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## Increasing Student Creativity And Connection To Nature Through Equitable Nature-based Experiences During Middle School Distance Learning

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INCREASING STUDENT CREATIVITY AND CONNECTION TO NATURE  
THROUGH EQUITABLE NATURE-BASED EXPERIENCES DURING MIDDLE  
SCHOOL DISTANCE LEARNING

by

Benjamin Olofson

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

Hamline University

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## TABLE OF CONTENTS

CHAPTER ONE: Introduction.....	4
Background.....	5
Rationale.....	8
Challenges.....	9
Summary.....	10
CHAPTER TWO: Literature Review.....	12
Introduction.....	12
Nature-based Learning.....	12
History of NBL.....	13
Benefits of NBL.....	16
Shortcomings of NBL.....	19
Experiential Learning.....	21
Distance Learning.....	23
Equity Concerns.....	24
Conclusion.....	25

CHAPTER THREE: Project Description.....	27
Introduction.....	27
Rationale.....	28
Framework.....	30
Participants and Setting.....	30
Assessment.....	31
Timeline.....	32
Summary.....	32
CHAPTER FOUR: Conclusions.....	34
Introduction.....	34
Project Design Process.....	35
Project Limitations.....	36
Future Considerations/ Applications.....	37
Conclusion.....	38
REFERENCES:.....	40

## CHAPTER ONE

### Introduction

In today's world of technology and screen time, I see many people becoming disconnected with the natural world around them. Human connection with nature is even more important during a global pandemic filled with quarantine, isolation, and social distancing (Johnson, 2020). Throughout history, humans have been tied to nature in every aspect of life. Being in tune with the natural patterns and routines of one's environment often meant the difference between life and death (Albert, 2015). As with all organisms, human children have learned about the world through experiences and exploration. In 2020, we are seeing the first generation of students who have been exposed to personal technology devices and social media for their entire lives (Hamm et al., 2014). For the first time in our existence, humans need to make the choice to notice the world around them or to live through the digital world.

As a middle school educator, I feel very passionate about nature-based education. In my 10 years of teaching, I have seen changes in the behavior and interests of my students, and have worked hard to inspire student interest in nature and exploration. For this project, I wanted to research the history of nature-based education, and develop strategies and projects that can be used in today's unique educational environment.

My research question is: *How can middle school teachers increase student creativity and connection to nature through equitable nature-based experiences during distance learning?*

In this chapter, I share my personal background and passion for nature and outdoor education. I explain the concept of “Nature Deficit Disorder” (Louv, 2005) and how it inspired me to choose this topic. I incorporate research supporting nature-based exploratory education. Finally, I discuss how my curriculum capstone project incorporates experiences and connections to nature and builds creativity in students. I also discuss how my project relates to both traditional teaching delivery models as well as current distance learning and hybrid delivery models.

### **Background**

As a child and as an adult, I have always enjoyed being outside. As a child, this usually meant playing the woods behind my house, going fishing or playing sports. I grew up outside of Rochester, Minnesota in a widespread wooded neighborhood that was previously a horse ranch. Whenever my wife asks if I remember a 90’s show on Nickelodeon, I usually respond with “I was probably outside.” As an adult my activities look more like playing hide and seek with my kids in the backyard, raking leaves and picking up smelly presents from our two dogs.

In addition to backyard chores, I enjoy hunting, fishing and camping. Even though I enjoy catching and cooking wild fish and game, I am most appreciative of how these activities allow me to connect with nature. My all-time favorite memory is waking up at dawn in the Boundary Waters Canoe Area Wilderness and paddling through the still, mist cloaked water en route to my favorite fishing spot.

In 5th grade, I had the privilege of going on an overnight field trip to the Minnesota Zoo. After the zoo closed to the public, we were able to participate in many

hands-on activities such as rationing out food for the animals, going behind the scenes of several exhibits and getting to sleep next to sharks in the aquarium! This experience had an immediate effect on me. As soon as I got home, I went on our computer and researched every marine animal on my family's Encyclopedia Britannica CD-ROM (child of the 90's). I made a binder called "Ben's Marine Biology Book". This experience definitely sent me on a path toward science and wildlife, and is something that I wish we could provide for all students to experience.

In high school, I took two transformative classes that reignited my passion from 5th grade. These classes were called Sports Biology and Environmental Awareness. Both classes were taught by Mr. Frutiger; my hockey coach, and the most influential teacher I have ever had. During these classes we participated in activities such as canoeing, winter camping in quinzees, building our own fly fishing rods and using them in a local stream, taxidermy, wild game feed fundraisers, and school-wide environmental issue debates. Although the content of these classes was interesting to me, it was the authentic experiences that really shaped and solidified my calling in life. I knew that wildlife and the environment was something that I wanted to pursue in my career.

I started my post-secondary education in fisheries and wildlife biology at the University of North Dakota. During these years, I had many great experiences including work with state and federal wildlife agencies, creating a student chapter of Ducks Unlimited, spending a summer outside of Yosemite National Park as a wildlife intern and even dressing up as Smokey Bear! At the end of my junior year, our wildlife class has an expert panel discussion around career placement. After realizing the instability and

mobility of fisheries/ wildlife careers, I realized that the career path did not match with my life goals. A few weeks later, I met with Mr. Frutiger at a coffee shop back in Rochester. I asked him about the possibility of becoming a teacher. Mr. Frutiger told me that he always knew I would make a great teacher, and that is a very noble and rewarding occupation. The next week, I enrolled in my first education class.

The connections and experiences that I made with nature during my childhood were not only fun and memorable, but they had lasting impacts on the decisions I made in life. As an adult, I have had the privilege to work with students on great projects involving an outdoor classroom, school forest and environmental learning centers like Wolf Ridge and Laurentian Environmental Center. These types of experiences are continuing to define my life as a person, and as a teacher. Just as English teachers aspire to create “life-long readers”, I have always aspired to create “life-long explorers”.

In the last few years, I have watched my daughter Chloe (4) grow up and learn about the world around her. Even at a young age, Chloe has always enjoyed exploring and getting her hands dirty. I am so proud of her! Even after a long day at work, I can never say no to a kid who wants to do a treasure hunt in the backyard! Witnessing Chloe’s curiosity and excitement in nature has re-inspired me to help build more connections to nature with my students. This is my chance to become a “Mr. Frutiger” to another student down the road.

