THE IMPACT OF NATURE DEFICIT ON

CREATING LEARNING SPACES FOR CHILDREN

By

Kirsten Bergren

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Primary Advisor: Karen L. Moroz, Ed.D

Content Reviewer: Carol Geisler, Ph.D.

TABLE OF CONTENTS

CHAPTER ONE

Introduction

Background

My experience in education is working in both formal and non-formal settings. In October of 2021, I left my job as a special education assistant where I spent the last fourteen years working in an urban, inner-city school district in Minneapolis. Most of my career was spent on the north side of the city serving an underprivileged, BIPOC population that included both teenage mothers, their children, and elementary school children. I also have a background working in early childhood education and non-formal environmental education. I have a Master of Arts in Holistic Health Studies thus my connection to health and wellness.

I have a chronic health condition, epilepsy, that piqued my interest in learning more about the connection between chronic disease and stress. Therefore, I went into holistic health studies. I have always been an animal lover, and animals have been a big part of my personal journey with developing coping mechanisms to deal with anxiety and epilepsy. Someday, I would like to combine my environmental education and holistic health experience together to create a holistic wellness experience which helps people to create wholeness in their life by utilizing nature and animals. As a precursor to this, I want to investigate how our own adult experience can impact children's experiences. The purpose for my capstone project is to describe how an adult's experience with nature deficit impacts their ability to create optimum nature rich learning environments for children.

Throughout my educational experiences, I have noticed that there appears to be a disconnect between children and nature. I noticed a clear discrepancy from when I was a young child and the youth of today. As a child, I remember playing outside in the yard pretending that the willow leaves from the tree were a fishing pole and that I was fishing in the puddle in the backyard. I would stay out after dark playing hide and seek with the neighbors. I enjoyed taking walks with my family in the local nature preserve. Several of the fond memories that I have of my childhood involve nature, animals and being outdoors. My family did not have a lot of money, but we did things that were inexpensive or free. My parents made a point of exposing me to these things growing up, which helped me gain a respect for nature and animals.

As a result, I am very intuitive and empathetic, which is why I chose to go into education in the first place. I am thankful for these experiences because they made me the person that I am today; now I share that knowledge with other people. Being empathetic and intuitive made me more aware of how children interact with each other and the natural world. In working with young children, I have observed that preschool children love nature and going outside, but this seems to wane as they get older.

Many of the non-formal programs that I participated in at the two nature centers were for preschool aged children. I love working with this age of children because they are very inquisitive; everything is exciting and they ask a lot of questions. To some people this may seem repetitive, but for me I enjoy helping young students learn about the natural world. Children's brains are processing so much information at the preschool age, and this is the best time to give them the experiences in nature. As they are growing older, they will have learned respect for our natural world. Children learn from watching

adults. If adults are not modeling behavior that is empathetic, respectful, and aware of the natural world, how can we expect children to be exhibiting this behavior? Then we throw technology into the mix, and children become enthralled with the latest and best gadgets and would rather spend time doing that then go outside. It is no wonder we are living in a nature deficit world.

By the time children reach high school their disconnect to nature is more apparent. It is often a struggle to get them to go outside, and because we live in Minnesota and it gets cold in the winter and hot in the summer it can be a bigger challenge to get them outdoors. For neighborhoods on the northside of Minneapolis, where I spent half of my career, safety is a large issue. Violence is a serious concern. It has always been an issue, but since the events surrounding the killing of George Floyd it is a distressing reality. Even in the dead of winter, gun violence permeates the city every day. Neighborhoods are plagued by this ongoing violence and it affects the livelihood of residents from young to old. If a child does not feel safe in their own yard, they are not going to want to go out and play.

Resources are also a concern. In Minnesota, we have four seasons. Winter is a season that requires warm clothes and proper footwear, which can get expensive to purchase yearly. These added costs make it difficult when the choice is putting food on the table or paying for your child to be able to do an activity outside, the choice is obvious. It falls on the school districts to fill in the gaps and provide the experiences and/or resources for children to experience the natural world through scientific inquiry and environmental education.

In my experience working in the public education system, teachers are bound to teach to the standards and spend part of their time in the classroom dealing with redirection of behavior. One of the reasons that children act out is that they do not have opportunities to get outside in the fresh air (Louv, 2009). In the urban school district that I worked in, children get one recess a day. Once they get to middle and high school, they are lucky to get outside for physical education class.

I have personally witnessed how children thrive in the outside air. It can positively influence their behavior and create a sense of calm to help them regulate their emotions. There was a child at my elementary school. His short life was filled with trauma; he lost his biological mother, his foster mother, dealt with a life-threatening illness and had been bounced around in foster homes. This little boy loved to be outside. The year he was in first grade, our school received a grant because we were in the process of converting to a STEM (science, technology, engineering and mathematics)school. The school used some of this grant money to contract with the University of Minnesota Agriculture Department to create a community school garden. The University sent people out to work with our students every week. They learned about plants as a part of the science curriculum, and they planted a garden. The kids took on the responsibility of caring for the garden and maintaining the plants. The students grew collard greens, lettuce, green beans, and peas. The child in my class suffered much loss and chaos in his life but found comfort and solace working in the garden and producing food to eat. The products of the garden were shared amongst the families and the community at large.

The next year, when he was in second grade, his teacher had a guinea pig in the classroom as a pet. Part of the classroom job responsibilities was helping to take care of

the classroom pet. The boy had a dog at home, so he was used to taking care of the dog. When he would break out into the special education classes, he would always talk about Skittles, the guinea pig. It became something that the teacher used to help this child with behavior regulation. If he did not get his work done in class or was acting inappropriately, he did not get to help take care of the guinea pig.

It was wonderful to see how this experience impacted this student and the other students in my school community. I used this student as an example because I saw the profound influence that the experience of the natural world had on his academic performance. By using the plants and the guinea pig, we could connect with him and transfer that to his behavior and interactions with other students. This child was diligent about taking care of the plants and Skittles. I could see that he had a strong desire to care for something, and in this case was the plants and the classroom pet. Sometimes, this child would get frustrated with other children and act out towards them. By using the experience with the plants and Skittles the guinea pig, we could talk to him about how he took care of the plants and Skittles. We pointed out that he was gentle to them and helped him transfer that empathy to other situations when dealing with humans.

The experience with the plants and the classroom pet helped him to practice empathy skills, but as I mentioned before, it was also very calming for him. His behavior was different when he came back into school after being outside. He was able to sit in his chair and do his academic work and concentrate better than before he went outside. He also was not aggravating other children and he was keeping his hands to himself. Nature has this effect on adults as well because I know that it does this for me. One way to help teach children about empathy is for adults to model empathy with animals by having a

class pet if that is possible in the classroom or adopting a virtual animal through a zoo or non-profit organization. Another way to model empathy through animals, if having a class pet is not an option, is through storytelling. Animals are wonderful characters in stories that children can relate to, and they can help to teach children about empathy (Karniol, 2012).

Nature has a positive effect on adults as well. It helps to decrease stress in adults as well as children (Louv, 2005). I have personal experience with this, and I can imagine it is like this for many adults who have similar experiences or experience high amounts of stress and anxiety.

Nine years ago, I was diagnosed with epilepsy. I have found that one of the best ways to keep my stress level down so that I do not have seizures is to spend time outside. If I feel overwhelmed, I go for a walk outside. This year, I also started volunteering with two organizations that rescue horses. One organization uses their horses as agents of therapy to work with persons that have experienced trauma, Post-Traumatic Stress Disorder (PTSD) and addiction. The other organization takes in former retired racehorses. My job as a volunteer is to help care for the horses. Being around the horses is therapeutic for me and helps me to relieve stress. Being in the presence of animals calms me down and gets me out of my head and grounds me. There is also something about being out in nature amongst the fresh air, sunshine, trees and sounds of animals that brings me back and grounds me. When I am out there taking care of the horses, nature is all around me. It has been a lifesaver for me. I am vested in helping other adults see how stress is impacting them and how it can be impacting their ability to see how it is affecting their students and showing up in ways such as nature deficit. Adults do not

always realize how our stress is impacting our students. We may think that we are handling our stress just fine, but in reality, we are contributing to children's nature deficit disorder by our behavior without even realizing that we are doing it.

