

ANIMAL ASSISTED ENVIRONMENTAL EDUCATION PROGRAM DESIGN: THE
ENVIRONMENTAL LEARNING FARM

by

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A capstone submitted in partial fulfillment of the requirements for the degree of Master
of Arts in Education: Natural Science and Environmental Education.

Hamline University

St. Paul, Minnesota

May 2023

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CHAPTER ONE

Introduction

Rationale

Environmental education is vital to being able to preserve, protect and improve the biodiversity and natural beauty of our earth and local communities. Humans are a significant cause of extinction of species, based on habitat destruction and introduction of invasive species. We are currently in the 6th mass extinction (Kolbert, 2015), all because of the changes we have made to the earth's nutrient cycles and the introduction of invasive species. We have introduced, both on purpose and by accident, new species to different ecosystems that slowly take over and deplete the resources of the environment for the native species that lived in specific areas (Kolbert, 2015). In South America's Amazon Rainforest, the introduction of a bacteria from North American toads has spread through areas of the rainforest suffocating the native frog species, bringing many species to extinction and some on the brink of extinction (Kolbert, 2015). Minnesota has seen the impact of the introduction of zebra mussels to the freshwater systems, a species that wreaked havoc on the ecosystem, depleting resources that native mussels and other species need to survive (DNR, 2022). It was with these concerns in mind that I was finally able to develop my research question for this capstone project: *How can I build an Environmental Learning Farm in Minnesota to help individuals improve their health and increase environmental education goals and objectives?*

We have altered landscapes for agriculture, residential, and commercial industry ruining habitats and fragile ecosystems, pushing animals out to new areas and depleting the resources they need to survive. All of this has affected me in ways that are not

positive. It has led me to feel defeat and helplessness towards making a difference that I know others feel. Which decreased my motivation to get involved because, “nothing changes, or I can’t change it on my own,” mentality. The thought of doing nothing to try and help make positive changes hurt worse than trying and failing. This was part of my thought process when I decided to apply for the Natural Science and Environmental Education degree in hopes I could learn how I could best make a difference even if it was only to the few I get to teach in my lifetime. Those thoughts helped me find the focus of my capstone project. I started asking more questions and thinking about my coursework that I have been taking through Hamline University. My coursework in environmental education taught me that building compassion and connections between individuals and the local land and community, has the best statistics for providing lasting impacts towards pro-environmental behaviors. There are so many different sustainable ways to get energy to grow food that don’t involve destroying the ecosystem and working with what we already have available. These are some of the questions that came to mind as I was trying to figure out the focus for this capstone project: 1. How can I help educate and inspire people to make changes in the way they perceive nature and natural resources? 2. How can I best help be an advocate and participate in promoting pro-environmental behaviors? 3. How can I help change our societal norms to be more conscientious about the impacts on the natural world? 4. How can I best teach participants that the natural world includes their urban, suburban and rural agricultural areas? 5. What experience or opportunity in my life led me to care for the community in which I live? 6. How did I build my compassion for the environment and all species within it?

Schools don't require environmental science to be studied for graduation in Minnesota. There are committees working on securing new standards that include some environmental science themes and phenomena based teaching to the Minnesota science standards, but what else are we missing? We have environmental learning centers to provide information and opportunities in nature and animal assisted therapies to help people with their physical, mental or emotional disabilities. The Covid pandemic brought to light the importance of mental health. It's shown on the news, it's written about in magazines and newspapers, and schools are now including more of it in professional development training. If our health is suffering it has got to be harder to care for the environment and behave in environmentally friendly ways.

In this chapter I will provide a bit of background information that I am going into further detail about in chapter 2 the literature review that helps explain my rationale for the project question. The background portion of this chapter highlights a couple important features I want to include in my project about animal- human bond and the benefits of animal-human interactions. This chapter also includes sections that explain how my academic, professional and personal experiences have influenced me and impacted this capstone project.

Background

The goals of environmental education can be summed up to a simple statement: increasing human awareness of the importance of nature and the environment. It's important that we build connections for the younger generations and the older generations to nature. The Environmental Learning Farm should be available to all ages. Animals in environmental education is one method to increase compassion for our natural world and

the environment. In Russ's book *Urban Environmental Education* in 2015, he writes a chapter called “Cultivating Compassion in Urban Environmental Education” describing the positive effects it can bring by adding animals to the educational setting. Opening an Animal Assisted Learning Center would be a great opportunity for schools to have partnerships that could provide lessons that use animals to help students connect with the content material, the importance of nature and opening the mind to idea that nature isn't only what we think of as untouched by humans, but as our local city areas and farms.

The benefits of animal interactions with humans are continually being studied. These studies worked to determine the benefits animals can have on our mental, emotional, and physical health. A dogs' olfactory senses can pick up a specific odor emitted from cancer cells and can be trained to help health care personnel identify where the cancer cells are located (Horvath et al., 2013). Many times we humans can take for granted the benefits animals can have in our lives such as helping ease our anxieties, depressions and many other physical, emotional and mental health concerns. There are many programs involving animals being used in rehabilitation for prison inmates, veterans, individuals with physical disabilities, and mental disabilities. If animals can help people overcome adversity and rehabilitate into society after incarceration and war then I believe animals, including horses, can be used to increase our environmental education goals and objectives. The benefits of using animals in our education systems to teach content to students, build connections between the environment, and understand our human impacts on the environment are starting to be understood (Born, 2019) through different teaching strategies. An Animal Assisted Learning Center would benefit the environmental education goals and objectives. It could be called an Environmental

Learning Farm. Domesticated animals in our agriculture industry are underrepresented in our society when thinking about animal welfare and the health of the environment (Linné, 2016). It's so easy to go to a grocery store and pick out any product and not think about where it comes from and how we get it on the shelf. Most children these days don't grow up in areas where they can have an experience to meet the domesticated animals our communities rely so heavily on unless it's at a county or state fair, and that is not quite the same as seeing them in their everyday lives.

The center will provide volunteer and job opportunities for individuals in the community. It will also provide therapy services for those with mental disabilities learning how to communicate with an animal on the animals' terms and learning to understand how verbal and nonverbal communication can be used to communicate and build relationships with animals and humans. Equine therapy can make huge impacts on those with physical disabilities or those recovering from physical injuries, build relationships with animals and lead to an increased awareness of the importance of the environment in which we live and our impacts on it (White-Lewis, 2019). Therapies and learning programs that use animals to help individuals with their emotional health can also help them understand the role humans have on positive and negative consequences in ecosystems. The more connections made in the natural world, the more we protect it and are likely to make changes in our behaviors to care for the environment. Many of the changes we need to make include policies, laws, and businesses we support. The Environmental Learning Farm could be the local spot for the community to information on current issues that are related to protecting and improving the health of our community.

Personal Experiences

As far as my memory goes back to childhood I can remember having animals around in my life and I can't imagine a life without them. I have a memory of being four years old, standing in my mom's kitchen, as she and my aunt Annie were talking about breaking the two year old colt. At the age of four, I didn't understand that breaking the colt meant training him for riding. All I thought was that it meant breaking his spirit or punishing him. I remember crying and screaming at my mother and aunt: "you can't break him." My aunt had bred and raised this colt and we have pictures of me hanging on his leadrope pulling him around when he was a yearling and I was 3 years old. This colt was the start of my love and passion for horses. It was because of this young animal that I grew up with that I started reading every horse book I could get my hands on to become a lifelong reader. It started with picture books, breed books, and eventually turned into short series and novels like the Saddle Club and Thoroughbred series. This was the start of me branching out to read other stories that involved other animals and lead me on the path to learn about ecosystems and how interactions between the abiotic and biotic factors influence the survival of species.

I was six years old when I started taking riding lessons and learning about how my body and position on the horse communicates different things with the horse. I remember when learning how to ride and communicate with the horse underneath me being so focused about how and what I was asking the horse to do that I would forget to breathe and get side aches from the focus I put into my lessons. As a child I was very active, loud, disorganized, and a whirlwind of noise and activity. Most of my report cards came back with comments such as these: she's distracted, she's loud, she doesn't follow

directions promptly. But when I was in the barn, I was a completely different kid. I was quieter. I took my time and didn't rush my grooming or tacking of the horse. I listened intently to my trainer and followed directions. I built confidence in myself and my skills.

As I grew and learned more about horses, I learned more about the natural world in which they live. I learned about the necessity of native cool and warm season grasses in a horse's pasture. Through horses and learning about insulin resistance because of dietary issues with horses, I built a basis and connection for understanding the dangers and causes of diabetes in humans. Working with horses built my confidence in myself and helped me recognize my own non-verbal communication and how an animal responds. All animals have what we call a flight or fight response when they are uncomfortable, insecure, threatened, etc. Working with horses helped me better understand how my posture, my gestures, the tone and volume of my voice can impact the way they respond to me. This knowledge I have been able to carry with me and help me with my daily life communicating with other animals and even people.

I have worked with quite a few rescue horses and off-the-track thoroughbreds, helping them to overcome the trauma and habits that they developed from their interactions with humans that makes them less desirable by many people. One of the things I have learned working with these horses is that all the problems they have are caused by humans. We rescued a miniature pony named Patty Cake. When we got her, the joints in her legs were completely out of alignment and crooked. She struggled at walking and her hooves were so overgrown that they curled up in front of her over a foot.

She was my introduction to natural barefoot trimming and natural horsemanship. During my training to become a Certified Natural Barefoot Trimmer through Liberated

Horsemanship, I learned the importance of a horse's natural ecosystem. When most people think of wild horses they think of great open plains with lots of grass, but when we look deeper into the history of horses and horse evolution the natural habitats of these animals are in high desert plains, not low grasslands. This was the beginning to my understanding and my motivation to learn more about humans impact the environment animals live in and introduce issues to domesticated species that they otherwise wouldn't have. My personal experience with animals I believe is what led me to have a compassion for all animals, even snakes, which I really can't stand to touch or be in close proximity to, but I do believe their habitats and homes need to be protected and they serve a purpose like we all do.

Academic Experience

After I graduated from college with my bachelor's degree in Life Science Education, I chose to travel to Alaska and Idaho to teach because of my own personal love and passion for mountains and their ecosystems. I wanted to live near the untouched places of nature and get away from the consumerist and materialistic way of living that I had experienced my entire life growing up in suburban areas of Minnesota. My love for nature and all things environmental started with my love of horses. This led me to start my four year degree at South Dakota State University as an animal science major and equine science minor. I did eventually transfer, but not after learning about range management, species identification and the physiology and anatomy of our domestic livestock animals and their needs for optimal health. I went so far in my passion to know more about the equine species and be able to care for my own horses properly that I trained with Liberated Horsemanship to become a barefoot trimmer. They take a very

holistic approach to horses and how their hooves should be shaped and trimmed. It uses a model called the Mustang Model, Liberated Horsemanship calls their approach the Mustang Model because it mimics the natural care of healthy wild mustangs hooves. This approach was designed after years of studying herds of horses wild and domestic, comparing their hooves, diets, range of room and overall health to follow a set of guidelines when trimming a horse to help them heal or stay sound. I eventually moved back to Minnesota to work, live, and teach because I missed my family and watching my nieces and nephews grow. Upon returning home, I got an opportunity to teach Biology and Forensic Science at the high school I graduated from. It was a part-time position that left me a lot of time to work with my horses and on the farm. I want to bring my passion for teaching science concepts and my passion for animals together in this project in a way that benefits as many in the community as possible. It is what has driven my ideas for different programs that could eventually be designed and implemented on the Environmental Learning Farm.

Professional Experience

I have been teaching science in our public schools around the United States for the last six years. I have traveled and lived in Alaska, Idaho, and Minnesota teaching a large and diverse population of students above elementary school across a wide variety of science courses. My first teaching experience was in Eagle River, Alaska, at the only high school serving students within about a ten mile radius of the town. I was hired on as a Biology teacher and Apex Credit Recovery teacher. An Apex Credit Recovery Teacher is one who works with students at different grade levels to complete and grade online course work in the classroom. I thought of it more as being a tutor that has 30 or more

students at once over a variety of subjects. Teaching in Alaska was a unique experience working with the student population, especially getting to know my Native Alaska Inuit population of students. It is a bit shocking to think that this town with a population of just over 34,000 according to Chugiak Eagle River Chamber of Commerce, about thirty minutes away from Anchorage and tucked onto the side of the Alaska Mountains, had no elective science courses that were based in environmental education.

My second teaching experience brought me to Idaho Falls, Idaho, where I taught eighth grade Earth Science. The population of this town was larger than it was in Alaska, roughly sixty thousand residents. The student population was predominantly white coming from middle class American households, a small percentage of students were BIPOC (stands for Black, Indigenous, and people of color) and Hispanic. The community in Idaho Falls had a mostly White (Non-Hispanic) population at 78% and the Hispanic population totaled 18.88%. Many of the population in this town were underprivileged and migrant workers. Our school would open early every morning at 5:30am for our families in the community to come and use the showers, laundry facilities, and obtain meals for the family members who were not in the school during the day. At each of these experiences I saw what a close community can do to work together and have positive impacts for those in need. I would like to be able to replicate parts of those experiences.

First Teaching Experience

As an Apex Credit Recovery teacher, I met many of these students who were still trying to find ways to graduate from high school. One of the students, who I am going to call Tim, was twenty years old when I met him in 2016. He needed one history course, two science courses, and one English course to finish in order to graduate. He had

attended the after-school Apex program for two years already and had not made much progress in these courses to hit graduation. This was his last year and last chance to finish. I learned that his biggest issue for getting the classes finished was lack of motivation. He couldn't connect to the material and find the significance of its importance. Tim is an Alaska Native Inuit of the Athabascan tribes. As I worked to build a connection with him, I learned more about his culture and the value placed on living things and their uses to the environment. I also learned about the cultural significance in using almost all of the animals hunted by tribes. His grandmother still used seal fat in many of the meals she cooked. His family still tanned hides in a very similar fashion to his ancestors and his mother did beadwork on the hides they would cure to sell. Tim didn't feel connected to the school because he didn't feel that his cultures were valued. The pressure of content and looking at the world as something to be used or manipulated for consumption was lost on him. Science classes offered with environmental education goals and objectives that could match with content he was missing in other courses may have been a faster route to reach graduation. An Environmental Learning Farm will provide opportunities to give students education that meets different state standards will be available to students over the summer or weekends to help them get to graduation.

Second Teaching Experience

The Idaho Falls community was different from Alaska's. Most of our students were white; we had a small percentage of BIPOC students, but we had a large migrant population of students who are Hispanic. I say migrant, because these students would be in our schools for the fall and spring months. They would then usually return over the winter to their parents and grandparents' native countries to spend some quality time

where their roots began. These students missed so many days of school and constantly had transcripts transferring and getting lost. As I got to know many of these students, I could see how they disconnected from the dominant white culture and religious mormon culture of the school, but they did connect in our science material when we got to talk about nature and ecosystems. The few times I've seen them actively participate and ask for help with material is when we explored and learned about the natural world and its interactions. We completed a project on plastic pollution, where students had to take a stance on banning plastic bags in stores. We spent our time in the science course reviewing data and learning about how plastic is made, distributed, eventually thrown away, how it can impact the environment and which ecosystems it can damage. During this project, the English teachers helped students organize their argumentative essays supporting their stance on the topic. In the science class, we helped build the paragraphs about their data research and how it can support their stance of their essay. This project had the largest participation I have seen from all of our students. Only five students didn't submit some form of an essay. I worked with the English teacher at grading our students' papers, but did not have the data of those grades still stored. I believe that we had such great success in this project because of our combined efforts to work with students and show them how the content is connected across subjects. The Environmental Learning Farm would be able to use this same strategy of combining contents or state standards to be able to provide curriculum to maybe help students meet standards through summer programs.