## **Rationale**

Before diving into research for this project, I first needed to develop a rationale. In his book “Start with why”, Simon Sinek explained the importance of having a purpose: “Very few people or companies can clearly articulate WHY they do WHAT they do. By WHY I mean your purpose, cause or belief - WHY does your company exist? WHY do you get out of bed every morning? And WHY should anyone care?” (Sinek, 2019 p. 89).

My “why” for this project is clear. I feel that humans are becoming increasingly distanced from the natural world we live in, and that in order to create a sustainable future on planet Earth, people need to explore and reconnect with it. As a teacher, this mission starts with the next generation of global citizens: my own children and students. In a world that has become exceedingly digitized, my main goal for this project is to allow students to unplug, and begin to observe and enjoy the world around them.

Richard Louv (2008) coined the term “Nature Deficit Disorder” in his book *Last Child in The Woods*. In this groundbreaking book, Louv linked a lack of natural experiences to obesity, attention disorders and depression. In his follow-up book *Vitamin N: The Essential Guide to a Nature-Rich Life* (Louv, 2016), Louv offered advice essays, and “500 ways to enrich the health and happiness of your family and community.”

This book was introduced to me by a classmate during a discussion in NSEE 8110: Foundations of Environmental Education course last fall. The book deeply inspired me to consider how I teach my students and raise my own kids. “An environment-based education movement--at all levels of education--will help students realize that school isn't

supposed to be a polite form of incarceration, but a portal to the wider world” (Louv, 2008 p. 218).

### **Challenges**

The COVID 19 pandemic has changed the way of life for just about every human on the planet. This new way of life has brought about many obstacles and challenges when it comes to nature-based education. Many schools across the country are in a “distance learning” or “Hybrid / blended learning” educational delivery model. Distance learning was defined by a Middle School Principal as students working from home accessing curriculum through a digital management system like schoology or google classroom. Distance learning students have access to teachers through e-mail, phone and digital commons such as Zoom or Webex (Lopez, 2020).

Hybrid models vary across districts, but many involve students attending school in person for 2-3 days per week, and completing lessons from home on the other days. Every family in the state of Minnesota is allowed to opt into all distance learning (MN Executive Order No. 20-41, 2020). These students complete lessons online from home every day. Some districts are able to provide online only teachers that teach distance learning students through live video classrooms. Many large districts (including the district I teach in) were not able to schedule teachers in this way. In these districts, teachers create lessons for 3 cohort groups at the same time; hybrid A, hybrid B, and distance learning students.

Both distance learning and hybrid models present a slew of issues, primarily around student equity. In my district, all students have been given computers and wireless

hotspots if needed to complete work online from home. Even with equal distribution of technology, there are many factors impeding academic success for some students. “We work very hard to provide an equitable education for all students during this pandemic, but realize that some students and families are really struggling” (Lopez, 2020).

It is more important than ever to find creative ways of getting students engaged and connecting with class materials and nature, regardless of their home environment or circumstance.

### **Summary**

Nature-based experiences and learning have always been a passion of mine. It is a crucial piece of child development as well as very important for the future generations of humans on this planet. “Passion is lifted from the earth itself by the muddy hands of the young; it travels along grass-stained sleeves to the heart. If we are going to save environmentalism and the environment, we must also save an endangered indicator species: the child in nature” (Louv, 2008, p.159).

I have had some experience in delivering nature-based curriculum in the past, but am now faced with a wide variety of new challenges and obstacles regarding the COVID 19 pandemic and modified delivery models. I decided to focus on this for my capstone project and attempt to answer the question: *How can middle school teachers incorporate nature-based exploration and reflection during distance/ hybrid learning?*

In the following chapters, I discuss the history, implementation, and reflection on my topic and project. In chapter two I discuss the history of nature-based education and prior literature supporting and opposing these programs. I also highlight research on the

benefits of experiential learning and reflection in education. In chapter three, I focus on the description and implementation of my project. This specifically addresses the use of nature journaling and exploratory lessons during distance and hybrid learning models. This is very relevant as many districts across the country are currently using these alternative delivery models. In chapter four I reflect on the process and add implications of this work.

The benefits of my project will reach beyond the COVID pandemic. Students will be able to use technology and social media as a supporting tool for nature education instead of a hindrance. Through the use of this digital curriculum, students will be able to connect to, explore, and reflect on the natural world around them.

## CHAPTER TWO

### Literature Review

#### Introduction

As described in Chapter One, my personal and professional experiences have driven a passion for nature and the opportunity to ignite curiosity and a connection to nature within my students. I am not alone in having this passion. In this chapter, I highlight a wealth of literature relating to my research question: *How can middle school teachers increase student creativity and connection to nature by incorporating equitable nature-based exploration during distance learning?*

In order to answer this question, chapter two reviews the literature behind three main themes: nature-based learning (NBL), experiential learning, and distance learning models. The first theme explores the history of nature-based learning, its benefits and its shortcomings. The second theme reviews the literature on Kolb's experiential learning cycle (Kolb, 1984) and the benefits to this method of instruction. The third theme involves taking the first three themes and implementing them in a fully online or blended learning format. This theme also looks into equity concerns specifically relating to technology and access to outdoor spaces.

#### Nature-Based Learning

In order to understand how to best implement nature-based learning (NBL) during distance learning, it is important to first define the term. The term nature-based learning is "learning through exposure to nature and nature-based activities. It encompasses the acquisition of knowledge, skills, values, attitudes, and behaviors in realms including, but

not limited to, academic achievement, personal development, and environmental stewardship” (Jordan & Chawla, 2019, p. 2). NBL involves many different approaches and applications across all ages and areas of the world. Some of these applications include: nature center programs, camp experiences, outdoor classes and schools, school gardens and nature-based curricula in a traditional classroom setting (Kuo, 2019). NBL can be applied to informal, non-formal and formal settings (La Belle, 1982). Simply put, nature-based learning is any method of getting students outside and interacting with the world around them.

To dive deeper into the subject of NBL, this section will be split into three subcategories: history, benefits and shortcomings.