My goal for my capstone project is that I can create a staff development curriculum to be used by teachers who work with youth in formal and non-formal education settings that addresses the concept of helping adults to identify nature deficit in children and be cognizant of how their own behavior is influencing their role in the development of nature deficit disorder in children. The research question for this project is how does an educator's experience with nature deficit impact their ability to create optimum learning environments for children?

I will discuss how introducing nature and animals into the learning environment can help reduce stress and create wellness. In doing so, the staff development curriculum will also give teachers the tools to help children learn empathy for the natural world. As a part of the staff development curriculum, I would like to design the optimum learning space involving nature that could help mitigate stress and create wellness for adults and students. The overall goal for the staff development is mitigating nature deficit and stress, creating wellness, and promoting learning while helping to teach empathy which can transfer to the school climate and the community at large.

In the urban communities that are on high alert from stress that occurs with daily violence, higher rates of homelessness, and food insecurity, children need to have opportunities to be able to interact with the natural world in a safe way. The natural world in the form of indoor green spaces, indoor gardens or safe outdoor natural areas gives

children a productive outlet for stress to help them learn empathy to transfer to their schools and communities.

This staff development will be geared towards teachers that teach in urban formal and non-formal education environments but can be adapted for all educators working with children. I will also develop a condensed version that can be adapted for community education. Adults and children can benefit from learning about nature deficit and how mitigating it can help reduce stress and create wellness. In doing so, we can also learn to be more empathetic, which makes for a more peaceful world.

The next chapter is the literature review. In the next chapter, I discuss the literature that is relevant to nature deficit and its relationship to stress and wellness. I look at how the literature connects the relationship between empathy and if it is a learned behavior or if it is innate. I compare what the literature has to say about how adult behavior contributes to nature deficit disorder in children. I revisit the research that has already been done to create optimum learning environments that mitigate nature deficit in the classroom. I will use the research from the literature to help me formulate my own project. I will develop a staff development workshop that includes parts that are missing from the research that has already been done such as a series of nature activities and self-reflective activities to help adults assess their own behaviors and attitudes related to nature deficit disorder. It will include wellness activities in nature to help promote overall health and wellness.

CHAPTER TWO

Literature Review

The purpose of this chapter is to review the literature relevant to nature deficit disorder in children. First, I review the history of nature deficit disorder, then I discuss the factors leading the development in nature deficit, then I discuss the impact of nature deficit disorder and finally I talk about how to mitigate the effect of nature deficit disorder.

History of Nature Deficit

Nature deficit disorder was defined in 2005 by child and family advocate/author Richard Luov as the disconnect that occurs between people and nature has implications on health and wellness (Louv, 2006; Louv; 2009; Louv, 2011; Swiderski, 2006). This section describes the theories that are behind the development of nature deficit disorder. The first part of this section defines what nature deficit disorder is and why it is an issue. The second part of this section describes the factors that lead to the development of nature deficit in children. The last part of this section provides information on how to combat nature deficit disorder and repair the damage once it has been done.

The research done by Louv on nature deficit disorder led to theories developed by other researchers in the field to describe nature deficit in various ways. Nature connectedness is defined as a person's affective, cognitive and physical relationship with the environment (Grimwood et al., 2018; Sobko et al., 2018). Restall and Conrad (2015) describe how people identify themselves with the natural environment around them and their connection to the natural world. This connection to the natural world is measured in different ways.

Children as young as two begin to develop an awareness for the natural world, and recognize animals and other environmental factors (Sobko et al., 2018). Storytelling and modeling are ways in which children learn about nature connectedness (Holm, 2012; Karniol, 2012; Ritchie, 2017; Sobko et al., 2018). For instance, Sobko et al. (2018) investigated the nature connectedness of preschool children in Hong Kong to see if there was a correlation between nature connectedness and overall behavior and wellness in young children.The areas that were measured were enjoyment of nature, empathy of nature, responsibility towards nature and overall awareness of nature (Sobko et al., 2018). Parents were asked to answer questions related to their children's behavior regarding the following four categories using the Connected to Nature Index (CNI) (Sobko et al., 2018). This scale is usually used with older children and had to be modified to be used with younger children. The concepts are the same, but in this case most of the children are too young to answer on their own so the parents answered on behalf of their child based on their observations of their own child's behavior around nature connectedness. This study reports that children's index values were higher on the CNI in the four categories of enjoyment of nature, empathy of nature, responsibility of nature and overall awareness of nature if they were exposed to nature over children that were not exposed to nature (Sobko et al., 2018). The researchers considered that empathy of nature may be unreliable because children have pets at home and they are likely to be empathetic of their own pets but not animals such as monkeys and snakes, because those animals are considered pests and dangerous in Hong Kong. This was just one study that was limited to preschool children, but the literature continues to show that as children get older and their knowledge grows about environmental literacy, their connection to nature grows

(Carlone et al., 2015; Ferreira et al., 2012; Grimwood et al., 2018.) Other initiatives at the city level are being done to help children understand the importance of nature in the urban settings that they live in.

Lowell (2008) touches on an important program, Open Spaces, that is being implemented in the urban areas of the United States and Canada. This program is supported by Yale University and is under the Urban Resources Initiative (Lowell, 2008). It combines traditional classroom activities with outdoor learning activities on school grounds. The literature shows that programs like these and the studies above with nature connectedness (Carlone et al., 2015; Ferreira et al., 2012; Grimwood et al., 2018) support the idea that children learn about nature in their own backyards and in urban areas that they frequent like schools, parks and in their neighborhoods. As they learn to connect with nature, children develop a desire to protect it (Lowell, 2008). Initiatives to educate children and foster environmental literacy start at the local level, supported by national initiatives that bring environmental literacy to the forefront of the classroom to try and combat nature deficit.

In 2009, a bill was introduced to the U.S. House of Representatives and the Senate called the Leave No Child Inside movement (Louv, 2006; Louv, 2009; Louv, 2011). If passed, the bill would have provided funding to create a grant for environmental education that would have been used for professional development of educators for the purpose of teaching environmental education to their students. The primary goal was to help children become environmentally literate. Unfortunately, the bill was stalled at the federal level and still stands there today (Louv, 2011).

In the next section, I discuss how the literature supports factors leading to the development of nature deficit disorder.

Factors Leading to Nature Deficit

According to Louv (2006), nature deficit disorder is caused by a number of different factors including the lack of green space in urban areas, increase of technology use, the elimination of recess and physical education classes in public school systems and an increased fear of violence. In this section, I discuss how the literature shows evidence of these factors playing a role in the development of nature deficit disorder in both children and adults.

Lack of Green Space

The literature shows a strong correlation between the design of an urban environment and if people in that community develop natural deficit disorder (Louv, 2009). The biggest cities in America have the most densely populated areas of people living in them which means that the city government needs to accommodate housing needs for people. Green space is defined as parks, areas of nature, grass, or anywhere that people can go for relaxation and recreation (Mazi et al, 2021). Developers often come in and take over green space because it is prime real estate land without thinking about the consequences of how it will affect the communities at large. Mazi et al. (2021) show there is a solution to this problem and that is to create a balance between development and green space. Mazi et al. (2021) say that proper planning and including green space in the development can create neighborhoods that include green space in their layout.

Green spaces can pop up anywhere like in the middle of the Bronx where a bird sanctuary was formed in a neglected lot (Gonzalez, 2014, p. A15). If people are passionate about nature and telling other people about nature, like in the case of a man named Mr. Lancaster, anything is possible (Gonzalez, 2014). Mr. Lancaster and a colleague researched the history of the Bronx area and were familiar with the migration patterns of birds in that area based on historical data. Based on his experience with his wife's garden, he realized how the garden made the area look better and he wanted to do that for the community. He and his wife planted green plants to attract birds and turned the sanctuary into an education center for all (Gonzalez, 2014).

