attitudes (Falco, 2004). Teacher confidence and classroom management skills also improved as students responded. Students showed a gain of up to 15 points on the post-tests that were teacher-developed tests of environmental knowledge (Falco, 2004). There was a five month difference between the post-test and pre-test. At the end of the year, most of the students had shown improved in all subject areas. Student and parent interviews confirmed these improvements, as well as behavioral and attitude toward school subjects improvements as well (Falco, 2004). The students noted that the

hands-on activities and opportunity to be outside doing service-learning projects for their community and to have fun while learning was some of the most appealing features of the Model (Falco, 2004).

In a literature review by Norman, Jennings and Wahl (2006) over 100 research studies were reviewed in order to determine when compared to traditional educational approaches, whether programs using the environment as a basis for teaching resulted in any measurable academic success. The relevance and quality of the research studies were ranked based on criteria drawn from the Education Science Reform Act of 2002 and subsequent federal research guidelines (Norman, Jennings & Wahl, 2006). The research reviewed included studies of a variety of program approaches, demographics, rural and urban settings, and measured outcomes. According to Norman, Jennings and Wahl (2006) the strongest studies had the following factors in common:

- Regular use of the environment as a platform for learning
- Combining active group learning and independently, integrated curriculum, problem-solving and inquiry, and constructivist teaching methods
- Evidence supporting higher gains in academic achievement in language arts, math, social studies, and science in comparison to traditionally-taught programs as measured by standardized tests (Norman, Jennings & Wahl, 2006).

Norman, Jennings and Wahl (2006) broke their reviews down into what they believed were the eight strongest research studies. They determined that using the environment as a setting for education could improve performance on standardized tests across in all subject areas (Norman, Jennings & Wahl, 2006). Out of all the literature reviewed, only

two results indicated lower gains than traditional programs in specific subjects (Norman, Jennings & Wahl, 2006). They concluded that while additional research is still needed, initial efforts revealed that the use of the environment was a key factor in the relative academic gains (Norman, Jennings & Wahl, 2006).

### **Conclusion**

This literature review explored an in depth history of EE in the U.S. and those responsible for its establishment. In addition, through this research, EE theory was established as building a sense of responsibility for the environment through appreciation, knowledge, understanding and responsible action. It was established that the key to EE is environmental literacy that requires knowledge and skills that both build upon and go beyond environmental science. It was also made clear that it is important to raise generations of environmentally literate problem solvers that will help ensure that future generations are prepared for the challenges they will likely face. This chapter also discussed how studies have shown EE engages students in learning and helps raise test scores. The research reviewed also showed that EE is an essential part of creating a healthy urban system.

This chapter reviewed studies conducted that examined the importance of the structure of environmental programming. Studies reviewed presented ideas for how environmental educators can successfully and ethically achieve successful programming. The research discussed in this chapter has reaffirmed the idea that a well-rounded education means more than just achieving high test scores. The reviewed research provided evidence in favor of the idea that when EE is integrated into a community through either nontraditional or traditional education framework, learners experience an

increased understanding of the environment, along with increased enthusiasm and desire to teach and learn. In addition, studies reviewed concluded that students exposed to programs that use the environment as integrated context became more self-motivated learners. Major findings of EIC students included: obtained additional educational benefits; advanced thinking skills; and an increased awareness and appreciation diverse viewpoints. Studies also revealed that regardless of any socio-economic factors, student performance in schools improved with the implementation of EE programs, providing evidence that EE can be taught successfully to people of all ages and backgrounds.

Another important finding from the research review was how students perceive their studies have important implications for EE. Research suggested that environmental topics and projects that tend to hold high interest for students are ones that are aimed close to home. It is clear through the research reviewed that EE plays a critical role in motivation, learning and effective teaching. The data revealed urban EE has a strong influence on the communities it touches as a whole, and that it establishes a well ecologically informed sense of place in its learners that contributes to pro-environmental behaviors within communities.

In Chapter 3, I will discuss methods of my own research investigation into the impact EE has on urban communities, with emphasis on increased environmental literacy and motivation within urban communities.

## **CHAPTER 3**

### **Methods**

This chapter focused on the purpose for my study, which was to determine if EE increases environmental literacy and motivation toward environmental stewardship in urban communities in the U.S. The research paradigm and methods used was discussed in detail in this chapter. This chapter also provided a participant basis for the study and a description of the methods that were used. A sample of the participant letter (See Appendix A) and teacher survey questionnaire (See Appendix B) that were used for the study is provided in the Appendix. In addition, the anticipated timeframe for completion of the research was discussed. The chapter concludes with a brief discussion on the original anticipated results of the data collected.

### **Purpose**

The primary purpose of the study was to determine if environmental education increases environmental literacy and motivation toward environmental stewardship, specifically in urban environments in the U.S. This information is important to understand as it has the potential to positively impact overall student academic success and increase both the learner's understanding of and connection to environment. As discussed in Chapter 2, over the past 30 years there have been great advances in incorporating EE into traditional schools in the U.S. In addition, EE has become part of non-formal education field, being taught at nature based education centers and various government, private, and public organizations have developed EE programs or centers throughout the U.S. Notably, many of these centers and programs have been established

in urban communities. Despite these advances, EE researchers are only now just beginning to understand the impact EE has had on students and urban communities. Since urban communities make up where almost 80% of our populations live (Parlange, 1998) (as cited in Freitas, Griswold, Krasny, Lauber, Tidball, Ulkeritis & Word, 2012), this fact makes the impact EE has on these communities an important, pressing topic to address and research. As a Teacher and Naturalist myself, my interest was to personally investigate if students have been able to make deeper connections to the environment through EE and if they are able to better understand the environment through personal experience. I was also eager to research the impact EE has had on environmental literacy within urbanized communities. In addition, I was curious to find out know if the students and communities I research had experienced increased motivation or not toward environmental causes after engaging in an EE program in their local community.

As a secondary aspect to this study, I sought to review the impact the EE program of focus had on student academic achievement, and while this is not a curriculum based project, I wanted to gather enough feedback from my participants to allow the reader to brainstorm ways to improve or rebuild existing EE programs based on my results. It is important to determine the results of these secondary aspects of my research, as any positive trends I might show could aid in encouraging teachers to develop EE programs and incorporated these programs into their classrooms daily, especially where a traditional EE program is not currently a part of a schools structured programing.

### **Research Paradigm**

The research paradigm used was a qualitative methods approach. I chose to use the qualitative approach as this research is aimed at gaining a deeper understanding of patterns and behaviors found among a group of participants (Creswell, 2013). The qualitative methods approach is also a useful strategy to gain a more complete understanding of the research question asked through observation (Creswell, 2013). As Creswell (2013) outlined, the qualitative approach allowed for a better sampling of larger and more diverse populations, and allowed me to connect my data to existing theories and similar studies already conducted. Creswell (2013) describes qualitative data collection observations as open-ended, in that the researcher asks general questions of the participants allowing the participants to freely provide their views, which I found to be a suitable approach to my specific research question, as it is more opinion and observation based.