Most Recent Teaching Experience

In the 2021-2022 school year, I worked for Intermediate School District 287 in Minnetonka, Minnesota. My role was as a case manager for students with many different diagnosed mental health disorders and as the special education science teacher for one of the Tier 3 High Schools. All of our students receive many services from the state and most of them are in foster care, adopted or in group homes. It was a challenging experience learning how to best build connections for students with autism, fetal alcohol syndrome disorder, emotional behavior disorders, reactive attachment disorder, pathological demand avoidance, misophonia, and many other mental and emotional health disorders. During my experience, one of our best lessons that really helped students engage in content material and want to learn was when I was allowed to bring in a chocolate labrador puppy for a genetics lesson. We had been studying how cells go through mitosis, meiosis, and protein synthesis. Our next lessons were on genetics and heredity.

I got permission to bring in my three month old chocolate labrador for a day and we used him as the attention getter and Aha moments for students to learn about alleles, genotypes, phenotypes, and genetic probabilities based on the alleles that could be passed down. It was one of the few times in the year that I was able to get every student to stay in the classroom, complete the work, and really learn about the role genetics play in our physical attributes. Having the puppy in the classroom and basing our materials and content around his recessive chocolate color allowed us to expand the students' understanding of Punnett squares from 4 squares to 16 squares. Students were excited to do the math on the probability of him having his chocolate color and hazel eyes. They

started asking questions about the likelihood of his parents' genetics, and we were able to work backwards through his pedigree and trace the heredity of his coat color. Including a live animal in the curriculum helped the students build a connection with material and a reason to actually care about more than what was written on the pages and ask their own questions.

Positionality

Until recently, I had assumed that I was around the average of what makes a middle class American when it came to wealth. After looking into it and using the data collected by the Pew Research Center, I have come to realize that my living wages have me just a little above the lower class and under the middle class average on the lower end. Knowing where I truly fall in the American class system does affect my positionality in my research and writing. Being on the border of lower and middle class as a public school teacher, I have ideas about how our public schools can do better for our students, especially those who have parents in the lower class that can't afford transportation, lunches, extra curricular activities, or field trips. It has helped me decide that part of my project is to develop the environmental learning farm into a non-profit business so that the opportunities it can offer are more readily available to the public.

As a white American woman who grew up in middle class America, I had opportunities that others did not, especially when it came to horses. My mother put me in lessons at a young age, training and riding competitively in English Equitation and Hunt Seat until I was thirteen years old. My trainer pressured my mother to buy a horse that could take me to Nationals; this horse would have cost my mother 25,000 dollars to buy and it did not include the upkeep on his training, my training, his board, farrier and vet

costs. My mother couldn't afford it and my biological father was not often around when I was younger. Instead, I was able to get a job at fourteen years old and was able to purchase my first horse. I put all my funds into being able to pay for her board and care.

As a Christian, I believe in the teachings of being a good samaritan, and I also believe in science. It was a struggle at first to fit science and God together until I learned more about biology, chemistry and biochemistry in college. I came to realize it is too perfect of a system that gives us life on earth and found a way to balance my faith and science. There are still things we can't explain like: how did chromosome two in humans become fused to separate us from chimpanzees? It was my knowledge growth in science that helped me to regain my faith and further my belief in God as an adult.

A large part of my identity is my compassion for animals. I have seen and heard stories about animals that have helped people improve their mental health and physical health. My experience with animals has helped me become a better person, a less selfish person, a more compassionate person, one who cares more about what we are doing in the world and votes more on policies that will help us to protect our environment and ecosystems so all animals and humans can enjoy the earth. The hope for my project is that I can find and design ways to bring more of our domesticated animals into the curriculum for all ages and make a lasting impact that can help further environmental education goals.

Conclusion

Animal Assisted Learning Centers can provide many benefits to the community. A center can provide positive experiences to all ages, increase compassion for living things, further environmental education goals and provide therapy services for physical,

mental and emotional disabilities. My own experiences, both professional and personal, are the driving influence for this capstone project and the importance of using animals to further the goals of environmental education to create lasting behavioral changes that protect our natural world.

In Chapter 2 I will look at the different objectives and goals of environmental education across different organizations, it will also look into the animal human bond and its ability to help enhance learning in education. Usually when someone starts working with horses, they learn very early that most of the time something goes wrong it is the rider's fault, not the horse, and that is one the first fundamental pieces of knowledge that I believe can help us to reflect on our environmental issues. It would be a huge benefit to our communities if we had readily available and well organized animal assisted programs to help teach individuals about the importance of animals in the world and why we need to protect the natural world from our negative impacts. The literature review in Chapter 2 will give a deeper look into the benefits provided from Animal Assisted programs that are in place and have been successful. It will explore some of the animal assisted programs already in place and the services that they offer in Minnesota. There is also a section describing the benefits of the animal-human bond in education and its effectiveness in helping build compassion which can lead to more awareness and pro-environmental behaviors. Chapter 2 will also cover some of the teaching strategies that have been successful in promoting environmental education, such as sense of place, outdoor learning, kinesthetic learning and gamification; these are strategies that could be implemented in the Environmental Learning Farms curriculum.

CHAPTER TWO

Review of The Literature

Introduction

Environmental education programs can help bring together humans and animals alike to improve our environment as well as our physical, emotional and mental health. The question I have been striving to answer in my research is: *How can I build an Environmental Learning Farm in Minnesota to help individuals improve their health and increase environmental education goals and objectives?* In this chapter, I will be reviewing research on: the importance of the animal-human bond for human physical, mental and emotional health; animals in education; effective practices of providing environmental education; animal assisted programs that are already in place; and how businesses build effective partnerships. The goal is to gather information about what makes environmental education effective and beneficial for pro-environmental behavior that continues after students have learned the curriculum.

The Environmental Learning Farm is designed to be located on an 18 acre property in Farmington, MN. It will use both our typical domesticated animals in the curriculum and as teachers, as well as observations of the undomesticated animals in nature, to further the environmental education goals and objectives. The mission statement for the Environmental Learning Farm is to provide a safe and welcoming place for all ages to learn about themselves and environmental science. Understanding the importance of the animal-human bond is essential to building and designing an Environmental Learning Farm that is able to help visitors connect to the materials and information presented. The Environmental Learning Farm will design programs to make

an emotional impact that the visitors remember and use to fuel their decision making and problem solving. The programs and curriculum will help visitors learn about improving physical, mental or emotional health through the use of animals and learn more about environmental sciences. It would also allow students the chance to grow compassion for other living creatures and instill the importance of habitats being protected and improved from negative human influence.

Researching and analyzing how animals have already been used in educational settings helps with the design of the programs and provide different opportunities for individuals to work with and learn from animals to promote environmental education. There are many theories on effective teaching strategies in environmental education. The effectiveness of the curriculum to be understood, appreciated and practiced after the classes have been completed depends on the effectiveness of the classes, not just on the awareness students or visitors get from the curriculum. The effectiveness of curriculum can be thought of as inspiring those who participated to effect change. Researching programs that are already in place and what partnerships they have will help design and build a successful Environmental Learning Farm that is able to provide an income to pay employees, provide care for the animals and property.

Environmental Education

What are the Objectives of Environmental Education?

Environmental education is more than learning about different ecosystems, biomes, and animal plant interactions. When environmental education is effective it inspires students to continue their own learning and find solutions to protect all life,

including the microorganisms in the soil, and the abiotic factors that make up an ecosystem. The Environmental Protection Agency's webpage (2022) states:

Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions. (What is Environmental Education? para. 1)

The Environmental Protection Agency (EPA) website lists five components that make up environmental education: awareness and sensitivity about the environment and the challenges, knowledge and understanding about the environment and the challenges, attitudes that show concern and motivation to improve or maintain the quality of the environment, skills to identify and solve environmental challenges, and participation in solutions to the challenges of the environment (EPA, 2022). The NAAEE (North American Association for Environmental Education) lists three main objectives that are fairly similar to the five components listed from the EPA's website. The three objectives are listed within their written guidelines as:

- To foster awareness of and concern about economic, social, political and ecological interdependence in urban and rural areas
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.
- To create new patterns of behavior of individuals, groups and society as a whole to the environment. (Simmons, 2017, p. 13)

The biggest difference between the EPA's five components of education and the objectives of environmental education written through the NAAEE is that the NAAEE includes more than the physical environment we live in; it also includes the economic, social, political cultures that exist in our lives. This is important because the parts of what makes up who we are and our intersectionality affects how we think about the challenges our environment and ecosystems face is dramatically affected by these other aspects of our life. Those that are economically challenged don't always have the means to be able to afford the most environmentally friendly produce and services. Someone's political views could influence the decisions they make to maintain or improve the quality of the environment. When we start taking into consideration these views, beliefs and cultural differences that affect our problem solving and decision making, we can hopefully design and create better solutions for our curriculums to inspire others to protect and care for the environment as they would for themselves.

The NAAEE has identified five key characteristics. Each characteristic has three to five guidelines to successfully engage communities in environmental education. The key characteristics and their guidelines as written in 2017 in *The Community Engagement of Excellence Guidelines*: #1: community centered, #2: based on sound environmental education principles, #3: collaborative and inclusive, #4: oriented toward capacity building and civic action, #5: a long-term investment in change (Simmons, 2017). Appendix A briefly describes each of these key characteristics and gives the basic guidelines to follow in order to meet each characteristic of successfully engaging the community in environmental education.

Environmental education programs that are community centered should focus on issues that matter to the local community. A local community that runs mostly on private wells is more likely to be worried about ground water quality. They may care more about learning how runoff and infiltration of water from neighboring farm fields can impact their lives and the lives of their pets. Individuals who live in close quarters and have homes that have access to city water may be more worried about the filtration systems the city uses to make sure the water provided to the homes is safe for drinking, cooking and cleaning. The effectiveness of environmental education can depend on the strategies and materials used in the learning process.

The mission of the Environmental Learning Farm is to provide a safe place for all ages to learn about themselves and environmental sciences. This includes being able to provide opportunities for those in the community to learn and participate in activities, labs and classes that provide them with knowledge of the environment and our impacts to the environment in both positive and negative ways. The goal for the Environmental Learning Farm is to encourage participants to take their skills and knowledge they gain in the curriculum and put it to use in their community. Participants will be able to recognize areas in their community that need maintenance or improvement so future generations can enjoy the same or better local environments. The Environmental Learning Farm will need to have a solid business plan with multiple sources for funding in order to have a continued presence in the community and make the long-term investment for change.

There is a gloom and doom aspect of environmental education, especially, around climate change. A lot of the negative effects in students' emotional state creates stress, grief and burnout feelings which start to push many to separate themselves from the

issues and feel it is not worth changing. The value in teaching about tragedies is that we can instill the importance of improving our ecosystems in order to try and prevent future tragedies from occurring, like extinction of a species or desertification of an ecosystem. Teaching about the destruction of ecosystems comes the feelings of despair, grief, anxiety, helplessness. These emotional responses can do more harm to a person rather than help them become advocates and participants in maintaining and improving healthy ecosystems. There is value in discussing and learning about how these tragedies occur, but only when we are also able to help students learn different solutions and actions. Students need to be able to take part in a research process, decision making process and designing solutions (Russell, 2016).

Bringing students to an Environmental Learning Farm to look into existing solutions and being able to share ideas about other possible solutions starts a collaboration process and can counteract the feelings of despair and doom that can cause individuals to shut off their capacity for caring. The goal and hope is that it will inspire them to live their lives and lead others towards more positive alternatives to benefit themselves and the environment. “Fostering critical hope requires attention to both cognitive and emotional elements as well as working with learners to envision and move towards their preferred futures” (Russell, 2016, pg. 16). When designing and teaching environmental education it’s important to remember to not just teach about the negative consequences many human interactions have on ecosystems, it is also important to discuss the positive influences humans are making on the environment, to restore and protect other species and the ecosystems. It helps to boost the emotional side from hopelessness to hopeful, and many times this leads people to pro-environmental

behaviors. Environmental education needs to have more accessible and creative ways to reach all ages of students, not just our grade school students, but our young adults and our older generations in order to have success with change for improving our environments.

How people interact with environmental concerns has a model for definitions of environmental language using words like environmental attitude, concern and worldview. A study done by Schultz in 2005 describes how people in six countries relate environmental behavior and values. The ten value types are broken down into four key value categories: openness to change, conservatism, self-transcendence, and self-enhancement. Individuals were asked to rate fifty-six different values as a guiding principle in their life to find a relationship to individuals' environmental behavior. The results found that individuals that have values considered as self-transcendence values are not likely to tie their self-worth to material things and are more likely to include nature into their sense of self and identity. Individuals that have values that are considered self-enhancement values are more interested in material things and wealth/power, they are less likely to include nature in their sense of self/identity. The findings have shown that there is a relationship between self-transcendence attitudes and positive environmental behaviors, but the findings also have shown a relationship between self-enhancement attitudes and negative environmental behaviors (Schultz, 2005).

A reason the author believes that self-enhancement values lead to negative relationships with environmental behaviors is the way positive environmental behaviors are marketed and structured. Pro-environmental behaviors are not often directed to show the benefit to the individual, only to the community and environment (Schultz, 2005). Environmental education can also appeal to more self-enhancement values and it can be

presented in a way to see the benefits to oneself by protecting and maintaining the environment's quality. This will reach more of the population and promote the environmental education objectives. The work done by Shultz in 2005 about the positive correlation of self-transcendence and positive environmental behavior matches with the work done by Russell in 2016. Russell mentioned the cognitive and emotional aspects need to be considered when educating students in environmental education. Our emotional side needs to be reached to foster hope and action from students and our cognitive side needs to design positive solutions and make decisions. Environmental education needs to offer opportunities for students to grow and work towards self-discovery, self-transcendence and remind students that protecting nature protects themselves.

Urban Environmental Education was written and edited in 2015 by Alex Russ with the help of multiple other authors the book achieves multiple goals utilizing many different approaches for environmental education. The five main trends for approaching urban environmental education are: using the city as a classroom, problem solving, environmental stewardship, youth and community development, and city as a social and ecological system. Goals of urban environmental education are to facilitate learning about science, ecology, and the environment in indoor and outdoor settings and could be seen as inquiry based programs, community mapping and citizen science (Russ et al., 2015). Urban environmental education's goal is to foster community based management and urban ecosystems. When urban environmental education is done well it contributes to positive youth development. Environmental and social problems are addressed in urban environmental education curriculum. Another goal of urban environmental education is

to help people develop an understanding of cities as social-ecological systems that are intertwined (Russ et al., 2015). Using science investigation methods and place-based outdoor exploration as teaching strategies can lead to more relevant learning and meaningful educational experiences.