In the next section, I discuss how the literature relates the influence of technology on nature deficit disorder.

Use of Technology

The literature also points to an increasing use of technology with an increase in nature deficit among children and adults (Louv, 2009; Louv, 2011; Swiderski, 2006). The age group of people thirty-five and younger is referred to as the "net" generation because their source of learning has largely relied on the use of technology in education such as computers, televisions, smartphones, laptops and video-conferencing screens (Walter, 2013). Technology has become the catalyst that drives everything, and without it, humans become unable to function. Unfortunately, it has also taken the place of people getting out into nature because they become more sedentary in front of their devices instead of going outside (Louv, 2009; Louv 2011; Walter, 2013). It is even more imperative that people get back into nature now more than ever because they are spending so much time in the digital age (Larson, et al 2018). Lowell (2008) refers to this as videophilia, or the

tendency to gravitate towards sedentary activities which involve electronic media. She agrees with Louv that biophilia is even more important at this time. Biophilia is defined as the urge to affiliate with other forms of life (Lowell, 2008)

In contrast, researchers also agree that it is possible to use technology to help connect back to nature. Louv (2011) defines the Nature Principle as in an age of rapid environmental, economic, and social transformation, the future will belong to the nature-smart-those individuals, families, businesses, and political leaders who develop a deeper understanding of nature, and who balance the virtual with the real (Louv, 2011). Louv is saying that we have the resources of technology so why not use them to our advantage to help us teach about nature. One of the current ways that technology is playing a part in helping to get people out into nature is through Geocaching in Minnesota State Parks (https://www.explore.minnnesota.com) or in the game Pokemon where people go searching for Pokemon characters outside (www.geocaching.com).

The technology of today includes laptops, smartphones and social media. The literature suggests that all of these tools of technology can be used to our advantage to get the word out about nature in the community (Louv, 2011). The best way to get information out fast to a big group of people is to send it out on social media. Creating a community nature group or circle which gets together by sending out messages on social media platforms (Louv, 2011). These groups help people get back in touch with nature and each other (Louv, 2011).

In his book, *The Nature Principle*, Louv (2011) suggests ways that this can be done such as using outdoor gyms and natural terrain instead of indoor facilities. This will give people the same benefits of exercise as indoors yet provide the vitamin C, D, and

other benefits that nature gives for health and wellbeing (Louv, 2011; Walter, 2013). Other researchers agree. Eisenhauer, from the Lowell School in Washington, D.C. was inspired by Richard Louv's research on nature deficit disorder and using technology to one's advantage to teach about nature to create a program called the 2012 TreeTALK educational program (Talking to Trees, 2012). This program utilizes cell phone technology to help third graders learn about nature. They take the cell phones to different trees and dial a number and a pre-recorded message answers and the tree tells them a fact about the tree or something else about natural history in that area (Talking to Trees, 2012). Researchers found that engaging children in the use of technology and nature got them excited about getting outside because they were using a familiar tool (Louv, 2011; Talking to Trees, 2012). Now, I discuss how the loss of recess and physical education classes in public schools has led to the increase in nature deficit.

Decrease in Physical Activity

Physical education classes and recess used to be a standard part of the school day but as years have gone on, it has slowly been on the decline (Louv, 2011). This is due to over structuring of the school day, the standards in education, more standardized testing in math and reading and teachers and administrators becoming out of touch with the need to get back to nature (Louv, 2009). Budget cuts have caused less money to be channeled into physical education classes and physical activity during the school day was down from 25 percent to 42 percent from 2001 to 2008 (Lowell, 2008).

From a young age, children are growing up in a containerized society (Depenbrock, 2017). Parents put children in bouncy seats, car seats and high chairs when they are infants, and then they move to bigger chairs where they sit in front of electronic

devices (Depenbrock, 2017). As a result, children are spending more time inside the classroom and less time outside. Researchers believe that this is leading to an increase in attention-deficit disorders, hyperactivity, more anxiety and depression and behavior problems overall (Louv, 2009; Louv, 2012; Swiderski, 2006; Walter, 2013).

Safety is also an issue in getting people outside. When people feel a lack of safety, they do not want to go outside. Parents have become helicopter parents and fear for their children's safety and stranger danger has become reality (Louv, 2009). It used to be that children could play freely outside without having to worry about stranger danger but in today's current climate that is not the case (Louv, 2009; Louv, 2019). Violence is also an issue that is keeping people from stepping outside their front door embracing nature because they do not feel safe. In some urban areas where there are higher incidences of gun violence and crime, there is also more nature deficit (Louv, 2009). However, these areas are also usually the most densely populated, have less green space and often there are higher rates of poverty and resources to begin with (Louv, 2006). In the next section, I discuss the impact of nature deficit disorder has on children's cognitive, social, physical and emotional wellbeing.

Impact of Nature Deficit

Nature deficit disorder has cognitive, social, physical, and emotional consequences on children's wellbeing (Louv, 2006). In his book, *Last Child in the Woods*, Louv (2006) states that:

> Yet, at the very moment that the bond is breaking between the young and the natural world, a growing body of research links our mental, physical and spiritual health directly to our association with nature - in positive ways. Several of these

> studies suggest that thoughtful exposure of youngsters to nature can even be a powerful form of therapy for attention-deficit disorders and other maladies. As one scientist puts it, we can now assume that just as children need good nutrition and adequate sleep, they may very well need contact with nature (p. 3).

This section discusses the impact on all these domains. The first part of the section discusses how nature deficit disorder impacts a child's cognitive ability. The second part of the section discusses how nature deficit disorder impacts a child's social domain. The third part of the section discusses how nature deficit disorder impacts a child's physical domain. The fourth part of the section discusses the emotional consequences of nature deficit disorder on a child.

Cognitive Domain

Nature deficit disorder affects children's cognitive abilities. Research shows a connection between nature and a child's ability to concentrate in the classroom and academic achievement (Louv, 2009). In his book, *Last Child In The Woods*, Louv (2006) talks about how outdoor schools in California and other states were studied to see how children that attended those schools fared compared to other students that were learning in traditional school settings. Research shows that they did better in social studies, science, language arts and math. The literature shows a correlation between sitting for long periods of time, increased attention deficit disorder and nature deficit disorder (Louv, 2009; Louv, 2011; Sobko et al., 2006; Swiderski, 2006). The research suggests that creativity is affected in preschool children.

Preschool children are very curious about everything and naturally are drawn to inquiry just because they are at the stage cognitively where they ask a lot of questions..

They are also very creative. Sobko et al. (2018) found that preschool children's creativity was negatively impacted in the cognitive domain by a shift in staying inside. In this study, they assessed the level of connectedness that children have to nature by asking their parents about their behavior towards nature and animals (empathy), their sense of oneness with nature, their enjoyment with nature and their sense of responsibility with nature. Researchers found that parents related their child's connectedness with nature to their overall health and wellness. Children whose parents scored lower on the nature connectedness assessment were also reported by their parents to be less happy and settled than the other children who scored higher on the assessment (Sobko et al., 2018).

Children develop their bond with nature during the second year of life, so the critical window to get children outside and immersed in nature is in the preschool years (Sobko et al., 2018). Parents reported in the survey that children who went outside showed greater concern for nature, and they were more likely to express themselves through artistic expression of what they saw outside by drawing a picture of something that they interacted with in nature, thus increasing creativity and cognitive development in a child's brain (Sobko et al., 2018). Nature deficit disorder impacts the social domain of children's development as well.

Social Domain

Children are social with other children even at a young age but nature deficit disorder can affect their social development. Louv (2009) tells a story about a young boy who was disruptive of his classmates because he had trouble paying attention in class. He had trouble forming relationships with people inside the classroom because he kept acting out. The school became frustrated with him, and the boy was expelled from

school. His parents knew that the boy loved to be outside, so they took him into nature any opportunity that they had. His parents noticed that their son's demeanor changed when he was outside, he was much calmer and he was able to focus. As the boy grew, he became interested in nature and taking pictures. As an adult, his photography was featured in many magazines and artistic literature. We now know this boy that grew into a famous photographer by the name of Ansel Adams (Louv, 2009).