### **Research Methods**

The first step in this process was to identify potential participants. Participants that were targeted for the study were primarily urban K-12 science teachers and their students, environmental educators and their students, and some college level environmental professors and their students. Educators were targeted that had at least one year of experience teaching science or environmental science. My goal was to get as many participants and students as possible to participate. I contacted potential participants through both the NAAEE and personal connections. I reached out to potential participants primarily through email to convey details about my capstone topic.



All participants were chosen by their willingness to participate in the study. No names were provided for any participant, organization or school that participated in the study in order to ensure confidentiality.

Initially, ten participants were identified, all from Arizona. Each participant had at least two years of teaching experience in the science field or environmental education field. Four of the ten participants identified were secondary school science teachers (9-12), three were strictly informal environmental educators, two were elementary school science teachers (K-8) and one was a college level environmental science professor. Six of the teachers expressed willingness to allow their students to also participate in the study, with a rough estimate of at least 80 student participants in all by time of completion.

Now that participants were identified, the next step was to obtain signed consent letters from the leaders of the schools or education facilities where all ten teachers worked. Once I received the signed facility consent letters back, the next step was to gain Human Subjects Committee (HSC) approval of my capstone. I met the Hamline University HSC requirements by registering my research project with Hamline University Institutional Review Board (IRB). I also was required to complete the proper HSC application. All questions on the application had to be answered completely to the full extent. In addition, I completed a proposal meeting with all three of my capstone advisors, and submitted proof of my IRB proposal approval. I was also required to submit all signed consent letters from the facilities where my identified participants worked, along with samples of consent letters and acknowledgement letters that were signed by any teacher or student participant who would actually be completing my capstone survey

(See Appendix A). After I received HSC approval, and the signed consent letters back from the participants, data collection could begin.

The participants in this study were set up to be the qualitative observers. Data was collected through a structured qualitative survey questionnaire (See Appendix B) that could have been taken either independently by the participant or over the phone. Prior to completing the qualitative questionnaire, participants were initially asked to reflect on the most recent urban EE program they had participated in within the last six months, or one that they were currently actively participating in that had been going on for at least the last six months at that time they received the questionnaire. The study questionnaire was constructed to show the value, connection and motivation achieved by the learner from participating in a structured EE program, and from the results I could interpret ideas as to how these programs can improve in the future for not only myself, but for other environmental educators.

The questionnaire was designed using Creswell's (2013) method design approaches for qualitative research. The questionnaire was suited for cluster groups as each group of participants will be different from one another. There was a separate questionnaire for teachers, student, and adult learners; however, all of the questionnaires were similar in structure and content. I preferred similarity, as I wanted the questionnaires to have certain identical principles and questions in order to ensure that I was able to map and show similarities and differences according to the type of learner, and to ensure I was able to show the overall impact felt across each group.

The questionnaire was in the form of a number of multiple sequential questions that established the participants' initial interest in the program or reason for becoming involved in the program, their connection to environmental prior to the program, the details of the program they participated in, and their connection to the environment after the program, along with the academic impact after the program. Participants were also asked to give opinions on what improvements could be made on current and future EE programs. Each question was either a multiple choice or fill in the blank question. The data was to be analyzed by comparing the answers of teacher-teacher, student-student, classroom-classroom, and adult-adult learners from all of the traditional or non-formal institutions and independent participants that were willing to participate. See Appendix B for the complete list of survey questions for teachers.

Once results were received, I interpreted the qualitative data visually through charts to determine what impact the EE program of focus made on both urban students and teachers and whether or not an increase in motivation, environmental literacy and academic achievement were observed. My hope was that this data would be useful to help determine possible changes to current EE programs and curricula, as well as hopefully be a positive addition to previous research conducted supporting EE program inclusion in schools across the U.S.

### **Timeframe**

From initial participant recruitment to survey completion, my goal was that the study would be completed over a period of three to six months. Depending on how long it took me to complete any interviews and collect surveys and to analyze the results, my

ultimate goal was to have the study completed, results analyzed and my conclusion written by October 2015, with a submittal goal of December 2015.

### **Conclusion**

When I initially completed preparing the Methods portion of my research, it was difficult for me to fully determine what the results of the survey would be at the time. There were numerous factors that could either influence the results positively or negatively, which I knew included not only personal opinions and attitudes toward EE, but also individual attitudes and beliefs toward the environment and environmental issues. My hope was that the results would reflect the literature studies reviewed in Chapter 2 and would reflect those studies in that EE has a positive impact on local communities and that when people participate in these types of programs, it results in increased environmental literacy and motivation toward environmental stewardship in the process. I was also eager to get to know if my participants felt that EE programs have a positive influence on student academic achievement in urban communities. Finally, I hoped that this process would produce ideas that could help environmental educators improve existing EE programs, or even help some educators construct new programs. Chapter 4 will review the results of my research in detail.

## CHAPTER FOUR

### Results

This chapter will review the results of my survey pertaining to the question, does environmental education impact environmental literacy and motivation in urban communities in the U.S? I originally set out to conduct a survey with as many urban K-12 teachers, environmental educators, and college level professors and their students as possible. Initially, during my search for participants, ten teachers stated through email that they would commit to helping me conduct my capstone survey. All of the teachers who stated they would complete the survey were from both traditional K-12 and college level academic fields, as well as the informal EE fields. However, in the end, I was only able to conduct my survey with five teacher participants. The actual teacher participants included only two of the four original secondary school (9-12) teachers and all three informal environmental educators. All participating teachers worked in the greater Phoenix area of Arizona. No students were surveyed. In addition to changes in the number of teacher participants and students surveyed, the timeframe of my capstone survey was delayed due to consent letter issues. The following pages detail the updates made to my original methods and survey timeframe, as well as details regarding the design of the teacher survey, and a breakdown of the results received from the five teacher participants.

#### **Revisions to Research Paradigm, Methods and Timeframe**

As previously discussed, all participants were chosen by their willingness to participate in the study and by receipt of a formally signed consent letter. Once consent letters were received, in March 2016, the *Environmental Education: Motivation and*

*Program Quality Survey, Teacher Questionnaire*, (See Appendix B), was given to the two secondary school teachers and three environmental educators all located in urban Phoenix, Arizona. The teacher questionnaire ended up consisting of thirty six questions in all. The body of the questionnaire consisted of eighteen general program questions, fifteen student connection observation questions, and three EE program development write-in questions. Thankfully, the structure of the survey remained in line with how I originally set out to create it, as I originally designed the survey to be able to be completed by teachers from all academic levels in both the formal and informal fields. Also as anticipated, the participants were asked to answer the questions based on an EE program that they had their students recently participate in over the last six months or were currently actively participating in. Each teacher questionnaire was emailed to each of the five participants and was taken independently. The survey was emailed back to me when completed. No phone interviews were conducted.