The USHHS (United States Health Human Services) has six C's of positive youth development (PYD): Competence, Confidence, Character, Connection, Caring and Contribution. *Urban Environmental Education* strategies are not focusing on PYD but they have been sharing many traits and can promote PYD. When educators are able to include outdoor learning into the curriculum, they are able to foster compassion for nature into students. When we are able to foster compassion and model kindness, we can help students acquire skills to be more sensitive to others and encourage compassionate behavior. Introduction of animals to outdoor learning can drastically increase compassion in students (Russ et al., 2015). Including environmental stewardship activities can help shift anthropocentric worldviews to an ecocentric worldview, which is important for building a sustainable future. Students that are engaged in environmental service projects where they can have a personal stake in the outcome of the project are more likely to promote continual action, even after the project is completed. It needs to be remembered that when we talk about the environment, the wording can be negative and lead to feelings of despair and hopelessness which can really decrease action from an individual (Russ et al., 2015). Russ's work in 2015 the *Urban Environmental Education* reinforces what Russell wrote in 2016 on fostering critical hope and that gloom and doom of environmental education when discussing tragedies leaves feelings of hopelessness.

The Environmental Learning Farm will need to be able to address the negatives

about our destructive human habits and practices without invoking an emotional response of hopelessness. The curriculum being offered will need to allow for the students or visitors to be able to find hope about the future and opportunities to research, experiment, and practice pro-environmental behaviors. It will need to be able to provide experiences for visitors to be able to build a compassion for nature and animals. To teach visitors how to help protect and care for the environment and all that live within it. The curriculum designed for the first program to be offered on the Environmental Learning Farm will include horses as educators for and their environment. One of the lessons learning targets will be on restoring topsoil and the importance of topsoil not only for our animals but for ourselves, there will also be a lesson on the importance of water quality and what influences surface and groundwater quality in a specific area.

Teaching Strategies in Environmental Education

When considering what are the most effective teaching methods or strategies to help students connect with the curriculum, we have to understand the goals and objectives of environmental education. Following the NAAEE's objectives and characteristics for environmental education is not just looking at nature, it is about recognizing that nature is all around us, even in our urban areas. The education system has recognized that students need to be engaged in the materials in a course to be able to learn and understand the curriculum. Psychological studies have been conducted on students' ability to learn and retain information; some results aren't clear, but one result was definitive. Students have a greater potential to learn and retain curriculum when they are able to focus on the materials they are given (Zerr et al., 2018). Some individuals are able to naturally focus better than others, but it is possible to engage students and

internally motivate them to learn using different strategies (Paris et al., 2017). The Environmental Learning Farm will be able to utilize these teaching strategies researched in order to provide an engaging and effective curriculum.

Outdoor Education. Outdoor education has shown to have many benefits for students of all ages personal and social development. It can help with physical, mental and emotional health and increase a students ability to learn (Becker et al., 2017). Outdoor education occurs under many names through many different programs across the world. Zoos, museums, aquariums, schools, and many learning centers all use various forms of outdoor education. Outdoor education gives students the opportunity to connect with nature and their environment as they are learning. The way classes are taught outside the traditional classroom matters significantly for the positive benefits of the student in learning and retaining the curriculum. It isn't likely that students will have positive experiences with the environment if the curriculum isn't well designed with opportunities for students to practice and apply the knowledge they are learning (Becker et al., 2017). The Environmental Learning Farm will need to carefully consider the audiences of their courses and programs being offered when designing the curriculum being offered. The courses need to appeal to the students and engage them into the material they are there to learn, otherwise they won't have much retention and most likely won't inspire positive environmental behaviors.

Education programs are embracing outdoor educational settings from Pre-K to 12th grade. The highschool I graduated from in Rosemount, MN built an outdoor classroom for teachers to check out whenever they could make the lesson plan fit. The MN Zoo has built outdoor learning centers for teaching classes and summer camps.

Forest Kindergartens are bringing children back to nature and encouraging natural exploration of the outdoor environments. They encourage students' natural curiosity and learning through play-learning outdoors (Russ et al., 2015). Forest Kindergartens do not just involve young children going to a playground. It is them being out in nature with movable parts, learning to collaborate, communicate, cooperate with others and gain self-confidence in their ability to set and achieve goals as they interact with peers, discover, create and problem solve on their own or in a group (Russ et al., 2015).

The Multiple Intelligence Theory lists eight different intelligences for teaching the whole child: logical-mathematical, linguistic, bodily-kinesthetic, musical, interpersonal, intrapersonal, spatial, and naturalist. Children haven't quite learned how to compartmentalize their learning. When designing curriculum, it is important to include as many of the intelligences as possible (Oltman & Eckman, 2002). The work written by Russ in 2015 about Urban Environmental Education shows us that Forest Kindergartens can incorporate all eight intelligences of the Multiple Intelligence Theory:

Though to some adults, it may appear that children are “just playing” at a forest kindergarten, they are building skills across many developmental domains.

Learning through “play” promotes creativity, develops imaginative thinking and fosters communication and cooperation. It also helps children develop gross and fine motor skills, stamina, self-confidence, a more positive outlook and a greater ability to set and achieve goals. (p. 43)

Students working and learning together in nature can increase their reasoning skills and provide opportunities for mathematics when faced with specific challenges. The linguistics piece is students talking to each other, bodily and kinesthetic comes with being

outside and being able to move throughout the natural environment. Outdoor classrooms are full of noises that can be part of the musical intelligence, with the songs of insects and birds, sounds and patterns of the natural world for any of the abiotic and biotic factors, the sound of the winds, and water sources that might be nearby. In urban areas, even the vibrant sounds of the city can be a part of musical intelligence. The interpersonal and intrapersonal intelligences are when students are in play or learning together and learning about each other and ultimately themselves when recognizing the difference and similarities between themselves and others. Outdoor classrooms also provide the opportunities for spatial intelligence, allowing students to be able to make maps and follow them or draw on different surfaces to express their learning. The last intelligence listed the Naturalist is all about being outdoors and understanding the physical world and nature (Oltman & Eckman, 2002). The Environmental Learning Farm will be able to provide opportunities to practice the Multiple Intelligence Theory; since it is a Environmental Learning Farm the courses and programs will be outside in nature. Nature that is manipulated by humans for the benefit of the animals on the farm and the soil health, as well as offering opportunities for exploration and lessons in areas that are more natural and less managed.

Sense of Place. “Sense of place refers to the level of connectedness individuals feel to a specific place and the meanings associated with this place” (Russ, 2015, p. 51). The Environmental Learning Farm will design its curriculum to help students connect the farm and the land it's built on; this connection will help promote pro-environmental behavior. The hope is to increase student involvement in their more local immediate areas, whether it is more natural or urban environments. When a curriculum is designed

around a specific place it can initiate students to contribute to their own physical, mental and/or emotional health. Sense of place defines what meaning the place brings to an individual and how the individual is attracted to that place. It is the emotional response the place invokes in the student. The sense of place teaching strategy can include labs and activities in the curriculum and they should be flexible and not have a long term time commitment for the students to build their connection to the place where they are learning (Russ et al., 2015). This is essential when designing the curriculum and courses offered at the Environmental Learning Farm. Since the Environmental Learning Farm is a public place for individuals to take courses and learn, the design of the farm needs to consider time constraints on the different classes being offered and how frequent participation in those individual courses lasts in order to learn the objectives of the specific course.

A sense of place that provides significant value to encourage students to connect with the land they live in and build a stronger relationship with their community can help increase the pro-environmental behavior that can be transferred to new places the students move on to in their lifetime, continually protecting and advocating for the environment around them. Increasing a student's sense of place increases the values of their own experiences (Sanger, 1997). Sense of place and outdoor education are linked and can be used to work at making achievement in the nature-deficit gap many of our younger generations are facing (Polovitz, 2017). This deficit keeps students from connecting with nature and possibly encourages less pro-environmental attitudes, beliefs and values that are going to be needed for the protection of our natural places and the ecosystems within them.

Gamification. The Environmental Learning Farm is going to use strategies in the education curriculum to not only introduce environmental topics, but also to help make effective conservation behaviors by analyzing cognitive biases, social influences, values and communication strategies. Evoking emotional response is one of the more impactful ways an educator can spark conscious pro-environmental behavior and it can, at times, encourage activism. In order to spark an emotional response it is good to avoid using large terminology or jargon that the audience doesn't know or understand. The language needs to be simple so that the audience can follow along and feel a part of the conversation.

Activities that allow people/students to participate in the learning process and play a role in the research and discussion have proven to have more lasting and pro-environmental behaviors, beliefs and attitudes. Zaval's article *Effective Education and Communication Strategies to Promote Environmental Engagement* (2017) mentions using games about climate change in the classroom to increase participation in the knowledge of students and awareness of issues. Creating activities that have game-like qualities can increase focus and that can help visitors retain the information. Zaval (2017) called it gamification:

First, messaging should be tailored to create, recall and highlight concrete experiences so as to better appeal to the personal relevance of climate change and elicit an emotional response. To do this, educators can use their personal or anecdotal accounts of negative climate change experiences and invite audience members to offer their own. Second, communicators should use carefully-researched metaphors, allusions, and real-world analogies, as these can

help to relate an abstract, unfamiliar topic to people's everyday interactions and experiences (p. 482).

The environmental education programs offered at the Environmental Learning Farm need to be able to be adaptable and flexible depending on the audience of that class and the objectives within that class. Classes being designed to provide specific knowledge about environmental sciences can be led more like investigations, or scavenger hunts where learning and acquiring different skills leads them to positive solutions and their own answers about how to best address different environmental issues. An essential part of active learning and the strategy of gamification is hands-on learning experimenting on cause and effect, discussing different possibilities and solutions and then making choices as well as open-ended activities and questions, so discoveries can be made by the students (Oltman & Eckman, 2002). Gaining students' interest in the activities designed for learning correlates strongly with a student's ability to focus and that ability to focus helps to increase learning retention.

Animals in Education

The question I am trying to answer in this section is “Do animals incorporated into educational frameworks contribute to positive feelings about the environment and help lead to changes in behavior?” Animals can have many roles in education. They can be used as a tool to describe and visually show what happens in natural selection, evolution, ecosystem degradation, genetics, cell theory and so much more. Physical sciences and mathematics can be taught with the use of animals as the subjects to determine speed, velocity, acceleration, etc. Animals also have a place in education teaching students to be more compassionate, caring, and understanding (Russ, 2015).

The social, economic and political aspects of our world have a way of oppressing animals as if they aren't living creatures with thoughts and emotions. There is a behavior towards non-human animals as being inferior to humans. There needs to be an awareness of anthropocentrism and speciesism ingrained into our western culture. The oppression of non-human animals is often overlooked and those who are empathetic to non-human animals are out of the norms of society (Spannring, 2017). The way we raise our livestock as food and how we keep them is an aspect of oppression. Spannring (2017) wrote about how the oppression of women in times past and in some cases currently is related to the same society issues that lead to anthropocentrism that allows humans to feel the justification in the cruelty we have in the animal agriculture industry for our human benefit, and at the expense of the ecosystems where we raise these animals. "Ethical consideration of animals means that one must be willing to behave in ways that acknowledge and support animal well-being, and avoid causing harm where possible" (Born, 2019, p.191). Dr. Born's work on *A Future that is Big Enough for all of us* supports many of the aspects written by Spannring and Linné, that the western culture places the needs of humanity above the animals and ecosystems we use as resources. Our society needs environmental education that teaches us to care about the land and all the animals' well-being in it, not only humanity.

The way the media portrays animals raises valid concerns and observations. The media does not do much to help bring awareness to the cruelty we place in our animal agriculture and the growth and production of the animals we raised for food. Marketing for many agricultural businesses show happy cows on green pastures for dairy products we buy in the grocery stores that are mass produced and distributed. In 1934, there were

24.6 million milking cows on 5.2 million farms, producing 10.7 billion gallons of milk, that's about 1.2 gallons of milk per cow per day. In 2017, 54,599 farms had 9.5 million milk cows, producing 23.5 billion gallons in a year averaging about 7.4 gallons per cow per day (King & Sarkar, 2021). King and Sarker's article teaches us that our number of small farmers in the dairy industry is diminishing significantly from 5.2 millions farms to 54,599 farms and that our agriculture community is becoming more efficient at gathering more gallons of milk from fewer cows. One thing it doesn't describe is how these fewer cows are kept, what their living conditions were like, and what changed in their food sources to increase the milk production from 1.2 gallons a day in the past to the 7.4 gallons a day that is more in the present. Small farms grow more of their own feed and raise their heifers onsite. Large operations tend to confine their milk cows in large barns or in drylot feedyards, while small operations may graze their cows on pasture (MacDonald et al., 2007, p. 3).

It is important for educational centers to make people aware that the ideas and messages sent over media and advertisements about "green pastures" and "cage free" don't share the full story of how the vast majority of the animal agriculture community works in the western world (Linné, 2016). The message Macdonald (2007) sends is that smaller farms tend to be more natural for our domesticated animals living on pastures and a more natural diet for cattle. The larger farms are less natural, confining the spaces of cattle and feeding them foods that are more processed with additives to supplement the lack of fresh grasses. The Environmental Learning Farm will be a place that can connect the local population to more local farmers in hopes that the community will be able to

work together to keep smaller farms and homesteads going and support environmental education goals.

There are different strategies for teaching others about the environmental injustices. It should be done in ways that help students learn alternatives to the current cruelties and practices in the agriculture industry to help further environmental education science goals and bring about actionable change from raising awareness. There are connections between what we eat, buy, and wear, that are not just a lifestyle but also a political choice. People need to be able to understand and have alternatives in order to make changes. The Environmental Learning Farm can provide students with these opportunities to interact with animals that feed us and provide us with products and materials which benefit humanity.

Studies have been able to show that children in early development are able to make connections and understand human damage to the environment that creates loss of habitat and food source to the animals in those environments. In a study done on young children ages three to six years of age they found that students who had interactions with a live dog were able to mimic the dog's calm behavior, focus more, needed less instruction, and had more motivation to learn than children with a stuffed animal dog in the study environment (Bone, 2013). We use animals as teachers in many children's books and children's movies, and they have a large range of roles to play. There is sometimes a gap in children's stories about exotic, rare or endangered animals or animals that have gone extinct. In western culture, animals have become more of an economic value, than of an emotional or wellbeing value (Spanning, 2017). We have studies and resources that have shown us that animals can help humans learn empathy.

The *Urban Environmental Education* book written in 2015 has some different resources about how to bring animals into the educational setting. Bird studies, for example, can be conducted in the urban environment and spark students' interest in a variety of subjects such as math, physics, environmental sciences, and biology. The use of bird-related activities provide useful and inexpensive ways to offer environmental science positive youth development in observations of their habitat, help students recognize the resources they need for survival, and spark interest in how to best help them to not just survive in an area but also thrive (Russ et al., 2015). When students get involved in these studies it can spark their creativity to problem solve and make decisions that are pro-environment.