### ***History of Nature-Based Learning***

Humans have been exploring the world around them for a very long time. Albert defined the early Anthropocene era as the time of the first human impact on earth through cognitive-behavioral strategies. This can be traced back to early hominins at a site in northern Tanzania called Olduvai Gorge over 1.75 million years ago (Albert, 2015). As these early humans evolved and adapted to their environment, the chief reason for exploring nature was to exploit it for their own survival. This pattern of exploration, discovery, invention and exploitation is still heavily present today (Albert, 2015). It was not until the 18th century that people such as Jean-Jacques Rousseau and Louis Agassiz began to view the natural world as more than simply a resource, and proposed we teach children that nature is to be studied, revered and protected (McCrea, 2006).

During the 19th and early 20th century, humans continued to colonize and exploit the planet with little regard to the lasting effects (McCrea, 2006). There were several groups that began changing the attitude toward environmental connection. The founding of the American Nature Study Society in 1908, and the founding of the Boy Scouts in 1910 and the Girl Scouts in 1912, were part of a social movement to preserve the virtue of children's contact with nature (Petrzela, 2017). The 1930's human-caused dust bowl gave rise to a government supported conservation education movement, alongside a progressive education movement led by John Dewey that supported experiential and holistic learning (as cited in McCrea, 2006).

The publishing of *Silent Spring* (Carlson, 1962) also changed the world's perspective on environmental issues. The book exposed information specifically relating to the use of pesticides and its negative human and environmental effects. The book was described as one of the most influential books of all time (Pimentel, 2012). This represented a shift in thinking from valuing only economic benefits to valuing human and environmental health.

The Foundation for Modern Environmental Education began with the passing of the National Environmental Policy Act of 1969 (P. L. 91-190). The purpose of the NEPA act was to:

Declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality. (P.L. 91-190).

Although many progressive steps have been made since NEPA, this stands as the foundation for modern environmental education (McCrea, 2006).

In 2015, the UN General Assembly adopted 17 Sustainable Development Goals (SDGs) as an integral part of the 2030 Agenda for Sustainable Development. These 17 goals are rooted in human rights and environmental issues, and are supported by 169 specific and concrete targets for nations to follow (Biermann et al., 2017). Many of the goals are steeped in environmental issues and human-nature relationships.

Although NBL is deeply connected to many of the principles and practices of the environmental education movement, it can often involve the implementation of instruction over the content itself. NBL can certainly be applied to science and the SDGs listed above, but can also be applied to any other content curriculum.

In 2015, the United States National Science Foundation (NSF) provided a 3-year grant to establish the Science of Nature-Based Learning Collaborative Research Network

(NBLRN). The goal of this network is to bring dozens of academic researchers from several different fields to define NBL research and study the effects that NBL has on students (Jordan & Chawla, 2019). In their work, the collaborative found benefits that apply to all age levels, content areas and educational settings. The collaborative reviewed current peer-reviewed literature, published their summaries, and proposed future research questions that are important to the future of NBL. They concluded that continued research is needed on the academic impacts of NBL, the cost analysis of NBL curriculum and programming, and the range of outcomes influenced by nature.

Humans' relationship with nature has changed significantly during the Anthropocene era, and education has changed along with it. With the rapid changes in culture and technology, continued research is needed in order for educators to adapt to a changing environment and a new generation of students. The next generation of human interaction with nature has crucial implications for generations to follow.

### ***Benefits of NBL***

Learning and interacting with nature has been proven to benefit students academically, socially, emotionally, and physically. This section focuses on research and literature highlighting the direct benefits of NBL, as well as the secondary benefits of limiting childhood screen time. These two benefits are central to the goals and rationale of NBL.

**Direct benefits:** In an integrative review of literature, (Kuo et al., 2019) reviewed hundreds of research studies relating to the topic of nature and educational outcomes. They found distinct patterns showing that exposure to nature correlates to, reduced stress, and increases in self-discipline, attention span, engagement and enjoyment. In addition to social and emotional benefits, there has been research showing academic benefits to NBL. These benefits include increased engagement and interest in normally uninterested students (Dettweiler et al., 2015; Truong et al., 2016), improved grades (Camassao & Jagannathan, 2018), and reduced disruptive episodes and dropouts among “at risk” students (Ruiz-Gallardo et al., 2013 as cited in Kuo et al., 2019).

The main goal of NBL is to use exposure and connection to nature as a pathway toward learning outcomes. By increasing exposure to nature, students are less stressed, more engaged, and in a more open social context. This path leads to increases in academic achievement, personal development and environmental stewardship (Kuo et al., 2019). This pathway will be central to answering my research question: *How can middle school teachers increase student creativity and connection to nature by incorporating equitable nature-based exploration during distance learning?*

Richard Louv is a writer and journalist that has written several books about human interaction with nature. Louv reinforces a common theme that connection with nature has many human benefits, and inversely that a lack of nature has measurable physical, emotional and psychological consequences. Louv coined the term “nature deficit disorder” in his 2005 book *Last Child in the Woods*. He uses this term not as a medical definition, but as a way to highlight research correlating an absence of nature

experiences with increased levels of Attention Deficit Hyperactivity Disorder (ADHD), depression and childhood obesity (Louv, 2005). These themes are echoed in hundreds of research studies including a review by McMahan and Estes finding that exposure to natural environments is consistently associated with positive personal affect, and decreases in negative affect in comparison conditions (McMahan & Estes, 2015).

**Reducing Screen Time:** As personal technology (computers, tablets and smartphones) have become more affordable and widely available, the amount of mobile screen exposure for children has increased drastically over the last decade. A Kaiser Family Foundation report found that many elementary school-age children have as much as eight hours of screen time per day and less than 30 minutes outside in the natural world (Rideout et al., 2010). Similar to the response to industrialization at the beginning of the 20th century, current nature-based education intends to extract our children from the clutches of computerization (Sobel, 2019).