Ultimately, both elementary school (K-8) teachers, two secondary school (9-12) teachers, and the college level environmental science teacher that had originally committed to participated in my research were not surveyed. I also was not able to officially recruit any college level students through any of the universities I contacted, nor was I able to obtain any elementary (K-8) or secondary level (9-12) students as I had originally hoped for. I was unable to secure any K-12 students due to the fact that I later found out that permission for student participation would have to either go through a long process with the school board, or through the district itself. In the end, I did not want to risk losing any of the teachers who had agreed to conduct the teacher survey by pushing them to get approval for student participation, especially when most of the teachers were

nearing the end of the school year and were under strict deadlines in terms of their student and classroom responsibilities. In addition, I was also unable to secure any informal EE students as classes had already passed for the season at the participating education center and would not resume until summer. On top of lack of teacher and student participation, the timeframe of my survey also changed significantly from an expected conclusion being written by October 2015, and submittal goal of December 2015, to my conclusion actually being written in May 2016, and a submittal date of August 2016. This was due to difficulties getting teachers to respond back to me in a timely manner confirming their participation and submittal of their consent letters (See Appendix A).

### **Teacher Survey Design**

The teacher survey was designed to identify as many aspects of the EE program as possible in order to gain a better understanding of the overall design and direction of the program, as well as how successful the program was from the teachers point of view. Key components of the survey included teacher demographics, motivation, personal attitudes, past experience, and program focus, as well as the teachers' review of overall program, reflection on environmental awareness and knowledge, student improvement, environmental literacy and overall program benefits. In addition, another key aspect of this survey was to gain feedback from the teachers' point of view as to how EE programs can improve in the future, so that educators can draw upon this research for EE program development purposes. The survey data was analyzed by comparing the answers of each teacher participant.

### **General Program Assessment: Teacher Questionnaire Responses**

The general program assessment consisted of identifying basic information in relation to the teachers themselves in terms of what type of educator they were, how they became involved in the program, their personal attitude towards the environment and their perception of their students attitudes both prior to completing the program and after completing the program. This portion of the survey also asked the participants to give basic details about the EE program that the educators focused on for this survey.

**Teacher Demographics and Program Involvement.** Participants surveyed identify themselves either by what level of educator they were in the traditional school system, or if they were an outside environmental educator. Based on the results, secondary school teachers and environmental educators were the only teachers who conducted the survey. Out of five participants, two identified themselves as traditional secondary school teachers (grades 9-12) and three identified themselves as environmental educators. All teachers work in the urban environment of the greater Phoenix area of Arizona.

**Questions on EE Program Involvement Prior to Participation.** This series of questions focused primarily on why the teachers became involved in the EE program they were focusing on for the survey and what their personal interest in EE programs looked like prior to participating in the program of focus. In comparison, participants were also asked what their students' attitude and connection to the environment was prior to participating in the EE program of focus. Participants were asked to identify the number of EE programs they personally had previously participated in or taught. They were asked to do this by estimating the number of programs they previously participated in between zero and



ten, or ten or more. These numbers were broken down into increments of five.

<b>Reason for EE Program Involvement</b>	<b>Number of Participants Identified</b>
This was a school mandated program	0
I am an environmental educator who teaches environmental education programs	4
Voluntary/personal interest	1

If the program was voluntary or personal interest, the participants were asked to explain why they chose to participate in the program. For the four participants who were environmental educators, it must be concluded that the topic already interested them.

The single voluntary interest participant, stated:

“Environmental Science is a Phoenix Union High School District (PUHSD) course that I brought to my school because I thought it is well suited for our school Career and Technical Education (CTE) program. I also elevated it to an Honors course.”

<b>Teacher Interest in EE Program Prior to Participation</b>	<b>Number of Participants Identified</b>
I had extensive interest or knowledge of the subject prior to participating in the program	4
I had some interest or knowledge of the subject prior to participating in the program	1
I had little to no interest or knowledge of the subject prior to participating in the program	0

<b>Student Interest in the Environment Prior to Participation</b>	<b>Number of Participants Identified</b>
Students had extensive interest or knowledge of the subject prior to participating in the program	0
Students had some interest or knowledge of the subject prior to participating in the program	2
Students had little to no interest or knowledge of the subject prior to participating in the program	3
Unknown	0

<b>Number of EE Programs Previously Participated in</b>	<b>Number of Participants Identified</b>
0	0
1-5	1
5-10	2
10+	2

**General Questions on Program of Focus.** The next questions in this survey were aimed at identifying information on the EE program that the participants were focusing on. Participants were asked to give details on the program in order to better identify the subject matter and how it related to the environment. Items surveyed included topic focus, length of program, facility type, information on the instructor, if the program was indoors or outdoors, and a lecture or hands-on.

<b>Topic Focus</b>	<b>Number of Participants Identified</b>
Local Issue	0
Global Issue	0

Both	5
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<b>Length of Program</b>	<b>Number of Participants Identified</b>
One Day	0
One Week	1
One Month	0
Other	4

Participants who chose “Other” were asked to specify the exact length of their program. Three of the participants who selected “Other” identified their program as being one year in length, and the fourth participant identified their program as being five years in length.

<b>EE Program Facility</b>	<b>Number of Participants Identified</b>
Traditional School	1
Environmental Education Center	4
Other	1

Participants who chose “Other” were asked to specify the exact length of their program. The participant that selected “Other” as one of their answers identified their program as being on public lands and also identified their program as being conducted in an EE center as well. This participant selected two answers in all to this question, which accounts for the additional participant identified.

<b>Program Instructor</b>	<b>Number of Participants Identified</b>
Self	4
Outside Educator	1

<b>Indoors or Outdoors</b>	<b>Number of Participants Identified</b>
Indoors only	0
Outdoors only	1
Both	4

<b>Lecture vs. Hands-on</b>	<b>Number of Participants Identified</b>
Lecture only	0
Hands-on only	1
Combination of Both	4

**Program Questions from Teacher Point-of-View.** These questions focused on the EE program from the teachers' point of view. The aim of these questions was to gain a better understanding of the programs' objective, promotion of environmental literacy, instructor engagement and perceived knowledge. The questions also aimed to tell if the teacher felt that the program was age appropriate for their students and if their students were supervised properly during the program in order to maximize learning potential. All questions were asked with the response options of 'Yes' or 'No' only.