Ansel Adams is an example of a person who had trouble relating to people through traditional academics, but he could relate to people through nature and photography (Louv, 2009). Nature helps some people express themselves because it helps them to feel connected and grounded. They feel free to just work with the materials and not be restricted so it is empowering (Netzer et al., 2019).

Nature brings people together. The literature talks about ways in which nature connectedness helps to bring communities of people together. Community gardens and nature circles are ways in which nature brings people together (Gonzalez, 2014; Louv, 2011).

Physical Domain

Nature deficit disorder affects children's physical domains. The simple fact is that the restructuring of schools and funding has led to the decline in recess and field trips so children are not getting the physical exercise that they need outside (Luov, 2011). Children's body mass rate has increased because they are not getting the exercise that they need (Louv, 2009). Louv goes on to say they are also increasing their screen time and getting less outdoor time which also means that they are spending more time doing things independently and less time working in groups.

Emotional Domain

Nature deficit disorder can have emotional consequences on a child's health. It can cause higher rates of anxiety, depression and stress when children are not getting outside to play (Louv, 2006; Swiderski, 2006). Being inside behind a computer screen is not encouraging children to participate in cooperative learning play where they are working together and problem-solving together. By bringing them outside in nature, this can bridge the gap and have positive effects on their cognitive, social, physical and emotional development (Louv, 2009).

What Can Be Done To Mitigate Nature Deficit

Helping to mitigate nature deficit disorder is complicated but it is possible to reverse the effects. The literature suggests ways in which it is possible to do this. Louv (2009) suggests getting children outside when they are very young so they can experience nature. The concept of nature schools is becoming popular especially amongst pre-school aged children. Instead of being located in a classroom, the backdrop of these classrooms is entirely outside. In these classrooms, children learn about nature, empathy, stewardship and environmental activism at a young age (Depenbrock, 2017).

The concept of a Japanese practice known as "Shinru Yoku" or forest bathing is a beneficial practice for youth and people of all ages that involves walking in the forest below the canopy of the trees (Mathias et al., 2020).The literature suggests that it decreases stress cortisol levels in the blood, decreases blood pressure, increases immune function and helps with stress and anxiety. It can be combined with meditation activities and is highly accessible if there are nature areas nearby. This is usually the case even in

urban areas (Mathias, et al., 2020). Using literature as a tool is another way to help teach about empathy.

Literature can be used to help teach children about empathy and environmental stewardship. Empathy is a type of caring (Holm, 2012). The ability to have empathy creates socially, intelligent individuals (Holm, 2012; Karniol, 2012). It is a characteristic that we see a lot in children's storybooks because it helps children relate to something that they can see (Holm, 2012; Karniol, 2012)

Lowell (2008) mentions the book by Dr. Suess called *The Lorax*. Dr. Suess has been under a lot of scrutiny lately due to the fact that his literature is controversial because it is not culturally relevant. Despite this controversy, I believe the Lorax is a teachable moment for children because its basic premise is the conflict between natural resources and man-made machines which threaten the destruction of nature (Suess, 1971). The main character, the Lorax, speaks for the trees. The Once-celer wants to cut the trees down and threatens environmental destruction for his own gain (Suess, 1971).

Other researchers agree with this definition. Empathy is the affective process which allows people to share an emotional response with other individuals along with the ability to discriminate their perspective and role (Karniol, 2012: Holm, 2012). When an adult reads a story to a child about an animal character, this is what allows the child to understand what the animal is experiencing in the story and feel empathy without imagining that they are actually the dog in the story (Karniol, 2012).

Richie (2017) and Seaman (2012) discuss how fiction and non-fiction texts can be used to foster empathy with older children in regards to environmental education. Richie (2017) says that bringing in texts full of multicultural characters experiencing real world

problems such as bullying and environmental issues can generate productive conversations. These conversations put kids in other people's shoes and drive curriculum to create activities which foster activism, positive working relationships with other students and diverse voices are heard (Richie, 2017). In doing so, children connect back to each other, their communities and nature, and then give back by becoming the voices of activism.

One way to bridge the gap between nature deficit disorder and its impact on children is to realize how adult behavior may be contributing to the development of nature deficit in children. In order to help children from developing nature deficit disorder, it is important to figure out how adults are affected by nature deficit disorder themselves. This section will identify types of curriculum that have been used to create optimum learning spaces to combat nature deficit disorder. The first part of the section will talk about the goals of a successful curriculum to combat nature deficit disorder. The second part of the section will identify what resources are needed to get the curriculum up and running. The third part of this section will talk about the connection between using environmental education as a tool for teaching empathy by integrating live and virtual animals, plants, and books. In creating the curriculum, the goal is to create wellness and mitigate stress and so in this section there will be an investigation of the types of learning spaces that can improve overall wellness.

Influence of Adult Behavior

Adults may be suffering from nature deficit disorder themselves and this may be influencing the behaviors that they model to children, thus contributing to the development of the behavior in children (Louv, 2006). We live in a busy world that is

constantly on the move. It is quite a regular occurrence to see adults on their cellphones and laptops in public places. When families are sitting having a meal in a restaurant and the adults want to talk, they put the cell phone in front of the children and let them play games so that they are entertained. Louv (2011) states that this sends a message to children that to stay busy, they should just put their face in front of a screen. Instead of taking a walk when they are stressed, people get on the internet or check their phones, so technology is becoming a distraction from stress (Louv, 2011). Parents are spending less time outside so as a result so are kids (Louv, 2006).The literature shows a connection between urban areas, racial disparity and the amount of screen time children get in relation to their outdoor time (Larson et al, 2018). Children in rural areas as well as more affluent urban areas were more likely to have safe green space thus increasing their chances of exposure to the outdoors (Larson et al, 2018). If adults are cognizant of their own behaviors regarding nature and being outside, this can help children to be aware of the importance of being outside (Louv, 2006; Swiderski, 2006; Walter, 2013).

In the next section, I will discuss what the literature identifies as the types of environments and curriculum that can be used to develop optimum learning spaces which will combat nature deficit disorder.

Outdoor Classrooms

Children spend a minimum amount of time outdoors at school due to the increase in instructional time and academic performance that the state standards demand (Largo-Wight et al., 2018). They go on to say that outdoor classrooms may be the optimal learning environment to meet instructional and academic needs while providing outdoor exposure without disruption of learning. Outdoor classrooms can foster and

increase math/science literacy skills, peer engagement, problem solving skills and child-centered pedagogies. Outdoor classrooms can be used all year around if children have the opportunity and the resources such as proper clothing to withstand the elements. The time of year may determine the amount of time that is spent outside in the outdoor classroom due to the weather conditions and temperature. These types of outdoor learning environments can aid student learning: school garden, animals, plants, etc….

The School Garden

Schoolyard gardens can be planted in the outdoor classroom to facilitate learning, Hammersten et al. (2019) talk about the concept of the "forest garden" which is a multiuse, polyculture garden that produces fruit, berries and robust edible perennials (p. 228). The advantage of these types of gardens is that they have a lower workload, and provide plants in all seasons of the year (Hammersten et al., 2019). They are suitable for areas where there are trees and also in urban areas.

In Sweden, researchers did a study to assess the student perception of forest gardens. The researchers had students go out into the forest gardens with computer tablets and take pictures of what they saw in the garden. Then students were asked to interpret their findings from the garden with verbal or written feedback to accompany their photos. Then adults were asked to perceive how they interpreted the same photos.

Research found that the perceptions were quite different between the children and the adults looking at the same photos from the forest garden (Hammersten et al., 2019). Children think about what is happening in the photo when they look at it (i.e. trees are growing and there is a bird that built a nest in that tree), whereas an adult focuses on what

they see in the photo itself.. One eight year old child named Alice said this about the forest garden,

> It feels good because I've been here before, and I can recognise it. That is why it feels so good to be in the forest garden. It feels good that the trees can grow, birds are twittering, and there is a pond and a bridge. Yes, that's it. (Hammersten et al., 2019, p. 234).