Zoos use animals to spark curiosity about the natural world when programs are well designed and include conservation content into the zoological information provided. Zoos, aquariums and museums may be well-visited places, but many times they don't provide the right types of opportunities for visitors to leave inspired to become advocates and participants in pro-environmental behavior (Swanagan, 2000). Many times these public places provide a lot of information and give people the opportunity to see animals they may otherwise never have a chance to see alive, but the study described in Swanagan's article relates that information is not enough to inspire people to make changes in their lifestyle that are environmentally friendly. "More effective methods of encouraging pro-environmental behaviors would be to offer day camps, overnight programs in a semi-formal controlled learning environment" (Swanagan, 2000, p. 27). The Environmental Learning Farm using different species of animals and the different teaching strategies that promote an individual's positive emotional response can help lead

to an increasing number of participants to have a more active role in protecting and advocating for the natural world. The Environmental Learning Farm could offer these types of programs into their services. It could have a day camp that is structured like a Forest Kindergarten. There could be an overnight experience close to the animals offering the experience of sleeping in a tent to wake up with the horses and other animals.

Animals in education can be unpredictable; the consequences can be both positive and what some might see as negative (Bone, 2013). When a child pulls too hard on a dog's ear the dog may bite or nip at the child. The normal reaction in our Western culture is to reprimand the dog as inferior and teach it not to nip at the kid even though the dog is in pain. The child needs to learn how to not cause pain to others. In this case the dogs are taking on the role of the teacher with the students. When students come to the Environmental Learning Farm incorporating domestic animals they can interact with or undomesticated animals that they can observe and learn from, they have the chance to participate in a curriculum that is driven by the six C's of positive youth development. The six C's of PYD (positive youth development) are six words that relate to how a program can help encourage and teach students confidence, caring, competence, connection, character and contribution (Monroe & Krasny, 2015). Environmental education can lead to more than only knowledge in environmental sciences; it can also lead to helping young adults make more conscientious and positive decisions. "Positive youth development is a strengths-based view of adolescent development, subscribing to the notion that youth possess innate talents and abilities that should be strengthened." (Russ et al., 2015, p. 69)

It will help them to become advocates and participants in improving and maintaining the health of their local environments and maybe inspire them to achieve that protection of the environment on a larger scale and broaden past their immediate areas to places that are in more need of advocacy and participants for change. The classes that can be offered on the Environmental Learning Farm can allow for a diversity of objectives and curriculum tying together environmental science content and objectives, with opportunities for positive youth development in confidence, caring, competence, connection, character and contribution.

To answer the question posed at the beginning of this section, animals can play a role in helping individuals to find compassion and caring for themselves, others and the environment in which we all live. The use of animals, both domesticated and undomesticated, will be a huge asset in the development of curriculum to help promote students to becoming protectors of environmental issues and advocates for maintaining and improving ecosystems. I believe Dr. Born said it best when she wrote, “We can commit to restoring and renewing our relationships with animals now and for the future” (Born, 2019, p. 196). Educators and educational facilities that can start to change the objectives and intentions of their curriculum to look at promoting the health of all living species and sustainability of abiotic factors that animals need to survive. It will hopefully start to make a difference in the belief that humans are dominant to other species and help others to make pro-environmental decisions.

Animal-Human Bond

Many cultures older than our dominant Western culture in America show the value of animals in their traditions and religions. The Native American culture is riddled

with stories about animals being creators. Many educators and educational institutions are using stories of the Native American culture connections and stories of animals as tools to teach environmental education (Chang, 2015). As Walsh (2009) has found,

Ancient peoples valued the profound connections between humans and animals. In recent years, increasing research evidence confirms the physiological, psychological, and social benefits of interactions with animals and the therapeutic potential of animal-assisted programs in a wide range of settings. (p. 462)

The animal-human bond is significant in our human history. We most likely would not have been able to make the advancements we have in society today without the help of animals. Our domestication of animals has led us to be able to use them for protection, hunting partners, guides, and tools for the advancement of our needs. Animals have changed throughout history to sort of co-evolve and work with us in order to secure shelter, food and protection. Many ancient cultures revered animals as being guides and protectors of the people. Cats were held in great respect in Ancient Egypt. This bond with animals from ancient times comes from the necessity of working with animals to survive and thrive in the world. Animals also learned they could rely on humans for equal protection and survival (Walsh, 2009).

“The vast majority of pet owners regard their pets as their friends (95%) and/or family members (87%)” (Walsh, 2009, p. 465) The animal-human bond is a complex one that doesn't just bring happiness, it also brings grief. It is a significant bond that should not and cannot be discounted or ignored. The way we think about animals, the value we give to the relationships we have with them can affect the ways we respond to the death and loss of those we consider pets and death of animals that are domesticated or wild. It

most likely is impacted by our relationships, support resources, cultural and religious beliefs, values, and worldview, basically our intersectionality. When we are able to look at our own intersectionality and find our biases and different perspectives in a reflective and constructive way we can look into the amazing bonds between humans and animals. We can better understand ourselves, help ourselves, and help others. We can find empathy, compassion and understanding (Blazina et al., 2013).

“One of the strongest areas of research evidence correlates pet ownership with positive physiological measures, such as lower blood pressure, serum triglycerides, and cholesterol levels” (Walsh, 2009, p. 466). There have been studies completed that show that when people pet or stroke animals it can actually decrease their blood-pressure as well as their heart-rate. Wells (2009) has found that even an animal's short-term presence can decrease stress in humans.. The animal-human bond has been proven to help so many people under many different circumstances, and through various studies. It has been well studied about the impact animals have on veterans, especially those suffering from post-traumatic stress disorder. Many of our veterans and current soldiers face surmounting stress and anxieties from their trials and experiences giving their lives over to the armed forces, and many go without significant or appropriate care to help them find a way to live with the experiences they have had. However, there have been significant breakthroughs in using the animal-human bond to help these individuals find a way to reduce their distress and get a handle or sense of control over their lives and diagnosis (White, 2011).

The Environmental Learning Farm’s designs for curriculum are going to work at offering courses to maximize on the human-animal bond. Being able to provide different

opportunities to meet animals that have been in a variety of situations can give unique opportunities to the students who participate. They will be able to connect in various ways to the importance of caring for all living creatures in our environment and find that they all have an equal amount of purpose in this world and to our survival in it by working together to better understand how our species' interactions are impacted. The animal-human bond allows for greater connections to exist when we use animals in educational settings. The Environmental Learning Farm can use the bond to help motivate and inspire visitors to want to learn healthier habits that will not only benefit themselves but also other living creatures around them.

Programs Already in Place

It is important to take a good look into the programs that are already in place around Minnesota in order to identify avenues of opportunities that might be missing or inaccessible to the majority of the public. Many programs have age limits and requirements for participation which is important when considering the target audience and the limitations of the programs as well as the liability needs for the programs. In this section I am going to break down the different programs already in place around Minnesota and what services they offer. The different categories of the programs are going to fall under environmental education, animal assisted programs, and organizations that I believe can help make the Environmental Learning Farm a long term success and provide many benefits for the community and environment.

Environmental Education Programs

Minnesota's Department of Natural Resources has a comprehensive list of environmental education organizations that are already in place around Minnesota.

Appendix B is a comprehensive list of 24 programs and environmental learning centers in Minnesota that encourage and teach environmental sciences and further the goals of environmental education. It describes each program and environmental learning centers services and classes that are offered to the community. Each of the environmental learning centers and environmental programs are registered as non-profit organizations with 501C3 status, they survive on government funding, fundraising, donations, some have revenue from classes held on the site of the environmental learning center. There are a couple environmental learning centers that host private events such as weddings and business meetings to increase their funding for their other programs. Minnesota's Department of Natural Resources has a webpage dedicated to Teacher Resources. On this webpage there are reminders and links to more information about what types of animals can do well as classroom animals, bringing nature inside the classroom by attracting animals to windows or bringing natural objects inside the classroom, the benefits of playing outside, how to have a successful outdoor classroom and there are links to free lessons plans and materials for environmental science concepts.

Minnesota Wet Project is a program owned by the Project Wet Foundation that focuses on improving understanding of water resources throughout Minnesota and offers resources, materials and guidance for MN School Districts, Universities, the National Park Service, Nature Centers, Non-Profit groups, Minnesota Association of Environmental Education, MN Master Naturalists, city and regional parks, Soil and Water Conservation Districts, and the Metro Watershed Partners to host events and watershed initiatives. Minnesota Project Wild is a training workshop for educators wanting to increase their interdisciplinary conservation knowledge and environmental

education programming (DNR, 2022). Project Wild's focuses on improving wildlife and offers certifications for educators pre-K to 12th grade teachers. Project Wild already makes correlations between their content and curriculum to Next Generations Science Standards (NGSS). The workshops are open to classroom teachers, scouts, 4-H and youth leaders, park and nature center staff and environmental educators. (DNR, 2022). They do have a complete list of Minnesota scientific and natural areas that can be looked up by name in alphabetical order or by location on the map function. It includes a list of workshops that can be completed online or in person to access an entire unit's worth of content and provide continuing education credits for educators in different environmental science content areas.

During my research of the different environmental education programs in place in Minnesota and the environment learning centers I noticed that none of these programs or centers offer experiences with our domesticated animals as a part of environmental science education. The experiences are wildlife and nature based. There are classes for survival, skill building, identifying local flora and fauna, understanding ecosystems, learning more about renewable energy and sustainability and participating in improving local environments. Minnesota needs more opportunities for participants to learn more about their animal agriculture and its versatile impact on the environment. Osprey Wilds environmental learning center located in Sandstone, MN is the only Environmental Learning Center to have a public educational program for individuals or groups to learn about our domesticated livestock. They are introducing livestock back onto some of the Osprey Wild acreage in an attempt to improve soil qualities and provide sustainable meat to the community (Osprey Wilds, 2022). There are 4-H programs that have opportunities

for the public to meet domestic agriculture animals and sometimes feed them but those opportunities for the public to see them are at county and state fairs, otherwise those opportunities to learn more about them are limited to those who participate in the programs. Many Zoos also have opportunities to meet livestock animals and see them through fences or pet them in a petting zoo, but we only have two zoos in Minnesota. The Minnesota Zoo has the Wells Fargo Family Farm, according to their website that has opportunities to allow the public to walk through facilities that mimic what agriculture farmers do on their facilities, but it doesn't mention if it's modeled after larger operations or more local small farms. They do state on their website that there can be times when they have the staff and volunteers to allow for it, the public may be able to pet the animals, but there's no mention of guided classes or programs to help engage the public in the environmental concerns with different agricultural practices (*Wells Fargo Family Farm 2023*). I searched the Como Zoo's website and did a deeper search looking through blogs and couldn't find any mention of there being any domesticated animals that can be considered livestock on their facilities, the closest thing would be Dall Sheep. They have environmental and nature programs but none that relate back to animal agriculture (*Welcome to Como 2023*).

Equine-Assisted Programs

There are many animal-assisted therapies already available in Minnesota. Many of these animal-assisted programs involve horses and dogs to assist in therapies for physical injuries, mental health issues, children and adults with special needs, and those with autism, Asperger's Syndrome, PTSD, ADD, ADHD, EBD, OHD, etc. There are a couple places people can look to find a list of these programs, and one is the Minnesota

Horse Council. The Minnesota Horse Council gives a brief description of the therapy services provided at equestrian facilities across Minnesota (Joyce, 2022).

Horses make excellent therapy animals for a couple of reasons. Horses are extremely sensitive to their environment; they can hear in a range much wider than humans, their range is 55 to 33,500 hertz as compared to 30 to 19,000 hertz (cycles per second) in humans. This means they can hear the ultrasonic shriek of a bat which can be as low as 20,000 hertz (Equine Guelph, 2022). Their ears can rotate independently from each other in 180 degrees. Their ears don't just pick up sound, they also reflect how a horse is feeling. Pinned ears to the skull is a very unhappy horse, it could be an environmental issue or a physical one where the horse feels pain. Horses are prey animals and their sensitivity to sound, sights and smells makes them sensitive to their environment. A horse is able to feel vibrations in the ground through their teeth while grazing and hooves, as prey animals this can help warn them of an approaching predator. Each eye of a horse feeds into one side of the brain. The image the eye receives is distorted compared to our vision (Equine Guelph, 2022). A common saying equestrians use when training horses is "New side, new brain", meaning that a horse may not react when you do work with them on one side, but when you switch sides they could be very reactive. They are able to pick up on verbal and nonverbal cues so small that we humans may not even notice we are giving them. Horses sensitivity to their surroundings means they can pick up on anxiety and fear, a well trained horse is able to overcome this stimulus from a human and move forward to help others under guidance learn to have more confidence and face their fears (Equine Guelph, 2022). "Horses also have a highly developed sixth sense. This ESP, perception or psychic ability is well documented. It

includes a pronounced homing instinct, the ability to sense impending danger, sensitivity to the moods of others.” (Equine Guelph, 2022). Horses each have their own personality and their own scent, horses are able to recognize each other through their scent, it is how mares identify their foals after birth in the herd.

In my 27 years of experience a horse's sensitivity to the environment makes it ideal to be able to help humans understand how their verbal and non verbal communication can be interpreted. Horses are expressive with other horses and humans, their ears and body language react to stimulus and this immediate feedback can help humans recognize the responses and learn how to correct their communication with the animal to build a stronger bond and develop trust. Horses are very large animals and they have a mind of their own. If a horse doesn't trust its handler it usually won't respond to basic commands or even let the handler approach them. It is sometimes a misconception that to ride a horse there has to be control of the animal, the idea of controlling a 1,000 pound animal is just an idea. They can react to some type of stimulus, throw their rider or tear a lead rope from a handler's hand if the stimulus is big enough to cause that kind of reaction. Prey animals are constantly acting in self-preservation and looking for threats, this is common to many humans and other living creatures. Their expressive behaviors and sensitivity makes them ideal for helping humans learn new skills (Spannring, 2017).

The Minnesota Horse Council provides contact information and some website links for those willing to look further into the different equine programs. Some of these programs that are in place offer services for people with all disabilities and opportunities for individuals to get involved in their community to seek help for themselves. Activities that involve riding horses can improve physical strength, flexibility and balance. The

adaptive and therapeutic riding programs can offer cognitive, physical, emotional and social well-being to individuals with disabilities (Burgon, et al., 2018), anxiety and post-traumatic stress disorder (Earles, et al., 2015). There are benefits to working with horses from the ground and can help improve a person's physical and mental health. Physical health can be improved through movement and working with horses on the ground or in the saddle is kinesthetic movement (Berardi, et al., 2022). Mental health can be improved through working with horses on the ground by learning how to communicate with them verbally and nonverbally (Burgon, et al., 2018). In therapeutic riding services, students learn focus, character development, team-building, critical thinking, problem solving, decision making, communication, confidence and leadership (Burgon, et al., 2018). I will also be taking a further look at other organizations that partner with animal-assisted therapy programs and what those programs provide for the community. There is more detailed information about the two nationally recognized equine therapy certification programs and the available equine therapy centers in Minnesota in Appendix C.

There are thirteen listed equine facilities that have PATH Intl. listed instructors for equine therapy services on the Minnesota Horse Councils Website. They are all similar in that they offer therapeutic riding services for those with disabilities, military personnel and veterans. The Eagala certifications are for groundwork horsemanship only therapeutic services. The Minnesota Horse Council lists five facilities that have Eagala certified teams working at the barns in order to provide services for mental, physical and emotional wellness for those who may have disabilities and those who may just be overwhelmed and their mental health needs a boost. It also lists sixteen other equestrian

facilities who are not accredited or have certified instructors in the Eagala or PATH Intl. in their programs, but some of them follow the same code of ethics and the Eagala model for people working with horses (Joyce, 2022). I haven't been able to locate or find any equestrian therapies in Minnesota listed online that are not listed on the Minnesota Horse Council's website. In Appendix C I have a more detailed description of the services offered for each equine therapy facility researched. It would be beneficial for the Environmental Learning Farm to be able to offer therapy services to the public or at recommendations for the mental health professionals or social workers. Equul Access Inc. might be a good resource for consulting on the Environmental Learning Farm to be able to provide support services for the county's social service departments. These non-profit equestrian programs survive on donations, sponsors, grants and funding from the state and federal government.