<b>Program Objective Clarity</b>	<b>Yes</b>	<b>No</b>
Do you feel the programs philosophy, goals, and objectives were established clearly to your students by the facilitator or yourself?	5	0

<b>Promotion of Environmental Literacy</b>	<b>Yes</b>	<b>No</b>
Do you feel the programs philosophy, goals, and objectives generally promoted environmental literacy of yourself and students by the facilitator or yourself?	5	0

<b>Instructor Engagement</b>	<b>Yes</b>	<b>No</b>
Do you feel the teacher or educator or yourself actively engaged with the students/participants when conducting the program?	5	0

<b>Instructor Knowledge</b>	<b>Yes</b>	<b>No</b>
Did you feel the educator or yourself was knowledgeable and understood the subject enough to instruct it?	5	0

<b>Age Group Appropriateness</b>	<b>Yes</b>	<b>No</b>
Do you feel the program was properly geared toward your students/participants age group?	5	0

<b>Student Supervision</b>	<b>Yes</b>	<b>No</b>
Do you feel that adults, including formal and non-formal educators, parents,	5	0

and caregivers, provided the context and supervision that maximized the learning and development possibilities from play and exploration?		
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### **Student Connection Observation Assessment: Teacher Questionnaire Responses**

This section of the survey was completely student focused. I wanted to assess what effect, if any, the EE program had on student environmental knowledge and awareness, attitude toward the environment, motivation toward environmental causes, any improvement, decline or stagnation in overall educational skills, and to gain a sense of whether or not the students wanted to participate in future EE programs or activities after the program of focus was completed. This assessment was again through the teachers' perspective only.

#### **Questions on Students Environmental Awareness and Knowledge. The**

following are the teachers' responses to questions that pertained to student environmental awareness and knowledge.

<b>Student Environmental Awareness</b>	<b>Number of Participants Identified</b>
Students feel less aware of the environment and environmental causes	0
Students feel the same awareness to the environment and environmental causes	0
Students feel an increased awareness of the environment and environmental causes	5

<b>Student Knowledge and Basic Understanding of the Environment</b>	<b>Number of Participants Identified</b>
Students understand the environment and environmental issues less than when they started the program	0
Students have the same understanding of the environment and environmental issues	0
Students have an increased understanding of the environment and environmental issues	5

<b>Student Attitude Toward Environment</b>	<b>Number of Participants Identified</b>
Students have an increased concern	5
Students have a decreased concern	0
Student concern has remained the same	0

<b>Student Motivation to Become Involved in Environmental Causes Outside Classroom</b>	<b>Number of Participants Identified</b>
Significant – Increase in motivation	1
Moderate – Increase in motivation	3
Slight – Increase in motivation	1
None - Motivation remains the same	0

<b>Changes in Student Skills for Identifying and Solving Environmental Problems</b>	<b>Number of Participants Identified</b>
Significantly – Increase in skills	1

Moderately – Increase in skills	3
Slightly – Increase in skills	1
None - Skills remain the same	0

<b>Student Personal Interest in Participating in Working Toward Resolutions to Environmental Issues</b>	<b>Number of Participants Identified</b>
Significantly – Increase in participation	0
Moderately – Increase in participation	4
Slight – Increase in participation	1
None - Participation remains the same	0

<b>Student Interest in Recruiting Others to Participate in Working Toward Resolutions to Environmental Issues</b>	<b>Number of Participants Identified</b>
Significantly – Increase in participation	0
Moderately – Increase in participation	2
Slight – Increase in participation	3
None - Participation remains the same	0



<b>Student Motivation to Continue to Learn about the Environment in the Future through EE Programs</b>	<b>Number of Participants Identified</b>
Significant	0
Moderate	2
Slight	3
None	0

### **Questions on Student Improvement, Environmental Literacy and Overall**

**Benefit.** Teachers were asked a series of questions that related to their personal perspective as to how they felt their students have been impacted in other areas of school after the students completed the EE program of focus. This portion of the survey focused on student improvement in math and science, student achievement overall in core subjects, impact on student health, and any potential gained workforce tools. Teachers were also asked to reflect on if they felt environmental literacy was a key subject in their state and if they felt that the benefits and challenges of having their students participate in an EE program(s) or environmental action project(s) was beneficial to the students education overall. Most of the questions were asked with the response options of ‘Yes’ or ‘No’ only.

<b>Teacher View of Student Improvement in Other School Subjects (i.e. Math &amp; Science)</b>	<b>Number of Participants Identified</b>
Significantly improved	0
Moderately improved	1

Slightly improved	2
Not improvement	0
Unknown	2

<b>Impact on Student Achievement</b>	<b>Yes</b>	<b>No</b>
I believe environmental education is important and has a positive impact on student achievement in core subjects:	5	0

<b>Impact on Student Health</b>	<b>Yes</b>	<b>No</b>
I believe environmental education helps improve student health in terms of field related programs as part of regular school curriculum contribute to healthy lifestyles through outdoor recreation:	5	0

<b>Impact on Workforce Tools</b>	<b>Yes</b>	<b>No</b>
I believe environmental education helps provided critical tools for a 21 <sup>st</sup> Century workforce by supplying next generations with a solid understanding of these problems and the tools to overcome them and make informed choices in their own lives:	5	0

<b>State Mandated Environmental Literacy Plans</b>	<b>Yes</b>	<b>No</b>
Do you feel environmental literacy plans should be mandated in your state?	5	0

EE Program Participation Beneficial to Student Education Overall	Number of Participants Identified
Significantly	3
Moderately	1
Slightly	1
Not beneficial	0

### **Environmental Education Program Development: Teacher Questionnaire Responses**

In the final portion of the survey, the teacher participants were asked three questions that related to future EE program development. The purpose of this feedback is to help future educators understand what may be working with current EE programs and what is not, and where improvements can be made. Only the answers provided by each participant are listed for each question.

**Feedback Results.** The following are the teachers' responses to the write-in questions.

1. What general suggestions for improvement of EE programs in the future (i.e. length of time of the program, presentation skills or tools used, indoor vs. outdoor, hands-on vs. lecture, general suggestions on increasing student participation and motivation, etc.) (participants were asked to list at least three suggestions):

Participant 1:

- “Smaller group sizes – so more qualified instructors needed”

Participant 2:

- “A mix of indoor and outdoor activities helps mitigate loss of interest and heat exhaustion.”

- “I believe a mix of lecture and hands-on is important. Over stimulation can reduce effectiveness with controlling the group.”
- “Length of program varies greatly and I believe it is good to offer a mix of daily, weekly and monthly programs.”

Participant 3:

- “Multiple touch points (more than one trip/lesson; follow up opportunities)”
- “Lessons must be locally relevant.”
- “Lessons should provide opportunities for students to take conservation action.”