In a Kaiser Family Foundation study (Rideout et al., 2010), students aged 8 through 18 were assigned to different cohorts based on their daily exposure to technology. Heavy users are those who consume more than 16 hours of media content in a typical day (21% of all 8- to 18-year-olds); moderate users are those who consume from 3–16 hours of content (63%); light users are those who consume less than three hours of media in a typical day (17%). The subjects were asked a series of academic and social/emotional questions. The results of this study made direct correlations between limited screen time and a wide variety of benefits. The results show that students in the light users had higher grades, failed fewer classes, got in less trouble at school, had better

connections with their friends and family, were less bored, and were overall happier than students in the moderate user or high user category (Rideout et al., 2010) These data show a clear inverse correlation between screen time and academic, social and emotional health and success. The reduction in screen time is an added secondary benefit of NBL and is a central goal of my research question.

Proponents of technology argue that the reason for increases in screen time is primarily that there simply was not the technology before. The recent advancements in technology have opened up many new learning opportunities for students and allow for increased connection and interaction with academic content (Takacs et al., 2015). Although there can be more interaction with content, increased levels of early screen exposure are correlated to decreased cognitive ability, addictive behavior, decreased growth, poor school performance, poor sleep patterns, and increased levels of obesity (Wolf et al., 2018).

### ***Shortcomings of NBL***

NBL during distance learning involves students venturing outside of their homes to explore the world around them. This comes with inherent fear and skepticism from parents. In a Manhattanville College study, 830 mothers born in the 2000's were surveyed. When asked about spending daily time outside, 74% of mothers said they personally spent time outside every day. However, only 26% of the same mothers said that their children spent time outside every day. When asked why their children did not spend as much time outside as they did, the top reasons were dependence on television/ technology, safety/ injury risks, and fear of crime (Clements, 2004).

In addition to safety concerns, several researchers claim that NBL programs can promote anthropocentric tendencies that draw away from the original ecocentric intent of the movement. Anthropocentrism can be defined as the philosophical belief that humans are the most important species on the planet. It also views nature and the other species as vehicles or resources to be used for the purpose of serving the interest of humans.

(Karatas, 2016)

Ross (2020) agreed with Karatas that anthropocentrism in education can have negative effects. She stated that by characterizing the environment as a source for enhancing human well-being, NBL perpetuates a utilitarian human-environment relationship. This ideology can lead to the misuse and degradation of the environment in the effort to improve human lives and advancement. This idea sees nature as a separate entity from human life, and that nature is only as good as the benefits that humans can get from it. An ecocentric approach focuses on the interdependence of all living and nonliving things in an ecosystem, and does not create a hierarchy of importance like anthropocentrism does. Even though there has been effort made in education to shift toward an ecocentric model, the anthropocentric ideals are still very prevalent in the field, and NBL needs to reposition humans in relation to other living organisms.

After reviewing the literature, it is clear to see that the benefits of NBL are widespread and well documented. In order to answer my research question: *How can middle school teachers increase student creativity and connection to nature through equitable nature-based experiences during distance learning?* NBL will play a critical

role. The next section discusses experiential learning and how it can be best incorporated to answer my research question.

### **Experiential Learning**

Over the last three decades, there has been a shift in pedagogy across the United States and many other countries. This shift has moved away from a passive education where teachers pass information to students through one way instruction such as lecture, and has moved toward student driven, experiential learning (Lewis and Williams, 1994).

Kolb's Experiential Learning Cycle (KELC) explained learning through four adaptive learning modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Concrete experiences are the basis for the learners' reflections. The reflections are then assimilated into abstract concepts to be utilized in future contexts. These abstract concepts are tested actively and are used to inform the student when they are exposed to new experiences. This process is a cycle, and knowledge results from the combination and progression of these learning modes continuously.

Experiential learning happens on a continuum as students draw on prior knowledge and work their way through new experiences, observations, conceptualisms and experiments. These ideals fit very well with NBL practices. The heart of KELC is the transformation of prior knowledge to new experiences, and from prior experiences to new knowledge (Tompkins, 2015). By giving students new experiences in nature, and allowing them to make their own connections, NBL teachers push students to higher levels of thinking and understanding.

Since 1984, there have been thousands of publications citing and analyzing KELC (Schenk, 2015). There have been many revisions and frameworks that have stemmed from KELC. One such framework is Co-Constructed Developmental Teaching Theory (CDTT). This framework is neurobiologically driven and focuses on an iterative process that progresses every student no matter where they start the process. CDTT is identified as a teaching theory instead of a learning theory. This allows the framework to be applied to “every brain, every context, and every learning event” (Schenck, 2015, p. 3).

The CDTT framework consists of six steps that continually reiterate and build upon each other. The six steps are framing, activity, debriefing, pause, bridge building, and assimilation. Once each cycle is complete, another cycle begins by extending from the previous cycle. The CDTT framework is meant to be an ongoing process that involves many iterations that continue to widen in scope (Schenck, 2015).

Experiential learning is a key component of my research question: *How can middle school teachers increase student creativity and connection to nature by incorporating equitable nature-based exploration during distance learning?* The materials that I create will give students the opportunity to follow the CDTT framework in order to build new learning through authentic nature-based experiences.

## **Distance Learning**

Distance Learning is one of many terms referring to an educational delivery model where students are accessing curriculum from home instead of a traditional, in-person classroom. Other terms used include: blended learning, hybrid learning, and online classroom. Distance learning is not a new concept in education. Many schools have adopted online or blended learning curricula in order to meet the changing needs of their students. Many college and university programs have been offered this way in order to fit the busy schedules of the student body (Hew et al., 2018).

Distance learning brings about several benefits and challenges for teachers, administrators, students and families.

### ***Advantages***

Distance learning models offer the ability to distribute digital materials quickly and accurately. Since the inception of distance e-learning, there have been many advances in technology, accessibility and delivery (Simpson, 2012). Educational management system software such as Schoology, Seesaw, Campus and Google Classroom have allowed teachers to share and publish materials and to students, as well as, give feedback in a timely manner (Lopez, 2020). Distance learning also allows teachers to explore and learn new educational technology in order to engage with students online. It is important to ground distance learning in many of the best practices in traditional education delivery models. Instruction that supports rather than defeats the human learning process is the key ingredient to effective digital learning (Clark & Mayer, 2016).

Digital learning can have many advantages if implemented in the right way. The goal is to create a curriculum resource that maximizes the positive impacts of distance learning, while minimizing the negative impacts such as equity concerns.