Animal-Assisted Programs

North Star Therapy Animals brings in an animal and human team to different facilities across Minnesota. Their therapy animal services consist of animal-assisted activities (AAA) and are informal visits from an animal therapy team to improve overall well-being with no specific goals. Animal-assisted therapy (AAT) is more formal, bringing the animal and human team into the therapy sessions with the client and the therapist or counselor with a specific set of goals. They work with PetPartners which is a national organization working with people and their animals to be a team in helping the public through mental and emotional crises (Admin, 2022).

PetPartners believes that the human-animal bond is a mutually beneficial relationship that improves the physical, social, and emotional lives for both pets and

owners. They work to educate, train and provide opportunities for humans and animals to interact in a beneficial way. PetPartners works to provide opportunities to the public to learn more about their pets, for example having a canine body language course for anyone interested to take and better understand what their dogs are trying to tell them. It supports programs such as Read With Me and Walk With Me. PetPartners also offers courses in how to use animals with patients with Alzheimer's and working with veterans, specializing courses to be most beneficial for the teams working with specific individuals with physical, mental or emotional disabilities in a positive and safe way (Peters, 2022).

The Environmental Learning Farm should have a certified PATH Intl. instructor or at least one Eagala Team on staff to provide more opportunities for those in the community that have special needs. Having a dog that is certified as a PetPartner and registered as a North Star Therapy Animal could be beneficial for many of the classes being offered. Specifically it would be a good resource for the Environmental Learning Farm to have a therapy dog on site that can help ease people's fears about being around large or unfamiliar animals and situations. The Environmental Learning Farm could work with other organizations around Minnesota to provide shelter for unwanted animals and pets. It could work with the This Old Horse rescue organization that works in Minnesota to home unwanted horses that have been surrendered. The rescued horses can be great teaching experiences for students to learn about working with animals and working with other humans for the benefit of the animal. It might even be able to provide an opportunity for visitors to meet potential horses that can be adopted to find new homes. The Environmental Learning Farm could also work with different environmental education centers to offer courses for those with their animals to come and participate in

specifically designed classes. It could be an investigation where they use the help of their pets' senses to learn about the natural world.

Building Partnerships

It is important to look into what makes sustainable partnerships between businesses, schools and the communities. Partnerships that last are ones that can be mutually beneficial for both parties. The Environmental Learning Farm needs to be able to partner with other businesses that offer similar or the same services. It needs to be able to partner with agricultural businesses to have reliable food sources for the animals on the Environmental Learning Farm and be able to continually provide quality information and opportunities with the local agriculture industry. Partnerships with certain non-profit organizations that are federally recognized or highly regarded by the state can lead to possibilities of additional grant money and more donations from charitable givers.

Working with the local 4-H leaders and Future Farmers of America (FFA) clubs could provide opportunities for the Environmental Learning Farm to have regular customers to the facility and increase the foot traffic of the local families of students that participate in those extracurricular activities. Working with the youth programs in the local community can increase the value the community sees in the Environmental Learning Farm.

Studies have shown that students working within their communities participating in the co-ops and learning from their institutions are feeling more positive about their education, program design, personal and professional development especially in the field of Agriculture (Kassem et al., 2021). There are a few agricultural co-ops around the area, and partnering with them to provide produce for lunches, dinners or snacks for different

events and courses on the Environmental Learning Farm would be beneficial for the local farmers and practice the importance of pro-environmental behavior.

Schools, communities and businesses have a way of not getting along and blaming each other for the deficits we see in our society. The biggest disconnect is they are not working together to better educate and prepare students for the future of employment and expectations of being an adult in our modern society. Schools working closely with the organizations and businesses in their communities can really help improve student motivation, behavior and the transition to successful independent living and employment (Barza, 2013). Having a partnership with the local school district to be able to offer opportunities to school clubs, sports and teams could benefit the students coming to the Environmental Learning Farm by providing short-term opportunities to participate in activities that can increase positive youth development. The partnership with the school can also be beneficial when applying for grants and funding for the upkeep of the farm, its animals and its staff.

Summary

Environmental education has many goals and objectives, the main theme when comparing the NAAEE and EPA are to raise awareness of environmental concerns in both rural and urban areas, provide opportunities for individuals gain knowledge and skills that will help the to make pro-environmental decisions and create lasting patterns of behaviors and changes in people to improve or protect the environment. There are many factors to consider when looking at why someone would choose to make a decision that helps protect or destroy the environment. Many times it is ignorance of the impact, other times it is inconvenient to make the decision that would be more environmentally

friendly and in other cases people's decisions are based on economic, social and political culture limitations.

The way we present materials and lessons to students matters in how much they actually engage with the material and find ways to relate to it. Many studies have been conducted on what ways we teach and provide learning experiences that promote lasting behaviors and learning. There is a positive correlation between self-transcendence attitudes and positive environmental behaviors, but a negative correlation between self-enhancement attitudes and negative environmental behaviors. (Schultz, et al., 2005) Successful environmental education programs have proven to help foster these self-transcendence attitudes in promoting positive environmental behaviors and positive youth development. Some of the strategies discussed will be the benefits and limitations of sense of place learning, outdoor learning, kinesthetic learning, gamification, storytelling and active participation strategies. Curriculum is only as good as the way it is implemented into lessons, if it is too grim it can lead to feelings of indifference and despair which can lead to inaction. Curriculum needs to be engaging, give moments of reflection, discussion, challenges and different ways of learning. It needs to have some flexibility for creative choice and personal ownership.

We seem to have a gap in providing services to our communities, and that would be including our domesticated animals that provide so many benefits in environmental science and education programs in Minnesota. The Environmental Learning Farm Project will be able to help fill this gap, as the animal-human bond can increase students' motivation to learn and help individuals face trauma and improve their mental health. Animals are valuable in educational settings as tools for curriculum and as teachers for

content. Including domestic animals in environmental educational programming could increase pro-environmental behaviors. The Environmental Learning Farm will be able to provide these opportunities and with time be able to provide even more services to benefit the communities and environments overall health.

Knowing what other programs are available in Minnesota helps to understand what might be missing and leads to an Environmental Learning Farm that can help fill in those missing pieces. Hopefully the Environmental Learning Farm will be able to build lasting partnerships with other centers for the success of both businesses, the environment and individuals who participate. The environmental education centers around Minnesota have access to acres of nature in the three different biomes around Minnesota. They offer various classes for those of all ages to participate in for learning skills and gaining information about environmental sciences. Frequently missing, however, is the opportunity to have closer interactions with domestic animals in their environments. Many of the environmental education centers have classes for the possibility of observing undomesticated animals in nature. Osprey Wilds came the closest to having animals on site, a facility for their raptors rehabilitation. The equine centers in Minnesota offer many different styles of equestrian therapy, also called Hippotherapy, but they lacked any goals leading to environmental education.

The Environmental Learning Farm is an opportunity for individuals of all ages to come together and learn about the natural world they live in and how we can influence it for the better and for worse. In chapter three I will describe in detail the mission and goals of the Environmental Learning Farm. I will describe the types of curriculum, programs and activities that could be offered and their objectives, as well as how they can

relate back to the goals or components of environmental education goals, what types of teaching strategies could be used and how the animals can be used in the curriculum, activities and programs.

The setting for the Environmental Learning Farm is described in more detail in chapter three. There will be a start-up nonprofit business plan to be able to support the Environmental Learning Farm, and a setting description of the property where I would like to start the first Environmental Learning Farm and a curriculum that will be offered with what the property already has available. The start-up business plan will have a section on growth and future plans on how to expand the Environmental Learning Farm and offer more diverse opportunities to the public. Chapter three gives an overview of the project design and the rationale for the Environmental Learning Farm and the essential components that will need to be covered in the project to ensure success.

CHAPTER THREE

Project Description

Introduction

The driving question in this capstone project is: *How can I build an Environmental Learning Farm in Minnesota to help individuals improve their health and increase environmental education goals and objectives?* Minnesota has many environmental learning centers and animal-assisted programs that are available to the public to receive services and gain an understanding of the natural world. I am trying to build a Environmental Learning Farm that is a combination of environmental education and animal-assisted programs. Often when humans think of the words environment and ecosystem they think only of rivers, lakes, forests, deserts, or grasslands. They think of places that are still natural without much human interaction or influence. In fact, the environment is all around us all the time—from the coniferous forests near the boundary waters in Minnesota, to the concrete jungle of the Twin Cities. Our environments provide us with our needs, shelters, food, and place of belonging. In order for the environment to be able to heal, improve, and thrive we have to care for it and all the species within it. A learning farm can help the populace that explores programs and services to learn more about how to care for the environment in which we live so that the ecosystems can prosper for both humans and animals.

Rationale

Many of the environmental learning centers around Minnesota do not have opportunities for the participants to interact with animals, sure many of them offer bird watching or other skills and opportunities that get people out into nature to observe wild

animals. I have researched 24 environmental learning centers listed online in Minnesota and most don't provide experiences for people to interact with domesticated animals. Animals have always had a role in our survival and growth as humans. We have used them for food, clothing, tools, and companionship. Horses carried humans far distances and allowed us to expand trades with other civilizations. They helped us improve our quality of life plowing fields to grow more crops and support larger populations. Animals deserve a role as teachers in environmental education; they can also help increase a person's compassion. Animals can be positive teachers and some might even say negative teachers, dogs can teach children not to pull on their ears by nipping them, they can teach children and adults about their sense of place and discover wonderment in their current environment (Bone, 2013).

Participants at the Environmental Learning Farm can build a sense of place when getting involved in the different programs. A sense of place can provide significant value to encourage students to connect with the land they live in and have a stronger relationship with their community. Increasing a student's sense of place increases the values of their own experiences (Sanger, 1997). An Environmental Learning Farm can help students take what they learn and hopefully help them build more positive connections with the land they live on and also with their community. The hope is that the knowledge and experiences they gain on the Environmental Learning Farm will be able to help them better understand and explore their local environments. The participants can look for areas that could use improvement in their local community and create solutions that will better benefit the environment and ultimately the entire community. We use animals in many physical, mental and cognitive therapies in Minnesota to benefit

humans. Research shows how animals have helped soldiers with post-traumatic-stress disorder and significantly reduce stress and anxiety in an article titled *The human-animal bond and combat-related posttraumatic stress symptoms* written by White (2011).

Chapter Overview

In this chapter, I will describe the project description and the rationale behind choosing what will be in the project. There are two main parts to this project: The start-up business plan will include a plan for starting a Environmental Learning Farm as a non-profit, and also to explore what partnerships can be formed to increase the quality of the content in the workshops and services. It will also describe the ways the Environmental Learning Farm can benefit the local community. The second part of the project will be a completed curriculum design for the first program the Environmental Learning Farm will provide to the community.

Project Description

This project is the design and development for services that could be offered on a learning farm and how it can partner with organizations within the local community to benefit as many people as possible and further environmental education goals. Some aspects of the project considered how to fund the Environmental Learning Farm, the structural organization, and opportunities for growth. When researching how to fund the Environmental Learning Farm I needed to consider the options available, including what grants are available to start-ups that are non-profits, and what organizations the Environmental Learning Farm could partner with to increase participation, clients, revenues, and services offered. Part of the project includes the curriculum and services that could be provided at the learning farm. These services could range from outdoor

curriculum designed for environmental sciences, to animal-assisted lessons and therapies. Each program or service being offered will be able to help in some way further one or more of the goals and objectives in Environmental Education or improve health and wellness. The program is an intergenerational learning experience with horses as part of the curriculum to help teach content about their interactions with the environment and our impact with the domestication of horses.

Start-up Business Plan

The start-up business plan for the Environmental Learning Farm will include a mission statement, a vision statement, a list of grants and funding options, services provided with goals and objectives for individuals and the community. The Environmental Learning Farm as a non-profit organization could find funding in certain grants, events that could be hosted, workshops and services may have fees, memberships, and donations. The business plan covers the necessary personnel, paid personnel and volunteers that would be needed to make the Environmental Learning Farm a success and the facilities necessary to make it the best possible experience and outreach center for environmental education and human growth physically, emotionally and mentally. Included in the start-up business plan will be the possible partnerships that could be formed in the local community and the benefits to the Environmental Learning Farm, the partnered organization and the community.

The Environmental Learning Farm is going to start slow and build its progress as it sees success starting with a one year growth plan and then building to a five year growth plan and a ten year growth plan. I was able to discuss my ideas for the Environmental Learning Farm with Mr. Harrison, a licensed high school teacher for

elective business courses at Rosemount High School. I was given advice to be good at one thing first. Starting small isn't an issue for business plans; I need to make a solid plan of what can be achieved in the first year and become really good at the one or two programs the Environmental Learning Farm is offering before adding to many other programs. It is important to build a client basis and find the niche of what's missing in other programs (Soronen & Harrison, 2022). The start-up business plan includes the detailed description of the program designed during this capstone project as the first service to be offered. It will also include a brief description of programs that could be added to the program over time.

The research done in Chapter Two helped me determine a couple of missing pieces in our current environmental learning centers that I believe the Environmental Learning Farm can offer to our community. These missing pieces helped to focus the curriculum design for the project's first program on the Environmental Learning Farm. One missing piece is the lack of domesticated animals involved in the curriculum of the programs taught in environmental education. The second missing piece is the lack of providing programs that can be attended by an entire family, a program that is intergenerational. A program that parents, children and grandparents can participate in together and learn from each other's perspectives and experiences. The Environmental Learning Farm will be able to host programs, workshops, lessons, and clinics on many different subject areas from mental health, physical health, agriculture, environmental science, biology, chemistry and physics concepts.

Program Curriculum

The curriculum design for this project will be cited accurately and with the current available resources and information. This portion of the project will have the essential questions of the curriculum, objectives and goals of the curriculum and description of the course. Content taught in the program that overlaps and Minnesota State Standards is listed with the learning targets and objectives of the curriculum.

The Environmental Learning Farm's first program offered is going to be available as an intergenerational program that an entire family could take together. According to Zimmerman & McClain (2014) "An important aspect of learning in informal environmental education programs is the role of families' social interactions" (p.178). This offers a unique chance for children to be able to teach their parents and their grandparents about how they look at the world and learn. It also will provide an opportunity for the younger generations to learn from the connections their elders can make between the content and their own experiences. Opening up programs as intergenerational can help spark conversations at home between family members and allow chances for younger children to confidently share their experiences from other learning settings with their family and give opportunities for families to work together for a common understanding (Zimmerman & McClain, 2014). The Environmental Learning Farm's first program is going to utilize the farm's access to the horses on the property and give the families the chance to work together and reflect on the horses behavior as a herd and with humans. It will also provide the content to explore in further understanding domesticated horses' impact on a localized ecosystem. The first intergenerational program at the Environmental Learning Farm is going to give the participating families a

chance to explore the farm's impact on the land's soil health since it was rehabilitated in 2009 with a native grass mix designed by the University of Minnesota for equine livestock. Participants will have a chance to learn about topsoil, look at pictures from the land's recent past showing the top soil and make comparisons of its past to its present. The horses on the property have played a large part in the rehabilitation of topsoil, through composting the waste from horses.