Participant 4:

- “EE should be mandated (in my state) as it is in over a dozen states.”
- “EE is best taught using non-traditional presentation methods such as project-based-learning, hands-on activities, and concept mapping.”

Participant 5:

- “Just like biology, chemistry and physics, environmental science should be a basic science course.”
- “Instead of three years of science (at the secondary level) we should have four years of science.”
- “Abstract science like chemistry and physics could be replaced by environmental if needed.”
- “Environmental science should be introduced at the elementary school level.”

2. In general, what evidence do you have from your personal experience that EE improves student achievement?

Participant 1:

- “We lack data to support increased scholastic achievement. We do survey students on changes in attitude towards the environment - and can demonstrate change for the better.”

Participant 2:

- “Students become more aware of their surroundings and how they are connected to the world around them. It encourages them to be more considerate of others (whether that be animals or people).”

Participant 3:

- “I have seen past students (interns) pursue higher education and career opportunities as a result of programing.”

Participant 4:

- “EE should be conducted outdoors whenever possible.”
- “My Environmental Science classes boast the highest passing rate of any science class offered at our high school.”

Participant 5:

- “One thing was evident that EE helped them understand that it is not a subject to get passing grades but it is a way of life. Thus, education is preparation for adult life. Most of all responsible for their learning.”

3. If you have apprehensions in terms of the inclusion EE programs as part of your classroom or school curriculum, whether by your own choice or by state or federally mandate, what are your major concerns?

- All participants stated, “None,” as their answers to this question.

## **Results Reviewed**

Based on the results, it can be concluded that all of the teachers involved in the study agreed that overall EE programs are beneficial to student education. With three of the participants agreeing that programs are significantly beneficial, one participant agreed that they are moderately beneficial, and one participant agreed that they are slightly beneficial. It can also be determined that all participants agreed that motivation and environmental literacy are improved through EE programs. Academic achievement was observed and based on the results; most participants stated on all levels that their students were successful in other subjects because of their participation in the EE program. Reflections of my findings in comparison to the literature review will be discussed in this chapter. In addition, I received important feedback on EE program structure from the participating teachers that I will use to help implicate ideas for EE program improvement in this chapter.

## **Conclusion**

I believe urban educators, including myself, can draw upon my research to make improvements to current EE curriculum and even create new EE programs as well. It is important for teachers to take away from this research that even incorporating EE into your general science class can make a difference in motivation, environmental literacy and student academics. I feel that EE is an important subject that should be integrated in all grades K-12. The participants in my research all concluded that environmental literacy plans should be mandated in their state. Teachers can use my research along with the research of many others who came before me, to make valuable arguments at the school district and state level to work toward EE integration across the board. My research lends

further support, that combination of hands-on and lecture learning both indoors and outdoors is the best method to conduct EE programs in. This gives urban informal environmental educators the support they need to better show that EE is best absorbed when outside the traditional classroom.

## **CHAPTER FIVE**

### **Conclusion**

While only a small group of teachers made up the participants, the research conducted produced a definitive answer the question; does EE impact environmental literacy and motivation in urban communities? The answer to this question, according to the participants, was a resounding, yes. The survey provided support that urban EE is integral in establishing an understanding of the environment both inside and outside the classroom, and that once this connection has been made, motivation to participate in environmental issues increases in urban communities. This survey also provided important feedback that teachers can use to help support the growing argument that EE programs should be a required course in the traditional classroom in urban environments, as this study supports what others have shown, which is that EE helps increase academic success across multiple disciplines. This section will provide a detailed overview of the implications of my research, ties to the literature review, as well as a discussion on the limitations of the survey and future research.

### **Implications**

Change is never easy, but I strongly feel the results of my study can be used not only in my own future educational endeavors, but also by the teachers who participated in the study as well. This study can be used as a conversation starter between the secondary teachers who participated in the study and their school leaders when arguing for increased EE program participation. The results of my study can help boost the secondary school teacher participants argument that EE has helped not only increase environmental literacy, but has also motivated their students to be more active in environmental issues in



the surrounding community, and that EE has also helped students improve academically. This study could possibly help increase the secondary school teachers' argument in a positive direction that traditional urban schools should include more EE programs into curricula. I also believe the study could benefit the environmental educators the same way. This data helps support the contributions these urban environmental educators and EE centers are making in the academic lives of the students they serve in their communities. The study also brings positive affirmation and attention to the growing need for EE centers in urban environments as alternatives to programming outside the traditional classroom.

The survey produced a great amount of constructive feedback from my participants and in the future, I would like to communicate the anonymous results in an organized format to the participating educators to draw upon as they all had some very constructive suggestions that they all could benefit from. When the teachers were asked, what general suggestions they had for improvement of EE programs in the future, some of the best reflections included a reference to keeping group sizes small to help individualize learning, having a mix of indoor and outdoor activities, keeping the program length a mixture of daily, weekly, and monthly and also making sure to keep the lessons locally relevant. I especially feel that the last point regarding keeping lessons locally relevant is constructive, as it is a subject I think needs to be further researched in terms of its impact, especially on motivation. In consistency with the thoughts and feelings of others who have participated in this type of research prior, another important piece of feedback was that some participants felt that making environmental science a basic science course is needed, and should be mandated in all states.

It is important to understand what evidence participants have from their personal experience that EE improves student achievement. One of the main challenges of EE centers is that they lack the data to support increased academic achievement. However, I think this is something that traditional schools can work with EE centers together on, by creating some kind of a shared reporting system or process that tracks academic data. A participant also noted that they felt that their students became more aware of their surroundings and observed increased connections to not only the outdoor world but other people as well after participating in the EE program. Another participant stated that their students were pursuing higher education and career opportunities as a result of EE programming, and one participant observed that EE helped their students understand that the environment is a way of life, and not just a school subject that involves a passing grade. These observations are important to document and share with one another and as evidence that EE helps promote positive attitudes toward higher learning in students, as well as a greater sense of the world and people outside of their own selves. The goal of urban environmental education is to connect city people with nature and get them out of the traditional classroom mold and into a new learning environment. As a teacher, it is important to make sure that you do everything in your power to ensure that each student's learning experience is both rich and meaningful. Environmental education has shown over and over that it provides this experience. So, educators need to figure out how to make this type of education a priority in our classroom and communities, and educators can start this by introducing EE not only into our own classrooms but also by spreading the word to others in the community as well.