### ***Equity Concerns***

A large concern for all districts during COVID 19 distance learning is equity. The spring of 2020 created many equity issues including access to food, childcare, and technology. Districts across the country worked hard to provide every student with the same basic needs and opportunities through public education. In the fall of 2020, districts had tough decisions to make between distance, hybrid, and full in-person learning. With COVID rates fluctuating, school districts needed to create plans for 3 scenarios: full in-person, hybrid delivery, and distance learning (Lopez, 2020).

The term “digital divide” refers to the disparity between high and low-income households on access to technology and reliable internet (Judge, 2004). Judge found that increases in the digital divide can be seen as early as first grade. In order to address equity for all students, districts and state agencies have provided devices to all students as well as mobile hotspot internet. These steps have made internet access available to all students. The Center for Innovative Learning Technologies, however, defined equity as not only access to computers and internet, but also quality learning opportunities accessed through the technology (Shear, 2002). As development of technology in curricula continues to adapt, the equitable access and learning opportunities for all students need to be at the forefront.

Another significant equity issue pertaining to NBL during distance learning is access to outdoor spaces. During traditional (in school) instruction, teachers have access to a variety of outdoor spaces including sports fields, school gardens, schools forests, and off-site locations (Rafferty, 2020). In a distance learning NBL, student outdoor access is limited to their home and immediate surroundings. With student housing including single-family homes, multi-family homes, apartments and hotels, access to equitable outdoor experiences presents a challenge. There are also widespread inequities involving access to outdoor spaces based on gender (Clark, 2015), race (Finney, 2014), and socioeconomic status (Astell-Burt, 2014).

A key component to answer my research question is to make sure that all students have equal access to the curriculum and experiences. This is even more crucial during the distance learning delivery model. Addressing these equity issues at the start of my project planning allows me to accomplish this task.

## **Conclusion**

This chapter has highlighted research in the fields of nature-based learning, experiential learning, and distance learning. Common themes from this chapter include the abundance of evidence supporting the physical, emotional, and psychological benefits of student connection with nature, the role of authentic experiences in building new knowledge, and the need for equity in distance learning. These themes have informed my research question, *How can middle school teachers increase student creativity and connection to nature by incorporating equitable nature-based exploration during*

*distance learning?* This research will also inform my teaching when we return to school after distance learning.

Chapters one and two have set the background and rationale for nature-based experiential education during distance learning. Chapter three discusses the process and methodology used to create and implement the project. During this chapter, connections are made to the research themes highlighted in chapter two.

Chapter three identifies the rationale and passion for this project as well as how the project framework was developed and the curriculum designed. The chapter then discusses the setting and participants that the project is designed for, and how it can be applied to a variety of students and settings.

## CHAPTER THREE

### Project Description

#### Introduction

Chapters one and two discussed the inspiration and background research pertaining to my project. The first two chapters can be summarized with one statement: increasing student connectivity to nature has many positive outcomes. This chapter will discuss the details and methods of my project aimed at effectively answering my research question: *How can middle school teachers increase student creativity and connection to nature through equitable nature-based experiences during distance learning?* The learnings from chapter two have solidified my belief that student exposure and interaction with nature not only increases engagement and achievement, but has immediate and lasting physical, emotional, and psychological benefits. This research gave me a great base of knowledge to work from when developing my curriculum project, and informed many of my decisions along the way. In chapter three, I discuss the rationale for this project and why it is so important both in traditional education models and distance learning. I give a detailed description of the curricular framework that I used for my project, and how I decided on that framework. I will discuss the various methods I used and how they work in several different applications. Lastly, I discuss the specific participants, setting and timeline for my project. All of these details will give a holistic view of my project and will lead into the results I discuss in chapter four.

## **Rationale**

A review of hundreds of studies show direct benefits of being outside and interacting with nature. These benefits include increases in academic motivation, engagement, self-discipline and achievement (Kuo et al., 2019). Studies also correlate interaction with nature to decreases in stress, anxiety, obesity, depression and hyperactivity (Louv, 2005). Louv has spent much of his career researching and writing about the impact that the natural world has on the minds and bodies of children and adults. “Time in nature is not leisure time; it's an essential investment in our children's health (and also, by the way, in our own)” (Louv, 2005, p. 78). Research also shows that children today spend more screen time per day than ever before (Rideout et al., 2010). With the COVID 19 pandemic, students are subject to more time at home and in front of screens. The first goal of my project is to simply get students outside during distance learning.

In addition to finding ways to get students outside, I wanted to provide experiences that would allow students to be creative and bridge connections between content, nature, and to their personal lives. Kolb’s Experiential Learning Cycle (Kolb, 1984) provided a framework for students to experience, observe, conceptualize and experiment with the world around them. This allows students to develop a deep understanding of relationships that go far beyond memorizing scientific vocabulary for a quiz. Kolb’s Learning cycle has been revised since 1984 and updated to include cognitive neuroscience and is called Co-Constructed Developmental Teaching Theory (CDTT). This theory is proven to meet each student where they are at and iteratively progress them

through 5 phases: framing, activity, direct debriefing, bridge building and assimilation (Schenck, 2015). I decided to use this framework for my project because of the iterative design of this model. My goal for this project is to meet students where they are, and move them toward more interaction and connection with nature. I also want students to build on their previous experiences during the course of this curriculum to bridge connections to new experiences.

Providing nature-based outdoor education poses a challenge during the traditional setting, but involves even greater challenges during distance or hybrid learning models (Rafferty, 2019). This capstone project will serve as a resource for middle level teachers to start or continue offering nature-based learning for students at home through a variety of methods, technology and applications.

### **Project Description**

In order to describe my activity guide project thoroughly, I discuss the various methods and strategies that I used and the framework that this curricular project fits into. I also identify the specific participants and setting for my project, although this activity guide is designed to be used across grade levels, content areas, and school settings. Lastly, I discuss the general timeline for this activity guide and explain how it can be used in many different ways as a supplement to a wide variety of curricula and applications.