The Environmental Learning Farm's programs will provide opportunities for open discussions to make comments, ask questions, listen to others opinions and reflections in a safe and inclusive environment. It will give participants a chance to explore concepts and content at their own pace with their families. Using reflection and exploration for content in the workshops curriculum is also supported by the Wiggins and McTighe book written in 2011. They state that to design a curriculum of high quality understanding is not memorization of mere fact, but true understanding comes from the ability for students to make connections to the material by uncovering and exploring the content. The content focused on will be more transferable to the students life outside of the academic setting. In the book Wiggins and McTighe wrote in 2011 titled *The understanding by design guide to creating high-quality units* they said,

Essential questions point us in the direction of both kinds of understanding.

Coming to an understanding and applying prior learning requires an active process of meaning-making on the part of the learner. This process involves the ability to ask and pursue the most helpful questions, draw inferences, create new understandings, and actively process the effects of attempted transfer. (p. 15)

The Environmental Learning Farm's first year open will focus on intergenerational learning opportunities; as the success of the intergenerational programs increases there will be more room for growth in designated programs for different ages and subjects in environmental education. The program curriculum portion of the project will be a fully designed program with lessons, activities and any materials such as powerpoints, photos, worksheets and guides that will be necessary to obtain the objectives of the program's content.

Animals in Curriculum. The Environmental Learning Farm has one resident AKC registered chocolate labrador retriever, but has access to many other labradors of a variety of colors, it even has access to a local breeder who would be willing to bring a litter of young pups at times. The ability for individuals learning this curriculum and having access to look at the dogs in person and interact with them allows for discussions to go further and consider what other traits could be passed down to offspring. Using the animals in the curriculum can help students see the value in these dogs as more than pets, but also as educators, which can help build stronger relationships and connections with the animals. Building these connections with animals and allowing us to have some personal reflections on these interactions can affect the way we behave and help us to become advocates for the animals that can't advocate for themselves (Linne, 2016). Animals playing the role of educators in the curriculum can help humans to create bonds between human and animal that add more meaning to the curriculum and to the lives of those that participate in the programs (Blazina et al, 2013).

Adult Learning. When looking at adult learning and including animals we need to consider the difficulties adults may face with connecting to the materials. Many adults

have some disconnect when thinking about animal ethics and the “rights” that animals have naturally. According to Spannring in 2017,

The margin of the interspecies discourse could be further expanded by considering more explicitly (adult) learning. Such a concern implies switching the perspective on animal ethics as something that can and should be taught to the learning processes themselves. Rather than seeing them as linear paths to a fixed goal one might investigate how they are characterized by difficulties, contradictions, detours, and how they remain open ended. (p. 70)

When building the curriculum for adults it is important to keep the discussions and the content almost abstract and let people open their minds to new possibilities about the way we think of the world and the animals that live in it. Workshops for adults will focus on how we can include animals into other content areas and help provide resources to allow for teachers to have the opportunity to have kids interact with live animals.

Animal agriculture propaganda shows happy animals on product labels, but the reality of their health and living conditions varies differently from the image portrayed. In order for change to occur there needs to be reflection on the impact humans have on the life and death cycle of animals (Linne, 2016), and to determine what alternative solutions there may be to decrease animal suffering. According to the Malcolm Knowles article written in 1992, when working with adults as learners it is beneficial to have interaction between the platform presenting the materials and the audience. The curriculum design includes ways for the learners to interact and help grow the material and start exploring ways to incorporate the information learned into their lives.

Young Learners. There is a lot of research about how students in our schools learn best. Most of the research has a hands-on approach. Outdoor education has many benefits for students. Physical benefits from being outside and out from under fluorescent lights and concrete walls into natural light that provides vitamin D, and outdoor education has more movement than sitting in a classroom. Kinesthetic learning promotes social interaction and collaboration (Culp et al., 2020). The Environmental Learning Farm being outdoors offers the perfect opportunity to incorporate kinesthetic learning and having the animals involved in the curriculum to increase engagement and motivation to learn. There are mental benefits of outdoor education promoting students' general curiosity and kinesthetic learning. Kinesthetic learning can include ABL (Action-Based Learning) which promotes social interaction and collaboration (Culp et al., 2020).

Setting

The setting of the Environmental Learning Farm would start on an 18 acre property in Farmington, MN. The property was once a single family home with two structurally unstable outbuildings and a pole barn. The acreage was leased to a nearby farmer who alternated growing soy and corn with the use of fertilizers, pesticides, herbicides and irrigation equipment in order to get a mediocre crop yield. Over the last ten years this property has transformed from acreage with one quarter of an inch of topsoil to an average of four inches of topsoil. The acreage is now covered in Minnesota native prairie grasses, a mix designed by the University of Minnesota to be beneficial to horses and beneficial to the native species of the area. The pole barn has been renovated to fit 8 horses and have a foaling stall as well as storage for hay and feed. One of the outbuildings was renovated and improved for environmental sustainable energy

efficiency; it runs on solar electricity and is insulated with a soy spray foam insulation. The house is supported by an underground geothermal heating and cooling system and solar panels for electricity. The farm has a well and is not supported with city water supply. Currently on the property are one chocolate labrador retriever less than one year old, two barn cats (ages unknown), seven horses in a variety of breeds and ages, and undomesticated animals that utilize the property and its resources. There have been a pair of mating bald eagles living and hunting off the property the last couple of years. The property is pretty bare of trees, except on the eastern edge where the neighbors have left the native trees to grow tall and shield their homes from winds and storms, as well as the farmers' sprays and dust when running equipment.

Audience

Audiences for the different workshop/clinics/courses offered would draw from the populace around the local Dakota county community, and even possibly other nearby counties in Minnesota, such as Hennepin, Scott, Carver, Rice, Goodhue, Ramsey, and Washington county. There are 442,038 people in Dakota county (U.S. Census Bureau 2021). The population estimate in 2021, shows that about 45.4% of the population is under 59 years old, specifically there was 6.1% as less than 5 years old, 24.2% less than 18 years old, and 15.1 % as less than 59 years old. Knowing the age demographics of the population can help the Environmental Learning Farm to provide opportunities to better create programs with the necessary skills based on age appropriateness. This project will create an initial curriculum for multi generational participants. Some examples could include parents and children or grandparents and children. The ages of the children could range from three years old to eighteen years old. This means that the accessibility of the

farm needs to be able to accommodate the elder generation and account for the limitations of the farm to have a comfortable experience. The use of UTV's (Utility Terrain Vehicles) could be driven by a staff member of the Environmental Learning Farm and liability releases will need to be considered to help with transporting participants around the farm's acreage. The Environmental Learning Farm will need to be able to provide secure and safe seating will be necessary for those who need a break from standing on their feet or those who have a difficult time standing up and sitting down.

Timeline

This project was started in the spring semester of 2022 and I plan on finishing the project by May 2023. It has been a long road with changes and turns. I hope to be able to start implementing portions of the projects, as soon as the start-up plan is solidified for investors or to be able to be registered as a non-profit 501C3 organization.

Assessment

As a way to assess the effectiveness of the Environmental Learning Farm's programs a short survey can be offered at the end of each learning opportunity. The collection and analysis of these short surveys as a google form could be used to improve different programs to learn which ones should receive more funding for more opportunities and which ones may need to be cut in the name of finances to keep the entire Environmental Learning Farm afloat.

Summary

The Environmental Learning Farm project will require significant planning to be able to survive and thrive as a non-profit organization. It will need to be able to have enough financial resources to give excellent care to the animals. Building relationships

with current environmental learning centers and equine therapy programs will help further the goal of the Environmental Learning Farm to further environmental science goals and provide further business opportunities to the Environmental Learning Farm. The curriculum taught on the Environmental Learning Farm in the form of workshops, therapy services and different courses can increase the health of the local community. Increasing our local population's knowledge about the importance of animals and their needs for us as humans to be their advocates can not only improve their and our own quality of life, but could help to increase our ability to protect and improve the environment in which we live.

The project will explain in detail the start-up business plan to start the Environmental Learning Farm on the 18 acres in Farmington, MN known as Last Landing Ranch. The start-up plan will also have the future goals and objectives of the Environmental Learning Farm to grow. The second part of the capstone project is the curriculum design for one workshop meant for both parents and their children to experience the benefits of working with horses and how horses naturally interact with their environment. In the start-up business plan of the project there will be a section describing the different programs that could be offered that include interaction with domesticated animals and environmental science concepts to be considered for future growth opportunities.

Chapter Four will revisit the significant finding from the literature review which will help to develop the curriculum for the Environmental Learning Farms first program. It will make connections between the information in the literature review and new understandings that have influenced the Environmental Learning Farm project. I will also

discuss the limitations of the project that could impede the success of the Environmental Learning Farm and what implications are necessary to have success on the Environmental Learning Farm. Chapter Four will include my reflections of the capstone project and what future research could come from this project. I will also describe how this project could benefit environmental education.

CHAPTER FOUR

Conclusion

Introduction

Some of my very first memories involved horses. When I think about the moments of my life where I felt the most accomplished, proud, angry, defeated, lost, and joyous it was while working with horses. There is this overwhelming amount of pride and accomplishment that one can feel when working with horses and helping horses overcome their fear and trust you enough to do what is asked of them. My experiences with horses gave me the ability to have more patience with children and adults. It gave me the courage to stand up in front of crowds of people and speak even when my hands were clammy and sweating. It helped me learn to have boundaries with those who might try to take advantage of my generosity. Working with horses improved my life by helping me always look at how I can improve what I'm doing. There's a saying I have heard from multiple coaches, trainers and riders, "99% of the time it's the riders fault, not the horses." Many people won't understand this statement and will say if the horse bites you or kicks you then it is the horse's fault, but those people who would blame the horse haven't had the Aha moment of realization that horses are prey animals, and everything we ask them to do, such as lifting a hoof, being ridden, kept in a stall or in fences, goes against the natural instincts of a horse's self-preservation, its survival mechanisms. It's one of the reasons I think horses make amazing educators for true change. You can't quite fake it with a horse. They have this sixth sense that they can feel your anxiety, fear, anger, and all the other emotions. Sensitive horses will react to the way you are feeling and depending on the horse's personality you may get cuddles or never be able to catch them.

I was lucky that my family had been in the horse world before I was born. My mother had a horse when she was younger. My father, my aunt, my grandmother and my great grandfather used to show horses in the early 60's to 80's. The equestrian world can be an expensive, cold and uninviting world to try and break into, but it can also be an amazing, uplifting, humbling and empowering world. Many people are interested in horses and would love to get out and ride them, learn more about them, but don't want to commit to the financial responsibility or can make the time commitment that is necessary to keep a horse. While working towards my Natural Science and Environmental Education Masters degree through Hamline University, the courses I took really started having me ask different questions about what helps individuals change their perception about acting in environmentally positive ways. In Chapter One, section rationale, I dive deeper into how I decided on my question for the capstone project, *How can I build an Environmental Learning Farm in Minnesota to help individuals improve their health and increase environmental education goals and objectives?*

This chapter will look further at the process I went through that helped drive my research to build something that fills a gap Minnesota is missing to connect the local community to environmental educational experiences. The Environmental Learning farm is designed to help the community connect with nature in a way that promotes sustainable and attainable solutions for our current and future ways of living with nature. I will revisit the literature researched to give insights about what sections impacted certain aspects of the project. This chapter will review what strengths and limitations the plan for the Environmental Learning Farm and what future work can continue to be done.

Major Learnings

I learned more about myself and my values while completing this project. While writing my business plan for the Environmental Learning Farm, I had to create a mission statement and a vision for the non-profit business. I needed to summarize the purpose of the Environmental Learning Farm and describe what I would like to see the non-profit achieve. I learned in my reflections over the literature review and the findings of experts that animals are necessary to include in our educational system. Our American Western society places a value on animals as inferior means of control to further our society. It is a harmful way to look at the animals that provide us with all our needs of survival. It increases the ideas and beliefs that because we can manipulate our environment for maximum capital, that we should despite what it does to other species and how it might negatively affect our environment. I learned that, most often, animal agriculture and the importance of our domestic animals are often overlooked and underappreciated.

There is a need to offer a wider range of environmental education programs that include domestic animals, such as pets and livestock, into our programs and curriculums to help instill compassion and caring into participants. Many of my resources in this project related back to Positive Youth Development (PYD) include 6 C's (Competence, Confidence, Character, Caring, Connection and Contribution). When I reflect on times in my life that I had experiences to grow in each of these categories, it was when I was learning to ride and train horses. My passion and love for them helped me achieve PYD. I have been involved in the equine world since I was six years old and have dedicated my career to being a teacher and making positive impacts through science education. I learned that if I want to really be able to make long last changes, I needed to be able to

design a program and ultimately a non-profit organization that could provide opportunities to the general public no matter age, demographic, or affiliations that have similar experiences to what I had growing up caring for and learning about horses, agriculture and animal agricultural practices. All my research into what would make a successful programming for the Environmental Learning Farm and building the business plan helped me to realize that, even though this project started as a dream, I can make it a reality with enough support and the right help from professionals and experts in a variety of different fields, such as financial planning, marketing, curriculum development, non-profit management, farm and ranch management, social services and educational administrators.

The Capstone Process

At first, this project was a bit of a nightmare for me. I had originally wanted to bring environmental education goals and objectives into other high school content areas. I had completed a bunch of research and my first two chapters on how Agriculture Practices have led the rise and fall of many civilizations across the globe. It is a subject that I am passionate about because it does deal quite a bit with looking at what really caused ancient civilizations to collapse or break apart into smaller communities and it was very informative about how humans have been impacting landscapes across the globe and changing the micro climates of an area based on their use of the land. I was proud of my topic, but I lost focus on being able to complete the project because I would never be a social studies teacher with the ability to teach the unit/course I was trying to create. I wanted the work and effort that I put into this project to be something that could not only truly benefit my community, but also help make long lasting change for the

better. It was while talking to my GED8400 professor, Shelley Orr and the co-program director of the NSEE program, Patty Born, that I was able to finally put together a project plan that would be able to make a difference for all people in our community and participation wouldn't be limited by age or members.

It was my experiences and passion for nature, farms, and animals that drove me to think that there has got to be another way besides expensive barns and lessons that could offer chances for the public to experience and learn about horses and all the good they can do for humans. I have been learning more about the benefits of equine therapy while completing my literature review. When I worked at a school district in the west metro area of the Twin Cities, I got to hear stories about the old Hennepin County Home Schools equestrian program. I heard this story from three different co-workers that had been with the district for over twenty years. The Hennepin County Home School used to have an equine facility that was used to help students learn important life and communication skills. One story in particular really resonated with me. I had been working with tier 3, setting 4 special education high school students when I heard about a student who once went through the program. She was a 3 to 1, meaning she needed 3 adults to follow her from class to class and around the school all day in case she wasn't able to control her behaviors and responses. A 3 to 1 ratio for a student usually indicates that when they are triggered they will do serious harm to themselves or others unless properly restrained. This girl was a 3 to 1 in the school, but she was admitted into the equestrian program at the Hennepin County Homeschool. One of the paraprofessionals still with the district at the time, and who used to at times have to cover responsibilities with this student, told me that when they brought her to the barn, her behaviors changed

so dramatically that she didn't even need an adult to follow her around to make sure she behaved responsibly and respected the rules. I couldn't find anyone in the district to give me concrete information about why the program shut down, but the general consensus was that the funding was just not there, despite the amount of success that was seen in the program.