### **Findings in Relation to Literature**

**Promotion of Environmental Literacy and Awareness.** Without a doubt, the questions surrounding environmental literacy and awareness were some of the most tightly unified in terms of my results. All five of the teacher participants felt that the philosophy, goals and objectives of the EE program they participated in generally promoted environmental literacy of both themselves and the students by the facilitator (or by themselves if they were the facilitator). In addition, all of the teachers felt that their students had an increased awareness of the environment and environmental issues after completing the program, and all felt that their students had an increased understanding of the environment and environmental issues after program completion. These results reflect the views of the National Science Teachers Association on environmental literacy and Chapman (2014) that EE programs develop environmental literacy among students as well as the environmental knowledge, skills, attitudes and behaviors students need to become environmental stewards and to boost academic achievement. It is also interesting to me that the survey results compared to the thoughts of former U.S. President Nixon from way back in 1970 when he stated:

“It is also vital that our entire society develop a new understanding and a new awareness of man’s relation to his environment, what might be called “environmental literacy.” This will require the development and teaching of environmental concepts at every point in the education process.” (Nixon, 1970, p. vii)

**Student Motivation.** Student motivation was one of the most important topics for this study. I was able to get a fairly tight consensus from my participants that the EE programs they participated in at least moderately motivated their students to become involved in the environment in some way. There were numerous questions relating to motivation in my questionnaire. Most had to do with whether or not the teachers saw significant, moderate, slight or no improvement from students after EE program participation.

When asked whether or not students showed an increase in motivation to become involved in environmental causes outside the classroom, one of my participants determined that their students showed significant increase in motivation, while three determined that their students had moderate increase in motivation, and the final participant determined that their students only had a slight increase in motivation for causes outside the classroom. In comparison, when asked what their students' attitudes toward the environment were after completing the EE program, all participants determined that their students showed increased concern for the environment. When asked about their students' personal interest in participating in working toward resolutions to environmental issues, four participants felt that student interest in working toward solutions was moderately increased, and one felt it was slightly increased. So, the motivation was there at least mostly at a moderate level, which is positive.

One of the most encouraging results of my study was the results of student interest in recruiting others to participate in working toward resolutions to environmental issues. Two of the participants determined that they saw moderately increased interest from their students in recruiting others to participate in working toward correcting

environmental issues outside the classroom. Three determined that they saw a slight increase in interest. While this question did not see highest marks in terms of motivation, it is encouraging that students would want to recruit others such as friends or family members to be part of the solution to environmental issues or to just become more involved in learning more about the environment itself. In addition, teachers were asked what if they felt their students would continue to learn about the environment through EE programs in the future. Two of the participants felt moderately that students would seek future programs, while three only slightly felt that students would seek out future programs. The outcome of this may be based on the fact that some of the participants are environmental educators and may not be able to follow up with some of the students in the future because they may only be with the students for one program.

The results just discussed relating to the motivation portion of my study are in line with the NAAEE and NEETF (2001) report which found that overall, as part of an overall educational development program, environmental based education plays an important role in providing students with a well-rounded education and helps increase motivation and attitudes of respect and responsibility (NAAEE & NEETF, 2001). In addition, the question that related to student recruitment of others to become involved in EE programs reflected the Cheak and Volk (2003) in that the impact of the program beyond saw a positive effect on the community.

**Impact on Student Academic Achievement and Future Skills.** The results of the survey showed one teacher felt there was a significant change in their students' skills for identifying and solving environmental problems, while three teachers felt that the change was moderate, and one felt it was only slight. In terms of academics, one teacher

viewed student improvement in other school subjects such as math and science as moderately improved, while two felt there was slight improvement and the other two teachers determined that the results were unknown. The teachers, whose results were unknown, are probably due to the fact that these teachers are environmental educators who do not know the full impact of their programs on their students, as they only know their students through an informal setting. While they may not have been on the same page in terms of math and science, all of the participants were in agreeance that EE is important and has a positive impact on student achievement in core subjects.

I found my research results relating to academic achievement to be in line with the Archie (2003) study, in terms of the fact that like Archie (2003), the students at the schools involved in my research were more enthusiastic about learning and performed better academically after completing an EE program. My research results also reflect the Freitas et al. (2012) study that found EE improved academic results for youth. In addition, the NAAEE and NEETF (2001) research on environmental based education also confirms my research findings in that this type of education is academically rigorous and results in higher test scores. Like my study, the results of the Hoody and Lieberman (1998) study showed that enthusiasm and the desire to teach and learn increased in each of the schools studied with an environmental-based context than within a traditional education framework. The results of my research also reflect the thoughts of the National Science Board of the National Science Foundation (2000), Chapman (2014) and NAAEE (2016) on the importance of implementing EE programs in schools or having students participate in EE programs to improve academic achievement.

In addition to improvements in academic achievement, all teachers were in agreement that EE helps provided critical tools for a twenty-first century workforce by supplying next generations with a solid understanding of environmental problems and the tools to overcome them and make informed choices in their own lives. This compared to the results of the NAAEE and NEETF (2001) report that looks at the effects of environment-based education specifically on young people, and how it impacts important skills for improved motivation, life-long learning, career preparation, and attitudes of respect and responsibility.

**Combining Learning Methods and Program Location.** Four out of five survey participants selected that their program was a combination of both hands-on learning and lecture on the survey, with the fifth participant selecting that their program was hands-on only. It should also be noted that, the same four participants that selected that their program was a combination of both hands-on and lecture learning also selected that their EE program was conducted both indoors and outdoors. In comparison, the participant who selected that their program was hands-on only, selected that their program was an outdoor only program. In combination with the other results previously mentioned, I believe these answers while not directed at the teachers belief of whether or not this impacted the students positively or not, when comparing these answers to the teachers surveyed other responses when it comes to academic, behavior improvement and motivation, these results reflect those of the Hoody and Lieberman (1998) and the Cheak and Volk (2003) studies which supported that students who experience combination learning have increased skills in critical thinking.

**Summary of Overall Environmental Education Program Benefits to General Education.** One of the most encouraging aspects of the study was that most of the participants felt strongly that the EE program helped their students overall in their education. To be precise, three participants agreed that EE Program was significantly beneficial to student education overall, while one moderately agreed and one slightly agreed. These feelings were also mirrored in participant feedback as well. The results of my research showing overall positive impact on students again supported the literature from Archie (2003), Freitas (2012), Chapman (2014), NAAEE (2016) and the thoughts of the National Science Board of the National Science Foundation (2000).

In summary, my research clearly supports that urban EE improves environmental literacy and motivates students in these communities to become more involved in environmental causes, and also encourage others to do so as well. My research also supports that student behavior and academic achievement are positively influenced when students complete an EE program.

### **Limitations**

While I believe the results and questions involved in this study are all very strong, this study faced numerous challenges. The first of these challenges was finding enough participants from different parts of the U.S. to complete my surveys. As previously discussed, I began this process having a fair number of contacts, and was initially able to find ten teachers who were willing to help me with my research, in the end, as previously discussed, I was only able to actually obtain consent letters from five participants, all from one state. In the end, the five teachers ultimately consisted of three informal environmental educators and two secondary school educators (K-8), each with at least



two years of science or environmental science teaching experience. I initially held out hope that this would not impair my research too much as I still had five participants committed, even if from only one state, and potentially all of their students as well.