Using the forest garden as a tool for a learning environment, but also combining it with the use of technology, is a positive way of assessing student critical thinking skills on how they perceive their environment. This aids in building skills of eco-literacy and positive environmental values and actions (Hammersten et al., 2019). The author goes on to say that ecoliteracy is about understanding how humans interact with ecosystems in ways that are sustainable. She further states that this allows children to form values about their environment that help sustain it and lead to actions to preserve it.

Using Animals as a Tool to Teach Empathy

Animals have been companions to humans for centuries as work animals and as pets. In his book, *The New Work of Dogs* (2003), Katz writes about how humans use dogs to fill the emotional gaps that exist in their lives, and dogs become members of their families. The animal/human bond is so strong that three people studied it comprehensively. In her book, *Handbook on Animal Assisted Therapy-Foundations and Guidelines for Animal-Assisted Interventions* (2010), Fine talked about Lorenz, the ethologist who studied animal behavior. Levinson, considered to be the founder of animal-assisted therapy and Bustad, the founder of the Delta Society. Lorenz believed that the desire to keep animals as pets arose from the desire to bond with nature.

Levinson used his knowledge of the animal/human bond to create the therapeutic intervention that is known today as animal assisted therapy. Bustad created the Delta Society which was the first organization to train therapy dogs to work with humans (Fine, 2010). Dogs are only one of the animals that can be used successfully to create strong animal/human bonds.

Horses are an example of an animal that forms strong bonds with humans. They are prey animals that have highly developed nonverbal communication skills and have the ability to run away from predators. As a result, they are keenly sensitive to human behavior and aware of body language which makes them good animals to use in the therapeutic process (Burgon et al., 2018). Equine Assisted Therapy Interventions have shown promise and benefits in patients who have not shown potential in traditional psychological therapeutic interventions (Burgon et al., 2018). Studies in Equine Assisted Therapy have shown a decrease in PTSD, less severe response to trauma, less depression, better mindfulness strategies and better coping strategies in veterans that participated (Earles et al., 2015).

In 1974, the U.S. Bureau of Land Management started the Wild Horse Inmate Program (WHIP). It works with prison inmates to gentle wild mustangs. The inmates qualified for the program on good behavior. Many of them had served some hard time for a long time for serious crimes like rape, murder, robbery (Hayes, 2015). Morris, an inmate in the WHIP program said, “I had an epiphany, I saw something in these horses that I see in myself” (Hayes, 2015, p. 18). Morris had been living his life in fear just as those wild mustangs had also been afraid. The inmates see the connection between the mustangs' violent behavior and their will to survive, but their violence is just because

they are just trying to survive, like a prison inmate is trying to survive in prison. As a result, these inmates learn compassion for the horses and they learn to feel it for each other. This is an example of how the literature points to animals being used to teach compassion/empathy to humans. Much can be done in the classroom to help teach children about compassion for each other by using animals as characters in books and as live or virtual animals in the classroom.

One way that the curriculum can be adapted to help introduce students to nature and also teach about compassion and empathy towards other sentient beings is to include animals and plants in the curriculum. Teachers may be teaching in urban districts but that does not mean that nature cannot be brought into the classroom by introducing animals and plants into the classroom setting.

In urban areas where safety is an issue, teachers need to rely on tools such as technology, books and virtual options to expose their students to the natural world. Books are an example of a way to bring in eco-literacy, social-emotional learning and teaching compassion all at the same time. Stringer (2020) recommends bringing in a mixture of fiction and nonfiction books into the classroom to help students connect to the characters in the natural world. Then students can reflect on their own behavior and actions if they have been in the same scenario. Karniol (2012) concurs that preschool children will respond to animal characters in a story and then can transfer those feelings onto human characters or their friends. This is due to the fact that children are more empathetic to those that they see being similar to themselves. Children's empathy is important to the natural world, because they are at an age where they can put empathy into action (Holm,

2012). This is where environmental empathy comes into play, and where books that introduce environmental issues bring awareness and action (Holm, 2012).

One way to help increase literacy in children and also teach empathy would be to create animal assisted therapy interaction with children/dog reading time. Research shows that this type of interaction where a child reads to a dog has shown promise in increasing literacy skills in children who have had trouble reading (Le Roux et al., 2014). This activity could be done by bringing dogs into the school or taking a field trip to the local shelter and having the children read to the shelter dogs (Le Roux et al., 2014). Unfortunately, having real animals in the classroom is not always an option due to children having fear of animals and allergies so having virtual options is an alternative. Taking a field trip either virtually or in person to a place like an aquarium, zoo or farm could be a way to teach children about the importance of these animals in nature and their role in the environment.

Research has also shown that children that interact with animals online such as having responsibility for a virtual pet can also develop humane attitudes and compassion towards animals and the natural world (Tsai et al., 2014). In the study done by Tsai et al. (2014), children had access to a computer program where they had to choose a pet dog. They were responsible for taking care of their pet on the computer and engaging in activities such as walking, feeding, taking it to the virtual vet etc. In their study, they found that the children that spent more time with their virtual pets responded more compassionately towards questions about real animals than children who did not. In this computer simulated activity, children were responsible for caring for an animal and developed the same compassion and empathy towards that animal even though it was not

real (Tsai et al., 2014). This is also a way that technology can be used in a productive way to help children learn empathy for the natural world.

Children are more familiar with farm animals due to the songs that we sing to them and the food that we eat. The literature suggests that it is also possible to help children learn about the welfare of farm animals through the use of games about farm animal welfare (Hawkins et al., 2019). Class presentations and activities regarding animal welfare can be a useful tool in helping children to develop positive attitudes and compassion towards animals, and interactive methods such as games may lead to action and change (Hawkins et al., 2019). In the Farm Animal Welfare game, the children were asked to look at stock photos of different farm animals and answer questions about five welfare needs of farm animals. An example of a question would be, does the chicken look like it is in pain? Then the children were asked what would make the pig happy? Then they were asked to pick between a bin to drag the picture to with the computer mouse, one being a bin that had a picture of a pig in a small cage and the other being a bin where the pig was rolling in the mud? It is the children's job to think about the welfare of the pig and pick the best option for the pig. If the children picked the wrong answer, the picture would bounce back and they could try it again. After they were done dragging and dropping into the bins, the children had to provide feedback about the five welfare needs of the animals and what they learned from the activity (Hawkins et al., 2019).

Although the activity did not show a significant increase in children's understanding of animal cruelty, it did allow them to better understand how the animal thinks. This helped the children to step outside of themselves and look through the eyes

of another sentient being and thus increase their compassion for others from this standpoint (Hawkins et al., 2019). This is another way that technology was used to help bring animals into the classroom without actually bringing live animals into the classroom environment. Plants can be used as a teaching tool to help educate children about compassion.

Using Plants to Teach Compassion

Planting school gardens is a way to help teach children about the value and importance of compassion to sentient beings. A study was conducted in Wales with some primary school children to research the value of the use of visiting natural green space and using art as a way to make meaning and create connection to nature (Hallam et al., 2021). The purpose of the study was to make use of nearby green space and focus on the children making connections with nature by taking photographs of nature. Then researchers asked the students questions about why they chose the flowers, plants or animals that they took pictures of with the digital cameras. Researchers found that this activity was not just about taking pictures, it became about meaning and significance to the children because it connected them to other things in their lives (Hallam et al., 2021). It also helped them to have a purpose and a reason to want to protect those parts of nature that they were taking pictures of (Hallam et al., 2021).

In another research study done in Germany in 2020, Hunter-Doniger (2021)found similar results. The concepts of forest schools are very popular in Europe. In this study, children from different socioeconomic backgrounds were invited to participate in Camp Create at a forest school in Germany. Some of the participants had not been around nature very much and were unfamiliar. They children were asked to gather natural materials and

create art from them as well as draw pictures and write about their experiences. The researchers found that children were very open to what they see and looked at things differently than adults (Hunter-Doniger, 2021). The literature shows that art can be an efficient tool to teach children about nature in a way that they can relate to and feel comfortable to express themselves.