This story was one that impacted my thought process and how I wanted to design my nonprofit business plan. If a tier three, setting four special education student, that was designated as a 3:1 ratio, was able to have such emotionally stabilizing moments with equines, what could the experiences of learning about and caring for horses do for others? I want to create a place that can offer opportunities for the general public that they don't often or ever get to have. It will share the joy and compassion that can occur between human and animals in hopes it would lead the community to take more responsibility for our local environment. It would be a place to help keep the public aware of policies that could govern ourselves and our business to take on more pro-environmental friendly behaviors for the benefit of everyone in the community and not only a few.

I took a different approach for this capstone project than I have seen listed in the Guidelines for Capstone Projects. I created a non-profit business plan proposal that I could continue to work on and evolve when the board of directors have been selected and given their commitment to the organization. This non-profit organization is to benefit the community and offer programs at affordable and free learning opportunities that can help further our environmental education goals and objectives. The Environmental Learning Farm business plan is designed to start small the first couple of years to build programs that are tested and evaluated on their objectives. It will hopefully grow into a place that

can bring our agricultural community closer together with the community members. The business plan involves short-term goals that are more attainable for a few people to organize and provide to show the usefulness of the Environmental Learning Farms goals and objectives. The business plan also includes ideas that more like ideal dreams for the non-profit organization to be able to become its own successful Environmental Learning Farm that would have open hours of business on certain days of the week for the community to drive up, sign in and be able to learn about the importance of caring for the environment and all the species that live in it. The Environmental Learning Farm is a chance to give the local communities a specific hub location for all types of animal and agricultural experiences from those that have no background and for those who have years of experience. It will be a center for local organizations to reach out to and form partnerships not only with the Environmental Learning Farm, but any organization/business that partners with the Environmental Learning Farm that is trying to do good for the human and non-human community. It was during my research that I was really able to identify that we do have a gap in the between environmental education programs and the benefits of learning from our domesticated animals.

Revisiting the Literature

The idea for the project was to develop an Environmental Learning Farm that provides opportunities to the public to work with and learn from animals to promote environmental education goals and objectives. In my literature review, I first looked into what the North American Association for Environmental Education (NAAEE) and the Environmental Protection Agency (EPA) define environmental education as and what are the goals and objectives. The NAAEE has three objectives for successful environmental

education and five characteristics that successful environmental education programs include to promote lasting pro-environmental behaviors. The EPA lists five components of successful environmental education programs. One of the differences between the NAAEE and the EPA is that the NAAEE includes learning and understanding how our physical environment is a factor towards our ability to act in environmentally friendly ways. It takes into account different parts of our intersectionality that influence our behaviors.

My research into how to promote and influence long lasting pro-environmental behaviors with environmental education programs was most influenced by Russel Schultz, and Russ. Their work led me to look into different teaching strategies which teaching strategies should be considered and implemented into the Environmental Learning Farms curriculum. I researched outdoor education, sense of place, and gamification as strategies that should be included in the designs for the Environmental Learning Farms programs. The works of Russ, Oltman Eckman, Becker, Sanger, and Zaval & Cornwell influenced the development of the curriculum for the first program Horses, Humans and Health to include activities that encouraged participants to connect with the Last Landing Farm. It also helped me design the fourth day's program to give participants a chance to design their own enrichment activity. The fifth day of the program is an optional day for the participants to come back and to actually build and test their enrichment activity designs on the Last Landing Ranch to evaluate the success of their designs.

The purpose of the Environmental Learning Farm is to provide opportunities for the local community to learn about and learn from domesticated animals in programs that

are designed to help the local community connect with environmental education goals and objectives. The works written by Spanring, Russ, Born and Swanagan supported my ideas of using animals in educational settings. The works by Bone reminded me that as many positive impacts the animals can have, I need to remember what the negative impacts can be if participants aren't comfortable with the animals and I don't acknowledge and approach their fear in a proper way to participate. I needed to understand on an academic level Animal-Human bond. I have my own experiences and I understand the value of the bond for myself and for my friends and family. I did not have research and published materials to support my belief that using domesticated animals as a part of the environmental learning farms curriculum would make it more successful in promoting environmental education goals until I found the written works of Chang, Walsh, Blazina, Boyraz Güler, & Shen-Miller, and White.

One of the most time consuming parts of this project was writing the Programs Already in Place in the literature review section. I researched every listed environmental learning center in Minnesota's missions, programs and services that I could find online. I found twenty-four of them and had to create Appendix B to summarize my findings. In this research, I couldn't find a single environmental learning center that had a current program or curriculum for the local community to engage in activities with domesticated animals as a way to learn about the environment. I then researched further into programs that use animals for therapeutic purposes in Minnesota and listed them and their services in Appendix C. During this research, I found that programs that use animals for therapeutic purposes have many successful stories for improving physical, emotional, and mental aspects of their clients' lives. If we could combine environmental education

experiences with opportunities to grow in emotional, physical, or mental health, we may have better chances of creating long lasting changes in an individual's behavior to act in positive ways for their environment. The written works by Berardi and Earles provided researched evidence supporting the use of animals, specifically horses in improving the quality of lives in a variety of individuals.

The building partnerships part of the literature review was influenced by Kassem and Barza who supported the ideas that the Environmental Learning Farm needed to be more than a stand alone center and could be started smaller, like hosting programs with local community farmers to encourage support for our local agricultural community. There are many strengths and limitations of this project. Some of these strengths and limitations are included in the business plan proposal for the Environmental Learning Farm. Partnering with other businesses private and non-profit can be very beneficial for both parties but could also have some challenges in building the partnerships. There are strengths in the capstone project for filling gaps in opportunities in environmental education, but there are some serious limitations that could end the entire project.

Strengths and Limitations

There are many strengths to this project. It is built to fill a need that I believe exists within my local community around the south metro of Minnesota. The curriculum I built for the first program involves four days of encouraging participants to learn how to effectively communicate with another species in a way that encourages trust and builds partnerships between humans and horses. Lessons are built to provide experiences to build connections and compassion for another species and then review how their environment can be influenced by them and by humans in positive and negative ways.

The program provides opportunities for participants to experience a sense of place and outdoor education strategies to promote environmental education. This specific program focuses on the necessity and benefits of biodiversity in a community and how we as humans improve biodiversity of an ecosystem. In the business plan portion of this project there is an entire section SWOT Analysis, which stands for strengths, weaknesses, opportunities and threats that exist around the non-profit business plan for the Environmental Learning Farm.

The Environmental Learning Farm will need to build community support in order to keep in operation as a non-profit organization. A strength of offering a program that can be adapted to be used at many farms in the local area can widen the experiences that are offered through the environmental learning farm and offer awareness to the local farmers from their fellow community members. One of the biggest limitations would be convincing local farmers to host programs designed by the educators hired or volunteering at the environmental learning center. There are ways to offer tax breaks that could be a beneficial tool to convince that partnerships can be beneficial for both parties. Those involved with the Environmental Learning Farm would need to work with a professional in taxes and financial planning to be able to maximize the incentives that could be offered to local organizations and businesses to build partnerships. Another limitation would be building partnerships would be the legal liability and dangers of having guests on different properties. I believe this can be worked out best with the help from a non-profit specialist lawyer to learn how to protect the non-profit organization, the partnering farmers, and the participants in the programs. The next section of this chapter will briefly overview the possibilities that could come from the capstone projects

business plan for the Environmental Learning Farm. It will give more detail about where in the project you can discover the hopes and possibilities for the non-profit organization.

Possible Future Work

The Environmental Learning Farm could grow from just offering programs for the community to learn about the environmental sciences and agricultural education at different farms around the Minnesota area. The hope is that it will be able to fund its own property and build a farm that is open to the public to visit, similar to many of the environmental learning centers in Minnesota. It would have public hours of operation that would welcome visitors to come without registering beforehand. This would give the local community the freedom to visit the farm and see what it has to offer without needing to make a commitment and plan ahead. A permanent residence for the Environmental Learning Farm would give the local rescue organization another opportunity to home abandoned animals and give them an opportunity to engage with many scenarios that could help them improve their chances for adoption as well as be a part of some educational program. The Environmental Learning Farms business plan proposal provides goals and objectives for the future of the non-profit business and gives details on the goals that it hopes to achieve over time. It lists many ideas for different programs the non-profit could offer as funding and resources increase, as well as support from the community.

The future of the Environmental Learning Farm could be multiple Farms opening around the state or country providing places for the community to learn more about what their community has to offer and what they can offer their community. The more farms

that are in operation the more ideas and solutions could be discussed and shared throughout the larger community.

Summary

This capstone project was designed to answer the question *How can I build an Environmental Learning Farm in Minnesota to help individuals improve their health and increase environmental education goals and objectives?* The question had many parts that provided other questions that needed to be answered to find the solution to answer the capstone question. I needed to answer the question: *what is the goal of environmental education?* I learned in my research that environmental education can be defined differently by different organizations, but a commonality is the need to create connections to foster awareness of environmental concerns that foster long lasting pro-environmental behavior changes. Research shows this can occur by building compassion in those that participate in programs, finding reasons to care more about the environment and all those that live in it, than just about what's most convenient or easiest for the individual. It was the process that I had in developing my capstone question and recognizing which experiences held the most value and joy that helped me define what I needed to research in order to develop this project. The strengths of the Environmental Learning Farm could lead to an entirely new way of bringing community members together to support each other and ultimately the local environment. The ability to include animals into any sort of educational concept is still being researched, but it has been proven useful in the Read With Me program. The Environmental Learning Farm uses sense of place methods to connect participants with educational concepts as they get to know a new location. It's programs also maximize efforts in establishing animal-human bonds to build confidence

and compassion. A strength of the project includes filling a need I see within my local Minnesota community, the need for experiences with animals that can help learn emotional, physical and mental skills that can be related back to other aspects in life. When the Environmental Learning Farm has room and funds to grow its facilities would open and look for further ways to fund programs focusing on improving mental health programs with licensed professionals. The weakness of this project, if not addressed and thoroughly researched with experts in financial and legal services, could bring a halt to the Environmental Learning Farm before it is able to successfully offer its first program openly to the public. The weaknesses would impact the long term objective goals of building sustainable facilities dedicated specifically to the Environmental Learning Farm. Nonprofits need funding and my inexperience with marketing and financial planning would need to be supported by professionals to make the Environmental Learning Farm a success. The success of the Environmental Learning Farm is based on its impact on the community and the support it will receive from grants, donations and fund-raising. In the name it says farm, farms have animals to provide shelter, food, water and veterinary care, this care is expensive. I know this from my own experiences owning horses over the last twenty years. If the local community does not believe that the Environmental Learning Farm fills a need in society it can easily lose support. The ideal Environmental Learning Farm would be to support the human and non-human community. The dream would be to have more Environmental Learning Farms across the country providing opportunities for those who don't get to interact with domestic and livestock animals to learn from them and about them, to build connections and compassion to help protect the environment for themselves and all species.

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APPENDIX A

North American Association for Environmental Education (NAAEE) Key Characteristics for Engaging the Community in Environmental Education

Key Characteristic #1: Community Centered; Anchoring environmental aims within the context of community interests, issues, and capacities puts the community at the heart of environmental education.

- 1.1 Get to know and understand the community
- 1.2 Connect environmental education interests and capacities with community concerns, assets, and aspirations
- 1.3 Consider the appropriateness of community engagement
- 1.4 Focus on community assets and shared priorities
- 1.5 Reach beyond usual partners and program-delivery modes

Key Characteristic #2: Based on Sound Environmental Education Principles; Environmental education engages communities in ways that rely on established principles and proven practices of the field.

- 2.1 Build on interests, issues, and settings familiar to the community
- 2.2 Facilitate broad accessibility
- 2.3 Use appropriate instructional strategies
- 2.4 Select, adapt, or develop effective educational materials
- 2.5 Match engagement strategies and tools to the interests, issues, and capacities of your partnership and community

Key Characteristic #3: Collaborative and Inclusive; Environmental education works in collaborative and inclusive relationships, partnerships, and coalitions.

- 3.1 Build coalitions and partnerships strategically
- 3.2 Value and incorporate diversity, equity, and inclusion
- 3.3 Plan and implement collaboratively
- 3.4 Learn from and resolve conflict

Key Characteristic #4: Oriented Toward Capacity Building and Civic Action; Environmental education supports capacity building for ongoing civic engagement in community life, contributing to long-term community well-being, sustainability, and resilience.

- 4.1 Integrate environmental education with complementary communication, education, and social-change approaches
- 4.2 Support and build community capacity
- 4.3 Move toward civic action

Key Characteristic #5: A Long-Term Investment in Change; Working in communities to create change is typically a long-term initiative, requiring a commitment to relationship building and an ongoing and evolving process of engagement.

- 5.1 Assess individual and organizational readiness for community engagement
- 5.2 Invest in building capacity for engagement
- 5.3 Incorporate learning, improvement, and adaptation
- 5.4 Plan for long-term support and viability
- 5.5 Embrace change and celebrate progress. (Simmons, 2017, p. 17)

APPENDIX B

Environmental Learning Centers Throughout Minnesota

- Project Learning Tree is the first on their list. It offers professional development for educators working to increase students' learning in forestry and natural resources. It is also affiliated with the National Learning Tree Project. It provides lessons for students ranging in age from preschool to 12th grade. Some of these lessons are ideal for in the classroom and outside of the classroom. The website also makes correlations between the lessons and state standards in other content areas such as social studies and mathematics (DNR, 2022).
- Project Wet is another program that offers professional development, training and resources for educators in formal and informal settings to learn about water health and quality in both in-person learning settings and virtual learning settings for Kindergarten to 12th grade students (DNR, 2022).
- Project WILD offers courses for educators in kindergarten to 12th grade to learn how to use materials and curriculum for increasing students' interest in wildlife. Project WILD and Growing Up WILD via Association of Fish and Wildlife Agencies (AFWA) provide resources and materials in the way of workshops for educators across different programs both formal and informal (DNR, 2022).

- The Minnesota School Forest Program is one that the Department of Natural Resources can help fund for schools to use land already available to them or procure land in order to learn environmental sciences and forestry science. For students, School Forests develop and provide: self-esteem, sense of community, skills, knowledge base, life-long critical thinking, real-life situations, frequent, enjoyable outdoor experiences, and engagement in learning. For schools, the School Forest program provides: great program benefits (these benefits are access to the staff to develop and understand curriculum, educational materials, grant opportunities, field and classroom kits, stewardship plans and access to other environmental agencies materials) outdoor and environmental education assistance and resources, and land management assistance and other support services. Schools are required to apply and complete the application requirements, which requires designated land, a committee for the program and a resolution from the school board for dedication to the program (DNR, 2022).
- BOW - Becoming an Outdoors Woman is a program to help women ages 14-plus (14-17 years of age needs to be accompanied by a guardian) learn outdoor skills which can range from wilderness survival to recreational skills that are beneficial to have when outdoors. They offer workshop classes that range from 1-3 days in hunting, fishing and other outdoor skills around Minnesota (DNR, 2022).
- Fishing in the Neighborhood offers resources collected by different departments and organizations affiliated with the Department of Natural Resources on what

Minnesota does to protect the aquatic environments throughout the seven-county area in the Twin Cities. It has guides on what fish are stocked where and why, and what the angler code of ethics is and why we have specific fishing regulations (DNR, 2022).