### ***Framework***

My project uses the Co-Constructed Developmental Teaching Theory (CDTT) framework (Schenck, 2015) and is produced as a digital activity guide for middle school science teachers to use with their students at home during distance/ hybrid learning. Each lesson is designed to connect to science concepts, increase observation and creativity, and build connection to nature. In the activity guide, the lessons are designed to build upon each other, but could also be plugged into a unit individually. Many of the lessons and activities were derived from other NBL resources and curricula such as Project Learning Tree (2008), Project Wild (1992) and *Vitamin N: The essential guide to a nature-rich life* (Louv, 2017). I adapted these lessons along with lessons of my own to fit into the CDTT framework as well as the distance learning delivery model. This activity guide uses a variety of methods including digital journaling, art, engineering, photography and storytelling. This resource was designed not as a stand-alone curriculum, but as a supplement to traditional classroom instruction.

### ***Participants and Setting***

The activities included in this project were designed as a supplement to the 7th grade Life Science curriculum and are aligned to Minnesota State Academic Standards (2007-2018). This activity guide was implemented at a middle school serving 1300 students in a suburban setting. The school serves a wide variety of student housing situations including upper-middle-class suburban neighborhoods, apartments, trailer parks and farms outside of town.

In our middle school model, the seventh-grade students were split into two teams of seven sections each. Each section consisted of twenty-eight to thirty-four students that accessed the curriculum online for one hour, every day of the week. The schedules were split into six weeks periods of instruction. Students were in the periods one through three for the first “hexmester”, and period four through six in the next six weeks. Although my activity guide was designed specifically for the 7th grade science curriculum, it can easily be adapted to other curricula and multiple grade levels. These activities are meant to be accessible to any teacher interested in incorporating nature-based education to their distance learning class.

The students accessing these activities were in a distance learning delivery model, and they accessed all materials from home online using chromebooks, tablets or home computers. These activities were designed for students with a wide range of background knowledge and experiences. The activities also included flexibility for a wide range of access to technology and outdoor spaces around students’ homes.

### ***Assessment***

In order to assess the effectiveness of this activity guide, I need to answer my research question: *How can middle school teachers increase student creativity and connection to nature through equitable nature-based experiences during distance learning?* I assessed the effectiveness of my project through a series of reflections and surveys. At the end of each activity, there is a reflection piece that allows students to share their experience, and how their connection with nature has changed. In addition to the formative assessments for each lesson, there is a pre/post student survey to assess

how effective the activities were regarding academic connections and building creativity and connection to nature. This survey is attached to the end of the activity guide for teachers to use and adapt their instruction based on the results.

### ***Timeline***

This activity guide is designed to be implemented throughout the school year based on the scope and sequence that science PLC's have developed. Each activity can be used as a direct supplement to instruction, as an exploratory lesson used before a unit, or as a summative lesson to make connections and synthesize information from a previous unit of study. The goal of this project is to increase student creativity and connection to nature, and can be used effectively in many different places in the curriculum. This is not meant to be a "one and done" unit that students easily forget about later in the year. The lessons and activities are designed to build on each other using the CDTT framework in order for students to see connections and build bridges to new knowledge and experiences.

### **Summary**

The main purpose of this project was to answer the question: *How can middle school teachers increase student creativity and connection to nature through equitable nature-based experiences during distance learning?* A wealth of research shows the importance and rationale for NBL and experiential learning. By incorporating a variety of methods throughout the year, students are able to make deep connections and experiences with nature even during a global pandemic and distance learning.

Chapter four discusses and reflects on the process of designing, developing and implementing the activity guide, as well as my learnings during the process. I will discuss changes that were made along the way, and what research led to these modifications. I discuss future research and implications of this project, how the results will be communicated, and how this project benefits my profession.

## CHAPTER FOUR

### CONCLUSIONS

#### Introduction

My passion for the outdoors and connection to nature are directly tied to experiences and connections that I made as a child and young adult. These experiences not only sparked an interest in science, but a lifelong curiosity about the natural world. As a teacher, a personal goal of mine is to instill the same passion and curiosity in my students. I strongly feel that in the digital age that we currently in, it is more important than ever to spend time outside and build a connection to the environment. In addition to my personal experiences, the last ten years of teaching has shown a pattern of increased screen time and decreased outdoor exploratory time.

Most of my knowledge on this topic before starting my masters program was personal experience and not grounded in any research or theory. During my two years of graduate classes I have learned much about environmental education, nature based learning, experiential learning and important issues such as equity and inclusion. These classes all worked together to build my passion for doing a project centered around equitable nature based exploration for all of my students.

The onset of the COVID 19 pandemic brought about many new ways to look at education. Many districts have changed educational models several times to adapt to the risk factors and safety of their communities. Many students across the country have been accessing curriculum from their homes for over a full year, and may continue to learn

from home in an uncertain future. I saw an opportunity to address both of these issues with my project.

The question I set out to answer was: *How can middle school teachers increase student creativity and connection to nature through equitable nature-based experiences during distance learning?* In this chapter I discuss the project design process, the limitations of this project, and future considerations/ applications for this project.

### **Project Design Process**

Before designing my project, I needed to research more about nature based learning (NBL), experiential learning, and distance learning. In my research I came across overwhelming support in favor of NBL as well as experiential learning. A wealth of research shows the importance and rationale for nature based learning and experiential learning (Kuo et al, 2019).

These benefits of NBL include increased engagement and interest in normally uninterested students (Dettweiler et al., 2015; Truong et al., 2016), improved grades (Camassao & Jagannathan, 2018), and reduced disruptive episodes and dropouts among “at risk” students (Ruiz-Gallardo et al., 2013 as cited in Kuo et al., 2019).

In addition to increasing engagement and creativity through NBL, I wanted to find a framework for my lessons that was equitable and embraced exploratory learning. I found a model of experiential learning called the Co-Constructed Developmental Teaching Theory (CDTT) framework (Schenck, 2015). I feel like this model matches very well with the goals of my project. The main reason for choosing this framework is how each lesson builds upon the next and allows students to build connections

throughout the unit. This iterative model allows teachers to meet students where they are at based on previous learning and personal experiences, and push them to deeper connections and understandings.