Goal of Curriculum

The goal of the curriculum for nature deficit disorder is to help teach adults how to teach children about nature in a way that is accessible, functional and that they can relate to. It means using resources which they already have and using tools that they have at their disposal already such as technology, the school yard, nearby parks and to create partnerships with nature organizations, zoos, nature centers, gardens in their community (Louv, 2009). Getting families involved is another way to encourage children to get involved because that is putting adults in the role of modeling positive environmental behavior (Louv, 2009). Environmental education is multidisciplinary, so it is very easy to adapt curriculum to meet literacy, math, art, physical education state standards.

In the next chapter, I will be discussing how the staff development project was created. The staff development project that can be used with teachers or any adults that work with children to answer the question how does an adult's experience with nature deficit impact their ability to create optimum learning environments for children to mitigate nature deficit. This workshop will include a series of nature activities and self-reflective activities to help adults assess their own behaviors and attitudes related to nature deficit disorder. It will include wellness activities in nature to help promote overall health and wellness.

CHAPTER THREE

Project Description

Background

Nature deficit is an issue that affects people of all ages. In chapter two, the literature shows the correlation between exposure to nature and decrease in adverse health effects and increase in overall wellness. It also shows that it is possible to use resources such as technology that have been deemed as promoters of nature deficit in different ways to combat it. The literature shows the correlation between adult behavior and the connection to children's nature deficit disorder. The literature shows that educators can use animals and plants as tools to help teach children about compassion and empathy of nature. Research shows that more needs to be done to help adults to be cognizant of how their own behavior is influencing their role in the development of nature deficit disorder in children. The research question for this project is how an educator experience with nature deficit impacts their ability to create optimum learning environments for children, These environments will mitigate nature deficit, stress, and create overall health and wellness

Framework/Context of Project

Adults are immersed in technology in their daily routines and in their jobs. Research shows that optimum adult learning occurs if adults can step outside the technology realm and immerse themselves into the natural world. The context in which they learn should be interactive and go beyond sitting, reading, or watching something on

a screen (Walter, 2013). The intention of this staff development training is that it will be interactive, reflective, transformative, experiential and outdoors.

In creating this staff development training, I refer to Louv's (2009) research on the Nature Deficit Theory as well as other empirical research that has been done to back up Louv's theory on nature deficit. The definition of the nature deficit theory is the growing gap that exists between nature and humans. This gap causes increased health problems and decreased wellness (Louv, 2009). The Nature Principle developed by Richard Louv is another theory that is relevant to the development of my capstone project. This theory states that reconnecting oneself to nature is fundamental to our health, wellness, spirituality, and survival (Louv, 2011). These theories are important in describing nature deficit disorder and it helps the layperson understand what nature deficit disorder is and what can be done to mitigate it.

Project Description

In this chapter, I describe the development of my capstone project which is the creation of a staff development training for educators. This staff development workshop will teach adults to deliver nature activities and be self-reflective of their own attitudes related to nature as it comes across when teaching children.

My project will be developing a staff development workshop that can be used with formal and non-formal educators to assess the impact that nature deficit has had on their own life experience. Then teachers will practice activities to implement with students to help mitigate nature deficit and create health and wellness. I will create an eight hour staff development training.. This staff development will be composed of small group activities such as discussions, small group inquiry activities, individual inquiry

activities that can be implemented with students, opportunities to model mentor relationships, collaborate with community partnerships, and follow up with self-care health and wellness activities such as yoga, forest bathing etc. I will also include activities that can be implemented in the classroom incorporating plants and animals into the learning environment with both in-person and virtual options using tools such as technology, books and partnering with community organizations. In the next section of this chapter, I will discuss the rationale behind the components that I have chosen to include in the development of my project.

Choice of Project Approach

I am including self-reflection activities in my project because the purpose of my project is to help adults to become aware of the role that they play in the development of nature deficit disorder even when they do not know that they may be contributing to it. Garmston (1997) states that self-reflection is an important component of learning. It is possible to be critiqued by other people, but it can take away from the learning process because it causes a person to focus more on the criticism than the actual learning. Self-reflection exercises are beneficial if done in an environment where individuals feel safe to express themselves, there is structure and tools are provided for assessment (Garmston, 1997). Participants oversee their own data and how they use it in their development. They have a map or template to guide their self-reflection and they have the authority to share data with other people if they choose.

Inquiry activities with small groups and as individuals help people to learn. It also gives educators a window to what it is like for their students when they are learning. Inquiry is about encouraging children to explore, be curious and ask questions

(Depenbrock, 2017). It is impossible to expect children to know how to learn the skill of inquiry if educators do not know it themselves, so practicing it in staff development is a positive environment to do it in, and then educators can model it for their students.

Including partnerships with educators, students and community organizations in the staff development helps to facilitate learning for both adults and children and helps to pool environmental learning resources (Ferreira, et al., 2012). Creating a sense of community helps to engage people that might otherwise be disengaged. Ferreira et al. (2012) references a community garden that brought students and adults together in planting a garden at a school in an urban setting. The authors discuss how this garden engaged children that were otherwise connected to their devices and considered outcasts. It helped children to find a place in the school community and make social connections with other children and adults (Ferreira, et al., 2012).

Facilitating mentorship partnerships between adults and young people in staff development can create a wealth of knowledge and help to pass down information through the generations that teaching through a textbook can never accomplish. This is how people in Indigenous cultures have facilitated teaching of the younger generations for centuries through storytelling and modeling to the younger generation. Richie (2017) says that relying on people from Indigenous cultures to serve as mentors and people of wisdom to help teach is essential to explain why we need nature in our lives.

Including health and wellness activities such as yoga, forest bathing, meditation activities help to break up the session and create overall wellness. As with children, it is of utmost importance to get the body moving. As educators, it is unrealistic to expect children to sit in their seats for long periods of time without movement before they get

restless. Louv (2009) states that research shows that increases in green space in urban areas correlate to a decrease in body mass in children especially in urban areas. Usually where there is green space, there are more parks and results in more outdoor play. It is the same with adults. We need to encourage adults to get up and move during training even if it means walking around for a few minutes or doing a quick stretch to get their muscles warmed up and blood pumping to all areas of their body.

Finally, including plants and animals into the classroom learning environment helps to teach about nature and develop eco-literacy and compassion for the environment (Hammersten, 2019).As adults, we serve as role models to modeling positive behavior when it comes to our attitudes in response to other sentient beings, and this can rub off on children. By showing our tolerance and advocacy for animals and plants, we are showing pro-environmental behavior and encouraging them to do the same.

Setting of Project

The setting of this staff development training would be offered in an urban, city school or non-formal education setting. Ideally, it would be open to all adults, but I would especially like to target urban populations because these are the people that are most affected by nature deficit. The training can be modified so it could be offered anywhere, but I would like to start in the urban areas because that is where it is most currently needed.

Intended Audience

I want to create a project that is useful for educators, but I also want it to be useful for any adults who work with children or interact with children. I envision that this project is one that can be modified to work in different educational settings. It is a staff

development for adults, but the purpose of the training is that these activities can be used with children.

Timeline

The context for which this project will be completed will be over the fall semester of 2022. It is my hope that I could use this to present this as a community education course. I plan to assess how I can make my project fit into the community education model of the urban school districts of Minneapolis/St. Paul and surrounding suburbs. I will do research this fall about when different school districts require people to submit proposals to teach community education classes. I am setting a deadline of November 30th to check into deadlines to submit proposals for Spring 2023 for the following school districts: Minneapolis, St. Paul, Robbinsdale, Osseo, Bloomington, Richfield, and Anoka/Hennepin. I will not necessarily submit proposals to all these districts but I want to have knowledge of when the deadlines are so I can submit a proposal if I decide that this is something that I want to do.