- ICan! Programs offer classes for camping, mountain biking, fishing, paddling and archery. It is designed for families to participate together, with parents and their children learning different skills and activities that can increase their desire to be out in nature (DNR, 2022).
- Conservation Corps Minnesota and Iowa contribute to the ICan! Programs and other summer camps, activities, field crews for improving the local environments and fellowship and internship positions in environmental education and stewardship programs (Conservation Corps, 2022).
- The Master Naturalist Program is offered through the University of Minnesota Extension program. It encourages adult volunteers to explore their neighborhood, local natural areas, and Minnesota's state parks and public lands. Participants are trained to teach family, friends, neighbors, school groups, and nature center visitors about nature and environmental sciences. They also learn to conserve and monitor local natural areas, restore ecosystems as well as assist with research and collect scientific data to help the University of Minnesota and other organizations

to maintain and improve the local environments (Minnesota Master Naturalist, 2022).

- The Minnesota Association of Environmental Education is a non-profit 501.c3 association that focuses on maintaining a network of environmental education jobs, grants, resources, and community events that range from professional development to conferences and classes for a variety of ages and individual interests in environmental sciences and skills. They also empower environmental educators through statewide initiatives, resources, and scholarships (Minnesota Association of Environmental Education. [MAEE], 2021).
- Springbrook Nature Center in Fridley, Minnesota offers a large variety of classes for different ages at different locations. It will collaborate with schools and with smaller organizations as well. Classes are offered in science and natural history, outdoor skills and recreation, and cultural history. They have adult programs and youth programs, as well as individualized experiences for those wanting to explore on their own in an informal setting (Springbrook Nature Center, 2022).
- Osprey Wilds Environmental Learning Center is another non-profit 501.c3 organization located in Sandstone, Minnesota. It has year-round experiential environmental education programs, school field trips and nature immersion learning experiences (Osprey Wilds also has programs and funding in place to help school compensate for the costs of the programs), youth and family camps,

programs and events for all ages, college courses, day tours and programs, adult learning experiences, wildlife programs, comfortable lodging for 162+ people plus rustic and camping options (for those looking for informal nature experiences) and spaces for conferences and weddings. They have on-site a raptor facility for recovering birds of prey and long-term care for others that can't be released back into the wild (Osprey Wilds, 2022). They have also started a farm and are one of the first Environmental Learning Centers that have plans to introduce domestic animals back onto their land.

- Eagle Bluff Environmental Learning Center located in Lanesboro, Minnesota is another non-profit that offers a nature preschool and residential outdoor school programs for the K-12 schools. It has accommodations for overnight school camping trips and a discovery center for indoor classroom activities. It provides summer and family camps, environmental education fellowships, short-term college courses, adult learning courses, continuing education courses, team building activities for businesses, organizations and groups, as well as public outreach programs about wildlife conservation with the use of animals in the programming (Eagle Bluff Environmental Learning Center, 2022).
- Prairie Woods Environmental Learning Center located in Spicer, Minnesota They offer environmental ed. programs for pre-K thru grade 12 and adults, team building courses and challenge courses. It is located on 500 acres of glacial terrain, prairie, woods, and wetlands. Its facilities have an outdoor classroom, 34'

voyageur canoe, 26' portable climbing wall, indoor learning center, pavilion, observatory, treehouse, a barn and lodgings. Prairie woods hosts many outreach programs, weddings, business meetings and retreats. The partner with the Yes! program which stands for Youth Eco Solutions. The funding for the Yes! program comes from the Minnesota Environment and Natural Resources Trust Fund (ENRTF) and the National Science Foundation Grant with UMN Institute on the Environment. (Swensen, 2022)

- Wolf Ridge Environmental Learning Center, a non-profit located in Finland, Minnesota. They offer graduate level courses for naturalists, overnight school trips, virtual field trips, summer camps, youth wilderness trips and family wilderness trips. They also have educational resources for teachers to bring environmental education to their classrooms as well as a Teacher Institute for teachers to work in small groups over 7 months to build curriculum around outdoor learning, science and the environment (Wolf Ridge, 2022)
- McColl Pond Environmental Learning Center located in Savage, Minnesota. It is 10 acres with completely sustainable and recyclable materials used to create the facilities and maintain utilities. This learning center can be booked for a few for different special events, such as weddings, business meetings, birthday parties, graduation celebrations, basically any private event. I have not been able to find any other services or programs that this learning center offers. (McColl Pond, 2022)

- Deep Portage Learning Center located in Hackensack, Minnesota. It is a non-profit with 6,000 acres of lakes, bogs, rivers, and woodlands. The mission statement for Deep Portage is “Through the exploration of woods, water, and wildlife, Deep Portage prepares and inspires learners of all ages to sustain and celebrate our natural world.” They offer summer camps in all manner of outdoor recreation, science and conservation topics. They offer 30 different classes for teachers to partner with the learning center to bring students. The utilization of the renewable energy resources in the learning center creates opportunities for participants to learn more about sustainability. (Deep Portage Learning Center, 2020).
- Boulder Lake Environmental Learning Center located in Duluth, Minnesota. The Learning Center provides educational programs in natural resources management to showcase resources including hydroelectric power generation and social, biological, and economic benefits of a working forest. Kayaks and Canoes can be rented by the public. Summer programs are offered to students K thru 12th grade. The learning center offers professional development, courses for adult learners, and opportunities for research. (University of Minnesota, 2022)
- Prairie Wetlands Learning Center located in Fergus Falls, Minnesota. It is a non-profit 501C3 organization run by the U.S. Fish and Wildlife services. They offer professional development for teachers, workshops for wildlife professionals, summer camps for youth and special events to learn about conservation, wildlife

and natural resources. They have managed to receive funding in the form of grants, and donations from private organizations. (Friends of the prairie wetlands learning center, 2022)

- Baker Outdoor Learning Center located in Maple Plain, Minnesota. The Baker Outdoor Learning Center has a lodge and 8 cabins that can each sleep 8 people. The cabins are of rustic design with no electricity or running water. Composting latrines are used as bathrooms and wood stoves are used for heat. You must schedule visits ahead of time. It is located in a park with some trails that are open year round. (Three Rivers Park District, 2022)
- Redwing Environmental Learning Center located in Redwing, Minnesota. This non-profit organization has programs for ages 2nd grade through 12th grade. They offer a range of activities from physical skills in skiing, archery, winter survival skills to knife construction and log furniture building. The other really interesting thing about the Redwing Environmental Learning Center is that they utilize many locations around Minnesota, Wisconsin, Iowa and Michigan for the different activities and programs. (Red Wing Environmental Learning Center, 2022)
- Agassiz Environmental Learning Center located in Fertile, Minnesota. Is a non-profit organization with over 600 acres of land with unique ecosystems to the area. One of these ecosystems are sand dunes. They have over 12 miles of trails

through their site that can be used all year. The learning center has a space for community events, environmental education classes, recreation and education equipment storage, restrooms and a campground. They have educational programs on site for everything from pre-K bug collection to 12th grade Natural Resources Career courses, other courses are in different survival methods (winter and summer options), birding and stream surveys. The Agassiz allows for the public to use trails for hiking, horseback riding, snowmobiling (winter only), Snowshoeing (winter only) cross-country skiing (winter only), geocaching, hunting and kayaking. (Goeken, 2022)

- Atchingtan Learning Center located in Finlayson, Minnesota. It is a 30 acre non-profit environmental learning center that allows groups to rent the facility for different events. They host events that aren't always environmental education, the learning centers facilities are rented to the community for different events and to receive funding for projects to further their ability to provide sustainable land management education and natural experiences. There are electric hookups at a few different campsites, recently built shower stalls for the campgrounds, a pavilion for gathering, a stage, walking trails, a central fire pit, RV pads, a tree of life center and a childrens play area with playground equipment. (Stephens, 2022)
- Riverside History & Nature Learning Center located in New Ulm, Minnesota. At this learning center there is a museum covering the history of Riverside, it includes hands-on displays on the history of the Minnesota River and how it has

impacted the town of New Ulm. Younger children have the opportunity to play on a pirate ship themed playground. They also sponsor environmental education programs, field trips, and clean-up outings. The center has done showings of unique fossils and artifacts that have been found along the river. (Bauldon, 2022)

APPENDIX C

Equine Therapy Centers in Minnesota

There are two big associations that are able to certify professionals in Equine Therapy for different disabilities and mental illnesses. Below is a more detailed description of both of these associations.

- PATH Intl. (Professional Association of Therapeutic Horsemanship) is a non-profit organization which can assess facilities and programs worthy of federal recognition in a few capacities with the use of horses as therapy animals.
 - The PATH Intl. offers certification courses for professionals in the equine therapy industry following a strict code of ethics for animal and human safety.
 - The facilities and professionals that PATH Intl. support offer services like adaptive equestrian sport, adaptive riding or therapeutic riding, driving and interactive vaulting.
 - They support and certify facilities and professionals in non-therapy services such as equine-assisted learning in education, equine-assisted learning in organizations and equine-assisted learning in personal development.
 - They also support and certify facilities and professionals in counseling, occupational therapy, physical therapy, psychotherapy and speech-language pathology.

- The Equine-Assisted Services for Veterans benefits both current military personnel and veterans in many therapy services, whether it is for physical and psycho-social benefits.
- Becoming a PATH Intl. Higher Education Member would mean national recognition, national networking and advertising opportunities, and opportunities to connect with other members in the same industry and find qualified employees. Through the PATH Intl. website anyone is able to look up services being offered at different accredited facilities (PATH Intl., 2022).
- The Eagala (Equine Assisted Growth and Learning Association) is a global non-profit and provides a comprehensive certification process and member support network that trains and supports professionals to certification in the Eagala Model.
 - It requires a minimum two-person team of a Mental Health Professional and an Equine Specialist. There isn't any necessary background with equines necessary for mental health professionals, and the equine specialists don't need mental health experience before starting the certification programs. Mental Health Professionals have a list of prerequisites.
 - A big limitation on what Eagala has to offer though is that it is purely groundwork with the horses. Through the Eagala website anyone is able to look up services being offered at different accredited facilities (Blossom, 2018).

- Courage Kennedy Riders is a non-profit located at Washington County Fairgrounds. It is affiliated with Courage Kenny Rehab Institute. The Allina Health clinic recommended to children (age 5-21) who have physical and/or sensory integration disabilities to this organization. Lessons are offered from May - September and cost \$150 for six weeks, although no participant will be turned away due to financial limitations, as they do have scholarships available for students that need the financial assistance. It has a PATH Intl.-certified instructor. It is a facility that allows for riding the horses, but does have a weight limit for participants riding the horses, which is 180 lbs (Allina Health, n.d).
- Equul Access Inc. is a non-profit organization located in Hutchinson, Minnesota. It offers equine-assisted services for individuals with all abilities. Sessions are offered year around due to the indoor arena. The facility is a PATH Intl.-accredited center and has PATH Intl.-certified instructors that offer therapeutic horsemanship through lessons. They offer internships, mentoring and consulting to the community. They host character education programming for all ages and business leadership and team building services based on the needs of those requesting them. (Equul Access Inc., 2022).
- Freedom Farm is a non-profit organization located in Waverly, Minnesota. Freedom Farm has four different programs that are offered through PATH Intl. accredited center & accredited instructor. It is able to offer year-round services. Succeed with Horses is a class for Freedom Academy students where students are

out at the barn every day during the classes sessions. Prices are not listed. Hope & Healing with Horses is a program for teenagers and adults to help develop trust, improve mindfulness, reduce anxiety, and improve communication. The Mount Up~Walk On program is designed for military personnel and veterans to receive services to promote and improve physical or mental health. There is also Adaptive Riding for those with special needs. (Freedom Farm, 2022).

- True Friends is a non-profit located in Camp Courage in Maple Lake, Minnesota. They offer adaptive riding with PATH Intl. instructors, using horses as tools in Hippotherapy to engage sensory, neuromotor, and cognitive systems in those with disabilities to help increase functional outcomes. Prices are not listed on their website. They also offer summer camps in horsemanship experiences. (True Friends, 2022).
- Health Directed Riding is a non-profit located in Cambridge, Minnesota. It offers therapeutic riding to both children and adults with disabilities. They don't seem to have an age restriction or weight restriction listed, but it does look like doctor recommendation is necessary with their rider application process. It does rely on volunteers and has a PATH Intl.-certified instructor. Therapeutic riding sessions run from May to October. Look into the newsletters listed on their website for the most accurate information on dates and times of the sessions (Health Directed Riding, 2022).

- Majestic Hills Ranch is a non-profit located in Lakeville, Minnesota. They offer equine-assisted services to children and adults with special needs. They also offer programs for injured military personnel, active duty personnel and veterans in rehabilitation. Majestic Hills has other animals beside horses to help assist in the different therapy programs to increase well-being. They are open year-round and have PATH Intl.-certified instructors. Prices are not listed (Majestic Hills Ranch, 2022).
- Hold Your Horses is a private facility, but a non-profit organization located in Greenfield, MN. They offer therapy services for clients that have disabilities that are physical, neurological and sensory related. Hold Your Horses also offers workshops for professionals, it is meant as a restorative practice for workers on the frontlines that experience trauma in their job. They have partnerships with licensed psychologists to help trauma, anxiety, depression and mental illness. They do have a detailed listing of their prices for different types of services and the organization does work with insurance companies to help pay for the services. (Hold Your Horses, 2022)
- We Can Ride is a non-profit organization in Maple Plain, Minnesota that has certified PATH Intl. staff. It was established in 1982 as an equine facility to help with physical and mental disabilities. They offer therapeutic Riding lessons to help improve clients physical, emotional and social well-being through mounted and unmounted equine activities. One goal of We Can Ride is to help their clients

gain a stronger independence. They offer a service called Equine Assisted Learning. It is an experiential learning process focusing on how non-verbal communication can be interpreted and make an impact. They have occupational therapists and physical therapy sessions with Hippotherapy as a tool for growth and development. Equine connections is a program that started for first responders to become interested in opportunities with equine therapies and decompress from the stresses and traumas of their jobs. (We Can Ride, 2022)

- Acres For Life is a non-profit organization located in Forest Lake in Minnesota. Acres For Life has been in business for 20 years and offer therapy and wellness sessions for those with addiction, depression, anxiety, suicidal thoughts, PTSD, combat injuries, eating disorders, physical disabilities, autism spectrum disorder and are open to sessions for people with other disabilities. They will work with individuals and group sessions. They offer services to professionals to gain experience and knowledge in running an equine therapy business, as well as experience for mental health professionals wanting to move towards equine therapies. A unique service Acres For Life offers is a women's empowerment 3-day immersion program. Prices are not listed on the website, it is recommended to call for more information. (Moore, 2022)