After deciding the content and framework of my project, I needed a way to apply the lessons in a distance learning environment. Many schools use google suite to deliver instruction in school and in distance learning. By using google slides for my project, teachers will be able to use it in a wide variety of content management systems like google classroom, schoology, seesaw, and campus.

I decided to create two separate presentations; one for teachers to present and give direct instruction, and the other for students to use as their journal. Again, this allows for a wide range of applications. Teachers in a hybrid model could use the instructional slides in the classroom and have students complete the journal during their at home days. Teachers in a full distance classroom can film the direct instruction for students to watch at home, and then complete the journal assignment.

### **Project Limitations**

As I created this project, I made sure to keep equity at the forefront. The two largest equity issues involving my project were access to technology and access to outdoor space. With schools moving to distance learning models, eventually every student was offered a device and wifi access. This made my approach easier in that I could expect that students had access to a digital file, and could complete the nature journal electronically and share it with peers, without ever needing to step inside school.

The issue of outdoor space was a bit harder to tackle. When I started creating lessons for my project, I realized that no student will have the same outdoor space available to them. For example, one student may have woods in their backyard, or a hundred acre farm, while others have a common area of an apartment building or mobile home community. I made sure to design lessons that could be accomplished in any of these environments. The one thing that I wanted to make consistent was that all students would get outside, regardless of what their space looked like. In each lesson, students make more observations and hopefully build a stronger connection to their outdoor environment.

### **Future Considerations/ Applications**

As I designed this project, I wanted it to be something that could be used in many different applications. I designed the curriculum to be applied in multiple delivery models and content areas. I made sure to include enough ambiguity that this project could be accessed and completed by a wide range of students, cultures and home environments. My goal for this project was to be an easy to implement starting point for other educators to build connections with their students and nature during distance learning.

One of the big future considerations for this project is how to modify the activity guide once students are back in school full time. My thought is that this project can still be implemented either in an outdoor space at school, or at students' homes over the weekend. This project will hopefully stem into other creative activities and projects that allow all students to build creativity and connection to nature regardless if they are at school or at home.

### **Critical Reflection**

As I look back on the last two years of my graduate program I am grateful for the amazing opportunities and experiences that I was fortunate enough to be a part of. It has been a very fulfilling journey to this point, and reflecting on this process has been a great experience. During this process, I feel rejuvenated as an educator. Before starting my graduate program, I felt in a rut of trying the same things and getting similar subpar results. This project has taught me so much about the researched benefits of NBL as well as ecocentric pedagogy and equity in the outdoors. I have been inspired by the countless passionate staff and students I met during this project and in my graduate program over the last two years. The amount of information and resources that were made available to me have really broadened my view of education, and have inspired me to improve my craft as an educator.

As I assess the effectiveness of my curricular project, I think that it is an effective way to connect students to nature during distance learning. Throughout the process of developing the framework and individual lessons, I made many changes in terms of content and delivery model. As this project is implemented, my goal is to continue to modify and improve the resource to meet the needs of students. This project will also need to be adapted as the educational models change across school districts.

### **Conclusion**

In this chapter I reintroduced my passion and rationale for this project. I outlined the process that I took designing the curricular framework as well as the content and delivery model. I then discussed the limitations and future applications of this project as

it is implemented across different classrooms, schools and districts. I then reflected on my personal experience during my graduate program and self assessed the impact and needs of my project. I am excited for this project to be implemented and inspire the next generation of creative, nature connected students.

## REFERENCES

- Albert, R. (2015). Anthropocene and early human behavior. *The Holocene*, 25(10), 1542–1552. <https://doi.org/10.1177/0959683615588377>
- Astell-Burt, F. (2014). Do low-income neighbourhoods have the least green space? A cross-sectional study of Australia's most populous cities. *BMC Public Health*, 14(1), 292–292. <https://doi.org/10.1186/1471-2458-14-292>
- Biermann, F., Kanie, N., & Kim, R. E. (2017). Global governance by goal-setting: The novel approach of the UN Sustainable Development Goals. *Current Opinion in Environmental Sustainability*, 26, 26-31.
- Camassao, M. J., & Jagannathan, R. (2018). Nature thru nature: Creating natural science identities in populations of disadvantaged children through community education partnership. *Journal of Environmental Education*, 49, 30–42. Doi: 10.1080/00958964.2017.1357524
- Clark, R. C., & Mayer, R. E. (2016). *E-learning and the science of instruction: proven guidelines for consumers*. John Wiley & Sons.
- Clark, S. (2015). Running into trouble: constructions of danger and risk in girls' access to outdoor space and physical activity. *Sport, Education and Society*, 20(8), 1012–1028. <https://doi.org/10.1080/13573322.2013.866548>
- Clements, R. (2004). An Investigation of the Status of Outdoor Play. *Contemporary Issues in Early Childhood*, 5(1), 68–80. <https://doi.org/10.2304/ciec.2004.5.1.10>

- Dettweiler, U., Ünlü, A., Lauterbach, G., Becker, C., & Gschrey, B. (2015). Investigating the motivational behavior of pupils during outdoor science teaching within self-determination theory. *Front. Psychol.* 6:125. doi: 10.3389/ fpsyg.2015.00125
- Erickson, D. M., & Ernst, J. A. (2011). The real benefits of nature play every day. *Exchange*, 33(4), 97-99.
- Finney, C. (2014). Black Faces, White Spaces: Reimagining the Relationship of African Americans to the Great Outdoors. In *Black Faces, White Spaces*. The University of North Carolina Press.
- Hamm, M., Shulhan, J., Williams, G., Milne, A., Scott, S., & Hartling, L. (2014). A systematic review of the use and effectiveness of social media in child health. *BMC Pediatrics*, 14(1), 138–138. <https://doi.org/10.1186/1471-2431-14-138>
- Hew, K., Qiao, C., & Tang, Y. (2018). Understanding Student Engagement in Large-Scale Open Online Courses: A Machine Learning Facilitated Analysis of Student’s Reflections in 18 Highly Rated MOOCs. *International Review of Research in Open and Distributed Learning*, 19(3), 69–. <https://doi.org/10.19173/irrodl.v19i3>.
- Judge, P. (2004). Digital Equity: New Findings from the Early Childhood Longitudinal Study. *Journal of Research on Technology in Education*, 36(4), 383–396. <https://doi.org/10.1080/15391523.2004.10782421>
- Johnson, A. (2020, May 22). The Mental And Physical Benefits Of Nature: Especially, Right Now. Retrieved from <https://thewell.northwell.edu/well-informed/>