Assessment

In this section of the chapter, I will discuss the ways in which I will assess progress of the participants that are attending the staff development training. The data that I will be collecting from the participants will be in the form of self-assessment activities, and a survey at the end of the staff development training to assess what changes need to be made to the training. I will create a post survey to give to participants related to the content of the workshop to assess what needs to be modified for future sessions. I will create a group of supplemental activities to substitute in if something else is not working.

Positionality

I have spent half my life working with children and in nature. I have worked in several schools in the inner city of Minneapolis serving BIPOC children, I worked as a naturalist. I have had the opportunity to see both sides of the spectrum, kids who have not had a lot of exposure to nature and those that have opportunities to thrive in it. I have worked with animals because I have owned my own pet-sitting business for twenty years. I also worked at an animal hospital for fourteen years and now currently do volunteer work with horses. I have seen the power of the healing of animals in myself and in others.

Conclusion

In this chapter, I have described my project, which is a staff development course for adults with a target audience of educators, non-formal educators, or anyone who works with children. The staff development training addresses my research question: How does adult experience with nature deficit impact their ability to create optimum learning environments for children that will mitigate nature deficit? My hope is that this project will help adults realize how their own experience with nature deficit can have an impact on how they facilitate learning for the children.

In Chapter Four, I will discuss the implications that my project has for the future of helping adults to be cognizant of their role in the development of nature deficit in children as they create learning environments for children. I will explain the implications of the importance of the learning environment and how this is crucial in helping to eradicate nature deficit in children. I will also discuss the literature that was most helpful to me in helping me to write my staff development curriculum. I will talk about the

limitations of my project and how this could influence future research on nature deficit disorder in children.

CHAPTER FOUR

Conclusion

Introduction

I have spent my career since college working in different educational settings from the non-formal setting of the nature center to the formal setting of a school classroom. Over the years, I have seen the power of nature and its effect on the health and wellbeing of people of all ages. Some of my favorite memories are of working with adults at the nature centers and seeing their excitement over things that they had never taken time out to notice in nature. This was the first time that I realized that we are missing the mark in teaching about nature at an early age.

Our lives pass before us, and we do not even notice the simple things in nature that are so important to helping us to understand the complex relationships that exist between humans and other sentient beings. As I got older, and had experiences with struggles with my own health, I realized for myself the power of nature and animals on my wellbeing. Being diagnosed with epilepsy at the age of thirty-eight, it has not just been pharmaceutical drugs that have stopped my seizures, it has also been figuring out what I can do at a holistic level. For me, that has been spending time outside in nature and with animals as much as possible because that gives me peace and reduces my stress level.

I have given a lot of thought over the years about how this is important to me and how I want to share this information with other people because I feel like it can be

effective in health and wellbeing. In doing so, I have reflected on the experiences that I have had in the school setting and in the non-formal setting and I thought it would be very interesting to blend those experiences together in order to help teach about nature deficit in regard to designing learning environments for children. Often adults do not realize how their own experiences with nature deficit can impact how they design learning spaces for children. This can impact how children learn and interact with each other. I have created an eight-hour staff development training to be used with educators. My capstone project addresses the question how does an educator's experience with nature deficit impact their ability to create optimum learning environments for children?

Capstone Outcomes

The outcomes for my capstone project are that this staff development gives educators tools for supplementing their curriculum with nature activities that are multidisciplinary. These activities allow educators to assess their own experiences with nature and reflect on how their experiences shape the way that they design and conduct activities in their classroom. The purpose of this capstone is for educators to use resources that they already have at their disposal. Relying on community partnerships, educators can use these people to help them fill in the gaps. Activities should be fun and encourage teamwork, conversation, and inquiry.

Literature Review Highlights

The literature highlighted the fact that nature deficit exists and that it is an issue for all human beings. It affects people of all ages and it can lead to numerous health problems and ongoing stress and impact overall wellness (Louv, 2009). Research suggests that small amounts of exposure to nature can decrease stress and help mitigate

disease (Louv, 2006). The literature suggests that children's learning environments can impact their ability to learn and thrive (Grimwood et al., 2018; Lowell, 2008). Using tools such as literature, virtual and live animals and plants, educators can teach students about empathy and advocacy for natural issues (Holm, 2012; Karniol, 2012).

Project Implications

My staff development project consists of a mixture of self-reflection activities, small group activities, inquiry activities, and opportunities to model mentor relationships using community partnerships and health and wellness activities. I created a self-assessment nature survey that I will have participants take at the beginning of the training. This is an inventory of the types of behaviors that people tend to engage in regarding nature of where they measure up regarding being naturally aware. I am still finding a scale to measure this, so this is a work in progress.

In another section of my staff development training, I have developed an activity that I call, "Telling My Nature Story." As the introduction to this activity, I will ask a member of the local Indigenous community to come in and share their connection to nature and the community. I have connections through people that I have met through school and the community, so I will rely on those resources. Storytelling is a large piece of Indigenous culture, and it connects them to the land and ancestors and thus it is an important part of the puzzle. Then we will break into small groups and have discussions and individual sharing of each other's nature stories by using photographs as prompts. I ask participants to pick a photograph that they are drawn to that describes their nature story and they are encouraged to share their story with their small group. It is possible to promote the use of technology in this activity to learn about nature because it is an

available resource. If participants do not gravitate towards one of my photos, I can encourage them to share a photo that they have taken on their own smartphone to tell their nature story, and then share that with their small group.

The next activity in staff development training is called, “Nature Advocacy Through Literature.” I have compiled a collection of multicultural children’s books that promote nature and environmental issues. The purpose of this activity is to identify environmental issues that affect nature through literature and advocate for them. Participants will spend time looking through literature and discussing what they find, identify the issue and present to the rest of the group that for which they are advocating. This activity encourages inquiry, critical thinking, teamwork, and empathy.

As part of this staff development training, I have created a forest bathing section which incorporates nature with health and wellness. In this section, I give a background on forest bathing and then I have a series of activities that focus on using your senses in the middle of the woods. In this activity, we would walk to a forest or a nature area to do this part of the training. In the first activity, participants use their senses to feel the woods around them. We do not realize how much we use our sense of vision. When we close our eyes, our other senses become much keener, and we need to rely on them to help navigate. We also are doing a trust walk. This activity is a positive team-building activity because it requires participants to trust each other to guide one another through the woods. In the last activity, participants will be getting to know a tree and this tree will become the backdrop where they will get to spend 20 minutes in quiet meditation. When we return to the classroom, participants will break into small groups again and talk about what a snapshot of their optimum classroom looks like. If they could lay that

classroom out and create it, what would it look like? In the next activity, I am going to ask them to do that. I will have art materials (clay, whiteboard, markers, etc.) and I will ask them to create their optimum learning space for children that they believe incorporates all the things they think that they need to defeat nature deficit.

At the end of the staff development training, I will have them complete a post-training survey. I will send each participant home with a list of literature for children regarding nature titles for children and other important literature that I find helpful.

Project Limitations

The limitations of this project may be resources, but it is my hope that educators will be able to make use of the resources that they have at their disposal no matter where they are located. I hope that by specifically targeting urban educators as my audience, this can help show them that it is possible to teach about nature even in areas that are surrounded by buildings and lack green space.

Future Growth

Nature deficit disorder affects people of all ages. I hope that this project shows the impact it makes when adults realize the contribution that their own nature deficit can impact their ability to create learning spaces for children. I hope that the activities that I have included in my staff development training help adults to become cognizant of their own attitudes regarding nature and how this might impact their classroom so that they can adapt moving forward. These activities can be used in both formal and non-formal settings and can be changed or adapted.

Conclusion

Nature deficit disorder is a nationwide epidemic that gets in the way of an individual's ability to thrive. By recognizing the signs in childhood, and learning how to mitigate it, children can grow up learning about how nature can be a part of their life and help them thrive. By recognizing it as an adult, educators can better meet the needs of individual needs in their classroom. I am glad that I was able to do this capstone project because it gave me a chance to do something that I have felt passionate about for a long time, and work on something that I have felt has been missing.