Unfortunately, the second and most disappointing challenge I faced was obtaining any student or college level participants. I initially started out this capstone with the goal in mind to complete my research with the perspectives of not only K-12 teachers and college level professors, but also K-12 student and adult learners as well. The five teachers who committed to my research did not have the time to include their students in the survey, or were simply unable to get the permission they needed from their principals or school leaders in order to have student participation, or did not have students to survey at the time. Some teachers even had to go through the school district if they wanted get approval for student participation. So, when considering my time constraints and without wanting to be too pushy and possibly lose what little committed teachers I already had, I ultimately had to accept that I would not have any student data for this study as I had originally hoped for. As for adult learners, I was unable to get any students to participate, despite contacting several universities.

Finally, in terms of the current data I have from the teacher point of view, I believe that additional research needs to be conducted on this subject. I have no doubt that my research would be further benefited if I had student data from both the elementary and secondary levels, as well as adult college level participants. I also would have liked to have been able to collect additional data from more secondary education teachers, as well as collect any data from elementary and college level teachers. As I have previously stated, three out of five of the participants were environmental educators and

two were secondary educators. It should be noted that while I feel that the study would have benefited by having a more diverse group of participants, I believe that even with an increase in participants, the results would still have fallen in line with my actual study outcome, as well as the results seen in previous studies outlined in my literature review, as my research still shows that EE is beneficial to students overall.

### **Future Research on Urban Environmental Education Programs**

Based on the fact that my participants for this study were all teachers, in the future, I would like to focus my research primarily on student observations. I would like to conduct a long term study following a group of students from elementary school through high school graduation to see how their opinions and motivation toward the environment change over time. This would be an age related study to see if long term EE program participation is more effective than short term. It would be interesting to compare the results of students that drop out of EE programs versus students who consistently were involved in EE programs.

Some research questions I would like to ask at both the beginning and end of the study include: What is their interest in the environment? What is their level of environmental literacy? How well would those who stuck with the programs excel in other subjects compared to those who did not? Does it really make a difference to be in EE programs long term or can even a short term program work for students in the long run? This research would be more from a student perspective with limited teacher involvement. It would be interesting to determine how students felt about EE over the course of the study and how that would or would not change, and perhaps if how they felt

about the environment and environmental causes overall at the end of the study may be more important than how they actually excel in other areas of school when considering the goal of environmental literacy.

### **Additional Literature for Future Research on Urban Environmental Education**

During my search for literature for this study, I came across the topic of Project EXCITE, (Environmental health science eXplorations through Cross disciplinary and Investigative Team Experiences), which was an Environmental Health Science Integrating Context (EHSIC) grant program that began in 1998 and was conducted over the course of seven years. It was designed as a teacher professional development program that was funded by the federal government, specifically the National Institute of Environmental Health Science (NIEHS). Its purpose was to prepare fourth through ninth grade teachers to design and implement problem based, integrative, environmental health curricula for over 1600 students (Haney, Keil & Zoffel, 2009). The idea was if, “Environmental Health Science (EHS) explicitly links environmental conditions to personal and public health,” then this can enhance student engagement and create topic relevancy beyond simply the topic of ecology (Haney, Keil & Zoffel, 2009). This idea was based off of the thought that many urban environments may provide more opportunities for EHS exploration rather than ecological based exploration, as they may not have direct accessible quality, diverse outdoor settings (Haney, Keil & Zoffel, 2009). Project EXCITE was created to see if implementing EHS programs would enhance student achievement in all subject areas in the schools studied.

Interestingly, Project EXCITE ultimately found that after two years of participation, most of the schools who participated in Project EXCITE had pass rates that were higher in all subject areas compared to year immediately prior to beginning Project EXCITE. Even more promising was that in the specific subject areas of reading, writing, math and citizenship, the increase in passing rates was greater than the annual variability for the preceding five years (Haney, Keil & Zoffel, 2009). In summary, state proficiency performance appeared to be enhanced during the periods of EXCITE implementation for all schools.

I feel that focus on EHS is something I would like to explore in the future in comparison the Project EXCITE study. I like the idea that EHS is a more approachable and manageable subject for some urban environments and I would like to compare the passing rate data of EHS based programs and EE based programs side by side. I think both results will be comparable, but I would predict that a hands-on, outdoor EE program approach to learning would still benefit urban student motivation and achievement better overall.

### **Closing Remarks**

In the growing field of urban environmental education, there are still great strides to make. It is clear through my research, as well as the research of others that I have outlined in this capstone that environmental education impacts not only environmental literacy and motivation positively, but also communities and academic achievement as well. I hope that my research, while small in nature, will be part of a positive step forward in the right direction, which to me, is including EE in academic curricula across the board in the U.S.

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## APPENDIX A

### Sample Letter to Adult Participants

Date

Name

Address

City, State Zip

Dear ,

I am a graduate student working on an advanced degree in education at Hamline University, St. Paul, Minnesota. As part of my graduate work, I plan to conduct research with various education level science teachers from January 10, 2016 – February 29, 2016. The purpose of this letter is to request your/your child's participation.

The purpose of my research is to study the impact environmental education has on environmental literacy and to describe what a high quality and successful environmental education program looks like. I plan to conduct my research through a questionnaire that will be delivered to you/your child sometime between January 10<sup>th</sup> and February 29<sup>th</sup>. The questionnaire(s) will help determine if the environmental education program you/your child recently participated in improved environmental literacy. The questionnaire will also focus on the quality and structure of the environmental education program that you/they participated in.

There is little to no risk for your/your child's participation. All results will be confidential and anonymous. I will not record identifying information about participants such as their names, nor report identifying information or characteristics in the capstone. Participation is voluntary and you may decide at any time and without negative consequences that information about you/your child will not be included in the capstone.

I have received approval for my study from the School of Education at Hamline University. The capstone will be cataloged in Hamline's Bush Library Digital Commons, a searchable electronic repository. My results might also be included in an article for publication in a professional journal or in a report at a professional conference. Again, in all cases, you/your child's identity and participation in this study will be confidential. If you agree to participate/if you agree that your child can participate, please keep this letter and fill out the duplicate agreements to participate on pages two and three, and return the **researcher's copy** to me by email no later than **February 15, 2016**.

If you have any questions regarding this letter, please do not hesitate to contact me using the information provided below.