- Jordan, C., & Chawla, L. (2019). A Coordinated Research Agenda for Nature-Based Learning. *Frontiers in Psychology, 10*, 766–766.  
<https://doi.org/10.3389/fpsyg.2019.00766>
- Karataş, A. P. D. A. (2016). “The Role of Environmental Education in Transition from Anthropocentrism to Ecocentrism.” *International Journal of Business and Social Science 7*: 1.
- Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
- Kuo, Ming & Barnes, Michael & Jordan, Catherine. (2019). Do Experiences With Nature Promote Learning? Converging Evidence of a Cause-and-Effect Relationship. *Frontiers in Psychology, 10*. 10.3389/fpsyg.2019.00305.
- La Belle T. J. (1982). Formal, non formal and informal learning: A holistic perspective on lifelong learning. *International Review of Education, 28*, 159–175.  
10.1007/BF00598444
- Lewis, L. H., & Williams, C. J. (1994). Experiential learning: Past and present. *New Directions for Adult and Continuing Education, 1994(62)*, 5–16.  
<https://doi.org/10.1002/ace.36719946203>
- Louv, R. (2005). *Last child in the woods: Why children need nature, how it was taken from them, and how to get it back*. Chapel Hill, NC: Algonquin Books
- Louv, R. (2017). *Vitamin N: the essential guide to a nature-rich life*. Atlantic Books.

National Environmental Policy Act of 1969 (P.L. 91-190): Bibliography (70-24EP).

Retrieved from US Congressional Documents Database

McCrea, E. J. (2006). The roots of environmental education: How the past supports the

future Environmental Education and Training Partnership. Retrieved from

<https://eric.ed.gov/?id=ED49108>

McLeod, P. (2013). Experiential Learning in an Undergraduate Course in Group

Communication and Decision Making. *Small Group Research*, 44(4), 360–380.

<https://doi.org/10.1177/1046496413488217>

McMahon, E. A., & Estes, D. (2015). The effect of contact with natural environments on

positive and negative affect: A meta-analysis. *The Journal of Positive Psychology*,

10(6), 507–519. <https://doi.org/10.1080/17439760.2014.994224>

Minnesota Executive Order No. 20-41, 2020

[https://mn.gov/governor/assets/EO%2020-41%20Final\\_tcm1055-430418.pdf](https://mn.gov/governor/assets/EO%2020-41%20Final_tcm1055-430418.pdf)

Minnesota State Academic Standards (2007-2018). Academic Standards (K-12).

Minnesota Department of Education. Retrieved from:

<https://education.mn.gov/MDE/dse/stds/> M

Petrzela, N. M. (2017). *Why Fear of Big Cities Led to the Creation of Summer Camps*.

<https://www.history.com/news/why-fear-of-big-cities-led-to-the-creation-of-summer-camps>.

Pimentel, D. (2012). Silent Spring, the 50th anniversary of Rachel Carson's book. *BMC*

*Ecology*, 12(1), 20–20. <https://doi.org/10.1186/1472-6785-12-20>

- Project Learning Tree (2008). Pre K-8 Environmental Education Activity Guide.  
Washington D.C.: American Forest Foundation
- Project WILD (1992). Project WILD: K-12 activity guide. Western Association of Fish and Wildlife Agencies (U.S.), & Council for Environmental Education.
- Rideout, V., Foehr U., & Roberts, D. (2010). Generation M2: Media in the lives of 8-18 year olds. Kaiser Family Foundation. Retrieved from  
<https://www.kff.org/wp-content/uploads/2013/04/8010.pdf>
- Ross, N. (2020). Anthropocentric tendencies in environmental education: A critical discourse analysis of nature-based learning. *Ethics and Education, 15*(3), 355-370, DOI: 10.1080/17449642.2020.1780550
- Ruiz-Gallardo, J., Verde, A., & Valdes, A. (2013). Garden-based learning: an experience with “at risk” secondary education students. *Journal of Environmental Education 44*,252–270. doi: 10.1080/00958964.2013.786669
- Schenck, C. (2015). Evolving Kolb: Experiential Education in the Age of Neuroscience. *The Journal of Experiential Education, 38*(1), 73–95.  
<https://doi.org/10.1177/1053825914547153>
- Shear, L. (2002). CILT2000: Technology, Equity, and K-14 Learning. *Journal of Science Education and Technology, 11*(3), 291–292.  
<https://doi.org/10.1023/A:1016080704668>
- Simpson, O., & Simpson, O. (2012). Supporting students for success in online and distance education (3rd ed.). Routledge.

- Sinek, S. (2019). *Start with why: How great leaders inspire everyone to take action*. Penguin Business.
- Sobel, D. T. (2019). *A Return to Nature-Based Education*.  
<https://www.yesmagazine.org/environment/2019/12/13/nature-based-education/>.
- Takacs Z., Swart E., & Bus, A. (2015). Benefits and Pitfalls of Multimedia and Interactive Features in Technology-Enhanced Storybooks: A Meta-Analysis. *Review of Educational Research*, 85(4), 698–739.
- Tomkins, U. (2015). “Oh, was that ‘experiential learning’?!” Spaces, synergies and surprises with Kolb’s learning cycle. *Management Learning*, 47(2), 158–178.  
<https://doi.org/10.1177/1350507615587451>
- Truong, S., Gray, T., & Ward, K. (2016). “Sowing and growing” life skills through garden-based learning to re-engage disengaged youth. *Learning Landscape*, 10, 361–385.
- Wolf, C., Wolf, S., Weiss, M., & Nino, G. (2018). Children's Environmental Health in the Digital Era: Understanding Early Screen Exposure as a Preventable Risk Factor for Obesity and Sleep Disorders. *Children (Basel, Switzerland)*, 5(2), 31.  
<https://doi.org/10.3390/children5020031>
- Zucker, A. (2008). *Transforming schools with technology: How smart use of digital tools helps achieve six key education goals*. Harvard Education Press.