References

Burgon, H., Gammage, D., & Hebden, J. (2018). Hoofbeats and heartbeats: Equine-assisted therapy and learning with young people with psychosocial issues – theory and practice. *Journal of Social Work Practice, 32*(1), 3-16. https://doi.org/10.1080/02650533.2017.1300878

Carlone, H. B., Huffling, L. D., Tomasek, T., Hegedus, T. A., Matthews, C. E., Allen, M. H., & Ash, M. C. (2015). 'Unthinkable' selves: Identity boundary work in a summer field ecology enrichment program for diverse youth. *International Journal of Science Education, 37*(10), 1524-1546. https://doi.org/10.1080/09500693.2015.1033776

Depenbrock, J. (2017). Nature preschools spread like weeds. *Education Week, 36*(18), 7.

Earles, J. L., Vernon, L. L., & Yetz, J. P. (2015). Equine-assisted therapy for anxiety and posttraumatic stress symptoms. *Journal of Traumatic Stress, 28*(2), 149-152. https://doi.org/10.1002/jts.21990

Explore Minnesota. https://www.exploreminnesota.com.

Ferreira, M. M., Grueber, D., & Yarema, S. (2012). A community partnership to facilitate urban elementary students' access to the outdoors. *School Community Journal, 22*(1), 49-64.

Fine, A. H. (2010). *Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice.* (3rd ed.). Elsevier Science & Technology.

Garmston, R. J. (1997). The teacher is within. *Journal of Staff Development, 18*, 62-64.

Grimwood, B. S. R., Gordon, M., & Stevens, Z. (2018). Cultivating nature connection: Instructor narratives of urban outdoor education. *Journal of Experiential Education, 41*(2), 204-219. https://doi.org/10.1177/1053825917738267

Hallam, J., Gallagher, L., & Owen, K. (2022). The secret language of flowers: Insights from an outdoor, arts-based intervention designed to connect primary school children to locally accessible nature. *Environmental Education Research, 28*(1), 128-145. https://doi.org/10.1080/13504622.2021.1994926

Hammarsten,M., Askerlund,P., Almers,E., Avery, H., & Samuelsson, T. (2019) Developing ecological literacy in a forest garden: Children's perspectives, *Journal of Adventure Education and Outdoor Learning*, *19*(3), 227-241. https://doi.org/10.1080/14729679.2018.1517371

Hawkins, R. D., Ferreira, Gilly A. R. Mendes, & Williams, J. M. (2019). The development and evaluation of 'farm animal welfare': An educational computer game for children. *Animals (Basel), 9*(3), 91. https://doi.org/10.3390/ani9030091

Hayes, T. (2015). *Riding home : The power of horses to heal*. St. Martin's Press.

Holm, D. (2012). Exploring environmental empathy in action with children's books. *Reading Improvement, 49*(4), 134-139.

Hunter-Doniger. (2021). Seeing the forest through the trees: At the intersection of forest kindergartens and art-based environmental education. *Journal of Adventure Education and Outdoor Learning*, *21*(3), 217–229. https://doi.org/10.1080/14729679.2020.1771388

Gonzalez, D. (2014, Aug 18). In the Bronx, a Sanctuary For Birds, and the Neighbors. *New York Times*.

Hammarsten,M., Askerlund,P., Almers,E., Avery, H., & Samuelsson, T. (2019) Developing ecological literacy in a forest garden: Children's perspectives, *Journal of Adventure Education and Outdoor Learning*, *19*(3), 227-241. https://doi.org/10.1080/14729679.2018.1517371

Karniol, R. (2012). Storybook-induced arousal and preschoolers' empathic understanding of negative affect in self, others, and animals in stories. *Journal of Research in Childhood Education, 26*(3), 346-358. https://doi.org/10.1080/02568543.2012.684423

Katz. (2003). *The new work of dogs: Tending to life, love, and family* (1st ed.). Villard.

Largo-Wight, E., Guardino, C., Wludyka, P.S., Hall, K. W., Wight, J.T., & Merten, J.W. (2018). Nature contact at school: The impact of an outdoor classroom on children's well-being. *International Journal of Environmental Health Research, 28*(6), 653-666. https://doi.org/10.1080/09603123.2018.1502415

Larson, L.R., Szczytko, R., Bowers, E.P., Stephens, L.E., Stevenson, K.T., & Floyd, M.F. (2019). Outdoor Time, Screen Time, and Connection to Nature: Troubling Trends Among Rural Youth? *Environment and Behavior, 51*(6), 966-991. https://doi.org/10.1177/0013916518806686

Le Roux, M.C., Swartz, L., & Swart, E. (2014). The effect of an animal-assisted reading program on the reading rate, accuracy and comprehension of grade 3

students: A randomized control study. *Child & Youth Care Forum, 43*(6), 655-673. https://doi.org/10.1007/s10566-014-9262-1

Louv, R. (2006). *Last child in the woods: Saving our children from nature-deficit disorder* (Rev., 1st pbk. ed.). Algonquin Books of Chapel Hill.

Louv, R. (2009). Do our kids have nature-deficit disorder? *Educational Leadership, 67*(4), 24-30.

Louv, R. (2011). *The nature principle: Human restoration and the end of nature-deficit disorder* (1st ed.). Algonquin Books of Chapel Hill.

Louv, R. (2011). Reconnecting to nature in the age of technology. *Futurist, 45*(3), 41-45.

Lowell, C. (2008). Beyond "The lorax"? The greening of the American curriculum. *Phi Delta Kappan, 90*(3), 218-222.

Mathias, Daigle, P., Dancause, K. N., & Gadais, T. (2020). Forest bathing: A narrative review of the effects on health for outdoor and environmental education use in Canada. *Journal of Outdoor and Environmental Education*, *23*(3), 309–321. https://doi.org/10.1007/s42322-020-00058-3

Mazi, A. N. (2021). *The relationship between green space, cultural and economic aspects and urban planning in al-madinah al-munawarah, Saudi arabia*. RIGEO. https://doi.org/10.48047/rigeo.11.09.19

Netzer, D., & Chang, M. (2019). Creative stress-reduction for urban working adults. *Journal of Creativity in Mental Health*. 14(2), 158-162. https://doi.org/10.1080/15401383.2019.1568940

Pokemon Geocaching. www.geocaching.com

Restall, B., & Conrad, E. (2015). A literature review of connectedness to nature and its potential for environmental management. *Journal of Environmental Management*, 159, 264-278. https://doi.org/10.1016/j.jenvman.2015.05.022

Ritchie, J. (2017). Fostering eco-cultural literacies for social, cultural and ecological justice: A perspective from aotearoa (new zealand). *International Journal of Early Childhood, 49*(3), 287-302. https://doi.org/10.1007/s13158-017-0198-0

Seaman, M. (2012). Learn how to foster empathy within your curriculum to increase the emotional intelligence of middle schoolers. *The Education Digest.*, *78*(1), 24–28.

Sobko, T., Jia, Z., & Brown, G. (2018). Measuring connectedness to nature in preschool children in an urban setting and its relation to psychological functioning. *PLoS ONE, 13*(11), 1-17. https://doi.org/10.1371/journal.pone.0207057

Swiderski, M. (2006). Nature deficit disorder: Plugged in and out of touch (undetermined). *Journal of Experiential Education, 29*(1), 95-97.

Stringer, K. (2020). Teaching students compassion and empathy alongside literacy. *Education Digest, 85*(3), 45-51.

Seuss. (1971). *The Lorax*. Random House.

Talking to trees: How lowell school combats "nature deficit disorder". (2012). *Independent School, 72*(1), 9.

Tsai, Y. & Kaufman, D. (2014). Interacting with a computer-simulated pet: Factors influencing children's humane attitudes and empathy. *Journal of Educational Computing Research, 51*(2), 145-161. https://doi.org/10.2190/EC.51.2.a

Walter, P. (2013). Greening the net generation: Outdoor adult learning in the digital age. *Adult Learning, 24*(4), 151-158. https://doi.org/10.1177/1045159513499551