Sincerely,

Amber Huston, MAEd Candidate  
Hamline University  
School of Education  
P: (602) 321-3376  
Ahuston02@hamline.edu

**APPENDIX B**

**Hamline University  
MAEd Candidate**

**Environmental Education: Motivation and Program Quality Survey**

**Teacher Questionnaire**

**General Program Assessment**

Please circle one answer for each question below or write in your answer where asked:

1. I am a \_\_\_\_\_

- a. Elementary School Teacher (K-8)
- b. Secondary School Teacher (9-12)
- c. College Level Professor
- d. Environmental Educator

2. How did you become involved in the environmental education program?

- a. This was a school mandated program
- b. I am an environmental educator who teaches environmental education programs
- c. Voluntary/personal interest

3. If you are not an environmental educator, and the program you completed was not mandated what interested you in participating in the environmental education program? (briefly write your reason for interest)

a. This question does not apply to me (program was mandated or I am an environmental educator)

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4. What was your personal attitude and connection to the environment prior to participating in the environmental education program?

- a. I had extensive interest or knowledge of the subject prior to participating in the program
  - b. I had some interest or knowledge of the subject prior to participating in the program
  - c. I had little to no interest or knowledge of the subject prior to participating in the program
5. What was your student's attitude and connection to the environment prior to participating in the environmental education program?
- a. They had extensive interest or knowledge of the subject prior to participating in the program
  - b. They had some interest or knowledge of the subject prior to participating in the program
  - c. They had little to no interest or knowledge of the subject prior to participating in the program
  - d. d. Unknown
6. The number of environmental education programs I have previously participated in or taught is between \_\_\_\_\_.
- a. 0
  - b. 1-5
  - c. 5-10
  - d. 10+
7. Was the topic focused on a local issue, global issue, or both?
- a. Local issue
  - b. Global issue
  - c. Both
8. How long was the program that you participated in or taught?
- a. One day

- b. One week
  - c. One month
  - d. Other \_\_\_\_\_ (please specify length of time)
9. At what type of facility did the program take place?
- a. Traditional School
  - b. Environmental Education Center
  - c. Other \_\_\_\_\_ (please specify)
10. Who conducted the program?
- a. Self
  - b. Outside Educator
11. Where was the program conducted?
- a. Indoors only
  - b. Outdoors only
  - c. Both indoors and outdoors
12. Was the program a lecture, hands-on program or project, or a combination of both?
- a. Lecture only
  - b. Hands-on only
  - c. Combination of both
13. Do you feel the programs philosophy, goals, and objectives were established clearly to your students by the facilitator or yourself?
- a. Yes
  - b. No
14. Do you feel the program's philosophy, goals, and objectives generally promoted environmental literacy of yourself and students by the facilitator or yourself?
- a. Yes

- b. No
15. Do you feel the teacher or educator or yourself actively engaged with the students/participants when conducting the program?
- a. Yes
  - b. No
16. Did you feel the educator or yourself was knowledgeable and understood the subject enough to instruct it?
- a. Yes
  - b. No
17. Do you feel the program was properly geared toward your student's/participants age group?
- a. Yes
  - b. No
18. Do you feel that adults, including formal and non-formal educators, parents, and caregivers, provided the context and supervision that maximized the learning and development possibilities from play and exploration?
- a. Yes
  - b. No



**Student Connection Observation Assessment**  
**Awareness, Knowledge, Attitudes, Motivation, Skills and Participation**

1. After completing the program, my observation of my student's awareness and sensitivity to the total environment after the program is:
  - a. They feel less aware of the environment and environmental causes
  - b. They feel the same awareness to the environment and environmental causes
  - c. They feel an increased awareness of the environment and environmental causes
2. After completing the program, my observation of my students knowledge and basic understanding of the environment and its associated problems after the program is:
  - a. They understand the environment and environmental issues less than when they started the program
  - b. They have the same understanding of the environment and environmental issues
  - c. They have an increased understanding of the environment and environmental issues
3. In your opinion, after completing the program, overall your student's attitude toward the environment increased, decreased, or remained the same?
  - a. They have an increased concern
  - b. They have a decreased concern
  - c. Their concern has remained the same
4. In your opinion, after completing the program, overall how has your student's motivation to become involved in environment causes outside the classroom changed?
  - a. Significant – Increase in motivation
  - b. Moderate – Increase in motivation
  - c. Slight – Increase in motivation
  - d. None - Motivation remains the same
5. In your opinion, after completing the program, overall how have your student's skills for identifying and solving environmental problems changed?

- a. Significantly – Increase in skills
  - b. Moderately – Increase in skills
  - c. Slightly – Increase in skills
  - d. None - Skills remain the same
6. In your opinion, after completing the program, overall how have your student's interest in participation in working toward resolution of environmental problems changed?
- a. Significantly – Increase in participation
  - b. Moderately – Increase in participation
  - c. Slightly – Increase in participation
  - d. None - Participation remains the same
7. In your opinion, after completing the program, overall how have your student's interest in getting others such as their parents, family members or friends to participate in working toward resolution of environmental problems changed?
- a. Significantly – Increase in participation
  - b. Moderately – Increase in participation
  - c. Slightly – Increase in participation
  - d. None - Participation remains the same
8. In your opinion, my students motivation to continuing learning about the environment by taking additional environmental education programs in the future is:
- a. Significant
  - b. Moderate
  - c. Slight
  - d. None
9. In your opinion, my students have \_\_\_\_\_ improved in other school subjects such as math and science after participating in an environmental education program:
- a. Significantly

- b. Moderately
  - c. Slightly
  - d. Not
  - e. Unknown
10. I believe environmental education is important and has a positive impact on student achievement in core subjects:
- a. Yes
  - b. No
11. I believe environmental education helps improve student health in terms of field related programs as part of regular school curriculum contribute to healthy lifestyles through outdoor recreation:
- a. Yes
  - b. No
12. I believe environmental education helps provided critical tools for a 21st Century workforce by supplying next generations a solid understanding of these problems and the tools to overcome them and make informed choices in their own lives:
- a. Yes
  - b. No
13. Do you feel environmental literacy plans should be mandated in your state?:
- a. Yes
  - b. No
14. Do you feel adding environmental literacy models to your curriculum could force out room for other education curriculum such as art or music in your school/facility?
- a. Yes
  - b. No
15. I feel the benefits and challenges of having my students participate in an environmental education program(s) or environmental action project(s) was \_\_\_\_\_ beneficial to my students education overall:

- a. Significantly
- b. Moderately
- c. Slightly
- d. Not

### **Environmental Education Program Development**

1. General suggestions for improvement of environmental education programs in the future (i.e. length of time of the program, presentation skills or tools used, indoor vs. outdoor, hands-on vs. lecture, general suggestions on increasing student participation and motivation, etc.) (Please list at least three suggestions):

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4)

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5)

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2. In general, what evidence do you have from your personal experience that environmental education improves student achievement?

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3. If you have apprehensions in terms of the inclusion environmental education programs as part of your classroom or school curriculum, whether by your own choice or by state or federally mandate, what are your major concerns?

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